Palpation Skills

Assessment and Diagnosis Through Touch

Leon Chaitow

Foreword by
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Foreword

The osteopath (and manual therapist) must be a perpetual student, for every patient is a new learning experience. The student who embarks on this journey towards the mastery of the art of palpation is committed to a life-long adventure. Leon Chaitow has vividly revealed the nature of that journey. He has not only had communication with the experienced teachers of the past and the present, and I am sure there are few that he has missed, but he has assembled their reports of personal experiences at various stations along the way, thereby providing a literary map of the long but eternally exciting road ahead.

Perceptive palpation is the key to diagnosis, and the more perceptive it becomes, the less will be the external evidence of the technique. William Garner Sutherland would sit with his hands upon the patient, his eyes closed and his attention totally focused within the patient. This would continue for 5, 10, 15 or more minutes. Suddenly a little ripple would go through the patient and the treatment was finished. His palpation perceived all that was necessary without being intrusive or invasive. In the early days of the American School of Osteopathy, Andrew Taylor Still required *1 hour per day* of palpation for his students in their first year! Is it any wonder that the early DO's were so effective in their profession. Meaningful palpation is the essence of effective treatment.

The palpation of structure through its successive degrees of altenuation from bone to muscles, to fascia, to fluid, to energy fields, progressively transports the student into the primary function of the structure=function equation which is motion.

The essential function of every tissue, organ and cell in the body is motion, inherent motion. 'In the moment when motion along a nerve is interrupted disease begins' (Still). Only when the inherent motility is physiologically established, will the special function of the organ be performed efficiently. A high velocity impact such as occurs in a car, or skiing accident, may have induced fractures, contusions, concussions or other structural injuries which may be treated, and apparently healed, but that patient will not be well and fully restored to health until the force factors implanted in every cell of the body by that impact have been dissipated. A sudden arrest of the inherent motion within the body may be induced by a traumatic impact in the emotional energy field such as from the sudden loss of a dear friend. When the inherent rhythmic motion is restored in the neuro-musculoskeletal system, the paralysing grief will undergo healing.

Sutherland described the inherent mobility of the brain and spinal cord. Erlinghauser, a little known inquirer in the early days of the cranial concept, discovered recordings of mobility of oligodendroglial cells. Vern, in recent times, has demonstrated the inherent motility of the neuron. Dynamic motion within the energy field is the hidden factor in immunity.

Vivid motion within the emotional energy field provides a clear diagnosis of the emotional nature of this patient: but the emotional energy field is imprinted in the myofascial system, as has been so eloquently described in Chapter 11, and can therefore be influenced by it.

However, I am most grateful to Leon Chaitow for raising the question of the right of a therapist to induce emotional release. Never intrude when the 'do not disturb' sign is on the door.

In homoeopathic philosophy, Hahneman described the direction of healing from within out and from above down. During the course of certain manipulative treatments, of which compression of the fourth ventricle and fascial unwinding of the total body after a high velocity impact are the most common, emotional reactions may occur. They have not been sought, or even suggested, but as the healing process begins, this emotional eruption must occur, and is of great benefit to the patient. But it is generated by the healing potency within the patient, not by any technique applied by a therapist. Let us ever work in partnership with God who knows exactly what the patient needs and when it is needed.

Every osteopath (and manual therapist) will owe a great debt of gratitude to Leon Chaitow for a most comprehensive study of palpation, and as his teaching is applied, will hear a whisper of the oft repeated words of Rollin Becker 'by our patients we are taught'. Let us never cease to listen and to learn.

1997 V. F.

Preface

The foundation on which manual therapy skills is built is the ability to assess and to be able to read the signs and signals which the body offers. To a very large degree, that ability relies on palpatory literacy, the development and refinement of which, should therefore be a primary objective for anyone whose work involves the understanding, the care and ultimately the treatment, of the living body.

Assessment is the foundation of sound therapeutic endeavour, and palpation lies at the heart of assessment. It is unthinkable to imagine treatment options being determined without assessment/palpation, whether or not such evaluation is objective or subjective, and whether or not it forms a basis for diagnosis, prognosis or review of progress (or lack of it).

Whatever additional tools are used, such as scans, X-rays and laboratory tests, there will always be a very special place for the subjective evaluation processes involved in palpation, the reliability and accuracy of which has been well established. Although palpation is commonly thought of as a means of accumulating evidence to be used when coming towards an assessment, diagnostic, or prognostic position, there exist situations in many areas of manual palpation where there is only a theoretical division between palpation/assessment and therapeutic activity.

In many forms of cranial therapy, for example, or in application of neuromuscular technique, the assessment mode slips into therapeutic activity and back again on an almost constant basis. This is the grey area of practice, in which almost instant decisions are made, based on subtle information entering the equation via palpated tissues. To the extent that the skilled practitioner/therapist can achieve the switch from palpation to treatment and back again, almost intuitively, so it can be assumed that palpatory excellence has been achieved.

Donald Schon (1984) states:

> 'it is not difficult to understand why practitioners (therapists) should be puzzled by their own performance in the indeterminate zones of practice . . . Artistry for example is not only in the deciding but in the doing . . . Often when a competent practitioner recognises in a maze of symptoms a particular pattern, and constructs the basis for a coherent design in dealing with it, or discerns an understandable pattern in a jumble of information, something is being done which cannot easily be described. Practitioners/therapists [often] make judgments of quality for which they cannot state adequate criteria. They display skills for which they cannot describe procedures or rules.'

Schon speaks of a special demonstration of knowledge which we see in many of our spontaneous actions. In practice this is demonstrated by skilled practitioners when they display the ability to recognise, judge, decide and perform skills in patterns of what can be called 'knowing-in-action'. A tightrope walker's abilities on the high wire, or a baseball pitcher's ability to 'know' and exploit a batter's weaknesses cannot be seen to depend upon planned, structured decision making. And although we sometimes think before acting, much spontaneous action in skilful practice suggests a knowledge which is not directly linked to intellectual activity. We can all relate to the fact that we can describe a something as deviating from the norm far more easily than we can describe what that difference is, or that we can describe what the norm is.

This is particularly true of palpation information. Our hands recognise normality and deviations from it, but trying to put this difference into words or to analyse the difference is far from easy and often impossible. When we explore the tactile sensations associated with the surface of a material (skin or anything else) we can describe what we feel in terms of rough, warm, smooth, cool, pliable, hard, etc but we do not speak of the actual sensation of compression or abrasion on the finger tips, although these are the sensations which produce the awareness of what it is we say we feel. From the fingertips, we perceive sensations which we interpret as certain qualities in the tissues.

Ultimately, skilled people learn to perform complex operations without being able to give verbal descriptions which are even remotely capable of describing the action faithfully. Trial and error when applied by someone with basic skills is more than a hit or miss affair, it flows from an inner logic in which unexpected consequences influence the design of what is done next.

A jazz musician displays an ability to listen to others and to their own performance simultaneously and to adjust constantly to what is happening – usually organised around an underlying musical structure or harmony. This is reflection in action. We do this every day in conversation with others, in which the form and content of the conversation may take unpredictable directions and in which we collectively improvise.

A skilful therapist/practitioner continually engages in a process of appreciating, probing, modelling, experimenting, diagnosing, assessing, psyching out, evaluating what is being done, and which can only imperfectly be described. It is hoped that the exploration of palpation skills which this text offers will lead to better ways of describing what it is that we are doing.

This book provides a series of graduated exercises and tasks which will help anyone on that quest for information, which will assist both the student and the experienced practitioner/therapist towards the goal of, at least, competence and hopefully of excellence, in their ability to touch, feel and understand the myriad messages which the tissues and functions of the body hold.

What each therapist/practitioner/student makes of the information divined via palpation and observation, and what, if any, therapeutic plan emerges from these assessments, is individual, and dependent on their particular skills, training, belief system and interpretation of the findings. In order to offer as wide a selection of choices as possible, the literature of many forms of manual medicine have been consulted so that the exercises which are contained in the many sections of the book derive from quite disparate sources – from chiropractic, osteopathy, traditional Chinese medicine, Ayurvedic medicine, physiotherapy, massage therapy, orthopaedic medicine, as well as from pioneering individuals who have charted the route towards palpatory excellence in their own fields over the past century or so. There are quotes, insights and exercises from the giants of many of the professions, relating to assessment and palpation of everything from the skin, to muscle structure, muscle function, joints, organs, emotional states and even that most fraught of topics, 'energy', and as each of these areas is explored the reader is asked to keep an open mind, to be a seeker after what is available to them as they repetitively observe, assess, practise, touch, feel and learn from the tissues they are handling.

The keeping of a journal is suggested as a means of recording the progression towards heightened palpation skills, to refer back to, to consult over the many months which any applied use of this text will take. By charting that journey, the reader will have the opportunity of comparing what was understood and 'felt' (in all senses) the first time a particular exercises was performed, with what they can deduce from the same exercise(s) months or even years later. Assessment and palpation skills add to the practitioner/therapist's ability to responsibly and effectively review, reflect and consider options, as they seek the best choices in any given case.

In truth, this is an endless journey since we never perfect palpation skills, we merely enhance and polish them, and as we do so, so our therapeutic potentials increase. The compilation of the exercises and the writing of the accompanying commentaries has been a sheer joy and the author wishes the reader an equal degree of delight when exploring the wonders of the human body's structures and functions.

1997 L. C.

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Dedication

This book and the tradition it represents is dedicated with profound and sincere thanks to the pioneers – osteopaths, chiropractors, physiotherapists, massage therapists, doctors or physical medicine, researchers into the field of human health – past and present, who inspired it and from whom I have drawn so much in its writing; in particular to: Beryl Arbuckle, Myron Beal, Alan Becker, Rollin Becker, C. A. Bowles, Boris Chaitow, Frank Chapman, Bertrand DeJarnette, Elizabeth Dicke, Jiri and Vaclav Dvorak, Clyde Ford, Viola Frymann, George Goodheart, Philip Greenman, Gregory Grieve, Laurie Hartman, Marshall Hoag, H. V. Hoover, Vladimir Janda, William Johnstone, Lawrence Jones, Brugh Joy, Deane Juhan, Dolores Krieger, Freddie Kaltenborn, Irvin Korr, Philip Latey, Karel Lewit, Stanley Lief, Harold Magoun, Carl McConnell, Fred Mitchell Jr., Raymond Nimmo, Charles Owen, Marion Rosen, Ida Rolf, David Simons, Fritz Smith, Edward Stiles, W. G. Sutherland, Andrew Taylor Still, R. McFarlane Tilley, Janet Travell, John Upledger, Paul Van Allen, Dewananchand Varma, William Walton – and to those many others I have not listed, whose work has been credited in the text.

Glossary

AC	acromioclavicular
AMT	adverse mechanical tension
AP	anteroposterior
ASIS	anterior superior iliac spine
CNS	central nervous system
CSF	cerebrospinal fluid
CTM	connective tissue massage
F-AB-ER-E	flexion-abduction-external rotation-extention
FMS	fibromyalgia syndrome
GAS	general adaption syndrome
HSZ	hyperalgesic skin zone
HVS	hyperventilation syndrome
LAS	local adaptation syndrome
MET	muscle energy technique
MI	mechanical interface
NMT	neuromuscular technique
PKB	prone knee bending
PNF	passive neck flexion
PSIS	posterior superior iliac spine
PPP	periosteal pain point
SI	sacroiliac
SLR	straight leg raising
SOT	sacrooccipital technique
TCC	thermal conducting coefficient
TCM	Traditional Chinese Medicine
TFL	tensor fascia lata
TMJ	temporomandibular joint
TP	trigger point
TR	thermoreceptor
ULTT	upper limb tension test

Structure and function: are they inseparable?

One of the oldest maxims in osteopathic medicine highlights the total interdependence of structure and function; structure determines function and vice versa. Anything which causes a change to occur in structure will cause function to modify, and any functional change will result in structural change (for example, fibrosis of muscle, alteration in length of any soft tissue, change in joint surface smoothness).

There is no way that a shortened or fibrosed muscle can function normally; there will always be a degree of adaptation, a modification from normal patterns of use, some degree of malcoordination or imbalance in use.

Similarly, all changes in the use of a part of the body, or the whole body which vary from correct use (i.e. the way it functions) will produce alterations in structure. If posture is poor, or habitual use is incorrect (sitting cross-legged and writing with the head tilted to one side are common examples) structural changes will develop in response to – or in order to support and cement – these functional changes.

We can summarise factors which produce functional – and subsequently structural – change as involving overuse, misuse or abuse, which in turn can be reduced to one word: stress. Conversely, if we palpate structure and find alterations from the expected norm, we should be able to confirm related functional changes. For example, if we palpate shortened or fibrosed soft tissues it should be possible to register that the area does not function optimally (for example, a shortened hamstring is palpable and the leg will be restricted during a straight-leg raising test).

When we observe functional change we should readily be able to identify structural alterations which relate to this. Thus when posture or breathing function (Ch. 8) are not as they should be we can easily target the tissues which are most likely to carry evidence of associated structural change.

On a more local scale, when skin elasticity (a function dependent on normal structure) is reduced, we know that underlying reflex change (function) is involved (see Ch. 3). Palpation and observation are as inseparable as structure and function, and this should be kept in mind both during our exploration of palpatory methods which experience both structure and function, and also as we observe the physical manifestation of these two concepts – what the body looks and feels like, and what its working looks and feels like.

When we palpate we are feeling structure, the physical manifestation of functional tissues and units, and we are also sensing the changes which take place as a result of the functioning of the body or part.

When we observe we are seeing these same things.

Ida Rolf (1977) suggests that we have an ever-enquiring mind focused on what we are feeling, and that we should ask ourselves:

> What is structure? What does it look like? What am I looking for when I look for structure, and how do I recognise it? Structure in general, structure in human bodies in particular – what is its function? What is its mechanism? To what extent can it be modified in humans? If you modify the physical structure of a body, what have you modified, and what can you hope to influence?

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1 Objective – palpatory literacy

It is axiomatic that practitioners who use their hands to manipulate soft or bony structures should be able, accurately and relatively swiftly, to feel, assess and judge the state of a wide range of physiological and pathological conditions and parameters, relating not only to the tissues with which they are in touch but others associated with these, perhaps lying at greater depth. The information a practitioner needs to gather will vary according to the therapeutic approach; it might be the range of motion and the feel of joint play, the relative weakness or tightness in muscles, the amount of induration, oedema or fibrosis in soft tissues, identification of regions in which reflex activity is operating, or even differences in the quality of perceived 'energy' variations in regions of the body.

Karel Lewit (1987) sums up a major problem in learning to palpate:

> Palpation is the basis of our diagnostic techniques [and yet] it is extremely difficult to describe exactly, in words, the information palpation provides.

We will try, nevertheless, to do just this, with the help of numerous experts from a variety of disciplines, all the while keeping in mind the words of Viola Frymann (1963):

> Palpation cannot be learned by reading or listening; it can only be learned by palpation.

Much of this book comprises descriptions of various forms of palpation, highlighting different ways in which this may be best achieved, along with numerous examples of exercises which can help in the development of perceptive exploratory skills. Of course, what we make of the information we derive from palpation will depend upon how it fits into a larger diagnostic picture, which needs to be built up from case-history taking and other forms of assessment. Such interpretation is naturally essential in order for treatment to have any direction; palpation is anything but an end in itself. However, interpretation of the information derived from palpation is not a major purpose of this text; the main purpose is learning to palpate. (This concentration on the process of learning to palpate is not because interpretation of information is regarded as being of only secondary importance – for it is not – but because to have ventured too far into that realm would have expanded the text to an unmanageable size.)

For example, in Chapter 3 (p. 37), which deals with the assessment of skin tone elasticity, we will discover how to make an accurate assessment of local or general areas in which there is a relative loss of the ability of the skin to stretch due to reflex activity. The section therefore deals with the art of palpation of these particular tissues in terms of this particular characteristic (elasticity, adherence). What the finding of local skin 'tightness' may *mean* in terms of pathological or physiological responses, and what to do about it, will also be touched on in terms of the opinion of various experts, but it is not possible to give a comprehensive survey of all possible opinions on the topic.

In other words, the individual therapist will have to fit the acquired information into their own belief system and use it in accordance with their own therapeutic methodology. The aim of the book will be to help in identifying what is under our hands.

We can equate palpation with learning to make sense of some other form of information, say that relating to music. It is possible to learn to read music, to understand its structure, the theory of harmony, tones and chords, and even something of the variations of the application of such knowledge to different forms of composition. However, this would not enable us to play an instrument. The instrument that therapists play is the human body, and the development of palpatory literacy allows us to 'read' that body.

One of osteopathy's major figures, Frederick Mitchell Jr. (1976), makes a different comparison when he equates the learning of palpatory literacy with that of visual literacy:

> Visual literacy is developed in visual experiences and the exercise of visual perceptions in making judgments. Visual judgments and perceptions may be qualitative or quantitative or both. Although the objectives in training the diagnostic senses do not include aesthetic considerations, aesthetic experiences probably are developmental in terms of visual literacy. In making aesthetic value judgments one must be able to discriminate between straight lines and crooked lines, perfect circles and distorted circles. . . To evaluate the level of sensory literacy, one may (also) test for specific sensory skills in a testing situation.

In later chapters I will suggest ways in which this can be done.

Assumptions and paradoxes

The text of the book makes the assumption that the reader has at least a basic knowledge of anatomy and physiology, and, ideally, of pathology. It is necessary to emphasise that we must distinguish between what we are palpating, what we actually sense, and the way we interpret the information thus gained. It is all too easy for the practitioner (even those with wide experience) to feel what she 'wants' to feel, or what she expects to feel. A relative degree of detachment from the process of assessment is therefore helpful, if not essential.

An open mind is also vital to the task of learning palpatory literacy; those practitioners with the greatest degree of 'rigidity' in terms of their training, and of the system of therapy they follow, often have the hardest time in allowing themselves to feel new feelings, sense new sensations. Those with the most open, eclectic, approaches (massage therapists are a prime example) usually find it easiest to 'trust' their senses and feelings.

The other side of the coin is the fact that many (though by no means all) such 'open' therapists also have the poorest knowledge of anatomy/physiology and pathology against which to relate their palpatory evaluations. This paradox can only be resolved by highly-trained professionals becoming more intuitive and open, trusting that they really are sensing very subtle sensations as they open themselves to developing the delicate skills necessary for many palpatory methods; at the same time, many less 'well-trained' professionals may need to accept that there is a need to add layers of knowledge to their intuitive and nurturing talents.

Unless a practitioner is able to 'read' with the hands the information which abounds in all soft tissues, and is also able to relate this to the problems of the patient – as well as to a good deal of other diagnostic information – much potentially vital data will be missed.

No one in the osteopathic field has done more to stress the importance of sound palpatory skills than Viola Frymann, and we will be learning from a number of her observations as we progress through the text. She summed up the focusing of these skills, and the importance of making sense of them, when she said (Frymann 1963):

> The first step in the process of palpation is detection, the second step is amplification, and the third step must therefore be interpretation. The interpretation of the observations made by palpation is the key which makes the study of the structure and function of tissues meaningful. Nevertheless it is like the first visit to a foreign country. Numerous strange and unfamiliar sights are to be seen, but without some knowledge of the language with which to ask questions, or a guide to interpret those observations in the life and history of the country, they have little meaning to us. The third step in our study then is to be able to translate palpatory observations into meaningful anatomic, physiologic or pathologic states.

Palpation objectives

Philip Greenman, in his superb analysis *Principles of manual medicine*, (Greenman 1989) summarises the five objectives of palpation; the practitioner/therapist should be able to:

1. Detect abnormal tissue texture
2. Evaluate symmetry in the position of structures, both tactically and visually
3. Detect and assess variations in range and quality of movement during the range, as well as the quality of the end of the range of any movement
4. Sense the position in space of yourself and the person being palpated
5. Detect and evaluate change in the palpated findings, whether these are improving or worsening as time passes.

As will become clear, others have added more subtle but still palpable factors, such as energy variations, 'tissue memory' and emotional residues, to these basic requirements of what can be palpated and assessed. The elements described by Greenman are, however, our major objectives in obtaining palpatory literacy. Karel Lewit (1987), the brilliant Czechoslovakian physician who has eclectically combined so much of osteopathic, chiropractic, physical therapy and orthopaedic knowledge, states his objective in palpating the patient thus:

> Palpation of tissue structures seeks to determine the texture, resilience, warmth, humidity and the possibility of moving, stretching or compressing these structures. Concentrating on the tissues palpated, and pushing aside one layer after another, we distinguish skin, subcutaneous tissue, muscle and bone, we recognise the transition to the tendon, and finally the insertion. Palpating bone, we recognise tuborosities (and possible changes) and locate joints. Reflex changes due to pain affect all these tissues, and can be assessed by palpation; one of the most significant factors is increased tension.

We will examine Lewit's methods of ascertaining the presence of tense, tight tissues in some detail in later chapters.

Regarding the learning process, Gerald Cooper (1977) says:

> To begin to learn palpatory skill one must learn to practise to palpate bone or muscle or viscera. Gradually one learns to distinguish between a healthy muscle, a spastic muscle, and a flaccid one, and gradually one learns there is a difference in feel between a hard malignant tumour and a firm benign tumour. *Palpation cannot be learned by reading or listening, it can only be learned by palpation.* [My italics.]

This message is basic and vital, and many experts repeat it. Read, understand, and then practise, practise, and practise some more. It is the only way to become literate in palpation.

George Webster (1947) said:

> We should feel with our brain as well as with our fingers, that is to say, into our touch should go our concentrated attention and all the correlated knowledge that we can bring to bear upon the case before us . . . The principle employed by Dr Still [founder of

> osteopathy] in so carefully educating his tactile sense as he did with his Indian skeletons and living subjects, together with the knowledge to properly interpret the findings, accounted for his success over such a wide field. He had a way of letting his fingers sink slowly into the tissues, feeling his way from the superficial to the deep structures, that gave him a comprehensive picture of local as well as general pathology.

On the learning of palpatory skills, Frederick Mitchell Jr. (1976) states:

> Although visual sensing of objects is done through an intervening medium (the atmosphere or other transparent material), students are rather uncomfortable with the notion that palpation is also performed through an intervening medium. The necessity for projecting one's tactile senses to varying distances through an intervening medium[1] must seem mystical and esoteric to many beginning students. Yet even when one is palpating surface textures the information reaches one's nervous system through one's own intervening integument. Students are often troubled by the challenge of palpating an internal organ through overlying skin, subcutaneous fascia and fat, muscle, deep fascia, subserous fascia and peritoneum.

Palpate by 'feeling' not thinking

It is just that 'troubled' feeling towards such challenges which the exercises and advice in the text will hopefully overcome, for along with the assertion of so many experts that palpation can only be learned by palpating, there is another common theme; there must be a trusting of what is being felt, a suspension of critical judgment while the process is being carried out.

Later on, critical judgment may be used in interpreting what was felt, but the process of 'feeling' needs to be carried out with that faculty silenced. No one has better expressed this need than John Upledger (1987), the developer of craniosacral therapy. He states:

> Most of you have spent years studying the sciences and have learned to rely heavily upon your rational, reasoning mind. You probably have been convinced that the information which your hands can give you is unreliable. You may consider facts to be reliable only when they are printed on a computer sheet, projected on a screen or read from the indicator of an electrical device. In order to use your hands and to begin to develop them as reliable instruments for diagnosis and treatment, you must learn to trust them and the information they can give you.
>
> Learning to trust your hands is not an easy task. You must learn to shut off your conscious, critical mind while you palpate for subtle changes in the body you are examining. You must adopt an empirical attitude so that you may temporarily accept *without question* those perceptions which come into your brain from your hands. Although this attitude is unpalatable to most scientists it is recommended that you give it a trial. After you have developed your palpatory skill, you can criticise what you have felt with your hands. If you criticise before you learn to palpate, you will never learn to palpate, you will never learn to use your hands effectively as the highly sensitive diagnostic and therapeutic instruments which, in fact, they are.

'Accept what you sense as real' is Upledger's plea. It is an ideal motto for this exploration of palpatory skills.

W. G. Sutherland (1948), the primary osteopathic researcher into cranial motion, gave his uncompromising instruction as follows:

[1]Becker, whose work is discussed in later chapters, suggested we palpate *through* our fingers, not with them.

> It is necessary to develop fingers with brain cells in their tips, fingers capable of feeling, thinking, seeing. Therefore first instruct the fingers how to feel, how to think, how to see, and then let them touch.

Palpation variations

As though the fears outlined by Mitchell were insufficient, or Upledger's and Sutherland's directions not difficult enough, there are also those therapists who make an assessment a short distance from the skin, although it should be clear that what they are 'palpating' is rather different from the tissues that Mitchell's students were palpating.

This approach is far less indefensible than might be assumed, following the publication of the results of double blind studies into the use of 'therapeutic touch' methods, in which no contact with the (physical) body is made at all. This will be discussed further in Chapter 9 where an array of methods aimed at increasing sensitivity to subtle energy patterns will be detailed.

Other forms of assessment involving very light skin contact, either with the palpating hand(s)/digit(s) stationary or moving in a variety of ways, will also be explored at length. Palpation of this sort often employs, as Lewit mentions, awareness of variations in skin tone, temperature, feel and elasticity (which may reflect or be associated with altered electrical resistance) or other changes.

Some methods, such as the German system of *bindegewebsmassage* (connective tissue massage) employ a sequential examination of the relative adherence of different layers of tissue to each other, either at an interface (say between muscle and connective tissue) or above it (skin over muscle, muscle over bone and so on). Lewit too has shown the relevance of identifying changes in skin adherence over reflex areas which are active (trigger points, for example).

Recent developments – as well as the reintroduction of older concepts – have led to methods of assessment of visceral structures, both in terms of position and 'motion', and some of the methods involved will be outlined. Craniosacral and 'zero balancing' methods (among others) involve the sensing of inherent rhythms, felt on the surface, to make assessments of relative physiological or pathological states, or even of 'tissue memory' relating to trauma, either physical or emotional. Variations on these methods will be examined and described together with the description of exercises which can assist in developing appropriate degrees of sensitivity for their effective use.

Deeper palpation of the soft tissues, involving stretching, probing, compressing and the use of various movements and positions are all commonly employed to seek out information relating to local and reflex activity; these approaches will also be examined and explained. Such methods are frequently combined with the use of sequential assessment of the relative degree of tension (shortness) or strength of associated muscles and such a sequence will be described in detail.

Examination of some of the ways in which joint status can be judged from its 'end-feel', when range of motion and motion palpation are used for this purpose, add a further dimension to the art of palpation and will be presented with appropriate exercises.

What the various palpation findings may actually mean will be surveyed, both in relation to obvious biomechanical changes as well as possible reflex and psychological implications. This latter element is something we should always be aware of, as there are few chronic states of dysfunction which are not overlaid (or often caused) by psychosomatic interactions. Indeed, research by German connective tissue massage therapists has clearly demonstrated specific, palpable, soft tissue changes which relate to particular emotional or psychological states.

The therapeutic methods involved in the practice of osteopathy, chiropractic, physiotherapy, massage therapy and a host of systems and methods associated with bodywork, have all developed individualised diagnostic methods, some of which have become universally applied and valued by other systems; in order not to upset professional sensitivities, credit will be given to the system which developed particular palpatory methods wherever this is known.

Poetry of palpation

Ida Rolf, the developer of structural integration through the system known as Rolfing, gave an idea of just how exciting an experience palpation can be. She suggests (Rolf 1977) that the beginner in the art of palpation should feel their own thigh (as an example). Initially, she says, this will feel 'undifferentiated', either overly dense or soft, lacking in tone, or as though large lumps were held together under the skin. These 'extremes in the spectrum of spatial, material and chemical disorganisation' make recognition of the ideally well-organised elements of the structures difficult. However, after appropriate normalisation of such tissues the 'feel' is quite different:

> You can feel the energy and tone flow into and through the myofascial unit . . . dissolving the 'glue' that, in holding the fascial envelopes together, has given the feeling of bunched and undifferentiated flesh.
>
> As fascial tone improves, individual muscles glide over one another, and the flesh – no longer 'too, too solid' – reminds the searching fingers of layers of silk that glide on one another with a suggestion of opulence.

Rolf's excitement is not feigned. Palpation of the body should change with practice from being a purely mechanical act into a truly touching and moving experience, in all senses of those words.

Paul Van Allen (1964) pinpointed the need for concentrated application to the task of heightening ones perceptive (and therapeutic) skills:

> Let us lay down a few principles to guide us in the development of manual skills . . . It is commonplace to accept the need for basic principles and for practice, in developing manual skill to strike a golf ball, or a baseball, to roll a bowling ball, to strike a piano key or to draw a bow across strings, but we seldom, if ever anymore, think of manual skills in osteopathic practice in this way. Is it possible that osteopathic manipulation began to lose its effectiveness and to fall into disrepute even among our own people, when students no longer practised to see through how many pages of *Gray's Anatomy* they could feel a hair?

Note that this was written at a traumatic time for osteopathy in the United States, when 2000 Californian osteopaths gave up their D.O. status and accepted M.D. status in return for the turning of osteopathic colleges into medical schools. A resurgence of basic osteopathic teaching and skills has since reversed that catastrophe.

Describing what we feel

All therapists who use their hands can ask themselves if they spend enough time refining and heightening their degree of palpatory sensitivity. The answer in many cases will be no, and hopefully this text will encourage a return to exercises such as this useful application of *Gray's Anatomy* (a telephone directory was used for this purpose in the author's training; it is equally effective).

Going beyond his despair at the loss of interest in palpatory skills, Van Allen makes another useful contribution:

> We will understand better what we feel if we attempt to describe it. In describing what is experienced through palpation we try to classify the characteristics of tissue states, thus not only clarifying our own observations but broadening our collective experience by affording a better means of communication between us and discussing [osteopathic] theory and method. We are accustomed to describing crude differences in what we feel by touch, the roughness of the bark of a tree or of a tweed coat, the smoothness of a glass or silk. We must now develop a language of nuances and I shall suggest only a few words from many to apply to palpable tissue states in an effort to describe them accurately.

Van Allen then launches into detailed descriptions of the meanings, as he sees them, of words such as 'density', 'turgidity', 'compressibility', 'tensile state' (or response to stretch) and 'elasticity'. His choice of words may not suit everyone but the idea is sound. We need to unleash a torrent of descriptive words for what we feel when we palpate and the text of the chapters covering various approaches to this most vital of procedures will hopefully inspire the reader to follow Van Allen's advice, to obtain a thesaurus and to look up as many words as possible in order to describe accurately the subtle variations in what is being palpated.

Viola Frymann reminds us that Dr Sutherland used the analogy of a bird alighting on a twig and then taking hold of it, when he tried to teach his students how to palpate the cranium. Some of the exercises in this book are derived from Frymann's work, and in many of these she echoes the idea of Van Allen that the student of palpation should also practise the art of describing what she is feeling, either verbally or in writing. Dr Frymann's words (Frymann 1963) can hopefully serve as a guide throughout this text:

> It is one thing to understand intellectually that physiological functions operate, and what may happen if they become disorganised. It is quite another thing, however, to be able to place the hands on a patient and analyse the nature and the extent of the disorganisation and know what can be done to restore it to normal, unimpeded, rhythmic physiology. This then is the task before us; to know what has happened and is happening to the tissues under our hands, and then to know what can be done about it and be able to carry it through.

By heeding the words of the experts, quoted throughout the text of this book, and by evaluating and reflecting on some of the insights to be found in the 'special topic' areas between chapters, as well as by assiduously practising the exercises which are present in all of the subsequent chapters and some of the special topic areas, palpation skills can be refined to an extraordinary degree, bringing both satisfaction and benefit to practitioner and patient alike.

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The dominant eye and sensory literacy

Many osteopathic and chiropractic texts advise that, before starting to palpate, you identify your dominant eye. Almost all of us have one, and the reasoning is that during the application of assessment procedures you should position yourself in relation to the patient, or body part, so that the dominant eye has the clearest possible view of what is being observed.

Clearly this is of little importance if palpation with the eyes closed (a common recommendation) is being employed. There will, however, be many instances when visual impressions need to be combined with palpation, for example in use of the 'red reaction' (see Special Topic 5).

Assessing the dominant eye

- Make a circle with your first finger and thumb and, holding the arm out in front of your face, observe an object across the room, through that circle, with both eyes open.
- Close one eye. If the object is still in the circle, you now have your dominant eye open.
- If, however, the image shifts out of the circle when only one eye is open, open the closed eye and close the open eye, and the image should shift back into clear view, inside the circle.
- The one eye which sees the same view as you saw when both eyes were open is the one to use in close observation of the body.

If the patient is on an examination couch, you should approach the couch from the side which will allow your dominant eye to be closest to the centre of the couch.

In some instances, when symmetrical motion is being observed, such as when rib function is being assessed, it is a mistake to closely observe one side and then the other. You should instead rely on the sensitive discrimination which peripheral vision offers. Focus on a point between the two moving ribs and allow your peripheral vision to judge variations in motion as the patient breathes. The use of the dominant eye will be referred to in various exercises when it is appropriate.

By the way, if you are right-handed, with a dominant left eye, or left-handed with a dominant right eye – both of which are unusual combinations – you would probably make an excellent batsman in cricket, or hitter in baseball.

Body position and the eyes

Vladimir Janda (1988) points to the existence of oculopelvic and pelviocular reflexes which indicate that any change in pelvic orientation alters the position of the eyes and vice versa, and to the fact that eye position modifies muscle tone particularly the suboccipital muscles (look up and extensors tighten, look down and flexors prepare for activity, etc.). The implications of modified eye position due to altered pelvic and head positions therefore add yet another set of factors to be considered as we try to ensure that our observational and palpatory efficiency is optimal (Komendatov 1945).

'Sensory literacy'

Frederick Mitchell Jr. (Mitchell 1976) writing on the topic of training and measurement of sensory literacy, discussed the various 'parts' of vision. Visual assessment is very important for making effective and reliable assessments and clinical judgments. As Mitchell puts it:

> Does the patient have good or poor posture, and how poor is the patient's posture?
> Is a laceration 2.5 cm or 3 cm in length?
> Are the iliac crests equal in height?
> Is the patient's head tilted, and by how many degrees?
> Is one knee larger than the other?
> Is dermatosis violaceous, or merely pink?

In order to make such judgments, Mitchell lists the need to be able to :

1. Identify and discriminate colour hues and saturations.
2. Quantify 'rectilinear length measurements, angular measurements, curvilinear and arcuate shapes, and their radius of curvature'.
3. Sense horizontal and vertical frames of reference in which to make quantitative judgments.
4. Appreciate motion, absolute motion or subjective awareness of motion in relation to himself, or relative motion of one thing to another thing.
5. Demonstrate depth perception and the ability to estimate length and proportion.

All sighted individuals have these skills but the degree of keenness is variable, and Mitchell suggests ways of measuring and of enhancing 'visual literacy' by means of training devices which, for example, simulate an extremity's range of motion, or leg length differences in a supine patient, or levels of iliac crest height in a standing patient.

When such tools are utilised in classroom settings, the student remains unaware of the true angle or length or height until having made an estimation. There then needs to be an immediate feedback of information, because, as Mitchell explains:

> Success builds confidence. Failure destroys confidence. It is not unlikely that self-confidence may be an essential ingredient of reliability in accuracy of visual judgment. As accuracy and reliability in making visual judgments increases the student learns to avoid parallax errors and to deal with the possibilities of optical illusion.

Eye dominance appears to be a significant element in the accuracy of visual judgment and becoming aware of backgrounds; lighting is also a part of the training process and is important in eliminating optical illusions as a source of error.

Visual assessment in a physical examination

Uri Dinnar and Myron Beal, and their research colleagues, provide the following summary of the questions you might ask yourself during the visual component – observation – of a physical examination, in which screening occurs from three viewpoints, posterior, lateral and anterior (Dinnar et al 1982).

You might assess your ability to make these observations now, before you start to work your way through the many exercises in this book, and perhaps some time later when you have applied the exercises and hopefully enhanced those skills.

This screening is designed to give an initial impression, it is not diagnostic. The patient is standing.

1. Posterior view
   —Are shoulders and scapulae asymmetrical (unequal)?
   —Is there a lateral curvature of the midspinal line?
   —Is the head held to one side?
   —Is the pelvic position asymmetrical (are crests level)?
   —Is there special flatness or fullness of the paravertebral muscle mass?
   —Are the feet placed symmetrically or not?
   —Are the positions of the knees symmetrical?
   —Is the body rotated as a whole?
   —Are the Achilles tendons deviated or symmetrical?
   —Are the positions of the malleoli symmetrical in relation to the heels?
   —Are arm positions symmetrical?
   —Are the fat folds (creases) at the waist symmetrical?
   —Is there any obvious morphological asymmetry of the posterior skin surface such as scars, bruises?
2. Lateral view
   —Are the normal spinal curves exaggerated or reversed?
   —Is the body displaced relative to the centre of gravity, for example is the head position balanced?
   —Is there any obvious morphological asymmetry of the lateral skin surface such as scars, bruises?
3. Anterior view
   —Are the shoulder levels symmetrical at the mid-sternal line?
   —Is the head tilted to one side?
   —Does the normal horizontal clavicular line deviate?
   —Is the pelvic position asymmetrical (are crests level)?
   —Are the patellae deviated laterally or medially?
   —Is there any obvious morphological asymmetry of the anterior skin surface such as scars, bruises?

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2 First steps in skill enhancement

Viola Frymann (1963) elegantly summarises the potential which palpation offers the healing professions:

> The human hand is equipped with instruments to perceive changes in temperature, surface texture, surface humidity, to penetrate and detect successively deeper tissue textures, turgescence, elasticity and irritability. The human hand, furthermore, is designed to detect minute motion, motion which can only be detected by the most sensitive electronic pick-up devices available. This carries the art of palpation beyond the various modalities of touch into the realm of proprioception, of changes in position and tension within our own muscular system.

These words define succinctly and with feeling, the tool we use and the task we perform when we palpate.

Different parts of the human hand are more or less able to discriminate variations in tissue features, such as relative tension, texture, degree of moisture, temperature and so on. This highlights the fact that an individual's overall palpatory sensitivity depends on a combination of different perceptive (and proprioceptive) qualities and abilities.

These include the ability to register temperature variations and the subtle differences which exist in a spectrum of tissue states, ranging from very soft to extremely hard, as well as the ability to register the existence and size of extremely small entities such as are found in fibrotic tissue or trigger point activity, along with the sensitivity to distinguish between many textures and ranges in tone, from flaccid to spastic, and all the variables in between.

Irvin Korr (1970) helps us to understand just why the hand is so delicately able to perform its many tasks:

> Where do we find the greatest number of muscle spindles? Exactly where they logically belong. If the muscle spindle has to do with finely-tuned muscle activity, with measuring gains in extremely small lengths of muscle fibers, one would expect that for more complex movement patterns, as in the muscles of the hand, we would have a very large number of muscle spindles. And this is exactly what we find. The number of spindles per gram of muscle is only $1\frac{1}{2}$ in the latissimus dorsi; in the hand the number is close to 26. Functionally this is of great significance.

Physiology of touch

Palpatory perception also results in large measure from variations in the number and type (see summary in Box 2.1) of sensory neural receptors found in the skin and tissues of various anatomical regions, since this greatly influences the discriminatory capabilities of those regions.

Box 2.1 Receptors and perception

Mechanoreceptors	
Light touch:	Meissner's corpuscle Merkel's disk Hair-root plexus
Deep pressure:	Pacinian corpuscle
Crude touch:	Thought to be Krause's end bulb Thought to be Ruffini's ending
Proprioception	
Muscle length, tendon and limb position	Muscle spindle Golgi tendon organ Joint/kinaesthetic receptors
Nociceptors	
Pain:	Free nerve endings
Thermoreceptors	
Warmth:	Thought to be free nerve endings
Cold:	Thought to be free nerve endings
Internal temperature:	Hypothalamic thermostat

Light touch is generally accepted to be achieved via mechanoreceptors (such as Meissner's corpuscle, and Merkel's disk, as well as hair-root plexi) lying in the skin, muscles, joints and organs. They respond to mechanical deformation resulting from pressure, stretch or hair movement. It is in the skin that the greatest number of these receptors are found. Cruder touch perception is thought to relate to Krause's end-bulb, Ruffini's ending and Pacinian corpuscles.

Sensations of heat and cold are detected by thermoreceptors which are considered to be the free nerve endings in the skin.

If cold is intense, detection is by nociceptors – specialised pain detectors – which are also free nerve endings.

Primary (afferent) sensory neurons link the target organ (in this case skin) with the spinal cord or brain stem. Sensory units of this type serve an area of skin called a receptive field. These fields may overlap – if there are many sensory units crowded close together, any tactile stimulation of such units (where there is close proximity and some degree of overlap) automatically results in signal transmission from neighbouring units to the central nervous system (CNS) being suppressed via inhibition of their synapses. This is known as lateral inhibition, and serves to sharpen perception of the contrasts noted in whatever is being touched.

The degree of tactile sensitivity in any area is in direct proportion to the number of sensory units present and active in that area, as well as to the degree of overlap of their receptive fields, which vary in size.

Small receptive fields with many sensory units therefore have the highest degree of discriminatory sensitivity. This can be assessed by use of what is called a two-point discrimination test: two sharp points are touched to the area, with the distance between them being varied until the shortest distance at which it is still possible to note that two and not one point is being touched is reached (Fig. 2.1).

Measurement of the minimum separable distance between two tactile points of stimulus proves that the greatest degree of spatial discrimination exists on the surface of the tongue, the lips and fingertips (1–3 mm). In contrast, the back of the hands, the back and the legs have a poor degree of sensitivity as to spatial discrimination (50–100 mm).

Not only is there a difference of perception relating to spatial accuracy, but also one relating to intensity. An indentation of 6 μm is capable of being registered on the fingertips, while 24 μm is needed before the sensors in the palm of the hand reach their threshold and perceive the stimulus.

The threshold on the backs of the hands, trunk and legs is some 10–20 times higher than the fingertips, which, along with the tongue, are the most sensitive

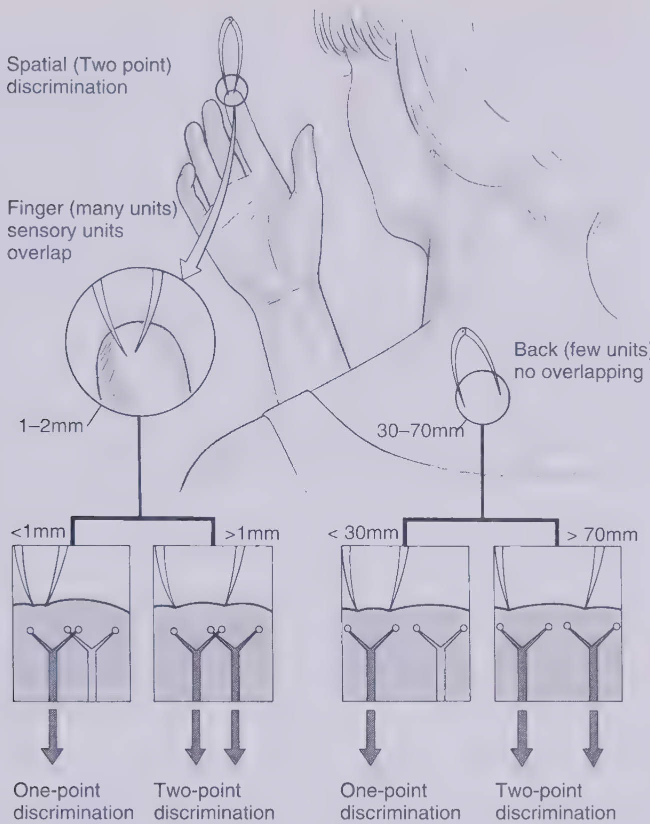


Fig. 2.1 Tactile discrimination. Spatial discrimination: in the two-point test, the spatial discriminative ability of the skin is determined by measuring the minimum separable distance between two tactile point stimuli. The back of the hands, the back and legs rate low (50–100 mm). The fingertips, lips and tongue rate high in this ability (1–3 mm). Intensity discrimination: sensitive areas are also better able to discriminate differences in the intensity of tactile stimuli. Therefore, an indentation of 6 μm on the fingertip is sufficient to extract a sensation. This threshold is 4 times higher in the palm.

palpatory units available to us. It is unlikely that any clinical value can be attached to the tongue's capabilities, and so the remarkable discriminatory abilities of the fingertips are best used for our enhanced literacy in palpation.

This is the majority viewpoint – however, some prominent dissenters hold that proprioceptive capabilities can be harnessed to a whole-hand contact, making this the more useful contact. This will be discussed further in this chapter. Relatively weak stimuli to the fingertips can produce brain–cell activation and it is this brain–hand link which holds the key to palpatory literacy.

Variations in sensitivity – relating to both spatial and intensity factors – highlight the marked degree of variation between individuals. This may be because of anatomical differences, such as the number of receptors per sq cm, a variation which would clearly alter the degree of perception possible. In any comparative study of human (or animal) anatomy, there are clear and marked variations in size, number and position of almost all structures, not excluding neural receptors.

Physiological differences also abound in any such examination and so it is a truism to note that not everyone will have the same degree of sensitivity when they palpate. Some will find it easy to perceive delicate pulsating rhythms, whereas others may have to work long and hard to heighten their sensibilities to the point where they can do so.

Receptor adaptation

Anatomical differences are not the only factors involved in variations in palpatory sensitivity; we have to try to overcome, by constant effort, a physiological response which 'switches off' (or decreases) the rate of firing of receptors when some stimuli are maintained. This relates to what are called 'rapidly firing receptors', which tend to lose their sensitivity on any sustained contact. Those receptors related to fine touch and pressure are of just this rapidly adapting type. Under normal conditions this is thought to have value in preventing our constant awareness of whatever is touching our body (clothing, for example) but it has a nuisance value for anyone involved in palpation assessment for any length of time.

By contrast, mechanoreceptors, serving joint and muscle, are slow adapters, as are pain receptors. It is use of the proprioceptive receptors which some experts such as John Upledger suggest should be incorporated into our palpatory endeavours. Their slow adaptation certainly adds weight to this suggestion. The alterations in sensitivity resulting from rapid adaptation to light touch is something which can be modified by practice, and the exercises which follow later in this chapter will assist towards this objective.

It is the *tips of the fingers* or *thumbs* which have the greatest discriminatory ability to measure variations in whatever is being felt. The skin surface itself, with its range of variations from hot or warm to cool or cold; thick or thin; dry, oily or moist; puffy or firm; smooth or rough and so on, is best assessed with the *pads of the fingers* or *the palm*, as a rule. The *dorsum of the hand*, because of its sensitivity, is thought by some to be best for measuring the skin surface for temperature and moistness variations. (Some experts question this assumption because it is thought to be based mainly on histological data, suggesting that definitive tests should be carried out in which individuals who have been trained to enhance their 'temperature literacy' would have different parts of their hands assessed for sensitivity.)

Assessment of the distance of structures from the surface, as well as their relative size, is usually best achieved by the *finger tips* and to some extent the *palms of the hands*. The *palms and finger tips* are also thought to be the most useful contacts for perception of variations in the status of osseous structures, through skin, fat, fascia and muscle.

The *whole hand including the fingers* (including the proprioceptors in the forearms and wrists) is an accurate measuring instrument; the hands can be moulded to the surface in the activity of 'listening' for subtle physiological motions, such as primary respiratory motion, in cranial osteopathic terminology, or visceral motion when organ position and function is being assessed. Subtle variations in amplitude and direction of such movement, as well as the frequency of cycles of activity, can readily be assessed in this way with practice.

If palpation is going to move beyond a simple assessment of the obvious characteristics of the tissues themselves, the hands need to register movement, pulsations and minor tremors and rhythms, along with variations in all or any of these as they respond to the palpatory processes.

The *palmar finger surfaces* are most efficient for the role of picking up very fine vibration. William Walton (1971) summarised this as follows:

> Most authorities agree on two points. One is that the pads of the fingers are the most sensitive portions of the hands available to diagnosis; that part of the pad just distal to the last interphalangeal articulation is the most sensitive. The second point is that the thumb and first two fingers are the best to use. Which of these fingers or what combinations of them to use vary with the area under consideration, and the operator's own personal preference.

Sara Sutton (1977) differentiates the loci of sensitivity in the hands as follows:

> The pads of the fingers are most sensitive for fine tactile discrimination and require light touch. The dorsal surfaces of the hands are most sensitive to temperature changes, while the palmar surfaces of the metacarpo–phalangeal joints are more sensitive to vibratory changes. The center of the palm is sensitive to gross shape recognition.

John Upledger (Upledger & Vredevoogd 1983) differs markedly in his suggestions as to the ideal palpatory tool:

> Most of you have been taught to palpate or touch with your fingertips . . . we, however, would urge you to palpate with your whole hand, arm, stomach or whatever part of your body comes into contact with the patient's body. The idea is to 'meld' the palpating part of your body with the body you are examining. As this melding occurs, the palpating part of your body does what the patient's body is doing. It becomes synchronised. Once melding and synchronisation have occurred, use your own proprioceptors to determine what the palpating part of your own body is doing. Your proprioceptors are those sensory receptors located in the muscles, tendons, and fascia that tell you where the parts of your body are without using your eyes.

Upledger's ideas will be expanded on, and some of his exercises for enhancement of palpatory skills examined, as we progress.

Clyde Ford (1989) reminds us that we commonly 'project' our sense of touch, giving the example of writing with a pencil. We feel the texture of the page on which we are writing not at our skin surface or in our fingertips, but at the end of the pencil, thus demonstrating how our proprioceptive awareness can be projected.

He suggests you experiment by:

> Changing the pressure with which you grasp the pencil – you'll quickly discover that you can't write. The pressure exerted to hold the pencil needs to be constant so you can extend your perception to [the] pencil tip and thereby control the complex task of writing. A good craftsperson knows this instinctively. The woodworker's sense of touch extends to the teeth of the saw, a machinist's to the end of a wrench, a surgeon's to the edge of a scalpel, an artist's to the tip of a brush.

In days gone by, when a physician had to diagnose by touch:

> A good practitioner did not feel a tumour at his fingertips but he projected his vibratory and pressure sensations into the patient.

So we regularly project our sense of touch beyond our physical being and, in palpation, says Ford:

> We merely make the ordinarily unconscious process available to our conscious mind. In so doing we cross the delicate boundary between self and other, to explore, to learn and ultimately to help.

Mitchell, Moran and Pruzzo, in their classic text (Mitchell et al 1979) explain what they believe palpation to be aiming at:

> Palpation is the art of feeling tissues with your hands in such a manner that changes in tension and position within these tissues can be readily noticed, diagnosed and treated.

This is the very simplest aim of palpation, for the method and the instrument (finger pads? whole hand?), it seems, can vary, and the objectives can become ever more refined.

Mitchell, writing alone this time (Mitchell 1976), examined the subject of the training and measurement of sensory literacy (he coupled visual and palpatory literacy in the term 'sensory literacy') in a wider sense:

> The necessity for projecting one's tactile senses to varying distances through an intervening medium must seem mystical and esoteric to many beginning students. The projection of the palpatory sense through varying thicknesses of tissue is actually a refinement of the sense of tension and hardness. This sense is capable of even further refinement, through perceptual eidetic imagery, to be able to recognise, characterise, and quantify potential energies in living tissues. Thus some osteopaths are able to read in the tissues the exact history of past trauma.

Specific objectives

Coming back to more basic physical examination as it relates to superficial and then deep palpation, Walton (1971) points to specific objectives which should be looked for:

> There are five types of change to be noted by superficial palpation in both acute and chronic lesions: *skin changes, temperature changes, superficial muscle tensions, tenderness* and *oedema*.

And for deeper palpation:

> The operator increases the pressure on his palpating fingers sufficiently to make a contact with the tissues deep in the skin . . . six types of change may be noted: *mobility, tenderness, oedema, deep muscle tension, fibrosis* and *interosseous changes*. All but fibrosis can be perceived in both acute and chronic lesions.

In order to achieve the basic objective of being able to assess and judge such changes, education of the hands and development of heightened proprioceptive sensibility in the detection and amplification of subtle messages is required (see Exercises 2.12–2.14). This is then followed by appropriate interpretation of the information:

- *Detection* is a matter of being aware of the possible findings and practising the techniques required to expose these possibilities.
- *Amplification* requires localised concentration on a specific task and the ability to block out extraneous information.
- *Interpretation* is the ability to relate the information received via detection and amplification.

As indicated in Chapter 1, it is the detection and amplification aspects of palpation with which we are concerned, since what you subsequently do with any information thus gathered will largely depend upon your training and belief system.

Philip Greenman (1989) defines the three stages of palpation as being reception, transmission and interpretation. A useful warning is given that care be taken over the hands ('these sensitive diagnostic instruments') as we develop coordinated, symmetrical skills, linked with our visual sense:

> Avoidance of injury abuse is essential, hands should be clean, and nails an appropriate length. During the palpation the operator should be relaxed and comfortable to avoid extraneous interference with the transmission of the palpatory impulse. In order accurately to assess and interpret the palpatory findings it is essential that the physician concentrate on the act of palpation, the tissue being palpated, and the response of the palpating fingers and hands. All extraneous sensory stimuli should be reduced as much as possible. *Probably the most common mistake in palpation is the lack of concentration by the examiner.* [My italics.]

Moving beyond the physical assessments towards the palpation of subtle circulatory and energy rhythms and patterns, as described in craniosacral therapy, 'zero balancing' and the work of various osteopathic researchers, requires that palpation skills be further refined.

Where then should we begin in the process of developing and/or enhancing our proprioceptive and palpatory skills?

Exercises which can help in this task have been formulated by many experts, and a good starting point would be to practise the following until you are comfortable with your ability to obtain the information demanded without undue difficulty. These exercises are based on the advice and work of numerous individuals who have described specific methods for the acquisition of high levels of palpatory literacy. *These exercises are meant to be introduced more or less in sequence in order to gradually refine sensitivity.*

Important comparative descriptors

Before starting these exercises (which are not only useful for beginners but are excellent for refreshing the skills of the more experienced therapist) it is useful to prepare a number of comparative descriptive terms for that which will be palpated. Thus, we should have a number of what Greenman (1989) calls 'paired descriptors'.

These can include:

- Superficial/deep
- Compressible/rigid
- Warm/cold
- Moist or damp/dry
- Painful/painfree
- Local or circumscribed/diffuse or widespread
- Relaxed/tense
- Hypertonic/hypotonic
- Normal/abnormal, and so on . . .

It is also useful to begin when appropriate, to think in terms of whether any abnormality is acute, subacute or chronic (see Box 2.2).

Box 2.2 Acute, subacute and chronic

In general terms:

- Acute conditions relate to the past few weeks
- Subacute to between 2 and 4 weeks
- Chronic to longer than 4 weeks.

In making such an assessment it is useful to couple this with information from the patient in order to confirm the accuracy or otherwise of the finding. Thus, if tissue feels chronically altered, and the patient confirms that the area has been troublesome for longer than 4 weeks, an accurate 'reading' was made. (Obviously, in many instances, acute exacerbation of a chronic area may be what is being palpated, a confusing but useful palpatory exercise.) The degree of change should also be noted, using a subjective scale for conditions which appear mild, moderate or severe. A simple numerical code can be used to identify where on this scale the palpated tissues lie.

Palpation exercises

Viola Frymann summarised some very simple beginning points for developing sufficient sensitivity to commence efficient palpation of the living body. When we come to palpating tissue she advises, quite logically, that we palpate direct, not through clothing, and that we remain as relaxed as possible during the whole process. This is important, as unnecessary tensions interfere with perception.

It is also vital that we use only sufficient weight in our contact with the region being explored, and that this contact should be slowly applied to allow time for 'attunement' to the tissue being assessed:

> The gauging of tissue resistance is attained by the application of your muscle sense, your work sense. It is not merely a contact sense, a touch sense, but sensations mainly derived from work being done by the muscles. This is what is meant by proprioception.

The objective of the following series of simple exercises is to begin to refine palpation skills.

Some of Frymann's exercises will increase the sensitivity required for very light palpation needed for noting elasticity, turgor, moisture, sebaceous activity, relative warmth or coldness of tissues and so on.

It is strongly suggested that all of the exercises in the book be practised many times, and that even experienced individuals, with well evolved skills in this field, go back to some of the apparently simple exercises from time to time. It is a process which should be regarded as a voyage of discovery.

A sense of profound satisfaction awaits you when you realise just how much you can learn to read with your sense of touch.

EXERCISE 2.1

Time suggested
2–4 MINUTES WITH EACH HAND

Sit at a table, wooden ideally, and while slowly and carefully palpating its upper surface with the eyes closed, try to locate the position of the legs.

There will be less resilience – or greater resistance – to the palpating hand/fingerpads in areas where support lies under a particular part of the surface.

EXERCISE 2.2

Time suggested
2–4 MINUTES WITH EACH HAND

Place a coin under a telephone directory and try to find it by careful palpation of the upper surface of the directory.

If this is too difficult at first, do it initially with a magazine, gradually increasing the thickness of the barrier between your fingers and the coin until the telephone directory itself presents no problem.

Incorporate variations in which you use different parts of the hand to palpate for the coin.

EXERCISE 2.3

Time suggested
2–4 MINUTES WITH EACH HAND

Place a human hair under a page of a telephone directory and palpate for it through the page, eyes closed.

Once this becomes relatively easy, place the hair under 2 pages and then 3, doing the same thing, feeling slowly and carefully for the slightly raised surface overlaying the hair.

Now how long does it take you to feel the hair?

Repeat until it is easy and quick. Incorporate variations in which you use different parts of the hand to palpate for the hair.

EXERCISE 2.4

Time suggested
5 MINUTES WITH EACH HAND

Sit at a table (blindfolded) and try to distinguish variations between objects made out of different materials: wood, plastic, metal, bone and clay, for example.

Describe what you feel – shape, temperature, surface texture, resilience, flexibility, etc.

Do materials of organic and non-organic origin have a different feel?

Describe what differences you noted.

EXERCISE 2.5

Time suggested
5 MINUTES WITH EACH HAND

Van Allen (1964) developed a training method for enhancing perception of what he termed tissue 'density'. He obtained several blocks, measuring $2 \times 4 \times 18$ inches ($5 \times 10 \times 46$ cm), of very soft wood (pine) and of progressively harder woods (cherry, walnut, maple). He states:

> Sliding one's fingers over these blocks revealed the differences in density and was a good exercise in developing tactile sensitivity. In some of these blocks I bored $\frac{3}{4}$ inch [1.9 cm] holes from the underside, half the length, to within a quarter of an inch [0.6 cm] of the upper surface, and poured the holes full of lead, peaning it solidly with a ball-pean hammer. The blocks appeared uniform as they lay face up, with the leaded ends, some one way and some another. It was not too hard for most observers to tell which end was which as they slid their fingers over them. Osteopathic physicians varied widely in their ability to do this, some detecting the differences in one sweep of the fingers, others requiring many trials.

Those that did better in the 'test' were the practitioners known for their palpatory skills.

Reproducing Van Allen's blocks, lead and all, may be somewhat difficult, but obtaining blocks of wood of uniform size but of differing density should not be difficult; schools teaching manual therapy should have an array of these for their students to palpate and assess.

EXERCISE 2.6

Time suggested
5 MINUTES WITH EACH HAND

Mitchell suggests different ways of performing a basic palpation exercise. He urges paired students to palpate a number of objects (unseen by the student to be tested) which are inside a box (or bag) with an opening through which the palpating student can reach to palpate.

Mitchell suggests that such a 'black box' can be used as the first stage of learning to assess temperature, texture, thickness, humidity, tension or hardness, shape (stereognosis), position, proprioception, size, motion proprioception and so on.

The hand palpates a hidden object (made of plastic, bone, metal, wood, ceramic, glass, etc.) and the student indicates the material being touched as well as what it is, before bringing it out of the bag/box.

EXERCISE 2.7

Time suggested
5–10 MINUTES WITH EACH HAND

An elaboration on the use of a 'black box' which Mitchell discusses, would be to enhance discriminatory faculties by including a variety of materials made of rubber, plastic, wood, metal and so on of varying thicknesses in the 'box'.

Both the material as well as its relative thickness could be estimated on palpation and the results discussed.

These materials could also contain another variation in which a rough textured material, say sandpaper of different degrees of roughness, could be covered by varying thicknesses of foam. In this way multiple variations could be created for the tuning of palpatory skills: 'Layers of materials of varying tension and hardness could be superimposed. For example, somatic soft tissues overlaying bone could be simulated with stratified layers of foam padding, sheet rubber, and vinyl fabric.'

In this way, a training device with variable tensions could be constructed, says Mitchell, simulating muscular spasm, fibrotic changes, oedema and bony structures felt through varying thicknesses of soft tissue: 'It would be reasonable to expect that training with such devices would increase a student's confidence in his/her ability to tell the difference between spastic muscle and bone, or between hypertrophied muscle and contracted muscle.'

EXERCISE 2.8

Time suggested
5–7 MINUTES USING BOTH HANDS

Frymann suggests that the next objective should be to move from tools to begin to increase the student's ability to study anatomy using the hand instead of the eye. Her suggested exercise follows.

Sit, with eyes closed or wearing a blindfold, while palpating one of the cranial bones, or any other bone, real or plastic if you are unfamiliar with cranial structures.

Articular structures should be felt for and described in some detail (ideally with someone else handing the bone to you, and with findings being spoken into a tape recorder for self-assessment later, when the object/bone can be studied with eyes open).

The bone should be named, sided and its particular features discussed. If you are new to cranial structures this is an excellent educational method for becoming familiar with their unique qualities.

While palpating this bone you should be asking:

- What is the nature of this object, is it plastic or bone?
- What would be the difference in feel between plastic and bone?

Bone, albeit no longer living, has a slight compressive resilience which plastic never has; nor can plastic achieve the detail of sutural digitation which bone contains.

Careful fingering of the unseen object would establish its shape, and if anatomy is well enough understood it could then be named and sided.

The whole process of palpating is enhanced, suggests Frymann, if the arms are supported so that the hands and fingers are unaffected by the weight of the arms.

DISCUSSION REGARDING EXERCISES 2.1–2.8

Regular repetition, on a daily basis for a few minutes at a time, of the sort of exercises outlined above, will bring a rapid increase in sensitivity, and this is necessary as a prerequisite to palpating living tissue. Such exercises should continue even when you have moved on to palpating the living body.

After building up a degree of sensitivity in palpation, using inanimate objects, it is time to move towards palpation of living tissues.

The ability to know what normal tissue feels like is a most useful palpatory exercise, since anything which feels other than normal is bound to offer evidence of dysfunction.

This suggests that it is useful to perform palpation exercises with people who are relatively young and 'normal', as well as individuals who are older, or who have suffered injury or stress in the tissues you intend palpating.

It is my personal experience that the most 'normal' muscles available for palpation are those belonging to preschool children, and even this group is often already dysfunctional in terms of muscular hypertonicity.

EXERCISE 2.9

Time suggested
5–7 MINUTES WITH EACH HAND

Whichever bone is used initially (cranial or otherwise as in Exercise 2.8), this should be followed by a blindfolded palpation of the same bone in a live subject, with its contours, sutures (if cranial), resilience and observed (not initiated) motion, being felt for and described.

When comparison is made with the live bone in this way, similarities and differences should gradually become apparent. The differences between the dead and live bone should be described and defined, ideally into a tape recorder.

Obviously, the living bone would not be palpated directly, but through superficial tissue. This requires that the palpation become discriminating (Frymann talks of the 'automatic selection device of our consciousness'), filtering out information offered by soft tissues which overlie the bone that is being assessed. By applying the attention of the mind to what is being palpated (for not less than 5 minutes in the early stages) subtle awareness of motion inherent in the live bone's existence should also become apparent.

If this is a cranial bone, there are three rhythms which can be felt for – pulsation, respiration and a slower rhythmic motion – and it is possible to learn to focus gradually on one or other of these at will. We will come to exercises which will improve such discrimination later.

EXERCISE 2.10

Time suggested 5 MINUTES

In order to begin to learn to study and analyse more subtle connections, Frymann then suggests that the student of palpation should feel for a rhythmic motion by placing one hand on a spinal segment, from which stems the neurological supply to an area which is simultaneously being palpated by the other hand.

By patiently focusing for some minutes – eyes closed – on what is being felt, she states, 'a fluid wave will eventually be established between the two hands'.

Can you feel this, or something which approximates to it?

EXERCISE 2.11

Time suggested 5 MINUTES

Mitchell makes the somewhat bizarre suggestion that the blindfolded student should palpate a live arm and, simultaneously, that of a cadaver which has been warmed to body temperature. Assuming no warm cadavers are available, he then urges that palpation be performed on normal tissues and those of individuals with pathology such as limb paralysis.

Simultaneous palpation of normal and diseased tissues offers an educational opportunity which all should aim to experience.

Describe the different 'feel' of hypertonicity and hypotonicity after palpating for several minutes.

EXERCISE 2.12

Time suggested 10 MINUTES

Frymann simplifies the initial palpation of living tissue compared with non-living, sparing us the task of finding a corpse. She suggests that the student of palpation should sit at a table opposite a partner, one of whose arms rests on the table, flexor surface upwards. This arm should be totally relaxed. The student lays a hand onto that forearm with attention focused on what the palmar surface of the fingers are feeling, the other hand resting on the firm table surface. This is to provide a contrast reference as the living tissue is palpated, to help to distinguish a region in motion from one without motion. The elbows of the palpator should rest on the table so that no stress builds up in the arm or shoulders.

With eyes closed, concentration should then be projected into what the fingers are feeling, attuning to the arm surface.

Gradually, focus should be brought to the deeper tissues under the skin as well, and finally, to the underlying bone.

When structure has been well noted the function of the tissues should be considered. Feel for pulsations and rhythms, periodically varying the pressure of the hand. At this stage Frymann urges you to:

> Pay no attention to the structure of skin, or muscle, or bone. Wait until you become aware of motion: observe and describe that motion, its nature, its direction, its rhythm and amplitude, its consistency or its variation.

This entire palpatory exercise should take not less than 5 minutes and ideally 10, and should be repeated with the other hand to ensure that palpation skills are not one-sided.

EXERCISE 2.13

Time suggested
5–10 MINUTES

When you have palpated an arm (or thigh, or indeed any other part of the body) to the point where you are clearly picking up sensations of motion and rhythmic pulsation, place your other hand on the other side of the same limb.

Is this hand picking up the same motions?

Are the sensations moving in the same direction, with the same rhythm and is there the same degree of amplitude to the motion as the first sensation?

In health, they will be the same. When there is a difference it may represent 'tissue memory' of trauma or some other form of dysfunction.

EXERCISE 2.14

Time suggested
5–10 MINUTES

Frymann suggests that on another occasion (or at the same session) you palpate one limb with one hand (upper arm) and another limb (thigh for example) with the other, and that you 'rest in stillness until you perceive the respective motions within'.

Ask yourself whether the rhythms you are feeling are synchronous and moving in the same direction. Are they consistent or do they undergo cyclical changes, periodically returning to the starting rhythmic pattern?

You may actually sense, she says, that the force being felt seems to carry your hands to a point beyond the confines of the body, pulling in one direction more than another, with little or no tendency to return to a balanced neutral position.

This may represent a pattern established as a result of trauma which is still manifest in the tissues. Careful questioning might confirm the nature and direction of a blow or injury in the past.

As we will discover in Chapter 4 (p. 59), researchers such as Becker and Smith have mapped this territory well, and have given us strong guidelines as to how we may move towards understanding such phenomena; Frymann's exercise is a first step in that direction.

EXERCISE 2.15

Time suggested
5–7 MINUTES WITH EACH HAND

Upledger (1983) suggests that palpation and assessment of more obvious pulsating rhythms should be practised, for example involving the cardiovascular pulses. He describes the first stages of this learning process thus:

> With the subject lying comfortably supine, palpate the radial pulses. Feel the obvious peak of the pulsation. Tune in also to the rise and fall of the pressure gradient.
>
> ***How long is diastole?***
>
> ***What is the quality of the rise of pulse pressure after diastole?***
>
> ***Is it sharp, gradual, smooth?***
>
> ***How broad is the pressure peak?***
>
> ***Is the pressure descent rapid, gradual, smooth or stepped?***
>
> Memorise the feel of the subject's pulse so that you can reproduce it in your mind after you have broken actual physical contact with the subject's body. You can often sing a song after you have heard it a few times; similarly, you should be able to mentally reproduce your palpatory perception of the pulse after you have broken contact.

Upledger then suggests you do the same thing with the carotid pulse, and subsequently palpate both radial and carotid at the same time, and compare them.

Frymann's views on pulse-taking

There are some very important lessons to be learned in performing simple pulse-taking. Frymann analyses some of the almost instinctive strategies we adopt if we do this well, and which all should consider as they perform Exercise 2.15.

1. If the patient has a relatively normal systolic pressure (120 mmHg) light digital pressure on the pulse will obliterate it.
2. If the applied pressure is very light only a very faint sensation will be palpated, if anything at all.
3. If, however, a light initial pressure is *gradually* increased, a variety of pulsation sensations will be noted, until the pulse is obliterated when the digital pressure overcomes the blood pressure.

Frymann notes that this is how blood pressure was assessed before the introduction of the sphygmomanometer.

The student of palpation should experiment with variation of the degree of pressure, noting the subtle differences which are then perceived. In doing this we are learning to control the degree of applied digital pressure so that we *meet that demanded by particular tissues, in order to gain optimal access to the locked-in information.*

Frymann states:

> The examiner must supply the equal and opposite force to that of the tissue to be studied. The pressure in the eyeball can be estimated by attaining a balance of pressure between the examining finger and the intraocular pressure. The maturity of an abscess can be estimated similarly. Action and reaction must be equal.

This is a vital lesson in learning palpation and will be seen to be echoed in later chapters when neuromuscular evaluation (NMT) methods are discussed and practised.

EXERCISE 2.16

Time suggested
5–7 MINUTES

Lay both hands on the upper thorax of the supine patient and palpate cardiovascular activity.

Focusing on the various characteristics of the perceived pulsations, alter your focus to the breathing pattern and its multiple motions. Practise switching attention from breathing to cardiovascular activity and back again until you are comfortable with the idea of screening out 'background' information from that which you want to examine.

Accurate evaluation of many functional and pathological states depends upon the ability to filter out that information which you require from the many other motions and sensations which are being picked up by the palpating hands. This is an exercise to revisit many times.

EXERCISE 2.17

Time suggested
5–7 MINUTES

Rest the patient's head on your hands, with no more than a few grams of contact pressure from your whole hand/finger contact. The occiput should be resting on your palms and hypothenar region (Fig. 2.2A, B).

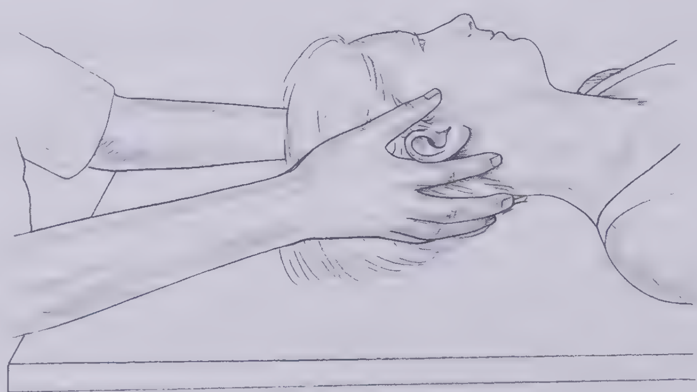
Sitting with your eyes closed, pay attention to cardiovascular activity (arterial pulsation, general pulsation in time with cardiac function and so on) as it is being sensed by these contacts.

After a while, alter your focus, screening out cardiovascular activity, and see what you can feel in relation to cranial motion, coordinated with the breathing rhythm.

Can you sense a very slight motion of the neck in time with respiration?

Can you describe the different rhythms and motions all demanding recognition from your hands?

Describe what you feel in your notes or into a tape recorder after 5–7 minutes of palpation.



A

Fig. 2.2A, B Hand position for palpation of cardiovascular activity, inherent motion and other cranial rhythms.


B

EXERCISE 2.18

Time suggested
5–7 MINUTES

In the same position as for Exercise 2.17, screen out and temporarily ignore both cardiovascular and respiratory motions, and see what else you can feel.

Imagine your hands are totally linked to the head, without more than a few grams of pressure, and with this whole hand contact shift your focus to the proprioceptors in your wrists and lower arms.

Sense what these are feeling.

Magnify in this way the very small amount of actual cranial motion available for palpation and you should gradually begin to feel as though quite a considerable degree of motion is taking place, as though the entire head were expanding and contracting laterally to a very slow rhythm, unrelated to cardiovascular or respiratory function, perhaps 6–10 times per minute. Trust what you feel uncritically at this stage.

Can you sense this rhythm?

Can you describe what you feel in words?

Is it a periodic 'prickling' or pressure sensation in the palms of the hand? Is it like a 'tide coming in and then receding'?

What words would you use?

Do so in your journal or on tape.

EXERCISE 2.19

Time suggested
5–7 MINUTES

Holding the head as indicated, tips of ring and little finger on the occipital bone, can you also sense a very slight dipping forward of the occiput as this lateral expansion occurs into the palms of your hands? With a return to neutral as the head 'narrows' again?

Can you, through the available contact of your middle and index fingers (resting on the mastoid bone and temporal bone respectively), sense what is happening to these?

Describe this in your journal or onto tape.

Can you also, through your thumb contact, sense what the parietal bones are doing as these rhythmic pulsations occur?

Describe this as well.

We will return to Upledger's exercises in a later section (p. 113) where we will examine palpation of craniosacral rhythms throughout the body, and assess your initial 'findings' and descriptions.

EXERCISE 2.20

Time suggested
10 MINUTES

Have your patient supine. Slide your dominant hand beneath the sacrum so that the fingertips rest at the base of the sacrum spreading from one sacroiliac articulation to the other. The coccyx should be gently cradled in the heel of the hand and the forearm and elbow resting comfortably on the surface of the treatment table.

Kneel or sit in order that you are as comfortable as possible during the 10 minutes or so of this exercise.

With eyes closed, focus attention to all sensations reaching the palpating hand.

Can you sense a rhythm synchronous with normal respiration?

If so, ask the patient to hold their breath, and observe what happens to the sacral motion at this time.

Is there still a subtle motion palpable as the breath is held?

As respiration resumes, feel how this subtle motion alters again. It should be possible gradually to learn to screen the motion related to breathing from the more subtle 'cranial respiratory' rhythm. Spend as long as possible studying these subtle variations in sacral motion.

Carefully record your findings after each performance of this and similar exercises.

Philip Greenman (1989) describes some excellent exercises – for both beginners and the more experienced – to increase their palpation skills.

These have been summarised as follows:

EXERCISE 2.21

Time suggested
7 MINUTES

Sit with a partner, facing each other across a narrow table. You are going to examine each other's left forearms with your right hands, so place the left forearms on the table, palm downwards and rest the right (palpating) hand and fingers on your partner's left forearm as they rest their hand and fingers on your forearm, just below the elbow.

The initial evaluation, without movement, calls for the mind to focus on what is being felt.

How warm/cool, dry/moist, thick/thin, rough/smooth is the palpated skin?

You and your partner should now turn the forearm over so that the same questions can be answered regarding the volar surface. Compare what was palpated on the dorsal surface with what was palpated on the volar surface.

Evaluate and put words to the differences noted in texture, temperature, thickness and so on.

Record your findings.

EXERCISE 2.22

Time suggested
5 MINUTES

In the same position, make small hand motions while a firm contact is being maintained with the skin, moving this in relation to its underlying tissues. Move the hand both longitudinally and horizontally, in relation to the forearm, and evaluate what is being palpated as to the subcutaneous fascial tissues. Try to assess its thickness and elasticity.

Do the surface tissues move more freely in some directions compared with others?

Compare the findings from the dorsal and volar surfaces of your partner's forearm.

Write down or record your findings.

EXERCISE 2.23

Time suggested
5 MINUTES

With this same contact, palpate the subcutaneous fascial layer for the arteries and veins which lie in it. Identify and describe what you feel from wrist to elbow.

Use an anatomical atlas if you are rusty regarding this aspect of anatomy.

EXERCISE 2.24

Time suggested
5 MINUTES

In the same position, think of the deeper fascia and increase your hand pressure until this is sensed. Use slow horizontal movements of the hands/fingers and try to identify thickened areas of fascia which act as envelopes which compartmentalise and separate muscle bundles.

It is in the subcutaneous and deeper fascial layers that much somatic dysfunction is found, ranging from trigger points to stress bands relating to overuse, misuse or abuse.

EXERCISE 2.25

Time suggested
5–7 MINUTES

With the same position and contact, feel through the fascia to the muscle fibres and see whether you can feel their direction of action. You and your partner should now slowly open and close the left fist in order to tense and relax the muscles being palpated. Sense the variations in the muscle fibres as this takes place.

Next, you should both hold your left fists closed, strongly, as you each palpate the hypertonic state of the forearm muscles, a most useful preparation for what will be palpated in most patients where overuse, misuse or abuse has been operating. Describe the textures and variations in tone which you have noted during this exercise.

EXERCISE 2.26

Time suggested
5–7 MINUTES

The arm being palpated should now be relaxed. Move your palpating fingers down the forearm and identify the interface between muscle and tendon (musculotendinous junction); continue to palpate the tendon itself onwards, towards its point of insertion, where the tendon is bound to the wrist by an overlying structure, the transverse carpal ligament. Palpate this and see whether you can identify the various directions of fibre angle.

Which way does the tendon run?

Which way does the ligamentous structure run?

Describe in writing or on tape the characteristics and 'feel' of what you have palpated.

Review an anatomy/physiology text to help evaluate the accuracy of what you thought you were feeling.

EXERCISE 2.27

Time suggested
7 MINUTES

Move back up to the elbow and with your middle finger resting in the hollow on the dorsal side of the elbow and your thumb on the ventral surface of the elbow, palpate the radial head.

Feel its shape and texture.

How hard is it?

Does it move on slight pressure?

What do you feel if you move your finger and thumb slightly higher on the elbow, over the joint space itself?

You should not be able to feel the joint capsule unless there exists gross pathology of the joint. Your contact is just above the joint. Have your partner slowly actively pronate and supinate the arm, and see what you feel between your finger and thumb.

How does the end of range of motion vary with the action of pronation and supination?

Is it symmetrical?

Describe the end-feel. (See the Special Topic on 'End-feel', p. 177.)

Which end of range seems firmer/tighter (which has the harder end-feel) – supination or pronation?

Record your findings.

EXERCISE 2.28

Time suggested
5 MINUTES

Now use your left hand to hold the hand and wrist of the arm you are palpating with your right hand.

Introduce *passive* supination and pronation as you palpate the joint. Assess the total range of motion as you slowly perform these movements.

You are receiving two sets of proprioceptive information at this stage, from the palpating hand and from the one which is introducing motion.

Describe the range and the end-feel, in both supination and pronation when these are passively introduced, as well as comparing active (as in the previous exercise) with passive findings.

Does supination or pronation have the harder or softer end-feel, and which seems to have the greatest range of motion?

Are you aware of the build-up of tension in the tissues ('bind') as you approach the end of the range of movement?

Are you equally aware of the sense of tissue freedom ('ease') as you move away from that barrier?

Try to become aware of changes, commonly known as 'ease' and 'bind', as you move the joint in varying directions.

Can you find a point of balance somewhere between the ends of range of motion in pronation and supination, where tissues feel at their most free?

If so, you have found what is called the physiological neutral point, or point of balance, which is a key feature of functional osteopathic treatment. We will be returning to this concept, and will perform more exercises involving the neutral point in later chapters (notably Chapter 7).

DISCUSSION REGARDING EXERCISES 2.7–2.28

Greenman cautions that the most common errors in the application of these palpation exercises (and in all palpation) involve:

- A lack of concentration
- The use of excessive pressure
- Too much movement.

In other words, go lightly and slowly, and above all focus on what you are feeling if you want to palpate effectively.

Palpation skill status

These first exercises will have helped you to gain (or enhance) an ability to differentiate (and describe) the shape, size, texture, flexibility and temperature of varying thicknesses and combinations of a variety of inorganic materials; to be able to discriminate between organic and inorganic materials, living and dead materials and tissues, living tissues of varying states of health, and the first stages of assessment of body pulsations and rhythms, with the facility to screen one from another at will being a key stage in palpatory literacy.

It may also be possible for you to now sense the forces associated with 'tissue memory' which will be examined more closely in later chapters.

These exercises can all be varied and altered to meet particular needs, they represent the ideas of some of the leading experts in the field and provide a starting point in the adventure in exploration of inner space which will follow.

We will now focus on palpation of the skin itself.

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The morphology of reflex and acupuncture points

Melzack and Wall (1988) have shown that at least 75% of trigger points are acupuncture points, according to the traditional meridian maps. The rest are 'honorary' acupuncture points since, according to traditional Chinese medicine, all spontaneously tender areas (whether or not they lie on the meridians) are suitable for acupuncture (or acupressure) treatment, and a trigger point is nothing if it is not spontaneously tender.

Recent evidence using thermographic imaging has shown that the actual size of a trigger point is fairly small, approximately 2 mm in diameter, rather than the previously suggested 5–10 mm (Diakow 1988).

Their incidence in young adults is shown to be 54% in females and 45% in males (age group 35–50). If they usually lie in the same place as acupuncture points, what tissues are involved?

Professor Jean Bossy, of the Faculty of Medicine, University of Montpellier, in France has examined the tissues extensively (Bossy 1984).

He informs us that all motor points of medical electrology are acupuncture points (which he calls 'privileged loci of the organism which allow exchanges between the inner body and the environment'). Head's maxima points, Hackett's points, visceral points, the chakra points – all are acupuncture points.

He sizes them even smaller than Diakow, at between 1 and 5 mm in diameter. The skin manifestation is, he says, 'easier to feel than to see. The most superficial morphological expression is a cupule'.

And under the skin (which is a little thinner than surrounding skin) of these (privileged loci), there are common features. Neurovascular bundles are commonly found, and connective tissue is always a feature, with fatty tissue sometimes present. Vessels and nerves seem to be important common features, although their stimulation during treatment is usually indirect, as the result of deformation of connective tissue and consequent traction.

In some instances, tendons, periarticular structures, or muscle tissues are involved, as part of the acupuncture/trigger point morphology. However, after extensive dissection, Bossy avers that, 'Fat and connective tissue are determinants for the appearance of the acupuncture sensation'.

Thus it seems that effective reflex effects only occur 'through the stimulation of multiple and various anatomical structures'.

The most useful information which this study provides is that, on palpation, a slight 'cupule' or depression, overlayed with slightly thinner skin tissue, can be felt, and that this indicates an acupuncture point (which if sensitive is 'active', and quite likely to also be a trigger point). As we will see in Chapter 4, other palpatory signs exist, skin 'drag', and loss of elastic qualities being the most important palpatory indications of active reflex activity.

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3 Palpating and assessing the skin

The significance of what is sensed when skin is palpated in one of many ways may not always be immediately obvious, and yet this boundary, which separates the individual from the outside world, is a vital potential source of information.

Contact with someone else's skin rapidly breaks emotional and resistance barriers. Physical touch offers a unique privilege and opportunity, something which is used to great advantage by those 'body workers' who focus on the mind as well as the physical condition of their patients. The body surface reflects the state of the mind intimately, altering its electrical as well as its palpable physical properties.

Deane Juhan (1987) sets the scene for our understanding of the skin's importance:

> The skin is no more separated from the brain than the surface of a lake is separated from its depths; the two are different locations in a continuous medium. 'Peripheral' and 'central' are merely spatial distinctions, distinctions which do more harm than good if they lure us into forgetting that the brain is a single functional unit, from cortex to fingertips and toes. *To touch the surface is to stir the depths.* [My italics].

Learning to read changes on this surface is not easy, but contact with it provides a chance for exploration of much that is obvious and much that is deeply hidden. We will examine various concepts which relate to the mind–body link in Chapter 11. At this stage we need to look more closely at some of the physical characteristics of the skin.

As mentioned in the previous chapters, the changes which should be able to be easily read by the palpator include the relative degree of warmth/coolness, dryness/moisture, smoothness/roughness, elasticity/rigidity as well as the relative degree of thickness of the skin in the region. Much research and clinical experience suggests that altered skin physiology of this sort is often an end-result of dysfunction involving the sympathetic nervous system, especially as it relates to the musculoskeletal system.

In order to understand some of the dynamics involved in skin function and dysfunction, as well as some of the potential pitfalls possible in skin palpation, a brief examination of some aspects of the physiology of skin is necessary.

Credit for the main thrust of the material in this section should go to the research of a group of researchers working in the United States. Their review (Adams et al 1982) is a clear examination of some of the main interacting elements which make the skin such a critical area in palpation.

The skin contains nearly 750,000 sensory receptors which vary in the density of their presence in different regions, from 7 to 135 per sq cm. However it is not neural endings which receive attention from these researchers, rather they focus much of their attention onto the characteristics of human skin which derive from the activities of atrichial sweat glands, the secretions of which, apart from playing a role in temperature control, influence 'the energy and mass transfer characteristics of skin as well as altering its properties by establishing different levels of epidermal hydration and salinisation'.

They ask us to make a clear distinction between epitrichial and atrichial sweat glands, the former being associated with hair shafts and the latter emptying directly on the skin, and thus directly influencing the important phenomena of skin friction and heat transfer properties. The atrichial glands on the palmar surface of the hand (and the soles of the feet) have only a small potential for influencing heat loss, but are important in being capable of modifying skin friction and pliability. It is of considerable clinical importance that the atrichial sweat glands are totally controlled by the sympathetic division of the autonomic nervous system, since this means that any palpable changes resulting from sweat production may be influenced by reflex activity, such as occurs when trigger points are active and when emotional or stress factors are operating. The chemical mediator between the motor nerve and the secretory tubule of atrichial sweat glands is acetylcholine, a neurotransmitter which increases the tendency for muscles to contract.

The complexities of water movement through the skin need not concern us at this stage, apart from a need to emphasise that the mechanical, electrical and heat transfer properties and characteristics of the skin are altered by this process.

As sweating occurs, liquid is not only passed through the tubule but diffuses laterally into surrounding peritubular drier skin areas. Even when there is no obvious sweat on the skin surface, sweat gland activity in the underlying skin continues, with some of the water which spreads into surrounding skin being reabsorbed. This mechanism is compared with the way in which the kidney tubule deals with sugar in the urine:

> By the same logic that it is incorrect to deduce that there is no sugar in the renal glomerular filtrate because none is detected in the urine, it is similarly incorrect to conclude that the sweat glands are inactive because there is no water on the skin surface. (Adams et al 1982).

Low-level sweat gland activity has the effect of altering the degree of skin friction. Friction is low when the skin is dry and higher as it becomes moist, decreasing again when sweating becomes very intense. It is hard to turn a page with a dry finger; moisten it slightly and the task is easier, but a very sweaty hand cannot grasp anything easily. We can conclude that there is a narrow range of epidermal water content that produces maximum frictional contact at the skin surface.

This knowledge may help us understand some of the reasons for the regional variations in skin friction ('skin drag') noted on palpation. Adams and his colleagues ask:

> Is it possible that regional differences in 'skin drag' perceived by the examining physician are related to segmentally active, autonomic reflexes that trigger chronic, low level, atrichial sweat gland activity, which in turn increases local epidermal hydration and skin friction at a defined body site? Do these reflexes produce, through chronic sweat gland activity, changes in the mechanical properties of the skin's surface, similar to those you might detect on the wrist skin surface when a watchband is initially removed?

Initially, when the skin under a watch strap is stroked, there will be a high level of epidermal water which will make the friction level high, with a great deal of skin drag. After a while this is lost and the degree of drag will be similar to the surrounding skin characteristics.

This insight into the pathophysiology of skin should help us to understand just why Karel Lewit (1987) is able to identify trigger point activity (or any other active reflex activity) by assessing the degree of elasticity in the overlying skin and comparing it with neighbouring tissue. He terms local skin areas of this type 'hyperalgesic skin zones'. It also explains why, prior to the introduction of methods of electrical detection of acupuncture points, any skilled acupuncturist could find the points very quickly indeed by palpation, and also why measurement of the electrical resistance of the skin can now do this even more quickly.

We will examine some of Lewit's thoughts and directions later in this chapter, but first we will see how the degree of epidermal hydration influences our perception of warmth or cold in the tissues being palpated, and how the condition of our own skin affects palpation.

Clyde W. Ford, in his study of palpation and subtle manipulation (Ford 1989) has a quite different interpretation of the mechanics of 'skin drag', outlined in Chapter 5 (p. 136).

Learning to measure skin temperature by touch

Exercises 3.1 through 3.9 are designed to help you to establish the basic palpation skills needed to determine heat variations in the objects and tissues being evaluated, as well as introducing you to the phenomenon of 'drag', the palpation of which is an extremely useful assessment tool.

EXERCISE 3.1

Time suggested
10–15 SECONDS PER OBJECT PALPATED

Assemble in front of you objects made of wood, plastic, metal, china, rough textured ceramic and paper. If possible have several different items made of each substance.

Make sure that they have all been in the same place in the room in which you are carrying out this exercise for at least an hour before you start. We can presume that the ambient temperature is uniform in this part of the room.

Palpate each of the items individually, with each hand, sensing the relative feeling of warmth or coolness it imparts when in your hands.

Were the objects to be measured with a thermocouple, they would show almost exactly the same reading and yet you will have noted that there is a distinct difference in temperature as you feel them.

Why do you think this is?

The answer will be found as you work your way through this chapter.

EXERCISE 3.2

Time suggested
15 SECONDS

Stand barefoot on a cold tile, marble or plastic floor. Rest one foot on the floor and the other on a rug or towel which has been in the room for some time. One foot feels cold, the other does not. And yet the temperature of the floor and the rug is almost certainly the same.

What is the reason for the perceived difference?

Does this raise any questions in your mind as to the accuracy of what temperature variations we think we can 'feel' when we are palpating something or someone?

Record your thoughts in your journal.

DISCUSSION REGARDING EXERCISES 3.1 AND 3.2

The variables which influence heat flow from the object which we are feeling to the surface of the unit we are using to feel with (fingertips, hand) are related to the thermal properties of these two 'exchanging surfaces'.

These thermal properties include:

- The surface areas of the exchanging surfaces
- The differences in temperature between the exchanging surfaces

- The distance over which heat is being transferred
- The intrinsic properties of heat conduction associated with the object being palpated and the palpatory unit (your hand or fingers).

A characteristic of this process called the 'thermal conducting coefficient' (TCC), requires explanation.

The TCC of a tiled floor is greater than the rug, and this causes the thermoreceptors in your foot on the tiled floor to be more rapidly cooled than the other foot.

Your *perception* of one foot being 'colder' than the other is accurate, but it does not relate to any differences in the temperature of the surfaces on which you are standing.

If it can be independently verified that two objects that feel as though they have different temperatures are actually at the same temperature, then the difference sensed by your thermoreceptors (the neural receptors which transmit messages relating to heat and cold to your brain) can be attributed to a difference in thermal conductivity, or some other heat transfer property, of the object(s) being examined, but not to a difference in temperature.

This is clearly of significance when it comes to making clinical judgments as to how warm or cool an area of skin feels.

A further complication becomes apparent when we examine the influence of the degree of epidermal hydration (sweat) in and on both the palpated tissues and the palpating hand.

What is the effect of sweat on our judgment of the temperature of the tissues we are palpating?

EXERCISE 3.1

Time suggested
10–15 SECONDS PER OBJECT, PER TEST

Take any two of the objects which you have previously palpated for temperature difference, say a pencil and a metal key or other metal object. Once again palpate these by hand and sense the difference in thermal sensation reaching the thermoreceptors in your hand. Use the same part of your hand (palm, dorsum, fingertip, etc.) to palpate each object.

- Try this first with your hands dry and then,
- Moisten the fingertips (or whatever part of the hand is being used to palpate for temperature difference) and repalpate the objects.

Do you notice any difference in what you sense in terms of temperature when the dry hand/fingers (do the exercise with each hand) and then the moist hand/fingers are in touch with the object?

If so what is the difference?

Record your findings.

EXERCISE 3.4

Time suggested
10–15 SECONDS PER OBJECT, PER TEST

Next, try to see whether the thermal sensitivity of the dorsal aspect of the hand is greater than that noted by the palm or finger pad, when assessing both a wooden pencil and then a metal object.

Are you more aware of temperature differences when palpating with one or other part of your hand?

Or with one hand or the other?

Record your findings.

EXERCISE 3.5

Time suggested
3–5 SECONDS PER OBJECT ASSESSED

Now test the same objects again, but this time use the tip of your tongue as your 'palpating' organ.

Did you sense the apparent differences in temperature more clearly with the tip of your tongue? Yes/No

DISCUSSION REGARDING EXERCISES 3.3, 3.4 AND 3.5

The thermoreceptors in the palmar surface of the hand are far more densely sited than on the dorsum of the hand, and are even more closely packed on the tip of the tongue (where they are close to the surface), making these regions more sensitive for palpation of heat. This means that despite the differences in epidermal thickness on the dorsum of the hand as compared with the palmar surface, the palm is usually a better place to make contact when seeking thermal information. Test this out for yourself, since some people seem to be more sensitive, where heat measurement is concerned, when using the dorsum of the hand, and you may be one of these.

It is of some importance to note that the relative dampness or otherwise of the palpating surface influences perception of heat. This is because of better conduction when water is present so that the temperature of the thermoreceptors is closer to that of the object being examined than it would be with a dry contact.

VARIABLES

Your own state of hydration, your peripheral circulatory efficiency, your sympathetic nervous system activity, and a number of other variables, including the ambient humidity and temperature, will influence your thermal perception as you palpate.

Adams and his colleagues (Adams et al 1982) summarise the problem of understanding the variables:

> The thermoreceptors in an examining finger are part of a complex heat exchange system. The temperature that is felt by the examiner is directly related to the rate of action potential formation on afferent, sensory nerves arising from thermoreceptors near the dermo–epidermal junction. Their temperature is strongly dependent on heat brought to the skin (or taken away from it) by the circulating blood.

The perceived temperature is also determined by the rate of heat transfer out of, or into, the examiner's skin from the patient's skin, which relates to such factors as the area of contact, thickness of skin in both examiner and patient, and the status of epidermal hydration in both, as well as heat transfer characteristics (which will be influenced by factors such as material trapped between the two skin surfaces – examiner and patient – including air, water, lotion, grease or oil, dirt, fabric and so on).

All or any of these variables will be operating each time we palpate, and to some extent at least, their net effect needs to be taken into consideration. Some of the variables affecting thermal perception are illustrated in Figure 3.1.

Palpating the skin for temperature and skin variations

Having established the need to be aware of possible misinterpretations of information gathered regarding apparent temperature differences, due to some of

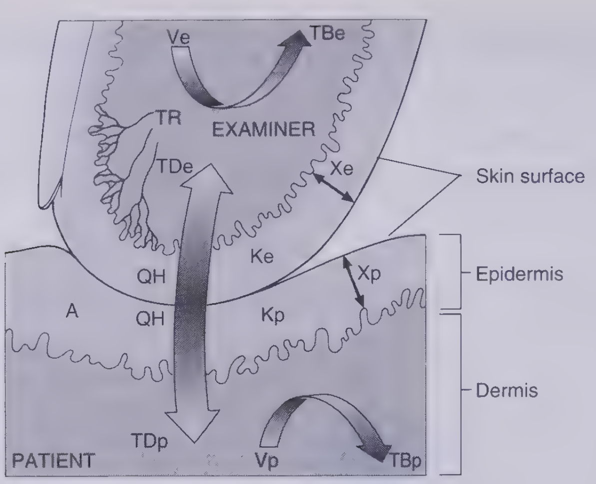


Fig. 3.1 This diagram depicts some of the physical and physiologic factors that affect the thermoreceptor (TR) discharge rate and consequently the temperature sensed in an examiner's skin in contact with a patient's skin. The temperature and its rate of change of the examiner's thermoreceptors are functions of the net effects of the time that the tissues are in contact, their contact area (A), the temperatures (TBe and TBp) and volume flow rates (Ve and Vp) of blood perfusing the examiner's and patient's skin, epidermal thickness (Xe and Xp) and thermal conductivity (Ke and Kp) of both, dermal temperature (TDe and TDp) of both, as well of the net heat exchange rate (QH) between the two tissues. QH is strongly affected by the heat transfer properties of material trapped between the two skin surfaces, for example, air, water, oil, grease, hand lotion, dirt, tissue debris, fabric. [Adams et al 1982]

the many variables discussed above, it is time to begin to try to make sense of the human body as you palpate for specific characteristics available for your evaluation.

The objective of the next few exercises (3.6, 3.7, 3.8) is to highlight the importance of using the skin as a source of valuable information which allows for the intelligent exploration of deeper tissues. Try to ensure that these three exercises are done sequentially in the same study/palpation exercise session so that the results of each can be compared with the others.

EXERCISE 3.6

Time suggested
3–4 MINUTES FOR EACH SEGMENT OF THIS EXERCISE (A, B AND C)

Your 'patient' is lying supine or prone, with areas of skin exposed (legs, chest, back, etc.). You should now apply hand or finger contact, without pressure, to the tissues being evaluated. Do not rub the tissues, merely mould your hand(s) to the skin surface for a few seconds before moving to an adjacent area.

In this way, slowly and carefully palpate the back or abdomen for variations of skin temperature, using both hands, one at a time or both at the same time:

A When the 'patient' has been lying still for some minutes in a room of normal temperature/humidity
B When the 'patient' has actively skipped, jogged, danced or performed some other exercise for several minutes
C When *you* have performed similar exercise for some minutes.

Are there any differences noted between A, B and C?

Vary your contact so that sometimes you use the palmar and sometimes the dorsal surface of the hands for this assessment under similarly variable conditions.

Is one hand more sensitive than the other?

Is one palpation contact more accurate than the other?

Do you sense differences in temperature from one area to another of the body surface?

How does your, or the subject's degree of hydration influence what you feel?

Record your findings.

EXERCISE 3.7

Time suggested
3–5 MINUTES

See whether you can actually register any temperature variations, and if so, how your results compare with A, B or C (above) when you palpate for these variations with your hands 0.5 cm above the body surface.

Viola Frymann (1963) states:

> Even passing the hand a quarter of an inch above the skin provides information on the surface temperature. An acute lesion area will be unusually warm, an area of long standing, chronic lesion may be unusually cold as compared with the skin in other areas.

As you 'scan' for temperature variations 'off the body' in this way, keep the hand moving slowly. If the hand remains still, or moves too slowly, you have nothing to compare, and if you move too fast you will not perceive the slight changes as the hand passes from one area to another. In this exercise use both the palmar and the dorsal surfaces of the hands to assess their relative sensitivity.

Try to be aware not only of heat, but of temperature variations and of areas which seem 'cool' or 'cold'.

Does your experience agree with the suggestion that the palmar surface is more sensitive than the dorsal surface of the hand?

Do any variations you can sense correspond with information you gathered when palpating the skin directly?

In other words, are areas of heat evident in both touch and off-the-body palpation, to some degree?

Record your findings.

EXERCISE 3.8

Time suggested
7–10 MINUTES

Palpate the same skin areas evaluated in Exercise 3.6, this time assessing for variations in skin friction by lightly running a fingertip across the skin surface (no lubricant should be used).

Perform this exercise with different fingers of each hand.

The degree of pressure required is minimal – skin touching skin is all that is necessary ('feather-light touch') (Fig. 3.2).

Movement of a single palpating digit should be purposeful, not too slow and certainly not very rapid. Around 5–7 cm per second is a satisfactory speed.

Feel for a sense of 'drag' which suggests a resistance to the easy passage of the finger across the skin surface.

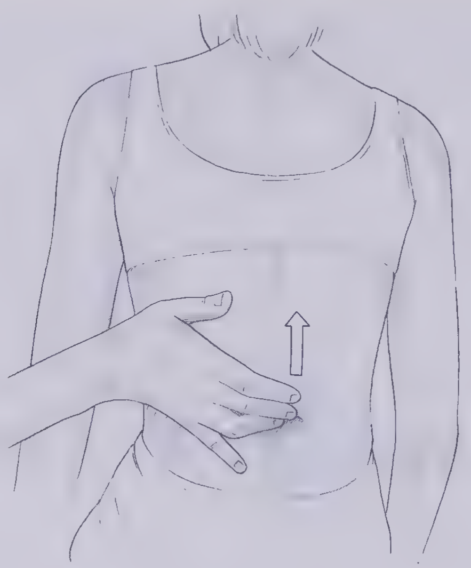


Fig. 3.2 Assessing variations in skin friction (drag, resistance).

A sense of 'dryness', 'sandpaper', a slightly harsh or rough texture, may all indicate increased presence of sweat.

Then, introduce the same variables as in Exercise 3.6 B and C above, in which either you or the subject will have exercised, before you repeat the assessment.

Note your results, especially if skin friction and temperature variation noted in previous exercises have been sensed in the same skin region.

Make a note on a chart of the findings, especially any which indicate both local skin drag/friction characteristics and greater warmth than surrounding tissue.

EXERCISE 3.9

Time suggested
20 SECONDS

If you are even slightly confused as to what you are trying to feel in this last exercise, remove your watch or bracelet and palpate for 'skin drag' over the skin adjacent to the skin under the strap, and then over that skin itself.

Run your palpating finger(s) from 'dry' skin to 'moist' skin; feel the difference in drag, friction, resistance.

Now wait for about 5 minutes and then, without having replaced the watch strap/bracelet, perform the exercise again. See how the drag on the skin which was under the strap is now absent so that the previous site of 'drag' now palpates as the same as the surrounding skin.

On another occasion, study perceived temperature differences in the skin under a watch strap once it has been removed, first immediately after it is removed, and then again 5 to 10 minutes later, as compared with surrounding skin.

Record your findings in your journal.

DISCUSSION REGARDING EXERCISES 3.6–3.9

You need to ask yourself whether an area of skin which 'feels' colder than surrounding skin is really colder (or warmer) or whether in fact this does not relate to a higher thermal conductivity coefficient which could be due to an increase in epidermal hydration (yours or the subject's) due to a local increase in activity of the atrichial sweat glands.

This in turn could be due to reflex activity, emotional distress or some local phenomenon.

If the same skin area which palpates as having a different temperature from its surrounding tissue also displays increased skin friction characteristics (drag), the likelihood of this being due to increased atrichial sweat gland activity is strong.

You also need to keep in mind your own state of physical and sympathetic activity as it relates to peripheral circulation and epidermal hydration when you palpate.

Ask yourself:

- Are my hands sweating?
- Have they been sweating?
- Am I relaxed, or anxious?

If your answer to any of these questions is in the affirmative, your thermoreceptors might be providing potentially inaccurate information as you palpate for temperature variables, a fact which would be compounded were the patient sweating, or if the relative ambient humidity or temperature was high.

You could also become confused in any attempt you might make to assess tissue texture changes (friction or 'skin drag') were you not aware of the possibility that similar interacting influences (hydration, humidity and so on) can alter 'skin drag' characteristics.

The phenomenon of 'drag' is commonly noted overlying active myofascial trigger points and areas of reflexogenic activity, and is a superb assessment tool.

Palpation skill status

The successful completion of the exercises, up to this point, means that you have established an ability to discern variations in skin/surface temperature and can use the 'drag' phenomenon to locate areas where there is increased hydrosis. If you are not satisfied with your degree of sensitivity in feeling temperature variations and 'drag', then repeat the exercises at regular intervals, daily if possible but several times a week at least, until you are comfortable with both the concepts and the practice of these methods.

You should also have satisfied yourself that different aspects of your hand are more sensitive than others and that a number of variables can influence the potential accuracy of what it is that you think you feel.

In the end it will be necessary for you to be able to compute your palpation findings along with variables such as ambient temperature, patient's (and your own) level of hydrosis, previous activity, anxiety, etc., almost instantaneously, and to interpret them according to the body of knowledge you have acquired, so that the interpretation forms a part of your overall assessment of the patient's current status and requirements.

Ask yourself:

- Do you understand the physiology of the 'drag' sensation?
- Do you feel that you can discern temperature variations by means of palpation?
- Do you feel that you can discern temperature variations by scanning from off the body?
- Do you feel that you understand what these palpated phenomena indicate?

Review appropriate texts and note your current level of awareness relating to these topics in your journal.

Lewit and his diagnostic and treatment method, using the skin

Karel Lewit has compiled a treasure-house of information (Lewit 1992). His discussion of the importance of skin palpation is worth examining. He points out that it was late in the 19th century that Head first reported on increased sensitivity to pinprick sensations in particular zones involved in reflex activity. Unfortunately, such a subjective symptom meant that the practitioner was dependent upon accurate feedback from the patient, for whom it was a slow and not particularly comfortable experience.

Lewit discusses the technique of 'skin-rolling', in which a skin-fold is lifted and rolled forwards between the fingers. Increased resistance is easily noted by the practitioner, as is the fact that, wherever reflex activity is operating, these folds of skin will also be 'thicker'.

Unfortunately, this technique is often painful to the patient and is difficult to perform on areas where skin is tightly adherent to underlying tissue.

In the German system of connective tissue massage (CTM), a variation on this assessment method involves the skin being lightly stretched over the underlying fascia by pressing with the fingertips in a direction away from the operator. This is usually performed bilaterally, so that variations in the degree of elasticity can be compared from one side of the body to the other, so producing evidence of reflex activity if there is a reduced degree of 'stretchability' when the two sides are compared (see Exercise 3.17 later in this chapter).

Lifting skin folds away from the body is an additional CTM diagnostic method (see Exercise 3.18).

The disadvantages of these methods lie in their fairly general indications, although this matters little to those using CTM, since they are usually attempting to identify large reflex zones which relate to organ or system dysfunction, rather than small localised areas of reflex activity required to identify, for example, myofascial trigger points.

Lewit reports that he has developed a painless and effective method which is more reliable diagnostically than those mentioned above, and which transforms from diagnostic evaluation to therapeutic treatment if the process (see Exercise 3.10 below) is prolonged.

He calls the method 'skin stretching'. He first stretches the skin with the minimum of force, in order to take up the available slack, and then takes the stretch to its end-position without force, where a slight 'springiness' is felt.

He performs a similar stretch in various directions over the area being assessed.

If a hyperalgesic skin zone (HSZ) exists due to reflex input to the area, a 'stiff' resistance is felt after the slack is taken up, rather than an elastic 'end-feel'.

Like has to be compared with like, and it is little use comparing the degree of elasticity available in skin overlaying – say – the lumbar paraspinal muscles with that overlaying the dorsal paraspinal tissues. The first would usually be relatively 'loose' and the other fairly 'tight' as a natural matter of course. However, if one area of dorsal paraspinal skin elasticity is compared with another area of dorsal paraspinal skin elasticity, and one of these is significantly less elastic than the other, evidence is gained that reflex activity may exist below the 'tight' skin area.

Treatment of such areas, which initiates a degree of normalisation of the reflex activity which created them, is achieved by maintaining the degree of stretch for a further 10 seconds or so.

According to Lewit:

> If the therapist then holds the stretched skin in end-position [around 10 seconds is usual] resistance is felt to weaken until normal springing is restored. The hyperalgesic skin zone can then as a rule no longer be detected. *If pain is due to this hyperalgesic skin zone this method is quite as effective as needling, electrostimulation and other similar methods.* [My italics].

Lewit tells us that this method allows us to diagnose (and treat) even very small reflex areas (HSZ) lying in inaccessible or potentially painful places, such as between the toes, over bony prominences, such as spinous processes, and around scars. Just what is going on in these HSZs?

They sometimes overlay areas affected by viscerosomatic reflex activity, or what is known as segmental facilitation, in which the neural structures in any spinal region may respond to repetitive stress factors, of varying types, by becoming hyper-reactive. This produces undesirable consequences both locally and in the areas supplied by nerves from that spinal level. We will look at palpation methods for identifying levels of spinal segmental facilitation (other than HSZ) when we examine muscular palpation (Ch. 4).

Localised myofascial facilitation also takes place in the development of trigger points, localised areas of soft tissue disruption which have the ability to bombard distant tissues with aberrant neural impulses, often of a painful nature HSZ will be found overlaying active (and also 'embryo' and dormant) trigger points, as well as over the target zone which the trigger point influences.

Those therapists who are interested in the acupuncture model of treatment will be aware that active points in the meridian system have an area of lowered electrical resistance overlaying them. The location of these areas is easily identified by means of Lewit's method of skin stretching (and according to him would respond therapeutically to further stretching, as they would to needling).

There is more detail on the trigger point phenomenon in Chapter 4, including a summary of methods for identifying these common troublemakers, as well as a reminder of Lewit's methods.

Skin stretching exercises

Ideally, Exercises 3.10, 3.11 and 3.12 should be performed in sequence, at one training/class session. Similarly, Exercises 3.13, 3.14 and 3.15 should be performed in sequence at one training/class session.

EXERCISE 3.10

Time suggested
10–15 MINUTES

At first, it is necessary to practise this method slowly.

Eventually it should be possible to move fairly rapidly over an area which is being searched for evidence of reflex activity (or acupuncture points).

Your model/subject should be lying prone.

Choose two regions which you will search in this way, one an area 7.5 × 7.5 cm to the side of the dorsal spine, covering the muscular paraspinal region as well as some of the skin over the scapula and/or ribs.

The other area should be in the low back/buttock area, much the same size, covering far more elastic,'loosely fitting', skin.

Mark these areas with a skin pencil or felt-tip pen, and begin the search.

Place your two index fingers adjacent to each other on the skin, side by side or pointing towards each other, with no pressure at all onto the skin, just a contact touch (Fig. 3.3A).

Lightly and slowly separate your fingers, feeling the skin stretch as you do so (Fig. 3.3B).

Take the stretch to its 'easy' limit. In other words, do not forcibly stretch the skin, just take it to the point where resistance is first noted. This is the 'barrier of resistance' and it should be easily possible, with a little more effort, to 'spring' the skin further apart to its absolute elastic limit at that time.

Slowly release this and move both fingers 0.5 cm to one side of this first test site, and test again in the same way, *and in the same direction of pull with each finger.*

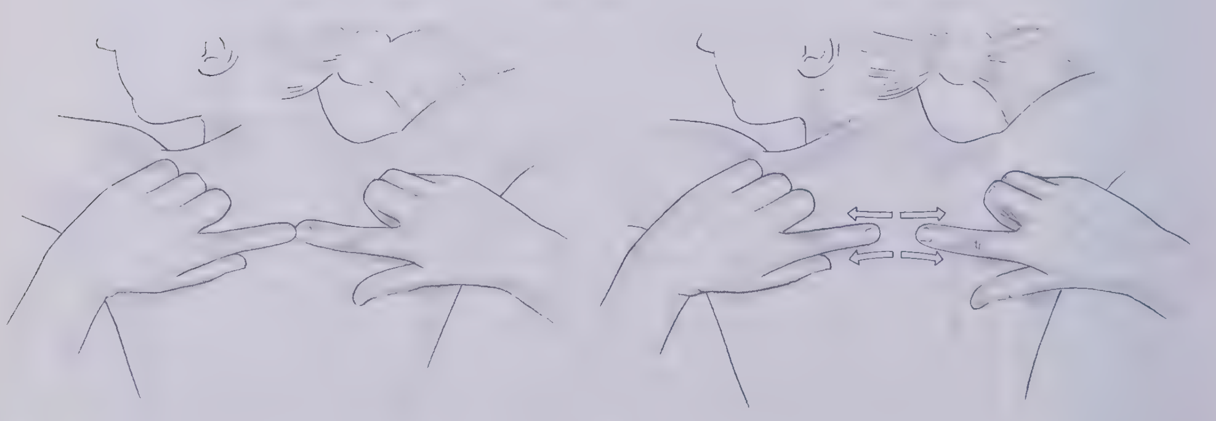
Perform exactly the same sequence over and over again until the entire 56 square cm of tissue has been searched.

When performing the series of stretches, ensure that the rhythm you adopt is not too slow (it is usually impossible to retain the subtle proprioceptive memory of the previous stretch if there is too long a gap between stretches). On the other hand, if the series of stretches is performed too rapidly the individual stretch is unlikely to be to the true elastic barrier which is being assessed. My preferred recommendation is that one stretch per second be performed, if possible.

In some local areas you may sense that the skin is not as elastic as it was on the previous stretch. This is a potential hyperalgesic skin zone. Mark it with pencil or pen for future attention.

If you were to apply light finger pressure to the centre of that small zone, you would almost always locate a sensitive contracture, which on sustained pressure may radiate sensations to a distant site (meaning that it is a trigger point, in which case add to your marking on the skin – or a record card – the direction of the radiating sensation), or may not radiate (meaning that it is either an active acupuncture point, an embryonic trigger point or some other reflex manifestation).

Record your findings.



A

B

Fig. 3.3(A) Fingers touch each other directly over skin to be tested – very light skin contact only. **(B)** Pull apart to assess degree of skin elasticity – compare with neighbouring skin area.

EXERCISE 3.11

Time suggested
5–10 MINUTES

Now reassess the same skin area but make the direction of each stretch different, perhaps going parallel to the spine rather than vertical to it, for example.

See whether you identify the same reflex areas/trigger points, this time.

Record your findings.

EXERCISE 3.12

Time suggested
10 MINUTES

Having satisfied yourself that you can utilise skin stretching effectively to identify localised areas of dysfunction as described in the previous two exercises, perform a search of other spinal areas which you had marked and note:

- The difference in elasticity which is available between skin overlaying the dorsal area and the lumbar/gluteal area.
- How it is possible to vary the direction of stretch as you move your finger contacts around the area, and still find yourself able to discriminate between elastic and less elastic skin.
- How it is possible to begin to speed up the process so that what took you 5 minutes of painstakingly careful stretch followed by stretch, can now be achieved in 1 or 2 minutes without loss of accuracy.

Record your findings.

EXERCISE 3.13

Time suggested
12 MINUTES

In order to develop your skills in using skin stretching diagnostically, you should now try to assess for variations in the elasticity of skin in difficult areas such as:

- The sternum/xyphoid process
- Over the spinous processes
- In the webbing between the toes or fingers.

If you have no available model, perform as many of the above exercises as you can on yourself.

Remember that no lubricant should be used during any of these assessments; they are best and most accurately performed ‘dry’. Be careful on hairy areas, as this could obviously cause discomfort.

Note the variations in degree of skin elasticity as you assess first one and then another anatomical site.

EXERCISE 3.14

Time suggested
5–10 MINUTES

Now go back to a marked HSZ which you found on a previous exercise. Gently stretch the skin to its barrier, and hold it there for 10 seconds without force.

Do you then feel the skin tightness gradually release?

Hold it in its new stretched position for a few seconds longer and then do the same to other HSZs which you noted in your initial assessments.

Now go back and retest the areas and see whether the previously reflexively-restricted skin has regained comparative elasticity.

Record your findings.

EXERCISE 3.15

Time suggested
2–4 MINUTES

Lewit describes a contact in which the ulnar borders of the cross-hands are used to assess large skin areas (such as the low back) in much the same way as the small areas are assessed by finger induced stretching of the skin. Using a firm contact, of the entire surface of the side of the hand, from the little fingers to the wrist, press lightly down onto the skin and separate the hands slightly, seeking to feel for the easy limit of stretch in the skin.

Move to an adjacent area, place the hands and retest, doing this sequentially so that an area such as the back, or thigh is covered. Note any stretches in which there seems to be restriction as compared with neighbouring skin elasticity. This reveals large reflex zones which could relate to organ dysfunction or other neurological evidence.

Practise 'releasing' these restrictions by holding the stretch at the barrier, without force, for 10 seconds or so until an easing of tone is felt. Retest to see whether this has indeed made a difference to the elasticity of the area.

Record your findings.

DISCUSSION REGARDING EXERCISES 3.10–3.15

The causes of reflex activity which manifests itself as a hyperalgesic skin zone may involve organic, systemic or structural dysfunction, or relate to other longstanding problems. Thus, while releasing skin tension in the manner described by Lewit may have some input in normalising function, this is likely to be of only temporary duration unless underlying causes are also dealt with. The methods described above are therefore useful in identifying tissues involved in reflex activity; however, their value in therapeutic terms should be thought of as short rather than long-term.

In this chapter some very important considerations regarding skin palpation have already been outlined. The significance of what is being noted during skin palpation has been addressed by a number of experts, for example William Walton (1971) who says:

> In superficial palpation, the operator, using the pads of his fingers, strokes the skin gently, but firmly enough to allow perception, over the area to be examined. There are five types of change to be noted by superficial palpation in both acute and chronic lesions:
> skin changes
> temperature changes
> superficial muscle tensions
> tenderness and oedema.
>
> In acute lesions an actual increase in temperature may be felt in the skin overlaying it, but evidence is vague and extremely fleeting, and not much reliance should be placed on it. The skin overlaying the lesion will feel tense and relatively immobile owing to the congestive effect of the lesion below it. In the chronic lesion, temperature changes may or may not be present . . . the skin overlaying a chronic lesion may be either normal or reduced as a result of ischaemia of the underlying tissues. This is characteristic of chronic fibrotic change.

Myron Beal (1983) has researched common paraspinal palpatory findings (mainly involving upper thoracic facilitated segments) relating to patients with acute and chronic cardiovascular disease and seems to place less importance on the reliability of superficial evidence as compared with deeper palpated changes:

> Skin texture and temperature changes were *not* apparent as consistent, strong findings, compared with the hypertonic state of the deep musculature. In one case of

> acute myocardial infarction there was an observable increase in the amount of subcutaneous fluid.

John Upledger, however, does not concur with Beal as to skin evidence being unreliable in such diagnosis (Upledger 1983). He describes use of the skin in localised diagnosis using a 'drag' palpation in precisely the areas in which Beal feels that deeper palpation is more reliable (see Upledger's description of this in the Special Topic 5 – 'Red, white and black reaction').

The difference of opinion between Beal and Upledger may have resulted from different palpatory methods, or, more likely, simply because Beal finds the evidence from the muscles more reliable (see Ch. 4). He does, after all, say that the skin evidence is not 'as consistent' as the muscle evidence, not that skin evidence is not available or reliable.

Scars

Karel Lewit (1987) brings into focus yet another skin phenomenon which is often overlooked, the scar. In his discussion of conditions which are resistant to treatment, or where symptoms do not seem to be explained by findings, he suggests we look for scar tissue:

> The German literature uses the term *storungsfeld* – 'focus of disturbance'. This is frequently an old scar after injury or operation, often a tonsillectomy scar. This focus-scar is usually tender on examination, with pain spots and surrounded by a hyperalgesic zone.

Such scars may act as 'saboteurs', he believes, requiring special attention. He suggests deep palpation for pain spots near scars, assessing for increased resistance ('adhesions') as well as for HSZ, by skin stretching. If release of the skin by stretching fails to resolve the situation (simple skin stretching is usually very successful with scars, says Lewit), needling (into pain spots) or local infiltration injections may be called for. When treatment has been successful, the local skin resistance and the pain spots should vanish, and the patient's symptoms should start improving.

Upledger and Vredevoogd (1983) discuss scar tissue, illustrating its importance with the example of a patient with chronic migraine headaches which resulted from chronic fascial drag produced by an appendectomy scar:

> Deep pressure medially on the scar produced the headache; deep pressure laterally caused relief of the headache. Mobilisation of the scar was performed by sustained and deep but gentle pressure.

This resulted in freedom from headaches, according to these respected authors, who add:

> Spontaneous relief of low back pain, menstrual disorders and chronic and recurrent cervical somatic dysfunction also occurred following cicatrix [scar] mobilisation.

The influence of fascia on soft tissue function and dysfunction will be considered in the next chapter.

EXERCISE 3.16 *Time suggested* 3 MINUTES

Palpate a scar. Feel the tissue itself, and see how the surrounding tissue associates with it. If possible, palpate a recent and also a very old scar. Compare them. See if local tenderness exists around the scar. See how the skin elasticity varies when this is the case.

Can you release the skin by sustained painless stretching?

Record your findings relating to the feel of as many scars as you come across, recent and of long standing.

CTM assessment

In the discussion of Lewit's hyperalgesic skin zones earlier in this chapter, brief mention was made of the German system *Bindegewebsmassage* or connective tissue massage (CTM), named by physical therapist, Elizabeth Dicke (1954). The methods used – the application of patterns of repetitive dry-contact, strong friction stroke, aimed at evoking reflex responses – do not concern us in this text. However, the diagnostic methods used to identify areas (zones) suitable for treatment are significant.

EXERCISE 3.17 *Time suggested* 3–5 MINUTES FOR EACH METHOD

Dicke's method of diagnosis is discussed by Irmgard Bischof and Ginette Elmiger (Bischof & Elmiger 1960). The subject is seated or lying prone (see Fig. 3.4):

> Both hands, applied flat, displace the subcutaneous tissues simultaneously against the fascia, with small to and fro pushes. The degree of displacement possible will depend upon tension of the tissues. It is important that symmetrical areas [i.e. both sides of body] be examined simultaneously.

As a palpation exercise try to identify local areas where your 'push' of skin on connective tissue reveals restriction as compared with its opposite side.

Use one or all of the methods previously used ('drag', scanning, skin elasticity etc.) to evaluate areas so identified further.

Do the different methods confirm each other?

EXERCISE 3.18 *Time suggested* 3 MINUTES

Dicke also suggests:

> By pulling away a skin fold from the fascia, the degree of tissue tension and displacement may be determined. Three different levels of displacement are distinguished (Fig. 3.5):
>
> 1 the most superficial displacement occurs between skin and subcutaneous tissues and is easier to find in children and in old people because the displacement is slight;
> 2 the main displacement occurs between the subcutaneous tissue and the fascia;
> 3 the deepest displacement layer is between the fascia and the interstitial connective tissue. The movement is most evident upon large, flat areas such as the lumbosacral area, on the sacrum, and in regions of the tensor fascia lata.

By gently grasping and lifting bilateral skin folds, see whether you can make any judgments using Dicke's comments.

Compare your findings using this method with those achieved by 'skin on fascia pushes' (Exercise 3.17) as well as 'skin drag', 'skin stretching/elasticity' and 'scanning'.

Note your findings.

Do the methods confirm each other?

Is one method more accurate (for you) than others as a means of assessment of local dysfunction?

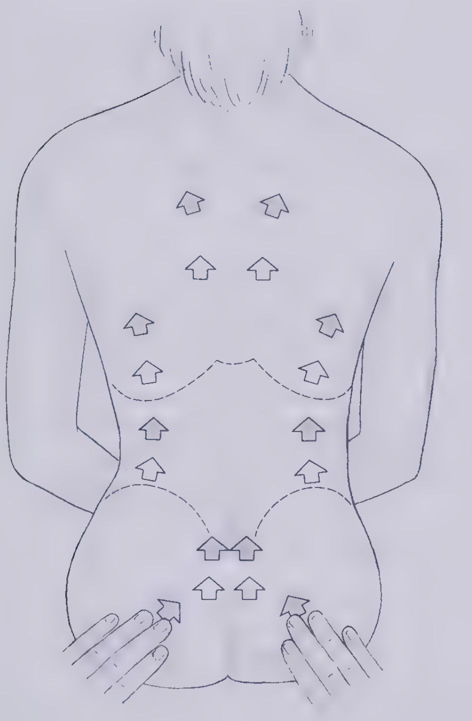


Fig. 3.4 Testing tissue mobility by bilaterally 'pushing' skin with fingertip.

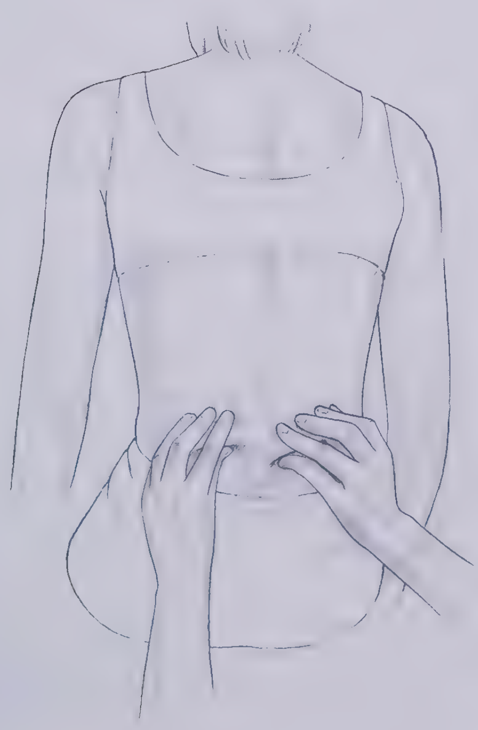


Fig. 3.5 Assessing bilateral elasticity of skin by lifting it in folds.

DISCUSSION REGARDING CTM EXERCISES 3.17 AND 3.18

Apart from these diagnostic methods, CTM uses a further 'diagnostic stroke' which employs a two-finger contact (patient seated, as a rule) which runs longitudinally, paravertebrally, starting at the level of L5 up to the level of the 7th cervical spinous process. As the stroke (pull) starts, the upper layers of displacement are superficial and gentle; they are followed by a slower, deeper stroke which pulls on subcutaneous tissue and fascia. Displacement of the deeper tissue, as well as interstitial tissue, is accomplished by a deep and slow pull along the same 'track'.

This highlights an important point, namely that the desired depth effect is obtained by the *speed* of the strokes *as well as the amount of pressure*. This is true also of neuromuscular technique, and is a most useful tip for those attempting to enhance palpatory skills.

'Slow down, the information is there and it cannot be hurried.'

WHAT SHOULD SUCH STROKES SHOW?

Healthy tissue elevates or 'mounds' ahead of the stroking digits (2–3 cm ahead). When an area of resistance is reached, increased tension is felt and further displacement of the skin becomes difficult or impossible. Folds of skin will be formed in front of the advancing stroke in such areas and the mass will become larger. The progress of the stroke will also become slower, as compared with the stroke across healthy tissue. Factors such as age of patient, constitutional state, posture and the area being tested, will all alter the anticipated findings.

It is easier to displace skin against underlying tissue in slim individuals, with little fatty tissue. Obese individuals have a higher fat and water content subcutaneously, making displacement more difficult.

Dicke pointed out that even before use of the diagnostic stroke, it is often possible to see reflex areas. They are characterised by being retracted or elevated. Retracted bands of tissue are commonly seen in areas such as the neck, lower thoracic border and over the pelvic and gluteal areas. Depressed or flattened areas are seen over the thorax, the scapulae and between the thoracic spine and the scapula as well as over the upper iliac tissues and the sacrum. Flat elevations are visible in many cases around the 7th cervical spinous process, on the outer border of the scapulae or around the sacrum.

These raised, or depressed tissue areas are not amenable to dissipation by massage and represent chronic reflex activity. They are considered to be viscerocutaneous reflexes (viscerosomatic in other words) resulting from altered blood supply leading to colloidal changes in the cells and tissues.

What is revealed by these diagnostic strokes is alteration in vascular skin reaction, tissue tension, tissue density, tissue sensitivity and often tissue displacement.

Valuable clinical evidence can be gathered using these strokes and 'pushes'.

For a deeper understanding of this system, Dicke's work should be studied in depth. Fortunately this system is now taught world-wide by her followers and is much used by physical therapists, massage therapists and some doctors, osteopaths and chiropractors who employ soft tissue methods.

We now have something of an answer (only the beginning though, as will become clear) to questions such as those raised by osteopathic physician Paul Van Allen (Van Allen 1963), who asks:

> How does one palpate? This seems too absurdly simple to bother with an answer. Yet Pottenger wrote half a book on *Light Touch Palpation in Visceral Disease*, without pretending to be exhaustive. 'Stroking' is a means of determining skin texture, a means

of setting up vibrations in the tissues. Pottenger was able by this means to outline the heart, liver, spleen or an area of consolidation in the lung.

Refer to Exercise 2.5 in Chapter 2 for a method for enhancement of specific palpatory skills relating to assessment of 'density' of tissues, suggested by Dr Van Allen. See how long it takes you to palpate the borders of an organ using light touch.

EXERCISE 3.19

Time suggested
20–30 MINUTES

If you have now practised the various exercises involved in assessing temperature variations and 'skin drag' (Exercises 3.1–3.9) as well as Lewit's method of identification of hyperalgesic skin zones using skin stretching (Exercises 3.10–3.16) and Dicke's method (Exercises 3.17 and 3.18) you are ready to attempt an assessment in which you compare the reliability and accuracy of these methods with each other, on one individual.

Obviously, such comparisons will only be valid if you use the same subject/model. Try to ensure that you use all the skin assessment variations described on the same subject, and compare results as you use the following palpation methods:

- Direct palpation for heat variations
- Assessment of heat variables 0.5 cm above the surface
- Light stroking for 'skin drag' variations
- Skin stretching for identification of HSZ (finger and side of hand contacts)
- Evaluation of scar tissue (if available)
- Connective tissue 'pushes' to identify adherence of skin to underlying connective tissue
- Connective tissue 'diagnostic stroke' method.

Do these findings agree with each other?

They should. If not try again, and again.

Incorporate as many of those methods which seem accurate and with which you are comfortable into your usual pattern of assessment.

Skilled skin palpation allows you to target areas of dysfunction below the surface and it is towards the structural information lying in the muscles themselves that our attention is now focused.

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Is it a muscle or a joint problem?

Is the patient's pain a soft tissue or a joint problem?

How can we very rapidly make this differentiation?

There are several simple screening tests we can apply, in answer to these questions, based on the work of Professor Freddy Kaltenborn, of Norway (Kaltenborn 1980):

1. Does passive stretching (traction) of the painful area increase the level of pain? If so, it is probably of soft tissue origin (extra-articular).
2. Does compression of the painful area increase the pain? If so, it is probably of joint origin (intra-articular) involving tissues belonging to that anatomical joint.
3. If active (controlled by the patient) movement in one direction produces pain (and/or is restricted), while passive (controlled by the operator) movement in the *opposite* direction, also produces pain (and/or is restricted), the contractile tissues (muscle, ligament, etc.) are implicated.
   This can be confirmed by resisted tests, described below.
4. If active movement and passive movement in the *same* direction produce pain (and/or restriction), joint dysfunction is probable.

This can be confirmed by use of traction and compression (and gliding) tests of the joint (see Special Topic 8 on 'Joint Play').

Resisted tests are used to assess both strength and painful responses to muscle contraction, either from the muscle or its tendinous attachment.

This involves producing a maximal contraction of the suspected muscle while the joint is kept immobile somewhere near the middle of range position. No joint motion should be allowed to occur. This is done after Test 3 above, to confirm a soft tissue dysfunction rather than a joint involvement. Before doing the resisted test it is wise to perform the compression test to clear any suspicion of joint involvement:

- If, on resisted testing (Cyriax 1962) the muscle seems strong and also painful, there is no more than a minor lesion/dysfunction of the muscle or its tendon.
- If it is weak and painful, there is a more serious lesion/dysfunction of the muscle or tendon.
- If it is weak and painless, there may be a neurological lesion, or the tendon has ruptured.
- A normal muscle tests strong and pain-free.

It is suggested that you test all these statements on conditions of known origin.

Obviously, in many instances, soft tissue dysfunction will accompany (precede, or follow on from) joint dysfunction. Joint involvement is less likely in the early stages of soft tissue dysfunction, than (for example) in the chronic stages of muscle shortening. There are few joint conditions, acute or chronic, without some soft tissue involvement.

The tests described above will give a strong indication, though, as to whether the major involvement in such a situation is of soft or osseous structures.

Examples of a joint assessment involving compression, would be the ones described by Blower and Griffin (1984) for sacroiliac dysfunction. This showed that pressure applied over the lower half of the sacrum, or over the anterior superior iliac spines, were diagnostic of sacroiliac problems (possibly indicating ankylosing spondylitis) if pain was produced in the sacrum and buttocks. Soft tissue dysfunction would not produce painful responses with this type of compression test.[1]

[1]Lumbar pain is not significant if it occurs on sacral pressure, as this action causes movement of the lumbosacral joint, as well as some motion throughout the whole lumbar spine.

Joint or muscle dysfunction – which is primary?

Janda (1988) has an answer to the emotive question when he says that it is not known whether dysfunction of muscles causes joint dysfunction or vice versa.

He points out, however, that since clinical evidence abounds that joint mobilisation (thrust or gentle mobilisation) influences the muscles which are in anatomic or functional relationships with the joint, it may well be that normalisation of the muscles' excessive tone in this way is what is providing the benefit, and that by implication, normalisation of the muscle tone by other means (such as MET) would provide an equally useful basis for a beneficial outcome and joint normalisation. Since reduction in muscle spasm/contraction commonly results in a reduction in joint pain, the answer to many such problems would seem to lie in appropriate soft tissue attention.

Liebenson (1990) takes a view with a chiropractic bias:

> The chief abnormalities of (musculoskeletal) function include muscular hypertonicity and joint blockage. Since these abnormalities are functional rather than structural they are reversible in nature . . . Once a particular joint has lost its normal range of motion, the muscles around that joint will attempt to minimise stress at the involved segment.

After describing the processes of progressive compensation as some muscles become hypertonic while inhibiting their antagonists, he continues: 'What may begin as a simple restriction of movement in a joint can lead to the development of muscular imbalances and postural change. This chain of events is an example of what we try to prevent through adjustments of subluxations.'

We are left, then, with one view which has it that muscle release will frequently normalise joint restrictions, as well as a view which holds the opposite, that joint normalisation sorts out soft tissue problems, leaving direct work on muscles for rehabilitation settings and for attention if joint mobilisation fails to deal with long-term changes (fibrosis etc.).

It is possible that both are to some extent correct; however, what emphasis each therapist/practitioner gives to their prime focus – be it joint or be it soft tissues – the certainty is that what is required is anything but a purely local view, as Janda helps us to understand.

SPECIAL TOPIC EXERCISE

Test the various guidelines described above (active and passive movement in the same, and in different directions; as well as compression–distraction) to establish whether what you are dealing with is purely joint, or purely soft tissue dysfunction, and decide whether these methods are accurate. Remember that it is common for both a joint and soft tissues to be distressed simultaneously, which might provide you with conflicting evidence (i.e. both joint and soft tissue involvement). If this is indeed the case, knowledge that there is joint involvement may influence your therapeutic approach.

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4 Palpating for changes in muscle structure

Unlike the skin, which is there for us to see as well as touch, once we begin to explore the inner regions of the body and try to deduce just what state the soft tissues are in, far greater skills are required if we are to successfully gather information regarding the current tissue state, the likely causes and probable prognosis.

General guidance can be given as to what superficial muscular tissues *should* feel like under given conditions, and it is not difficult to learn to read such information by gentle palpation.

But it is not just the relative state of tone, tension, contraction, flaccidity and so on which need to be assessed, important though these factors are; there are also fluid fluctuations through connective tissue, and other rhythmic patterns, which indicate the degree of normality, or otherwise, of the soft tissues, as well as possibly having wider implications. In order to make sense of these fluid movements when it comes to palpating at greater depth – or understanding more subtle energy – we need to employ fairly refined skills.

Some of these have been well explored and explained by diligent researchers, among them John Upledger (1987), who discusses the mechanics which govern vital physiological motions in some of the exercises in Chapter 2; Rollin Becker, in his articles on 'Diagnostic touch' (Becker, 1963, 1964, 1965); Fritz Smith (1986); and Stanley Lief, the prime developer of neuromuscular technique, whose work has been described in my books (Chaitow 1988, 1996a).

The techniques and exercises based on the work of these and other developers of the art and science of palpation have expanded the potential for skilful assessment of the pathophysiological state of muscles and other soft tissues. In this chapter we will be reviewing methods aimed at determining *structural* changes in the soft tissues (increased tone, shortening, fibrous development, periosteal pain points, trigger points and so on) whereas in the next chapter it is the palpation of those *functional* changes which can be 'read' through muscles and other soft tissues which will be considered.

How and why changes occur in the soft tissues

Before we delve into methods of palpation of soft tissue structures, we should briefly review the reasons why the changes we are trying to evaluate occur. A host of interacting factors have the ability to increase muscular tone, including stress response, postural anomalies and overload, repetitive physical actions (sport, occupation, hobbies, and so on), emotional distress, trauma, structural factors (congenital short leg, cranial distortion at birth) visceral and other reflex activity. These can be summarised as *overuse, misuse,* and *abuse* of the musculoskeletal structures.

When tone in a muscle is initially increased for any length of time, a degree of local irritation results, due to two factors:

1. Local tissue hypoxia or ischaemia, involving inadequate oxygenation of the tissues due to increases in tone and demand.
2. Relative inadequacy of drainage and removal of metabolic waste products.

This combination leads first to fatigue, then to irritation, and in some instances to inflammation over time. This might be termed the 'acute' phase of the body response to any persistent increase in tone. During this stage, discomfort is probable and pain possible, creating a cycle in which even greater tone and therefore more pain would be likely. Palpation would indicate the tissues to be warmer than surrounding tissue, possibly oedematous, and usually very sensitive.

Local adaptation syndrome

This phase may be equated with the alarm stage in Selye's (1984) general adaptation syndrome (GAS). Indeed, all elements of the GAS can be scaled down to a local level (a single muscle, or joint, for example) in which the same stages are passed through (alarm, adaptation, collapse). This is then referred to as the local adaptation syndrome (LAS).

As would be expected according to both GAS and LAS, after the acute phase would come the phase of adaptation. In the muscular sense this means that if increased tone is maintained for longer than a few weeks, a chronic stage evolves. This is characterised by indications of structural changes in the supporting tissues with the development of fibrotic modification.

Some see these alterations as an 'organising' response, in which tone is replaced by concrete supportive bands. The body is seen to be adapting to the seemingly permanent demand for increased tone in the musculature.

The degree of relative ischaemia, hypoxia and toxic debris retention increases at this stage, varying from person to person (and region to region) in relation to features such as age, exercise and nutritional status and so on. Any pain noted would probably have a deep, aching quality and palpation would reveal a fibrous, stringy texture along other palpable changes, perhaps involving oedema; it is during this adaptation stage that early signs would be noted of myofascial trigger point development, in which discrete areas of the affected soft tissues would evolve into localised areas of facilitation.

Highly sensitive, discrete and palpable tissue changes evolve which are themselves capable of sending noxious impulses to distant target areas where pain and new 'crops' of embryonic trigger points develop. Bands of stress fibres commonly become evident in the hypertonic tissues, and the muscles affected in this way begin to place increasing degrees of tension on their tendons and osseous insertions. (See notes on connective tissue diagnostic methods in Chapter 3 for commentary on palpable bands and zones).

As all this occurs, tendon changes begin, at first evoking an acute and later an adaptation response which progresses on to degenerative changes. As these stresses begin to affect the tendons and as these begin to adapt, it is usually possible to palpate very tender periosteal pain points (PPP), or to note early signs of joint dysfunction.

The natural sequence described by Selye, in which tissues progress from an acute phase to an adaptation phase (which can last many years) and ultimately (when adaptive capabilities are exhausted) to the final phase of degeneration and disease, is the natural consequence of any unrelieved chronic hypertonicity. The end result could take the form of arthritic joint changes or chronic muscular or other soft tissue dysfunction.

POSTURAL MUSCLES REACT DIFFERENTLY TO PHASIC MUSCLES

As will become clear, the abbreviated pattern of LAS, outlined above, has quite different effects in postural (stabilising) muscles as compared to what takes place in active phasic muscles similarly stressed.

The research work of Lewit, Janda and others has shown that postural muscles (see p. 88 for a fuller explanation of this phenomenon) when chronically abused, misused, overused, will tend to shorten and eventually to contract. Phasic muscles, however, when faced with the same insults, will tend to weaken but will not shorten.

Palpation tasks

The palpating hand(s) need to uncover the locality, nature, degree and if possible the age, of soft tissue changes which take place in the sequence outlined above.

As we palpate we need to ask:

- Is this palpable change acute or chronic (or, as is often the case, an acute phase of a chronic condition)?
- How do these palpable soft tissue changes relate to the patient's symptom pattern?
- Are these palpable changes part of a pattern of stress-induced change which can be mapped?
- Are these soft tissue changes painful, and if so what is the nature of that pain?
- Are these palpable changes active reflexively; are they trigger points (do they refer symptoms elsewhere)?
- Are they the result of trigger points elsewhere, or of other reflex activity (see viscerosomatic reflex activity p. 64)?
- Are these changes present in a postural or phasic muscle group? (See later in this chapter, p. 92 for methods of assessing shortened postural muscles.)
- Are these palpable changes the result of joint restriction ('blockage', subluxation, lesion) or are they contributing to such dysfunction?
- In other words, we need to ask ourselves *'What am I feeling, and what does it mean?'*

Viola Frymann (1963) helps to illuminate the need for some thought as to how deeper palpation might be carried out as we search for such changes, acute or chronic:

> A slightly firmer approach brings the examiner into communication with the superficial muscles to determine their tone, their turgor, their metabolic state. Penetrating more deeply, similar study of the deeper muscle layers is possible [and] the state of the fascial sheaths and condensations may be noted.

LIGHT AND VARIABLE TOUCH NEEDED

The words 'firmer' and 'penetrating more deeply', if taken too literally could lead to 'counter-productive' palpation; if these recommendations were to involve a noticeable increase in applied pressure, two negative possibilities might eventuate.

Firstly, there could be a defensive retraction of the palpated tissues, tensing superficial musculature, making assessment difficult or its interpretation invalid; and secondly, there is likely to be a lessening of sensitivity as pressure increases on the surface of the palpating digit, especially if it is sustained for more than a short time, greatly affecting the accuracy of perception.

Palpation solutions

Different solutions have been found in order to overcome these problems. In Lief's system of neuromuscular evaluation, which will be outlined later in this chapter (p. 69), these problems are largely overcome by use of what is termed 'variable' pressure, in which the digital contact matches the resistance it meets from the tissues. A subtle and effective method is therefore available for fairly deep assessment of soft tissue status, with little evidence of protective tensing by the tissues, or of much loss of sensitivity in the thumb or finger contact.

Others have approached this problem differently, most notably John Upledger with his 'melding' and synchronisation approach, which leads to the palpating instrument doing 'exactly what the patient's body is doing and would otherwise be doing, even if you weren't there'.

Rollin Becker (1963) uses what he describes as a 'fulcrum' palpation technique, which increases perception of tissues at depth without greatly increasing pressure on the skin surface. Fritz Smith (1986) makes his assessments in yet another way, using among other methods, what he terms a 'half-moon' vector contact. The first section of this chapter will look at palpation of structure (as opposed to the palpation of function involved in assessment of rhythmic fluctuations and pulses) including various ideas and recommendations for palpation of the soft tissues, derived from a number of prominent physicians and researchers from various schools and disciplines, including Magoun, Tilley, Lief, Nimmo, Dicke, Lewit and Beal. This will be followed by a summary of recommended methods for sequential assessment of shortened postural muscles, the importance of which will be explained as we progress.

Interspersed amongst this review material will be a number of exercises which can enhance sensitivity when practising one or other of these methods. There is inevitably going to be a degree of overlap in the concepts of these innovators of palpatory (and therapeutic) technique, but each has a unique insight into the needs of the practitioner who is trying to make sense of physical problems as they 'read' the body.

It is suggested that all the methods outlined in this and the next chapter be attempted, practised, and assessed for their individual degree of usefulness. Many therapists use all these methods (and others) in appropriate settings.

Palpation and assessment of structure

Jiri and Vaclav Dvorak outline their basic requirements for sound palpation of structures of the musculoskeletal system (Dvorak & Dvorak 1984). They insist that a healthy anatomical structure cannot be differentiated from surrounding structures whereas 'a pathologically altered structure, however, can be exactly differentiated from the surrounding healthy tissue'.

Rolf (1962) reminds us of the importance of keeping fascia in mind when we try to make sense of what we are palpating:

> Our ignorance of the role of fascia is profound. Therefore even in theory it is easy to overlook the possibility that far-reaching changes may be made not only in structural contour, but also in functional manifestation, through better organisation of the layer of superficial fascia which enwraps the body . . . Osteopathic manipulators have observed and recorded the extent to which all degenerative changes in the body, be they muscular, nervous, circulatory or organic, reflect in superficial fascia. Any degree of degeneration, however minor, changes the bulk of the fascia, modifies its thickness and draws it into ridges in areas overlying deeper tensions and rigidities.

Apart from starting to palpate from the site where the patient localises the symptom (usually pain), the Dvoraks' other major emphasis is on the therapist having a 'three dimensional anatomical perception' of what is being palpated, a useful description to emphasise the need for a sound anatomical knowledge.

Such knowledge leads, they suggest, to the application of 'adequate pressure with regard to area, force and direction' as 'the muscles, ligaments and other structures are located above and next to each other in the specific topographical region'.

They suggest beginning at the site of pain, localising this and palpating precisely for hard, bony structures; along tendons for information about the insertion; making comparisons not with symmetrically placed sites but with 'locations with the same anatomical arrangement and sites undergoing no changes'; differentiating from similar changes in adjacent structures by palpating the course, shape and opposite poles of attachment (origin and insertion) of such structures; identification of myotendinosis by use of stroking and pressing palpation, performed perpendicular to the direction of the fibres until origins and insertions are reached.

Compare this description with the diagnostic methods of Lief's neuromuscular technique, and Nimmo's methods, as outlined below, and decide which approach best suits your way of working.

The facilitated segment

Harold Magoun is renowned as one of the giants of osteopathic medicine, both clinically and theoretically. Writing in the *Journal of the American Osteopathic Association* Magoun (1948) made an important contribution to our understanding of the structural analysis of muscular tissues. Describing what the searching practitioner will uncover, he says:

> What should palpation reveal? First he finds that the soft tissues are abnormal. Then he must determine if the condition is a primary lesion (local) or a viscerosomatic reflex. While these are often combined, especially if not recent, the differential diagnosis is most important.

He makes the distinction between what will be palpated if the cause of altered soft tissue feel is a local problem or if it is of reflex origin.

The primary lesion involves mainly the deep muscles, producing an inert and irregular rigor; if of long standing, the superficial tissues may be atonic or stringy. The hypersensitivity is usually limited to the deeper tissues.

Magoun points out that there may be oedema in the connective tissue and that if the condition is years old:

> fibrous degeneration takes place with overgrowth of connective tissue, calcification, thickening of the periosteum and so on.

He then differentiates the above description from what would be found if the cause of tissue changes were of reflex (organ disease) origin:

> The uncomplicated viscerosomatic reflex is manifested by a concentration of both superficial and deep tissues, both of which are hypersensitive to the same degree [only deep tissues are expected to be sensitive in primary lesion condition]. *This continuous contraction or exaggerated tone makes the tissues hard and tense in a regular homogeneous manner* [my italics].

Compare this description with that of the research findings of Beal (1983), some 35 years later, when he makes clear the difference in general somatic effect of such a reflex change in which: 'There is no change in the nutrition such as brings about a wasting or ropy condition of the muscles; there is no change in the circulation so as to produce haemorrhage or oedema; there is no ligamentous thickening or fibrositis or oedema about the joint.'

Beal rightly directs attention to correction of viscerosomatic reflex activity by dealing with the causes of the dysfunction of the affected organ, which might involve nutritional, manipulative or surgical intervention.

Tilley and Korr on the facilitated segment

R. McFarlane Tilley (1961) summarised his ideas on digital palpation of the spine as follows:

1. Light palpation to discover areas of increased moisture on the skin surface, indicating increased sweat gland activity.
2. Moderate friction of the skin by heavier stroking to elicit 'red reaction' [see Special Topic 5].
3. Deep palpation to elicit muscular tension and tenderness of tissues upon pressure.

He follows these observations with an examination of the topics of range of motion and restriction. Stress patterns may develop for any number of physical or emotional reasons, he states, as a result of which spinal nerve pathways and cord centres become facilitated (hyper-reactive). When this occurs related spinal musculature become palpably stressed; reflex relationships may be involved, including both vicerosomatic and somaticovisceral pathways.

Professor Irvin Korr (1976) has compared any facilitated area of the spine to a 'neurological lens', in which stress factors which impinge upon any aspect of the body or mind are automatically targeted through the facilitated segment, further focusing and intensifying activity through its neurological structures.

Below (p. 66), we discuss a simple diagnostic palpation method for 'compressing' or 'springing' the paraspinal tissues, by means of which the likelihood of a facilitated segment being present can usually be readily confirmed.

The common palpatory feature of segmental facilitation as it manifests in the paraspinal musculature, is of a feeling of relative rigidity and tenderness, as compared with the segments above and below. As a rule this will involve two or more adjacent segments, rather than just one local segment. If this rigidity results from visceral pathology, it will fail to respond – other than for a very short time – to any manual treatment applied to the muscles or joints involved. These rigid muscular states can, however, be a useful prognostic indicator of change, for better or worse, as therapy is applied to the dysfunctioning organ in question.

Tilley (1961) lists the *possible* meanings of such facilitation in various spinal regions, based on osteopathic clinical observations:[1]

- Myocardial ischaemia: rigid musculature in any two adjacent segments between T1 and T4 (usually left, but not essentially so).
- Cardiopulmonary pathology: any two adjacent segments of muscular paraspinal rigidity in the upper thoracic spine, either side or bilaterally.
- Duodenal pathology: any two adjacent segments of muscular paraspinal rigidity and tenderness, right side thoracic spine, levels 6, 7 and 8.
- Pancreatic dysfunction: any two adjacent segments of muscular paraspinal rigidity and tenderness, bilaterally, thoracics 6, 7, 8 and 9.

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[1]It is important to differentiate between segmental facilitation and spinal 'splinting' which occurs as a result of underlying pathology such as TB spine, vertebral metastasis (primary or secondary) and osteoporosis. Splinting such as this will usually be more widespread than the two adjacent segments associated with segmental facilitation. No attempt should be made to reduce such splinting, which is protective.

- Liver and gall bladder: any two adjacent segments of muscular paraspinal rigidity and tenderness, right side thoracics 8, 9 and 10.
- Chronic fatigue related to 'adrenal exhaustion' or stress: any two adjacent segments of muscular paraspinal rigidity and tenderness in thoracics 9, 10, 11 and 12.
- Renal disease: tenderness and painful on pressure, aggravated by percussion, thoracics 11, 12 and lumbars 1, 2.
- Female and male reproductive organ problems: lumbosacral area tenderness or rigidity.

EXERCISE 4.1

Time suggested
5 MINUTES

If it is possible to examine a patient with known visceral disease (cardiovascular, digestive), palpate the superficial and deeper musculature paraspinally, to see whether a local segment can be identified which matches the description given by Magoun (p. 63). There should be superficial and deep contraction of tissues on one or both sides of the spine, at an appropriate segmental level (see above for Tilley's suggested paraspinal sites), both layers being hypersensitive.

If possible, compare your palpation findings with those adjacent to a known structural (spinal) problem where only the deeper tissues should be contracted and sensitive.

Record your findings in your journal.

EXERCISE 4.2

Time suggested
10 MINUTES

On a suitable patient/model follow Tilley's recommendation to lightly palpate for signs of increased moisture (sweat gland activity) and 'drag', followed by heavier stroking to elicit the 'red response' (see Special Topic 5). Where this is observed, palpate more deeply for deep muscular tension and tenderness.

IDENTIFYING SEGMENTAL FACILITATION BY PALPATION

Myron Beal, Professor in the Department of Family Medicine at Michigan State University College of Osteopathic Medicine, conducted a study in which over a hundred patients with diagnosed cardiovascular disease were examined for patterns of spinal segment involvement (Beal 1983).

Around 90% had 'segmental dysfunction in two or more adjacent vertebrae from T1 to T5, on the left side'.

More than half also had left side C2 dysfunction. Beal reports that the estimation of the intensity of the spinal dysfunction correlated strongly with the degree of pathology noted (ranging from myocardial infarction, ischaemic heart disease and hypertensive cardiovascular disease, to coronary artery disease).

He further reports that the greatest intensity of the cardiac reflex occurred at T2 and T3 on the left. The texture of the soft tissues, as described by Beal, is of interest:

> Skin and temperature changes were not apparent as consistent strong findings compared with the hypertonic state of the deep musculature.

The major palpatory finding for muscle was of hypertonicity of the superficial and deep paraspinal muscles with fibrotic thickening. Tenderness was usually obvious, although this was not specifically assessed in this study. Superficial hypertonicity lessened when the patient was supine, making assessment of deeper tissue states easier in that position.

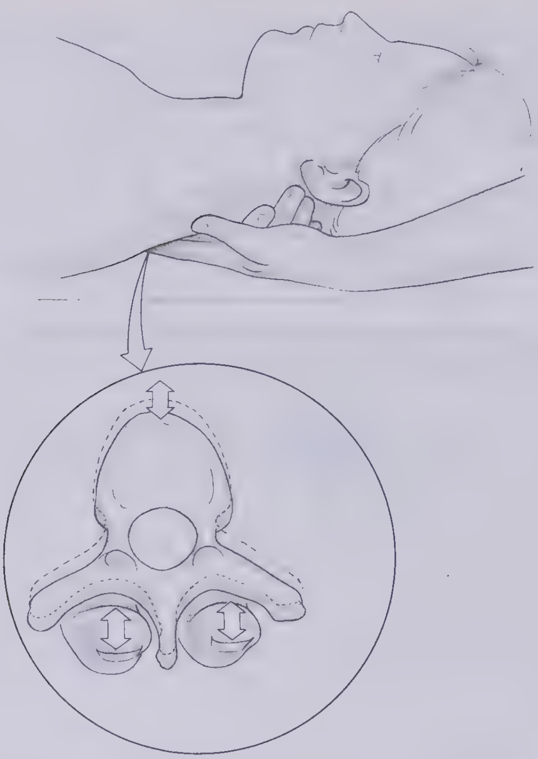


Fig. 4.1 Beal's 'springing' assessment for paraspinal facilitation rigidity associated with segmental facilitation.

Beal's palpation method for identifying thoracic areas of segmental facilitation

With the patient supine, the thoracic spine is examined by the operator sliding the fingers under the transverse processes, and applying an anterior compressive force, assessing the status of the superficial and deep paraspinal tissues and the response of the transverse process to an anterior, compressive, springing force (hence Beal's term of 'compression test' for this method). (Fig. 4.1)

This compression is performed, one segment at a time, progressively down the spine, until control becomes difficult or tissues inaccessible. It is also possible to perform the test with patient seated or side-lying, though neither are as effective as the supine position.

EXERCISE 4.3

Time suggested
5–10 MINUTES

As an exercise in developing this particular skill, it is suggested that some time be spent carefully springing the thoracic paraspinal tissues (and transverse processes) with a supine model/patient/partner precisely as described by Beal in the previous paragraph.

If possible, try to perform such palpation on people with and without known cardiovascular (or other visceral) dysfunction in order to develop a degree of discrimination between normal and abnormal tissue states of this sort.

Compare and record your findings with those gathered when you performed Exercises 4.1 and 4.2.

EXERCISE 4.4

Time suggested
10–12 MINUTES

Use all the elements in Exercises 4.1, 4.2 and 4.3 on the same patient at the same time, and see which methods produce the most reliable evidence of viscerosomatic reflex activity.

Muscles and facilitation

When considering paraspinal soft tissues we must not forget the very small intersegmental muscles in this area, which would be dramatically affected by such facilitation. Korr (1976) reminds us:

> Inter segmental mobility is very finely tuned by the small and easily forgotten muscles that run from segment to segment. Their critical role is not always appreciated in considerations of longstanding degenerative changes. We can see that the large muscles, for example the erector spinae group, initiate large movements, but which mediates the translation of forces from one segment to the next? What concentrates the force of a particular motion at one particular locality, not once but a hundred thousand times in 20 years or so?
>
> The inter segmental muscles are the conditioning agents and if their function is disturbed the result may be a change in the tracking characteristics at that particular junction, which in time will show impaired function.

Korr also reminds us that the more active a muscle is in fine movement, the greater the number of muscle spindles there will be present (as in the hands). He goes on:

> Studies such as those involving the deep occipital muscles have indicated roughly the same ratio between spindles in the small and large muscles [as in the hand i.e. 26:1.5]. *Although disturbances here are not apparent on routine examination they are detectable when the clinician has a well developed palpatory sense.* [My italics.] Locating these disorders and modifying or removing them, insofar as possible, is a most logical and important element in preventive medicine.

Descriptions

It may be useful to consider how the physicians in Beal's study described what they actually felt.

In a separate study of palpatory reliability by Hugo Rosero and colleagues (Rosero et al 1987) the terms most commonly used by palpating physicians to describe their findings in this type of condition were examined. Sixteen descriptive terms were provided for their use. Only five were consistently used to indicate what they were feeling on palpation:

- 'Resistant' (firm, tense)
- 'Temperature/warm'
- 'Ropiness' (cord like)
- 'Heavy musculature' (increased density)
- 'Oedematous'.

Of these, 'resistant' and 'temperature/warm' were the descriptions most commonly used.

Did you feel the 'resistant and warm' tissues when doing Exercises 4.1, 4.2, 4.3 and 4.4?

If not, perhaps you should repeat the exercises.

Supportive Chinese evidence

Paraspinally, in traditional Chinese medicine, lie the Bladder Meridian points. In a study of 33 patients with gastric or duodenal ulceration, some significant findings were produced.

This group of patients were scheduled for subtotal gastrectomy (Cunxin et al 1986) but before operation they were palpated paraspinally:

> The patients lay on their sides and were palpated 2 or 3 times with the physician's thumb along the medial line of the Urinary Bladder Channel of Foot Taiyang (1½ of the subject's thumbwidths lateral to, and parallel with, spinous processes) from above downward. The location of any tender spots (hereafter referred to as reaction spots) and the shape and location of any palpable mass under the reaction point were recorded.

The researchers recorded the degree of pressure required to elicit tenderness on these points and also applied pressure 10 cm lateral to the reaction points as a means of establishing a control for comparison. A week after surgery the same reaction points (and the control points) were reassessed.

Before surgery 89.4% of the patients with peptic ulcer had reaction points overlaying traditional acupuncture points Pishu (U.B.20) and Weishu (U.B.21) at spinal levels T9-T12.

The palpated findings at that time are described as 'mainly cord-like in shape, soft and mobile', averaging 1.19 sq cm in size.

At the time of reassessment these were scarcely palpable and required far greater pressure to elicit tenderness – from a mean of 1.89 kg of pressure to a mean of 3.22 kg of pressure. The pressure required to 'hurt' the control points hardly varied pre- and postoperatively, around 3.5 kg.

The significance of these findings is as follows:

- Somatic reference points resulting from visceral pathology are palpable.
- The findings may range from rigidity, if segmental facilitation is operating, to 'soft and cord-like' if it is not.
- Both the sensitivity and the structural changes alter or vanish in tandem with changes or disappearance of the visceral disease.

Such palpatory findings therefore have prognostic value.

The Chinese study also examined the effect of needling similar reactive points relating to stomach pain, unrelated to ulceration, in over 100 patients. They achieved a 93.8% response rate (improvement or 'cure') which led them to claim:

> Anomalies of internal viscera are manifested on the body surface, and needling these surface reaction points (acupuncture points) produces regulating effects on visceral functions and so can correct the anomaly.

Whether this claim can be substantiated or not is debatable, since causes [smoking, stress, diet and so on] are unlikely to be corrected by acupuncture alone. However, a beneficial influence can certainly be claimed for the methods described.

Palpating skills can therefore provide evidence, from the paraspinal muscles, of visceral dysfunction, and we have Beal's 'compression' test as a guide to what to anticipate if pathology is marked and involves the spinal segment itself.

Neuromuscular technique

Neuromuscular technique (NMT) evolved in Europe in the 1930s as a blend of traditional Ayurvedic (Indian) techniques and methods derived from other sources.

The therapist who created this method of combined diagnostic and therapeutic value was Stanley Lief. He and his son Peter (a graduate of National College of Chiropractic, Chicago) and his cousin Boris Chaitow (also from National) developed the techniques now known as NMT into an excellent and economical diagnostic (and therapeutic) tool. Our attention will be focused on the palpatory diagnostic potential of NMT, for this is a system which allows methodical, sequential, systematic, controlled combing of the major accessible (to palpating digits) sites of trigger points and other forms of localised soft tissue dysfunction.

NIMMO'S CONTRIBUTION

Other methods commonly used in seeking out trigger points, such as those advocated by Raymond Nimmo (taught in the United States, confusingly enough, as 'neuromuscular technique') do not always have this feature of systematic, sequential, *comprehensive* pattern of search which leaves little to chance. Increasingly, the two versions of NMT are being blended, however, so that if there are trigger points present, NMT will probably identify them.

Many 'point' systems

Within shortened muscles (see later in this chapter for a sequence of assessment for short muscles) and within weakened ones as well, there are often to be found an abundant crop of palpable, localised, discrete, sensitive areas of altered structure, which may or may not be active trigger points, but which are all potential trigger points.

All palpable, sensitive, tissue changes are of importance in palpatory analysis. Some will be trigger points but even if such 'points' are not referring symptoms elsewhere they are of potential diagnostic value. (They could be points described in some other system, such as Chapman's neurolymphatic reflexes, Bennet's neurovascular reflexes, active acupuncture points, or Jones's 'tender' points). All such points are characterised by the overlying skin being less elastic than surrounding tissue (see Ch. 3) or by having a measurable degree of lowered electrical resistance.

One simple definition of a trigger point is that it is a palpable, sensitive, localised structure, within the soft tissues, which is sending aberrant, noxious, neurological impulses to a distant site and which, on pressure, refers symptoms – usually involving pain, but with other symptoms possible – to that predictable target area.

Doctors Janet Travell and David Simons, authors of the finest exposition on myofascial trigger points to date (Travell & Simons 1992), give a broader definition of trigger points, which is summarised later in this chapter (p. 80).

Lief's methods

The major sites of these self-perpetuating trouble makers (trigger points) are often close to the origins and insertions of muscles, and this is where NMT probes more effectively than most other systems.

There are numerous ways of finding such localised areas of dysfunction, as witness the methods advocated by Travell, Pruden, Nimmo as described in this chapter and others. However, many practitioners in the United Kingdom and United States have come to the conclusion that few other forms of trigger point assessment measure up to Lief's original methods in terms of ease of application, economy of time and effort, and efficiency of result.

Lief advocated that the exact same sequence of contacts be followed on each occasion, whether assessing or treating, the difference between these modes being merely one of repetition of the strokes, with some degree of added pressure when treating. Lief's recommendation did not, however, mean that the same treatment was given each time, for the essence of NMT is that the pressure applied, both in diagnosis and in therapy is *variable*, and that this variability is determined by the tissues themselves.

Thus, while repetition of a diagnostic or therapeutic stroke might *appear* identical to its predecessor, it would differ depending upon the state of the tissues it was passing through.

This concept will become clearer as we progress.

PALPATING DIGIT

A light lubricant is always used in NMT, to avoid skin drag; the main contact is made with the tip of the thumb(s) – more precisely the medial aspect of the tip, as a rule (see Fig. 4.2). In some regions the tip of the index or middle finger is used instead (see Fig. 4.3), as these allow easier access for insertion between the ribs for assessment (or treatment) of, for example, intercostal musculature. This 'finger contact' is identical with that suggested in *'bindegewebsmassage'* except that in the German system no lubricant is used.

Operator's body mechanics

Practitioner posture and positioning are important when applying NMT, as the correct application of forces reduces dramatically the energy expended, and the time taken to perform the assessment/treatment.

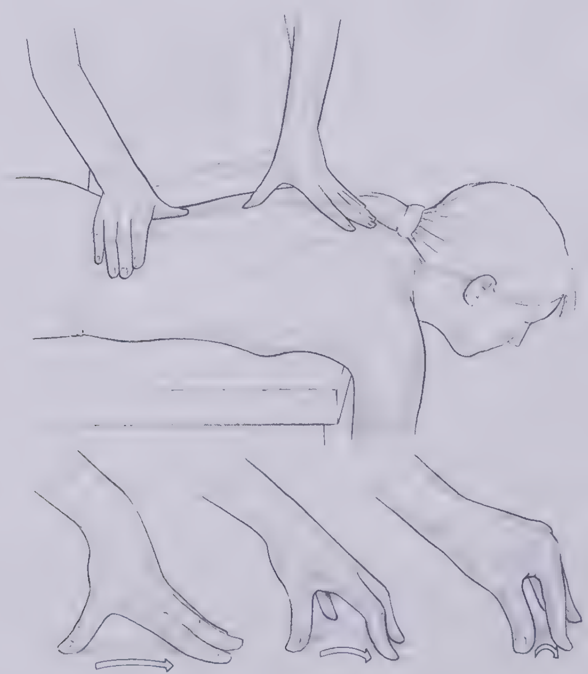


Fig. 4.2 Neuromuscular thumb technique. The operator uses the medial tip (ideally) of the thumb to sequentially 'meet and match' tissue density/tension and to insinuate the digit through the tissues seeking local dysfunction.

Fig. 4.3 Neuromuscular finger technique. The operator utilises index or middle finger, supported by a neighbouring digit (or two), to palpate and assess the tissues between the ribs for local dysfunction. This contact is used instead of the thumb if it is unable to maintain the required pressure.

It is suggested that the examination table should be of a height which allows the therapist to be able to stand erect, legs separated for ease of weight transference, with the assessing arm straight at the elbow. This allows the practitioner's body-weight to be transferred down the extended arm through the thumb, imparting any degree of force required – from extremely light to quite substantial – simply by leaning on the arm. (This presents a problem for a small number of practitioners whose thumbs are too flexible. A solution is for them to use only the finger contact described below.)

Weight transference from the back to the leading leg, with knees slightly flexed, is a sound way of controlling accurately the degree of pressure being applied while saving energy. It is important that the fingers of the assessing/treating hand act as a fulcrum, and that they lie at the front of the contact, allowing the stroke made by the thumb to run across the palm of the hand, towards the ring or small finger as the stroke progresses (see Fig. 4.4).

Control and delicacy of touch critical

This approach produces numerous benefits, the most important being control. Were the thumb merely pushed along through the tissues it would lack the delicacy of fine control which Lief's NMT demands.

The finger/fulcrum remains stationary as the thumb draws intelligently towards it across the palm.

Each stroke, whether it be diagnostic or therapeutic, extends for approximately 4–5 cm before the thumb ceases its motion, at which time the fulcrum/fingers can be moved further ahead in the direction the thumb needs to travel. The thumb stroke then continues, feeling and searching through the tissues.

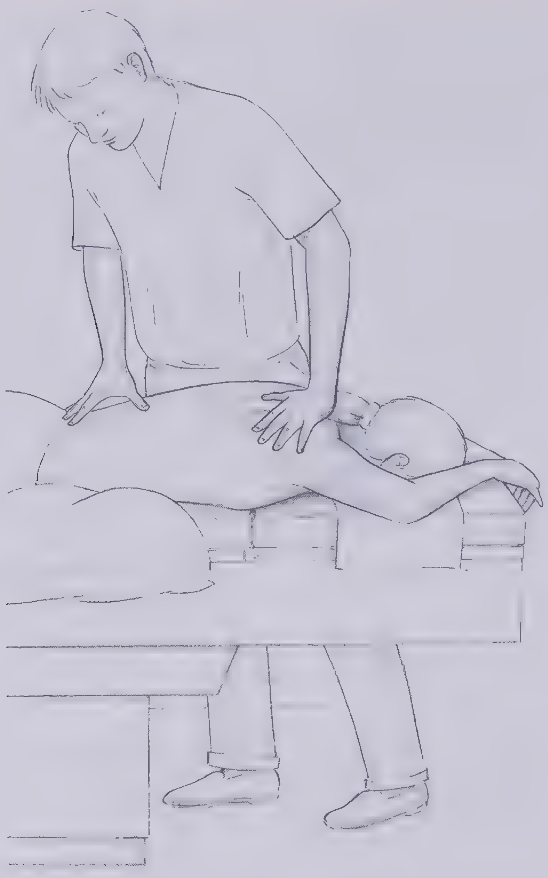


Fig. 4.4 Operator using neuromuscular technique. Note position of feet; straight right arm; right hand position; thumb position.

Variable pressure – the key to successful NMT

Another vital ingredient, indeed the very essence of the thumb contact, is its application of variable pressure (diagnostic pressure is in tens of grams initially) which allows it to 'insinuate' and tease its way through whatever fibrous, indurated or contracted structures it meets.

The degree of resistance or obstruction presented by the tissues determines the degree of effort required.

Thus, in heavily tensed tissues, kilos of pressure may be needed for a subsequent diagnostic stroke. Tense, contracted or fibrous tissues are never simply overcome by force, as this would irritate, and add to dysfunction. Rather, the fibres are 'worked through', using substantial pressure at times, but in a constantly varying manner in which both angles of application of pressure, and degrees of pressure, are constantly altered to meet the particular demands of the tissues.

THE INTELLIGENT THUMB OR FINGERTIP

A degree of vibrational contact, as well as the variable pressure allows the stroke and the contact to have an 'intelligent' feel, and seldom risk traumatising or bruising tissues even when heavy pressure is used. As in the advice quoted in previous chapters, it is a requirement of NMT palpation/assessment that the thumb tip be seen as an extension of the brain, that an intelligent quality be added to the mechanical nature of its travels over and through tissue. The patient picks this up rapidly and senses that the approach is not just a mechanical process but an intimate response to the needs of her pain or dysfunction.

As in much palpation, it is usual to suggest that NMT be applied with eyes closed. A 'nice hurt' is all that is usually complained of, even when pressure is fairly deep.

It is helpful to try to get the medial tip of the thumb to be the precise contact and, as a rule, this is achieved after a little practice, unless there is hypermobility of the thumb joints preventing a stable contact of this sort.

RELAX THE WORKING ARM

Whether thumb or finger contact is used (see below for discussion on finger contact) it is of some importance, both in terms of energy conservation and ease of application of NMT, that the arm and even the hand which is doing the work remain relatively relaxed.

This may seem to be a contradiction in terms. However, it requires some emphasis; if the muscles of the forearm are tensed unduly, or if the fingers which form the fulcrum towards which the thumbs move are rigid, an inordinate amount of energy will be wasted, the arm will tire rapidly, control will diminish, and the 'feel' to the patient will be harsh rather than gentle. Perception will be dulled in the process unless a relatively relaxed state is maintained throughout.

The finger-fulcrum does not grasp, or 'dig into', the tissues on which it rests. It merely alights and rests there, with minimal pressure, as the thumb travels towards it. Effort, if any is required in terms of added pressure, is achieved by shifting body weight through the almost straight arm, not by using arm or hand strength.

FINGER STROKE

When a finger contact is used instead of the thumb (which always travels away from the practitioner in a controlled manner, towards the finger-fulcrum at the end of the extended arm) the hand is drawn towards the operator's body, with the treating finger slightly hooked, as in the methods of *bindegewebsmassage.* This allows for control of the hand and the use of body weight in a different manner to that applied when the thumb is employed. The other major area where finger contact is useful, apart from the intercostal structures, is the lateral pelvic region. Indeed, as the palpating hand is brought towards the operator, over a curved surface, its main usefulness will be perceived. By leaning backwards, weight on the back leg, and allowing the hooked finger to be pulled through the tissues, a moderate degree of counterweight from the patient's inertia can be utilised, increasing depth of penetration with minimal effort for the practitioner.

Standing on the side opposite the one being treated, the hooked finger – supported by its neighbouring digit if necessary – can be inserted deeply into the intercostal space or the lateral pelvic musculature, above the trochanter, and as the practitioner leans back and allows the weight of the patient to apply drag, the fingers are slowly drawn through these tissues, thus assessing the nature of dysfunction in this region (or applying cross-fibre or inhibitory contacts, if these contacts are being used therapeutically rather than diagnostically).

Using NMT

The pattern of strokes which Lief and Chaitow evolved is the one which allows maximum access to potential dysfunction in the shortest time, and with least demand for altered position and wasted effort. These strokes are illustrated, together with the suggested operator foot positions for each region (Figs 4.4–4.8).

Diagnostic assessment involves one superficial and one moderately deep contact only. If treatment is decided on at that time then several more strokes, applied from varying angles, would be used to relax the structures, to stretch them, to inhibit contraction, or to deal with trigger points elicited in the examination phase. Trigger point treatment is possible by use of direct inhibitory pressure followed by stretching of the affected musculature. (This is fully described in Chaitow 1991, 1996a.)

NMT for joints

In assessing (or treating) joint dysfunction or problems involving the extremities, it is suggested that all the muscles associated with a joint receive NMT attention to origins and insertions, and that the bellies of the muscles be assessed for trigger points and other dysfunction. In this way, not only the apparently affected joint receives attention but, at the very least, the ones above and below it.

A full spinal NMT assessment should be accomplished in 12–15 minutes with ease, once the method is mastered. (Treatment of those areas which demand extra attention would add perhaps another 5–10 minutes.)

It is suggested that every patient receive full spinal and abdominal (including thoracic) neuromuscular assessment at least once at the outset of any programme, and that this should be repeated periodically to evaluate changes brought about by whatever treatment is decided upon. It is, of course, not necessary to do a full assessment at each visit and a diagnostic evaluation of a localised region, accompanied by other diagnostic modalities and methods might be all that is necessary.

By following a pattern which does not vary, involving the regions illustrated, and most importantly by *recording whatever findings there are each time,* a clear individual pattern of dysfunction and localised structural changes can be established for each patient, and progress or lack of it readily noted.

With effective use of NMT, not only would localised, discrete, 'points' be discovered, but also patterns of stress bands, altered soft tissue mechanics, contractions and shortenings. Beal's rigid paraspinal tissues (see p. 65) would be readily identified, as would the difference between changes resulting from viscerosomatic activity and localised dysfunction, as described by Magoun earlier in this chapter (p. 63).

NMT, in its therapeutic mode, has proved itself as an adjunct to manipulation, as well as often being able to obviate the need for other soft tissue, or osseous approaches. Even if only the diagnostic approach is adopted, the patient will still have had 'a treatment', and will usually report marked benefits.

Is the term neuromuscular technique accurate?

Knowledge of the function of the neural 'reporting' stations such as the various components of the muscle spindle, and Golgi tendon organs, has allowed us to understand how NMT achieves its results.

When used near origins and insertions, the load detectors – the Golgi tendon organs – are clearly receiving mechanical input, especially if the direction of the stroke is towards the belly of the muscle. The effect of any degree of pressure away from the origin and insertion, towards the belly, would be initially to increase tone, and if sustained would produce reflex relaxation of the muscle.

If pressure is away from the belly of the muscle, near both the origin and insertion simultaneously, there will be a tendency for muscle to lose tone. The spindle registers length of muscle and rate of change of that length, and pressure via NMT would alter length locally, as well as having an inhibitory effect on neural discharge. Pressure inhibition of neural discharge is the main NMT contribution to trigger point treatment. The overall effect of NMT via neural mediation is one in which reduced tone is created in hypertonic structures, over and above the purely mechanical effects introduced by stretching, friction and drainage of fluids and toxic wastes.

Many hours of patient NMT work are required before achieving the degree of sensitivity which allows the smallest local area of dysfunction to be identified. It is this idea of optimum palpatory literacy which should be the objective of those who utilise NMT.

EXERCISE 4.5

Time suggested
15 MINUTES

Begin to practise NMT by concentrating on body position. Make sure your treatment surface is of a height which will allow you to stand in the manner illustrated and described, without hunching or stretching unduly (Fig. 4.3). This position must allow a straight arm position (when the thumb contact is being used) and the ability to transfer weight to increase pressure without arm muscle activity being employed.

After applying a light lubricant, position yourself and place the hand according to the illustration and description, fingers acting as a fulcrum, thumb (medial tip) feeling through the tissues, slowly and with variable pressure.

Practise this, in no particular sequence of strokes, until the mechanics of the body–arm–hand–thumb positions are comfortable and require no thought.

EXERCISE 4.6

Time suggested
20–30 MINUTES FOR EACH SEGMENT (FIGS 4.5–4.10)

Choose an illustrated NMT sequence (4.7A or B is ideal) and follow the strokes precisely as illustrated (although direction of strokes need not follow arrow directions).

Chart any findings you make – tender areas, stress bands, contracted fibres, trigger points and so on. If TPs are found, note target area as well.

In this sequence there are intercostal strokes illustrated.

Use the hooked finger contact to search these regions.

Stand on the left side of patient to assess right intercostals.

Record any findings.

Work slowly and try to follow the descriptions given above regarding the way the thumb insinuates its way through the tissues, never overwhelming them, never gouging or pushing unfeelingly.

Allow your palpating contact to be your eyes.

Work with your eyes closed.

Record your feelings and findings in your journal.

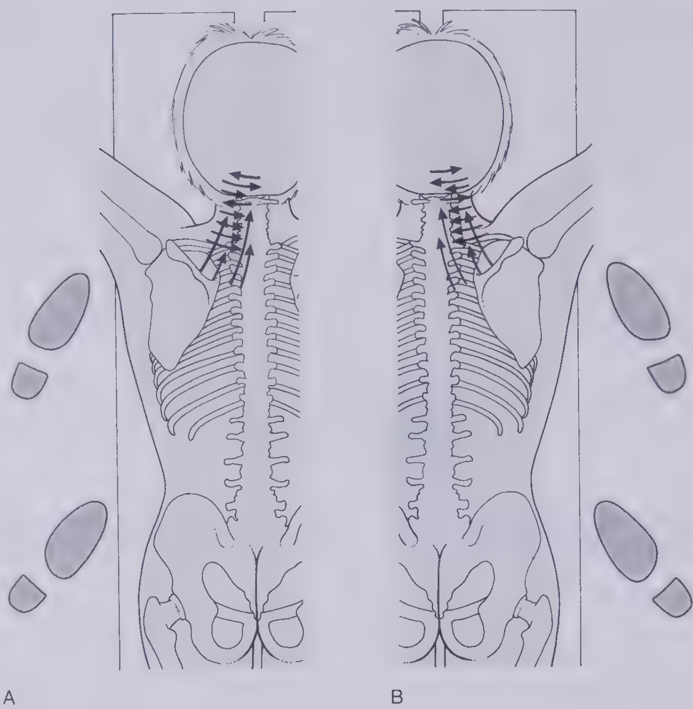


Fig. 4.5A, B Neuromuscular technique. Illustrating position of operator and lines of application.

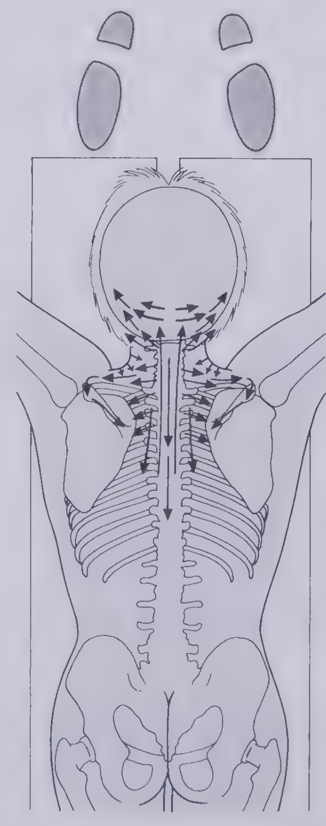
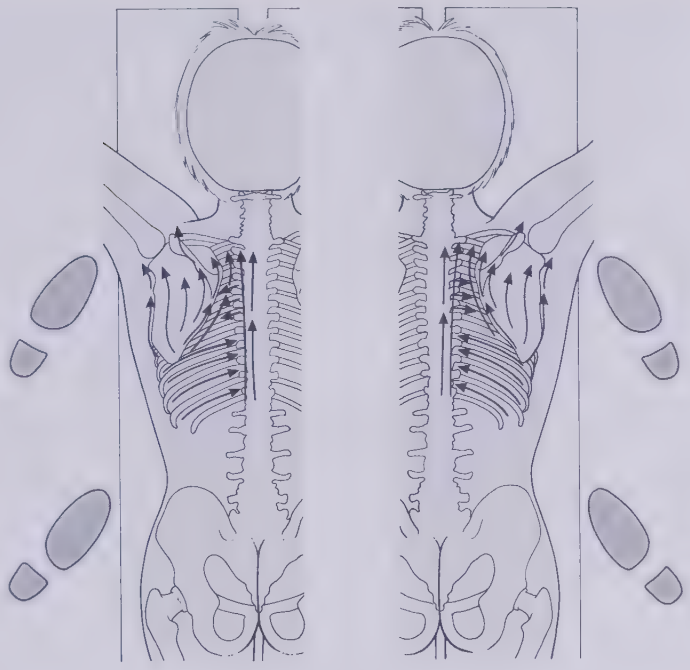


Fig. 4.6 Neuromuscular technique. Illustrating position of operator and lines of application.



A B

Fig. 4.7A, B Neuromuscular technique. Illustrating position of operator and lines of application.

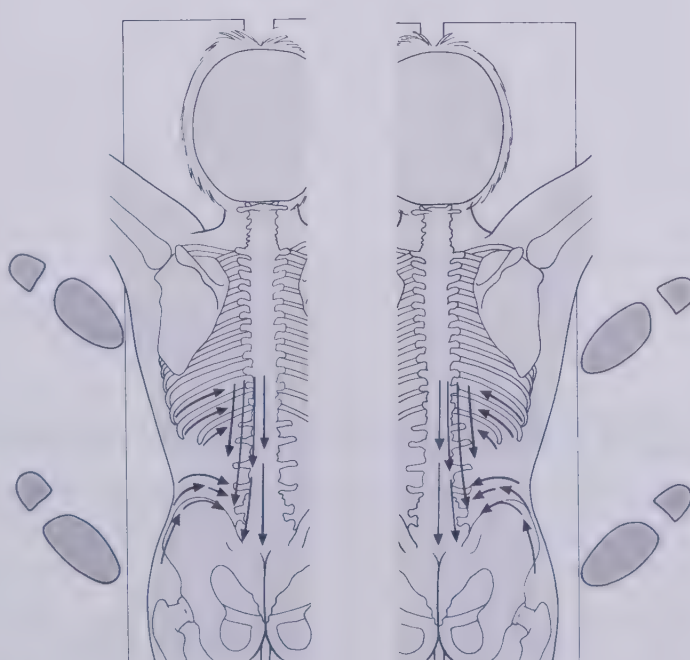


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Fig. 4.8A, B Neuromuscular technique. Illustrating position of operator and lines of application.

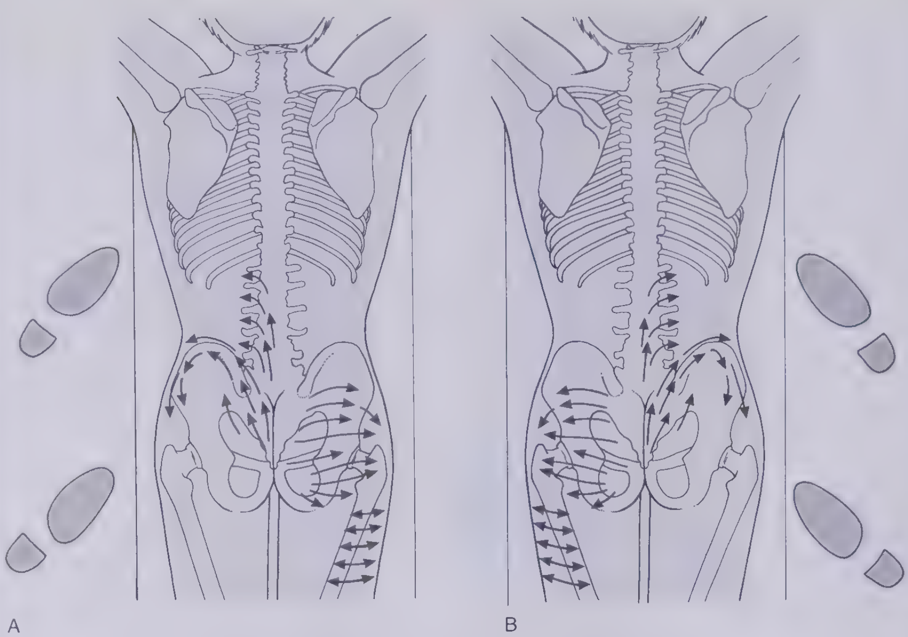


Fig. 4.9A, B Neuromuscular technique. Illustrating position of operator and lines of application.

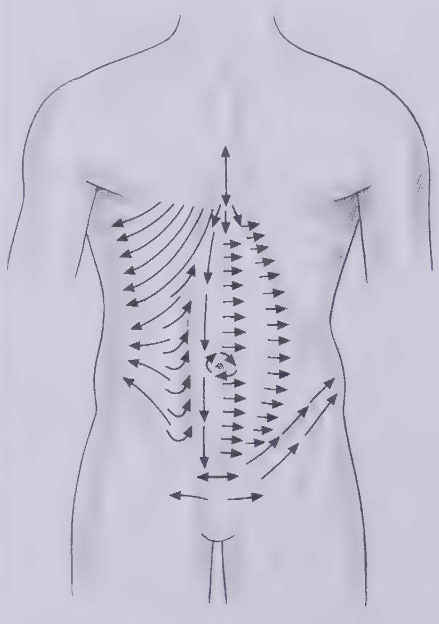


Fig. 4.10 Neuromuscular general abdominal technique. Lines of application.

EXERCISE 4.7

Time suggested
15–20 MINUTES

Practice the abdominal/lower rib cage sequence as illustrated.

Use lighter contacts than would have been appropriate for paraspinal musculature.

See what soft tissue changes you can discover in these tissues, especially near origins and insertions, below the thoracic cage, near the pelvic and pubic insertions, in the lower intercostal structures. If there are scars, search diligently around these for sensitive and tight structures. For greater guidance as to this and other NMT sequences reference should be made to *Modern neuromuscular techniques* (Chaitow 1996a).

EXERCISE 4.8

Time suggested
30–60 MINUTES

Over a period of several weeks, work your way through the individually illustrated segments of the spinal NMT assessment, several times each (taking 20 minutes for each segment at first, reducing with practise to 8–10 minutes and then around 5–6 minutes each).

Then put them all together, doing a full spinal assessment, charting everything you find. At first this will take up to an hour. With practice it can be effectively and thoroughly done in 20–30 minutes.

Chart and record your findings.

Jones's tender points and their significance

Lawrence Jones (1981) described the evolution of his therapeutic methods, which partly depend upon identification of 'tender' points which are found in the proximity of joints which have been stretched, strained or traumatised. These are identified, according to Dvorak and Dvorak (1984) as 'swollen, flat regions in specific parts of the body'.

They are located in deep muscle, often in musculature which lies opposite to that which was stretched at the time of the strain or trauma (i.e., in the antagonist). Thus, in spinal problems resulting from a forward bending strain, in which back pain was complained of, for example, the appropriate 'tender' point would be found on the anterior surface of the body. It would itself be exquisitely sensitive on palpation, but painless otherwise. Once identified, such points are used to position the area/body so that the palpated pain disappears, or reduces substantially.

Tissue tension almost always eases at the same time as the easing of pain in the palpated point. If the 'position of ease' is held for some 90 seconds, there is often a resolution of, or at least marked improvement in, the dysfunction which resulted from the trauma.

This method is fully explained in Jones's book, and a modified version is described in my book *Positional release techniques* (Chaitow 1996b). The reason for its inclusion in this survey of palpation is that awareness of its principles helps the therapist to account for unexplained, and previously unreported sensitive areas uncovered during palpation, whether or not Jones's methods of treatment are then used.

Such points are similar to Ah Shi points (spontaneously tender points) as reported in traditional Chinese medicine (TCM) for several thousands of years. In TCM, however, they are not used in the manner described above, but are considered to be amenable to acupuncture or acupressure methods for as long as they remain sensitive. These points are sometimes also trigger points, in that they may refer pain to a distant target.

EXERCISE 4.9a

Time suggested
5–10 MINUTES PER STRAIN OR POINT

When available, palpate the tissues opposite those effectively stretched during a joint or spinal trauma or strain. These should be in an area not complained of as being painful.

A localised extremely tender area in such tissue may be a 'Jones tender point'. Apply sufficient pressure to the point to cause mild discomfort and then slowly position the joint or area in such a way as to remove the tenderness from the point. Creating 'ease' in the point usually involves producing some degree of increased slack in the palpated tissues. Hold this position for 90 seconds and then slowly return to a neutral position and repalpate.

Has the tenderness reduced, vanished?

Does the joint feel more normal?

Are the tissues more relaxed?

Record your findings and continue to attempt to use this approach a number of times until the concept becomes imprinted.

EXERCISE 4.9b

Time suggested
5 MINUTES FOR EACH PAIN POINT

If no suitable patient is available on which to evaluate the validity of Jones's 'strain' concept, use yourself as a model.

Find by palpation (using one of the simple skin methods described and practised in Chapter 3, such as 'drag') a painful tender area in your upper chest region just below the clavicle (almost everyone is sensitive to pressure in this area).

Sit in an upright chair and apply sufficient finger pressure to cause yourself mild pain.

Rate this pain as a '10' – where 0 is equal to no pain at all.

Take your head and neck into flexion approximating your chin with your chest.

Does the palpated pain reduce? What is the 'score' now?

Find the degree of neck flexion which eases the pain the most and then add also some degree of side-bending and rotation of the neck and head, away from the pain side.

Does the pain get worse?

Now side-bend and rotate the head towards the pain side.

Does the pain get easier?

Find a position of flexion and fine tune the other variables (rotation etc.) until pain is reduced to a score of 3 or less.

Do the tissues being pressed feel 'slacker', more 'easy' when the pain is most reduced, or not?

Any pain points you find on the back of your body, say behind the shoulder, will require (usually) extension and 'fine tuning' using other variables to ease pain and tension.

Record your findings.

Travell and Simons's definition of trigger points (TP)

Travell and Simons (1992), medical pioneers of our understanding of trigger points, describe specific characteristics which identify them from other myofascial changes:

1. A TP which is active causes pain to be referred to a predictable site and it is rarely located where the patient complains of pain.
2. There will be taut fibres (palpable bands) in the muscles which house TPs. Tension on such a band (stretching the muscle actively or passively) will refer pain to the target area.
3. There will be a palpable ropiness or nodularity in muscles which house TPs, and the muscle will have a reduction in its full range of motion.

4. A TP will be found at the site of the most sensitivity/tenderness in any taut band of muscle fibres.

5. If the tissue housing the TP is 'rolled' briskly by fingers or thumb (called 'snapping palpation' by Travell and Simons) so that there is a sudden change of pressure on it, a 'twitch' response is observed. This, they claim, is unequivocal evidence of TP activity, latent or active. Travell and Simons state that the 'jump' sign involves the most sensitive part of the affected muscle shortening visibly when the relaxed muscle is passively stretched, if the firm band of the affected muscle is briskly 'snapped' by the palpating finger at the same time.

6. Sustained digital pressure on the TP (or insertion into it of a needle) usually reproduces the referred pain pattern for which it is responsible.

Other autonomic phenomena may also be evoked, apart from pain.

Dr Travell maintains that the high intensity of nerve impulses from an active trigger point can produce, by reflex, vasoconstriction, a reduction of the blood supply to specific areas of the brain, spinal cord and nervous system, thus producing any of a wide range of symptoms capable of affecting almost any part of the body. Among symptoms reported by Travell, and others, as a direct result of trigger point activity (as proved by their disappearance when the triggers were dealt with) are those listed in Box 4.1.

Box 4.1 Possible trigger point symptoms

Pain
Over- or under-secretion of glands
Numbness
Itching
Localised coldness
Over-sensitivity to normal stimuli
Paleness
Redness of tissues
Spasm
Menopausal hot flashes
Twitching
Altered texture of skin (very oily, very dry)
Weakness and trembling of muscles
Increased sweat production.

In triggers found in the abdominal and thoracic muscles:
Halitosis (bad breath)
Heartburn
Vomiting
Distension
Nervous diarrhoea and constipation
Disordered vision
Respiratory symptoms
Skin sensitivity.

Travell also reports symptoms of 'hysteria' which disappear with successful trigger point work.

EXERCISE 4.10

Time suggested 15 MINUTES

Find, on yourself or a suitable model, a number of trigger points using NMT (or any other palpation method such as 'skin drag'). Establish precisely the 'target' or reference area to which pain is being referred when each trigger point is pressed, or lightly 'squeezed' or 'pinched' if they lie in the sternomastoid, scalenes or upper trapezius muscles (among the most richly supplied sites for triggers). Go through the Simons/Travell guidelines to evaluate whether any of the other possible trigger effects are present, as listed above.

Record your findings.

Raymond Nimmo's assessment plan for TPs

Raymond Nimmo developed a system which he called 'receptor-tonus', which systematically uncovered trigger points and then 'deactivated' them by inhibitory pressure, followed by stretching of the muscles involved if they were hypertonic, or strengthening if they were hypotonic. He also applied himself to what he termed 'noxious' points in ligaments. He diagnosed all noxious points by their sensitivity, claiming that, properly applied pressure would elicit painful points in all hypertonic and hypotonic muscles.

He summarised his approach by saying: 'We have three things with which to deal, to wit: noxious or trigger points, ligament and tonus.'

His method of identification of trigger or noxious points can be understood if we examine the following quote from his lecture notes (Nimmo 1966) which covers examination of the subscapular area for trigger points affecting the shoulder:

> Look about 2.5 inches [6.5 cm] to left of spinous processes on a level with the lower scapula border. Let the fingers glide along until a slight difference is found in the small muscles. If such a point is sensitive it should be treated.

After describing his method for dealing with the trigger (5 seconds sustained pressure, repeated if necessary) he continues:

> After holding pressure on a point, say on the level of the lower scapula border, move in a straight line upwards along the internal margin of the scapula about one inch [2.54 cm]. Here, usually, another point may be found. Treat it in the same manner and move upward about another inch [2.54 cm] and look for another point.

Nimmo states that 90% of all patients will have trigger points in one of these sites and referred pain will be to the shoulder or head from these. He continues by suggesting the practitioner search the body in the sites listed in Box 4.2, where the given percentages (Nimmo's figures) demonstrate active, sensitive, 'noxious' points. Only sensitive points are treated, never non-painful ones (Fig. 4.11).

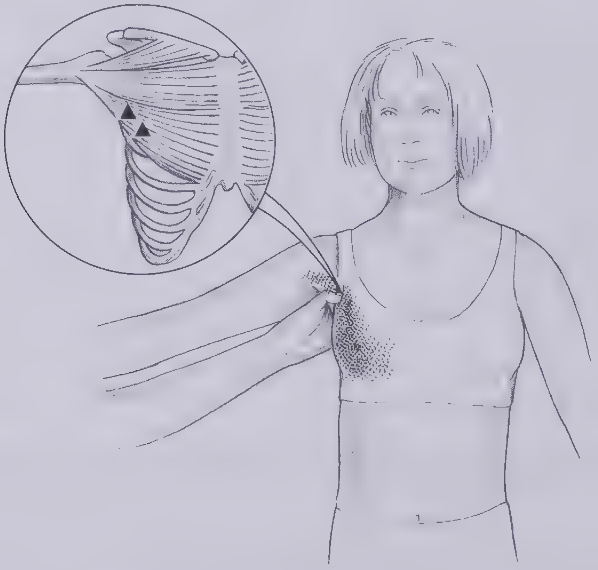


Fig. 4.11 Illustrating trigger points and target area (shaded) in pectoralis major muscle (sternocostal fibres) and ideal palpation method in this area (as well as trapezius, sternomastoid and scalenes).
a) Pincer palpation of trigger points in the sternocostal fibres of the pectoralis major muscle.
b) Referred pain patterns and trigger points (▲) in the left pectoralis major muscle. Solid area shows essential areas of referred pain, and stippled area shows the spillover pain areas. The lateral free margin of the muscle, which includes fibres of the costal and abdominal sections form the anterior axillary fold.

Box 4.2 Nimmo's suggested search sites (and reported percentages) for sensitive points

1. Superior angle of scapula, on tendon of *levator scapulae.* This refers to head, face, neck and shoulders: 90% incidence reported.
2. Between and on the ribs, between the transverse processes and around rib heads. Triggers here indicate an imbalance between *paraspinal musculature* due to Davis's Law which states: 'If hypertonus exists on one side, tonus is released on the other side'. Affects most people.
3. Inferior angle of scapula, on inner insertions of *infraspinatus.* Also along inner border until spine of scapula is reached, working outwards until insertion of *infraspinatus* on humerus is palpated. 'After this, search the space toward the lateral edge of the scapula, letting thumb fall off outwardly, then flipping it back on, pressing partly against *infraspinatus* and partly against fascia beneath and also on *teres minor.* Here is a favourite place for trouble. It will usually refer to the back of the arms and to the 4th and 5th fingers. Upper *infraspinatus* refers to front of shoulders.' 90% of patients have triggers here.
4. Press on internal aspect of *supraspinatus*, moving laterally towards its insertion. Triggers here are a common cause of 'tired' shoulders. A 40% incidence of triggers at this site is reported.
5. Search outer border of scapula for *teres major* points. Triggers are common if patient cannot raise arm behind back. 60% of patients were found by Nimmo to have triggers in these muscles.
6. *Upper trapezius* is searched by squeezing it between fingers and thumb, moving slowly from shoulder region towards spine until triggers are found. Pain refers to mastoid area or to forehead. Very common – 90%.
7. Pressure ('firm', says Nimmo) on superior border of sacrum, between iliac spine and sacral spinous process, produces pressure on *SI ligament.* Move contact superiorly and inferiorly searching for sensitivity. Triggers here are involved in all low back syndromes and 50% of all patients, according to Nimmo. As in all descriptions given, it is suggested that you search both sides.
8. Press just superiorly to sacral base adjacent to spine medial to PSIS. This is *iliolumbar ligament.* Heavy pressure is required to find triggers which are involved in most low back problems. Search both sides. 90% incidence reported.
9. Hook thumb under *sacrosciatic* and *sacrotuberous ligaments* medial and inferior to ischial tuberosity, lifting and stretching laterally if painful. Nimmo reports a 30% incidence of triggers in these sites.

Note: Nimmo used a palm-held, rubber-tipped wooden T-bar, in order to apply pressure to areas requiring high poundage such as iliolumbar ligament.

10. Medial pressure is applied by the thumb to lateral border of *quadratus lumborum,* avoiding pressure on tips of transverse processes, starting below last rib down to pelvic rim. A 'gummy' feel will be noted if contracture exists (plus sensitivity) in contrast to resilient, homogeneous feel of normal muscle. Often associated with low back problems. If *latissimus dorsi* is also involved, pain may radiate to shoulder or arm. 80% of patients show trigger activity in these muscles, according to Nimmo's research.
11. Search area below posterior aspect of ilia for noxious points associated with *gluteal muscles* generally.
12. Search central region of belly of *gluteus medius* for triggers which can produce sciatic-type pain. 90% incidence.
13. Search midway between trochanters and superior crest of ilium, in central portion of *gluteus minimus* where trigger affecting lateral aspect of leg or foot, or duplicating sciatic-type pain, is common. This also has a 90% incidence of triggers, as opposed to *gluteus maximus,* which produces active triggers in only 4% of patients.
14. The point of intersection, where imaginary lines drawn from the PSIS and the trochanter, and the ischium and the ASIS meet, is the access point for contact with the insertion of the *piriformis* muscle. If the line from the ASIS is taken to the coccyx, the intersection is over the belly of piriformis. These two points should be palpated; if sensitivity is noted, the muscle requires treatment. Sciatic distribution to the knee is a common referred symptom. A 40% incidence of triggers is reported by Nimmo.
15. *Hamstring* trigger points lie about a hand's width above the knee joint in about 20% of patients.
16. Trigger points in *abductor magnus* muscles lie close to its origins and insertions, notably near the tendinous insertion, and close to the ischium.
17. The area *posterior* to the *tibia* is a site for trigger points relating to calf pain. 90% of patients display triggers here, according to Nimmo.
18. Triggers abound in the region of the *external malleolus,* especially if recurrent ankle strains have occurred.
19. With patient side-lying and operator standing facing patient at chest level, reach across with cephalad hand to ease scapula into maximum abduction while thumb of the caudad hand is inserted under scapula to try to contact *seratus magnum* and *subscapularis* muscles (both have 90% incidence of triggers). Careful probing allows contact with triggers and restrictions, which occur in 90% of individuals.
20. Search for triggers in the *upper cervical* muscles with patient face upwards and operator's thumb applying pressure against these muscles, medially and upwards (to ceiling) along length of lamina groove from occiput to base of neck. 90% of patients have triggers in these muscles.
21. Same position, right hand under and cupping lower neck, thumb anterior to trapezius fibres, rotate head to right allowing hand to slowly glide towards floor. Thumb can descend into 'pocket' created by the head position. When thumb has reached as far as possible, pressure

Box 4.2 (contd)

towards the opposite nipple allows contact to be made with insertion of *splenius capitus* muscle (around 2nd thoracic vertebra). Referred pain to base of neck is common symptom. Again, 90% of people have triggers here.

22. Standing at head of patient, place right thumb just superior to clavicle, lateral to outer margin of sternomastoid; flex neck by raising head with other hand, allowing right thumb to enter area below clavicle over attachment of *anterior scalene* muscle. Patient's head is turned right, bringing scalene directly under thumb. Pressure laterally with thumb finds triggers located here, a common (90%) finding.

23. *Anterior cervical* muscles are palpated for changes and trigger points by facing seated patient and inserting thumbs under jawline to contact anterior surface of upper transverse processes. Gliding thumbs inferiorly allows contact with *longus capitus, coli*, and so on, (70% trigger point incidence). Care is required as to degree of pressure and time spent in the region of carotid body.

24. *Sternomastoid* palpation is performed with patient face upwards, head turned towards side being assessed. Contact is by 'squeezing' between finger(s) and thumb as direct pressure is avoided in this muscle (as in scalene, apart from its insertions).

25. Triggers lying in *masseter* and *external pterygoid* muscles are found with operator sitting at head of supine patient. Triggers here relate to TMJ dysfunction, tinnitus and salivary gland dysfunction.

26. Functional disturbances of the eyes may stem from active triggers in the *temporalis* muscle, which is palpated from same position as 25.

27. Standing to side of supine patient, grasp wrist with cephalad hand and abduct the arm; other hand contacts coracoid process and thumb contact glides towards sternum assessing *subclavius* muscle. A similar stroke from coracoid process towards xyphoid assesses *pectoralis minor* (Nimmo reports a 90% incidence of triggers in both muscles, only 10% in *pectoralis major*).

28. Thumb pressure should be applied to the *biceps tendon* insertion for a distance of 2.5 cm or so below its insertion in search of a trigger which would relate to shoulder problems (90% incidence).

29. Trigger points are found on the sternum in the *rudimentary sternalis* muscle (40% incidence of triggers) as well as in *cartilaginous attachments* of ribs on sternum.

30. With supine patient, knees flexed, contact is flat of hand (fingers more than palm) with other hand on top of it, applying pressure from just inferior to rib margins, going under these as far as possible to approach triggers lying in *upper abdominal* musculature (90%). Finger pads are stroked in a series of movements from the most superior point reached under the ribs, towards the umbilicus. Tight bands will be felt, in which triggers reside.

31. *Serratus magnus* is searched with flat of hand stretching it towards its attachments (90% incidence).

32. Patient in the same position. Operator standing on side opposite that to be assessed and starting some 7.5 cm below umbilicus on a line from it to the ASIS, a firm flat hand contact is made; this is taken inferior and then medial allowing contact to be made *anterior to 4th and 5th lumbar vertebrae* (site of hypogastric plexus and ganglionated cord). This is likely to be an area of referred sensitivity (upwards to chest) in 70% of patients. This contact could be avoided in the elderly, the obese, or patients with aneurysms or sclerotic aortas.

33. Patient in same position, operator standing on side to be examined, place finger pads just superior to ASIS, pressing towards floor and then towards feet allow access to occur under the pelvic crest, to contact *iliacus* muscle. A gliding contact followed by flexing of the contact fingers allows searching of this area for triggers (90%).

34. Access to the *psoas* muscle is suggested from lateral margin of rectus abdominus, allowing finger contact to pass under the sigmoid on the left and under the caecum on the right. This accesses the belly of psoas in non-obese patients. Another access is directly towards the spine from the midline (patient with flexed knees) some 7.5 cm below umbilicus. On approaching the spine (denser feel) finger pad contact slides laterally over body of lumbar vertebrae (2, 3 or 4) to side opposite. This will contact origin of psoas, a common site for triggers (50–70%).

35. *Abductor longus* and *pectineus* can be contacted with patient in same position, as thumbs glide along abductor towards pubic attachment and then laterally to contact pectineus. 50% of patients have triggers in this muscle.

36. *Quadriceps* can be contacted and searched with thumbs, heel of hand or fingers, with patient supine. Triggers abound in both *rectus femoris* (90% incidence) and the *vasti* (70%).

37. *Tensor fascia lata* is best contacted with patient side-lying, affected leg straight, supported by flexed other leg. Triggers here can produce sciatic-type pain (70%).

38. *Gracilis* attachment into the knee region (via its tendon) is a major trigger site (90%). The muscle itself should be assessed from tibial attachment to the pubis.

39. *Anterior tibialis* muscle may rarely contain triggers affecting feet or toes.

Lewit's view of trigger point significance

Karel Lewit suggests that, apart from their local significance in terms of pain, and their influence on target areas, trigger points can have a clinical significance in the links they have with certain pathology. For example:

- Triggers in the thigh adductors indicate hip pathology
- Triggers in iliacus indicate lesions of segments L5/S1 (coccyx)
- Triggers in piriformis indicate lesions of segment L4/5 (coccyx)
- Triggers in rectus femoris indicate lesions of L3/4 (hip)
- Triggers in psoas indicate lesions of thoracolumbar junction (TI0–L1)
- Triggers in erector spinae muscles indicate lesions of corresponding spinal level
- Triggers in rectus abdominis indicate problems at xyphoid, pubis or low back
- Triggers in pectoralis indicate problems of upper ribs or thoracic viscera
- Triggers in subscapularis common in 'frozen shoulder'
- Triggers in middle trapezius indicate radicular syndrome of the upper extremity
- Triggers in upper trapezius indicate cervical lesion
- Triggers in sternomastoid indicate lesion of CO/1 and C2/3
- Triggers in masticatory muscles relate to headache and facial pain.

EXERCISE 4.11

Time suggested
5–7 MINUTES PER 'NIMMO AREA'

Choose several of Nimmo's suggested targets (Box 4.2); for example, take description 1 or 2, and see whether you can find active trigger points using Lief's NMT assessment method (thumb or finger contact) and/or one of the skin palpation methods described in Chapter 3 ('drag', elasticity, etc.) to evaluate the accuracy of these methods in locating triggers in the areas suggested by Nimmo.

See whether any of the triggers you locate are associated with joint and other restrictions as described by Lewit (this will be assisted by use of the joint palpation methods as described in Chapter 8).

Over time, attempt to evaluate all of Nimmo's target sites.

Record your findings.

Periosteal pain points (PPP)

Lewit also interprets periosteal pain points as relating to specific functional or structural problems.

As tonus increases and becomes chronically entrenched, leading to changes in the structure of the soft tissues, with increased fibrous and decreased elastic content becoming palpably apparent, so do stresses build up on the tendons and their osseous insertions into the periosteum. Many are characteristic of certain lesions, making them useful as diagnostic aids.

The feel of periosteal pain points varies; however, a frequently palpated common feature is of a sensitive 'soft bump' at the point of attachment of tendons and ligaments. This is often observed on spinous processes where one side is tender, relating to tension or spasm in the muscles on that side, which also prevents easy rotation of the body of that vertebrae to that side. Intervertebral joints can be palpated directly in some areas; for example, the cervical joints are accessible when the patient is supine. Greater pressure is required through paraspinal tissues with the patient prone for access to other spinal joints (for example, using NMT approaches as described above).

Many extremity joints are available for direct palpation. The hip can be reached via the groin if care is taken.

Acromioclavicular and sternoclavicular joints are easily accessed, as is the TMJ anterior to the tragus.

Table 4.1 gives the sites of some PPP and the significance accorded to them by Lewit.

Table 4.1 Some PPP and their significance according to Lewit

PPP	Significance
Head of metatarsals	Metatarsalgia (flat foot)
Calcaneal spur (a classical PPP)	Tension in plantar aponeurosis
Tubercle of tibia	Tension in long adductors, possibly hip lesion
Attachments of collateral knee ligaments	Lesion of the corresponding meniscus
Fibula head	Tension in the biceps femoris or restriction of the head of the fibula
PSIS	Common, but no specific indication
Lateral aspect of symphysis pubis	Tension in the adductors, SI joint restriction or a hip lesion
Coccyx	Tension in the gluteus maximus, levator ani or piriformis
Iliac crest	Gluteus medius or quadratus lumborum tension or dysfunction at thoracolumbar junction
Greater trochanter	Tension in the abductors or a hip lesion
T5/6 spinous process	Lesion of the lower cervical spine
Spinous process of C2	Lesion at C1/2 or C2/3, or tension in levator scapulae
Xyphoid process	Tension in rectus abdominis or 6, 7 or 8th rib dysfunction
Ribs in mammary or axillary line	Tension in pectoralis attachments or a visceral disorder
Sternocostal junction of upper ribs	Tension in scalene muscles
Sternum, close to the clavicle	Tension in sternomastoid muscle
Transverse process of atlas	Lesion of the atlas/occiput segment, or tension in either rectus capitis lateralis or sternomastoid
Styloid process of the radius	Elbow lesion
Epicondyles	Elbow lesion or tension in muscles attaching to epicondyles
Attachment of deltoid	Scapulohumeral joint lesion
Condyle of the mandible	TMJ lesion or tension in masticatory muscles

EXERCISE 4.12

Time suggested
3–5 MINUTES PER PPP AND ASSOCIATED MUSCLE

Work your way through the PPP points as described in Table 4.1, and see how many are present as sensitive, palpable, structures in the patient/model. Try to assess the potentially involved soft tissues as indicated in the descriptions in the table. Are they indeed involved?

Try to establish the connection between a PPP and the soft tissue dysfunction which caused it by evaluating the tone and general 'feel' of associated muscles.

This will become increasingly pertinent if you incorporate tests for shortness of such muscles, as outlined later in this chapter, which are specifically linked to PPPs according to Lewit's research.

Record your findings.

Chapman's neurolymphatic reflex points

We have seen that viscerosomatic reflex activity is commonly associated with the development of facilitated spinal segments (Exercises 4.1, 4.2 and 4.3 in this chapter) and that another form of localised facilitation is associated with trigger point evolution.

The soft tissue changes which result are palpable both via the skin and directly in the muscles and other soft tissues affected. Additional soft tissue changes which might be picked up during palpation include Jones's tender points, associated with joint strain or trauma.

We now need to examine, albeit briefly, another reflex system which is assessed by careful palpation.

In the 1930s, osteopathic physician Frank Chapman, and, subsequently, his brother-in-law Charles Owens, charted a group of palpable reflex changes which they termed neurolymphatic reflexes. Owens (1963) described the palpable changes consistently associated with the same viscera which are found in the fascia:

> These extremely localised tissue changes (gangliform contractions) are located anteriorly in the intercostal spaces near the sternum. They may vary in size from one half the size of a BB shot, to that of a small bean, and occasionally are multiple. This type of change is apparent in some of the reflexes found on the pelvis, but the ones found on the lower extremity (colon, broad ligament and prostate) vary in character. Here there may be areas of 'amorphous shotty plaques' or 'stringy masses'.

The variations in texture result, according to these researchers, from a combination of both the nature and severity of the visceral involvement and the constitution of the patient.

The degree of tenderness noted on palpation differentiates these from what the authors term 'fat globules'. In some areas, such as in the rectus femoris muscle, reflexes (from the suprarenal gland) have the feel of acute contraction. Posterior reflexes are found mainly between the spinous processes and the tips of the transverse processes, where they have more of an oedematous feel, and sometimes a 'stringy' nature on deeper palpation.

Beryl Arbuckle (1977) discussed Chapman's initial discovery of these reflexes in her fine collection *Selected writings of Beryl Arbuckle*:

> Chapman found highly congested points in different regions of the fascia, and with certain very definite groupings he found to exist a definite entity of disease or, reversely, with a particular disease he always found a definite pattern in these regions. These findings led him to conclude that the states of hypercongestion were due to a lymph stasis, in viscus, or gland, which was manifested by soreness or tenderness at the distal ends of the spinal nerves. To understand this reasoning one must have a knowledge of the lymphatic system, the autonomic nervous system, and the interrelation of the endocrine glands, and the embryologic segmentation of the body.[2]

Arbuckle cites, in support of Chapman's concepts, the research of Speransky (1944) which demonstrated that CSF travels through the lymphatic structures to all areas of the body. This fact (reinforced by Erlinghauser's work) combined with knowledge of the many nutrient substances carried by nerve axons – the end products (metabolites) of which re-enter the lymphatic system – strongly supports Chapman's concept of neurolymphatic reflexes. Charts and means of application of these reflexes are to be found in Owens's *An endocrine interpretation of Chapman's reflexes* (Owens 1963) as well as in my book *Modern neuromuscular techniques* (Chaitow 1996a).

Arbuckle says:

> Trained, seeing, sensing, feeling fingers . . . are able to "open some of the windows and doors" for the correction of perverted circulation of fluids.

[2]It is suggested that Arbuckle's thoughts be kept in mind when the Erlinghauser's research into cerebrospinal fluid circulation through tubular connective tissue fibrils is discussed in Chapter 5 (p. 114).

How easy is it to achieve this?
Owen says:

> You may not at first be able readily to locate the gangliform contractions with ease, but with practice you will acquire a readiness of tactile perception that will greatly facilitate your work. Do not use excessive pressure on either anterior or posterior. (See Figs 4.10–4.14.)

The suggestion by Chapman, Owens and Arbuckle is that these points are only active – and therefore of use for treatment purposes – if *both* the anterior and posterior points of a pair are active, as evidenced by both of them being at the same time palpable and sensitive. The degree of sensitivity of the anterior of the pair indicates the degree of associated lymphatic congestion.

The sequence suggested by these researchers is that a start be made by palpating the anterior reflexes. If any are found to be active by virtue of being easily palpable and sensitive, the pair of this reflex is then examined posteriorly. If this is also palpable and sensitive, treatment commences on the anterior reflex point.

Gentle rotary pressure is used in the treatment phase, dosage being determined by palpation. The aim is to procure a decrease in oedema, dissolution of the gangliform contracture in the deep fascia, and subsidence of the tenderness in the anterior reflex areas. The actual time involved in treating a point may be from 20 seconds to 2 minutes.

Rechecking for sensitivity is suggested by gentle palpation.

This is said to give a strong indication of the success or otherwise of the effort thus far. Since these are reflex areas, the skin overlaying them would be subject to the influences discussed in Chapter 3. These points can therefore be found by looking for them specifically, once you have knowledge of their existence, or by skin stretching, or via a systematic soft tissue assessment, such as Lief advocated.

EXERCISE 4.13

Time suggested
7–10 MINUTES TO EVALUATE AND 'TREAT' A PAIR OF REFLEX POINTS

If this system interests you, spend some time palpating for pairs of neurolymphatic points as illustrated (Figs 4.10–4.17) and described above. See Appendix for captions relating to these Figures.

Record your findings.

Assessing tight postural muscles

The final segment of this section will deal with a sequence in which postural muscles may be assessed for relative shortness.

Vladimir Janda (1983) asserts that postural muscles have a tendency to shorten, not only under pathological conditions but often under normal circumstances.

Postural muscles are genetically older; they have different physiological and probably biochemical qualities compared with phasic muscles, which normally weaken and exhibit signs of inhibition in response to stress or pathology.

Most of the problems of the musculoskeletal system involve dysfunction related to aspects of muscle shortening. Where weakness (lack of tone) is apparently a major element, it will often be found that antagonists to these are shortened, reciprocally inhibiting their tone, and that prior to any effort to strengthen weak muscles, hypertonic antagonists should be dealt with by appropriate means, after which spontaneous toning occurs in the previously hypotonic or relatively weak muscles.

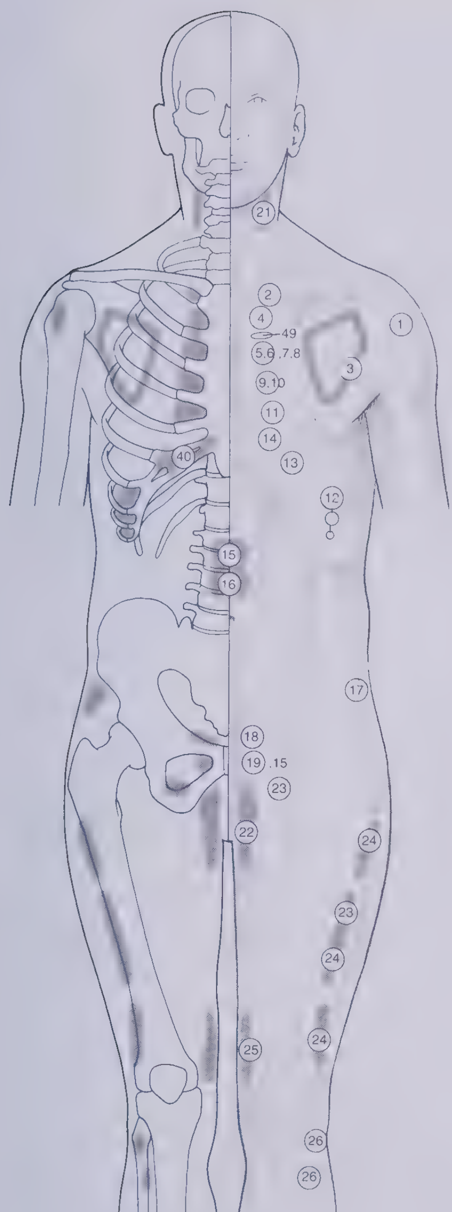


Fig. 4.12 Chapman's neurolymphatic reflexes.

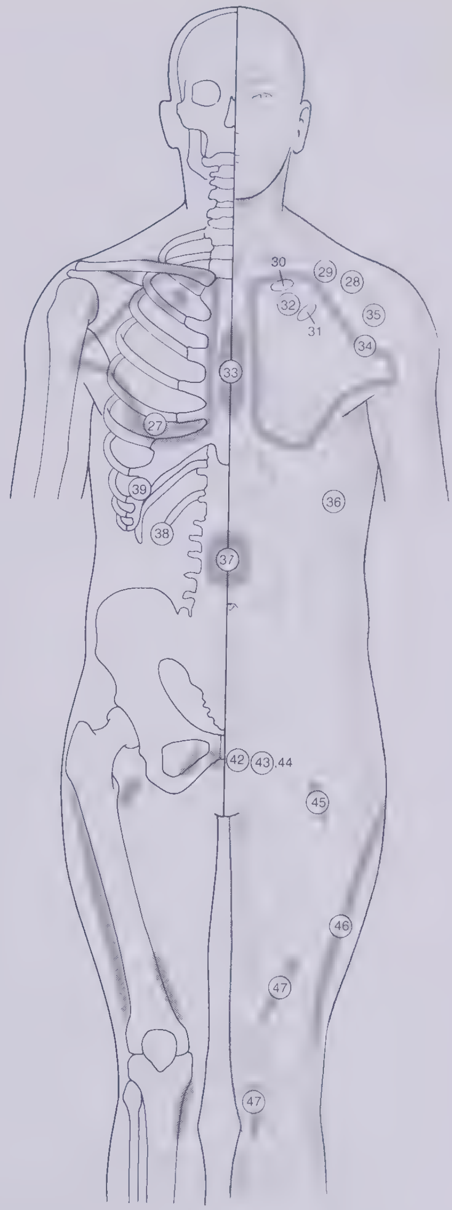


Fig. 4.13 Chapman's neurolymphatic reflexes.

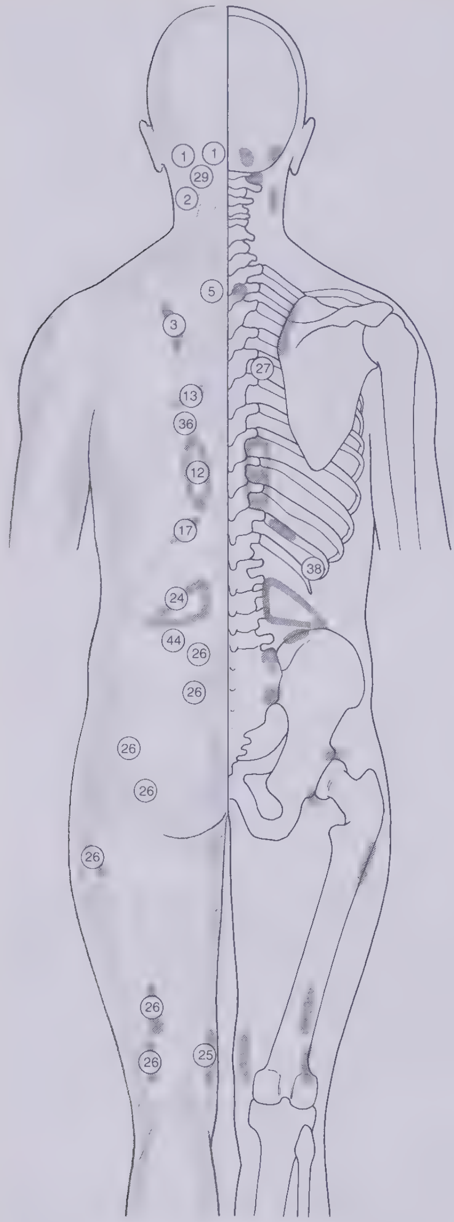


Fig. 4.14 Chapman's neurolymphatic reflexes.

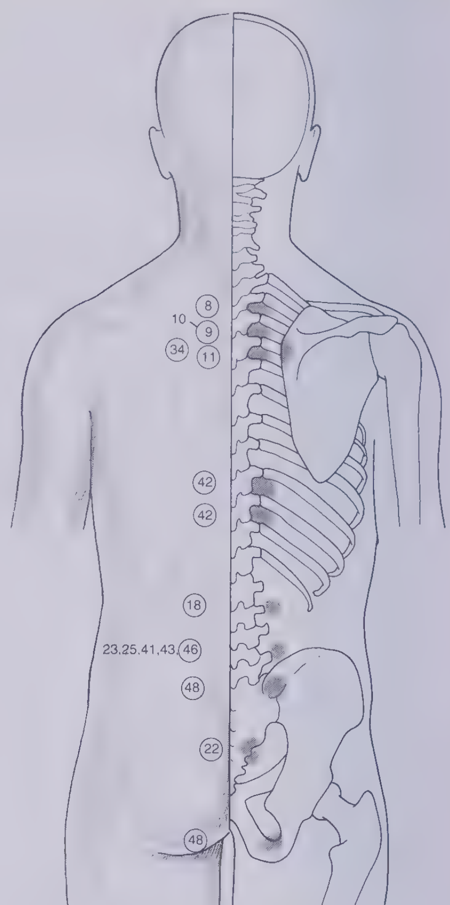


Fig. 4.15 Chapman's neurolymphatic reflexes.

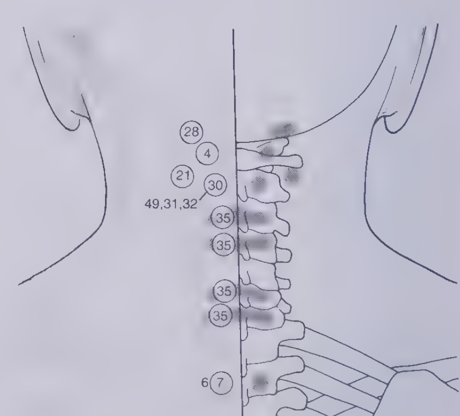


Fig. 4.16 Chapman's neurolymphatic reflexes.

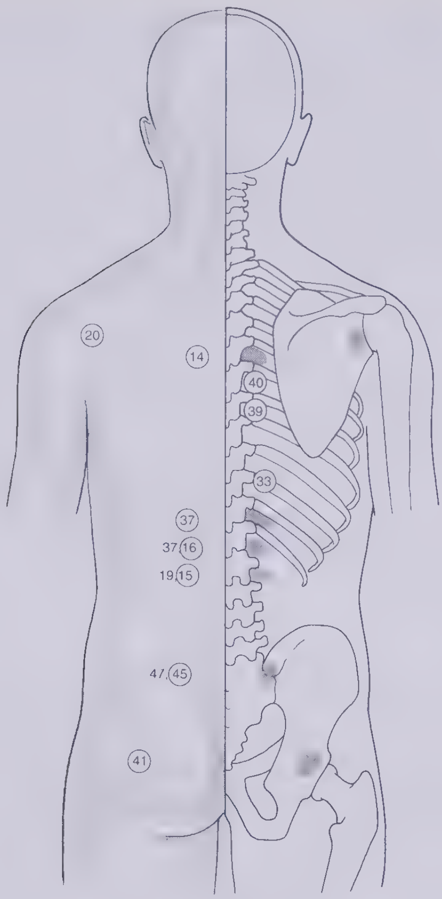


Fig. 4.17 Chapman's neurolymphatic reflexes.

If tone is still inadequate then, and only then, should exercise and/or isotonic procedures be brought in.

As part of comprehensive palpation protocol, it is desirable to learn to assess short, tight muscles in a standardised manner. Janda suggests that to obtain a reliable evaluation of muscle shortness the following criteria be observed:

- The starting position, method of fixation and direction of movement must be observed carefully.
- The prime mover must not be exposed to external pressure.
- If possible the force exerted on the tested muscle must not work over two joints.
- The examiner should perform at an even speed a slow movement that brakes slowly at the end of the range.
- The examiner should keep the stretch and the muscle irritability about equal and the movement must not be jerky.
- Pressure or pull must always act in the required direction of movement.
- Muscle shortening can only be correctly evaluated if the joint range is not decreased, as might be the case should an osseous limitation or joint blockage exist. [Janda 1983]

It is in shortened muscles, as a rule, that reflex activity is noted. This takes the form of local dysfunction variously called trigger points, tender points, zones of irritability, neurovascular and neurolymphatic reflexes, etc.

Localising these is possible via normal palpatory methods (NMT, 'drag', skin elasticity, etc.) or as part of neuromuscular diagnostic treatment.

Identification of tight muscles may also be systematically carried out as described below. Note that the assessment methods presented are not themselves diagnostic but provide strong indications of probable shortness of the muscles being tested.

See the Special Topic 8 on 'End-feel' (p. 177) for descriptions of different end-feel characteristics.

The following tests are derived from the work of Janda (1983), Kendall et al (1952) and a variety of other sources.

Tests for postural muscle shortening

Ease and bind

Before commencing a muscle by muscle sequence in which postural muscles are evaluated for relative shortness, one such test makes a useful teaching aid for establishing a sense of 'tension', 'bind' or resistance, occurring as a muscle or other soft-tissue structure is moved towards a barrier of resistance.

The concept and reality of tissues providing palpating hands or fingers with a sense of their relative 'bind' as opposed to their state of 'ease' is one which needs to be grasped. There can never be enough focus on these two characteristics which allow the tissues to speak as to their current degree of comfort or distress.

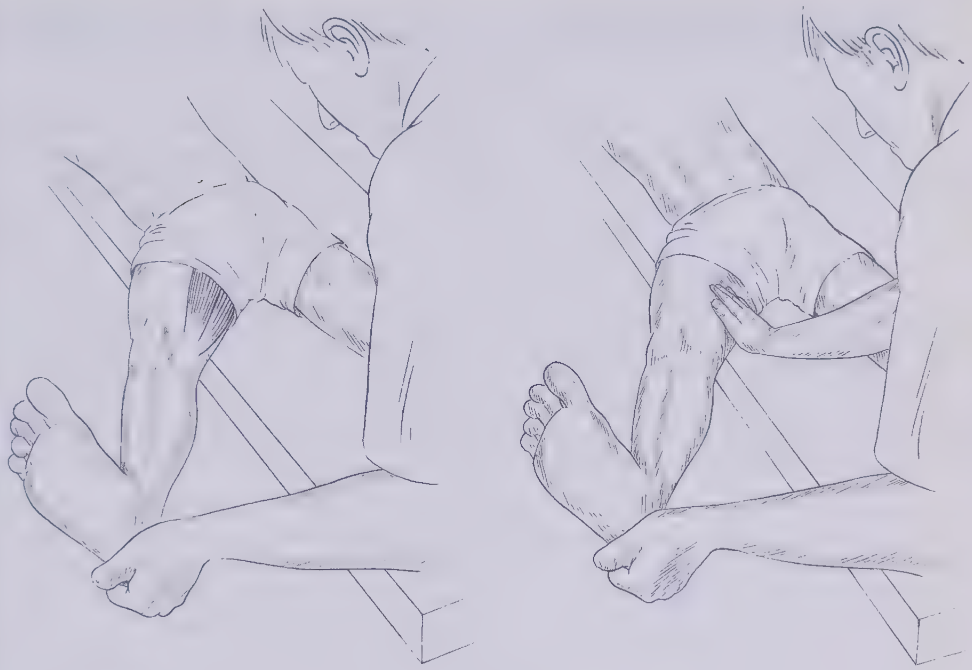
Osteopathic pioneer H. V. Hoover (1969) describes 'ease' as a state of equilibrium or 'neutral' which the operator senses by having at least one completely passive, 'listening', contact, either of the whole hand or a single or several fingers or thumb, in touch with the tissues being assessed.

Bind is, of course, the opposite of ease and can most easily be noted by lightly palpating the tissues surrounding, or associated with, a joint as this is taken towards its end of range of movement, its resistance barrier.

In order to 'read' hypertonicity, palpation skills need to be refined, and as a first step John Goodridge (1981) suggests the following test, which examines medial hamstring and short adductor status as a means of becoming comfortable with the reality of ease and bind in a practical manner.

EXERCISE 4.14a — *Time suggested* 5 MINUTES

This is a palpation exercise for 'ease and bind' during assessment of adductors of the thigh. (Fig. 4.18A, B)



A B

Fig. 4.18 Assessment of 'blind'/restriction barrier with the first sign of resistance in the adductors (medial hamstrings) of the right leg. **(A)** The operator's perception of the transition point, where easy movement alters to demand some degree of effort, is regarded as the barrier. **(B)** The barrier is identified when the palpating hand notes a sense of bind in tissues which were relaxed (at ease) up to that point.

Before starting, ensure that the patient/model lies supine, so that the non-tested leg is abducted slightly, heel over end of table. The leg to be tested is close to the edge of table.

Ensure that the tested leg is in the anatomically correct position, knee in full extension and with no external rotation of the leg, which would negate the test:

> After grasping the supine patient's foot and ankle, in order to abduct the lower limb, the operator closes his eyes during the abduction, and feels, in his own body, from his hand through his forearm, into his upper arm, the beginning of a sense of resistance.
>
> He stops when he feels it, opens his eyes, and notes how many degrees in an arc, the patient's limb has travelled.

What Goodridge is trying to establish in the individual is a sense of the very beginning of the end of range of free movement, where easy motion ceases and effort on the part of the operator moving the part begins.

This 'barrier' is not a pathological one, but represents the first sign of resistance, the place at which tissues require some degree of passive effort in order to move them.

This is also the place at which 'bind' should be palpated. It is suggested that the process described by Goodridge be attempted several times, so that you get a sense of where resistance begins.

Then do the exercise again as described below.

EXERCISE 4.14b

Time suggested
5 MINUTES

Stand between the patient's partially abducted leg and the table, facing the head of the table, so that all control of the tested leg is achieved by using your lateral arm/hand which holds and supports the leg at the ankle while your table-side hand rests on the inner thigh, palpating the muscles which are being tested. This palpating hand (often called a 'listening' hand in osteopathy) must be in touch with the skin, moulded to the contours of the tissues being assessed, but should exert no pressure, and should be completely relaxed.

Abduction of the tested leg from its neutral resting position is introduced passively by the outside hand/arm, until the first sign of resistance is noted by the hand which is providing the motive force, i.e. the one holding the leg, the listening hand.

As you approach this point of resistance can you sense a tightening of the tissues in the mid-inner thigh which your table-side hand is touching?

This is bind. If this sensation is not clear, then take the leg back towards the table and out again but this time go past the point where easy movement is lost and effort begins, and towards its end of range. Here you will certainly sense bind. As you once more take the leg back towards the table you will note a softening, a relaxation, an ease, in these same tissues.

Go through the same sequence with the other leg, becoming increasingly familiar with the sense of these two extremes, and try to note the very moment at which you can palpate the transition from one to the other, not to its extreme but where it begins, whether you are moving from ease to bind or the other way. Normal excursion of the straight leg into abduction is around 45°, and by testing both legs in the manner described you can evaluate whether they are both tight and short, or whether one is and the other is not. Even if both are tight and short one may be more restricted than the other. This may be the one to treat first.

NOTE

It is suggested that you practise performing palpation exercises for ease and bind on many other muscles, as listed below for example, when they are being both actively and passively moved, until you are comfortable with your skill in reading this change in tone.

The point at which you feel bind (or where the hand carrying the leg feels the first sign that effort is required) is the resistance barrier where a muscle energy isometric contraction commences in application of MET to acutely taut structures.

Goodridge states:

> The operator compares the arc with the arc produced on the opposite side. In treatment, for example, if the abducted right femur reaches resistance sooner than the left, then restriction of abduction exists. To remove this restriction, the patient's limb is positioned in that arc of movement, where resistance is first perceived, and at this point the operator employs MET to lessen the sense of resistance, and increase the range of movement.

Record your experience, using the two methods of evaluating shortness in this muscle (Exercises 4.14a and 4.14b) and try wherever possible to use a directly palpating hand to assess bind as you perform the following exercises.

For each of the following exercises, involving individual muscles it is suggested that around 5 minutes maximum be spent practising each side, at first. This should, with practice be reduced to around 2–3 minutes.

EXERCISE 4.15

Time suggested
3–5 MINUTES

ASSESSMENT OF TIGHT GASTROCNEMIUS AND/OR SOLEUS

Method 1. Patient is supine with feet extending over edge of couch. For right leg examination, operator's left hand grasps Achilles tendon just above heel, with no pressure on tendons.

The heel lies in the palm of the hand, fingers curving round it.

The right hand is placed so that the fingers rest on the dorsum of the foot (fingers rest all the time, do not apply a pulling stretch) with the thumb on the sole, lying along the lateral margin. This position is important as mistakes may involve placing the thumb too near the centre of the sole of the foot. Stretch is introduced by a pull on the heel with the left hand, while the right hand maintains the upward pressure via the thumb (along its entire length). The heel of the right hand prevents sideways movement of the foot. (Fig. 4.19A, B)

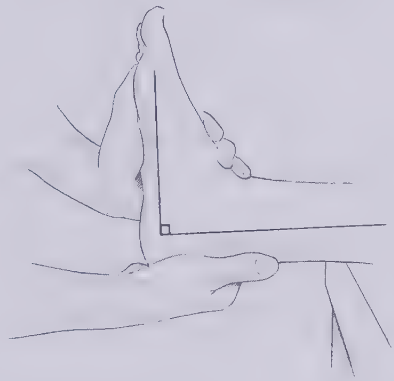


Fig. 4.19A Assessment of gastrocnemius and soleus. The sole of the foot should achieve a vertical position without effort once slack is taken out via traction on the heel.

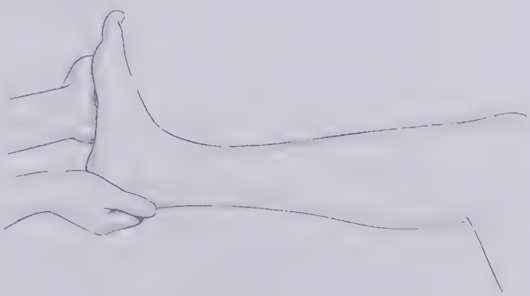


Fig. 4.19B With the knee flexed, the same assessment is evaluating the status of soleus alone.

A range should be achieved which takes the foot to a 90° angle to the leg – *without force.* The leg must remain resting on the couch all the while and the left hand holding the heel must be placed so that it is an extension of the leg, not allowing an upward pull when stretch is introduced. A fingertip or two might be able to be placed so that they can sense bind in the lower leg as the end of the range is approached.

Method 2. An alternative method is to have the patient seated on the couch, legs outstretched and to have her bend towards the toes with arms extended. If toe touching is possible, but toes are plantar-flexed, then there is probably shortness of the gastrocnemius–soleus muscles.

ASSESSMENT OF TIGHT SOLEUS

Method 3. Method 1 assesses both gastrocnemius and soleus. To assess soleus alone, the same procedure is adopted with the knee passively flexed (over a cushion for example).

Method 4. Patient is asked to squat, trunk slightly flexed, feet apart, so that the buttocks rest between the legs. It should be possible to go fully into this position with the heels flat on the floor. If not, and the heels rise from the floor as the squat is performed, soleus is shortened.

EXERCISE 4.16

Time suggested
3–5 MINUTES

ASSESSMENT OF SHORTNESS IN FLEXORS OF THE HIP

Patient is supine with buttocks at end of couch, coccyx right at the edge. The leg not being assessed is flexed as far as possible in order to tilt the pelvis posteriorly to flatten the lumbar curve against the couch. This leg is held (by patient and operator) in order to maintain this position of the pelvis. The leg to be tested should lie so that the upper leg is horizontal to the surface of the couch with the lower leg hanging down freely. (Fig. 4.20)

If the thigh cannot lie horizontal to the couch, then it indicates a shortened iliopsoas muscle. Additional downward pressure on the distal thigh, applied by the operator, should allow for extension at the hip; if it does not, then the iliopsoas is very much shortened.

If the lower leg cannot flex completely to hang vertically in this position, then there is a probable shortening of rectus femoris.

If additional downward pressure on the lower third of the femur of the tested leg results in compensatory extension of the lower leg, at the knee, then rectus femoris is very short.

If the thigh is unable to lie horizontal to surface of couch and the lower leg is unable to hang vertically then both iliopsoas and rectus femoris are shortened.

Fig. 4.20 In the test position, if the thigh is elevated (i.e. not parallel with the table) probable psoas shortness is indicated. The inability of the lower leg to hang more or less vertically towards the floor indicates probable rectus femoris shortness (TFL shortness can produce a similar effect).

EXERCISE 4.17

Time suggested
3–5 MINUTES

ASSESSMENT FOR SHORTNESS IN TENSOR FASCIA LATA

If there is a marked lateral deviation of the patella, and a deep hollow groove is noted on the outer thigh, then tensor fascia lata is probably shortened. If additional pressure is applied on the lower third of the thigh of the tested leg, to take it slightly more into adduction, and this increases the hollow in the outer thigh over the iliotibial band then the tensor fascia lata is very short. (Fig. 4.20)

The patient is side-lying, tested leg uppermost. Lower leg is flexed and held to the couch. Upper leg is flexed at hip and knee and is abducted and extended by the operator, whose hand holds this leg at the ankle thus allowing the knee to fall into adduction, towards the couch. It will not do so if there is shortening of the iliotibial band, even if the patient is totally relaxed. (Fig. 4.21)

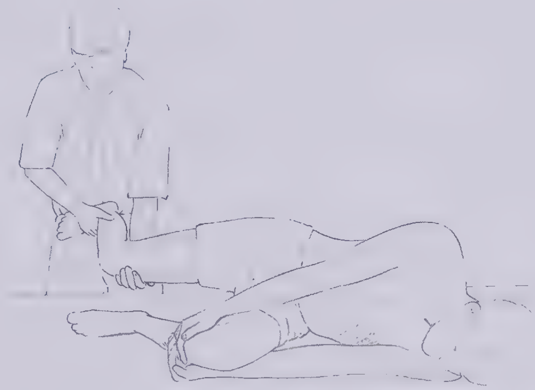


Fig. 4.21 Assessment for shortness of TFL – modified Ober's test. When the hand supporting the flexed knees is removed the thigh should fall to the table if TFL is not short.

EXERCISE 4.18

Time suggested
3–5 MINUTES

ASSESSMENT OF SHORTENED HAMSTRINGS (BICEPS, FEMORIS, SEMITENDINOSUS AND SEMIMEMBRANOSIS)

Patient is supine with legs outstretched. In order to assess tightness in the left leg hamstrings, the operator is standing at the side of the leg to be tested, facing the couch. The lower leg is grasped with his caudad hand, keeping the knee of that leg in extension and resting the heel of that leg in the bend of the elbow to prevent lateral rotation of the leg. The cephalad hand can then rest on the dorsal aspect of the thigh to evaluate for bind as elevation takes place. The non-tested leg should not flex or leave the table.The range of movement should allow elevation of the tested leg to about 80°.

If the hip flexors are shortened as assessed in Exercise 4.16, thus causing a forward tilt of the pelvis and stretch of the hamstrings, a modification is required.

The patient is supine with the leg not to be tested flexed at the hip with the sole of the foot on the couch. This tilts the pelvis backwards and allows the lumbar curve to remain flat against the couch. All other aspects of hamstring evaluation are repeated.

Does the first sign of resistance, bind, occur before 80°?

If so, hamstrings are short.

EXERCISE 4.19a

Time suggested
2–3 MINUTES

TESTING FOR SHORTNESS OF PIRIFORMIS

Stretch test. When short, piriformis will cause the affected side leg of the supine patient to appear to be short and externally rotated.

Supine, place the tested leg into flexion at hip and knee, so that the foot rests on the table lateral to the other knee (the tested leg is crossed over the straight non-tested leg in other words). The non-tested side ASIS is stabilised to prevent pelvic motion during the test and the knee of the tested side is pushed into adduction to place a stretch on piriformis. If there is a short piriformis, the degree of adduction will be limited and the patient will report discomfort behind the trochanter.

EXERCISE 4.19b

Time suggested
3–4 MINUTES

Direct palpation test. Patient is side-lying, tested side uppermost. Operator stands at the level of the pelvis in front of and facing the patient, and, in order to contact the insertion of piriformis, draws imaginary lines between: ASIS and ischial tuberosity, and PSIS and the most prominent point of the trochanter. Where these lines cross, just posterior to the trochanter, is the insertion of the muscle, and pressure here will produce marked discomfort if the structure is short or irritated.

If the most common trigger point site in the belly of the muscle is sought, then the line from the ASIS should be taken to the tip of the coccyx rather than the ischial tuberosity. Pressure where this line crosses the other will access the mid-point of the belly of piriformis where triggers are common. Light compression here which produces a painful response is indicative of a stressed muscle.

Perform the two versions of the test and see whether they confirm each other.

NOTES ON PIRIFORMIS

- This postural muscle, like all others, will shorten if stressed. The effect in the case of piriformis, of shortening is to increase its diameter and because of its location this allows for direct pressure to be exerted on the sciatic nerve, which passes under it in 80% of people. In the other 20% it passes through the muscle so that contraction will produce veritable strangulation of the nerve.
- In addition, the pudendal nerve and the blood vessels of the internal iliac artery, as well as common perineal nerves, posterior femoral cutaneous nerve and nerves of the hip rotators can all be affected.
- If there is sciatic pain associated with piriformis shortness, then, on straight leg raising which reproduces the pain, external rotation of the hip should relieve it since this slackens piriformis.

EXERCISE 4.20

Time suggested
4–5 MINUTES

ASSESSMENT OF SHORTNESS IN QUADRATUS LUMBORUM

When the leg of the side-lying patient is abducted and the operator's palpating hand senses that quadratus becomes involved in this process before the leg has reached at least 25° of elevation, then it is clear that quadratus is overactive. If it is overactive then it is almost certainly stressed, and since a postural muscle which is stressed will always become short, shortness and a need for MET can be assumed. (Fig. 4.22)

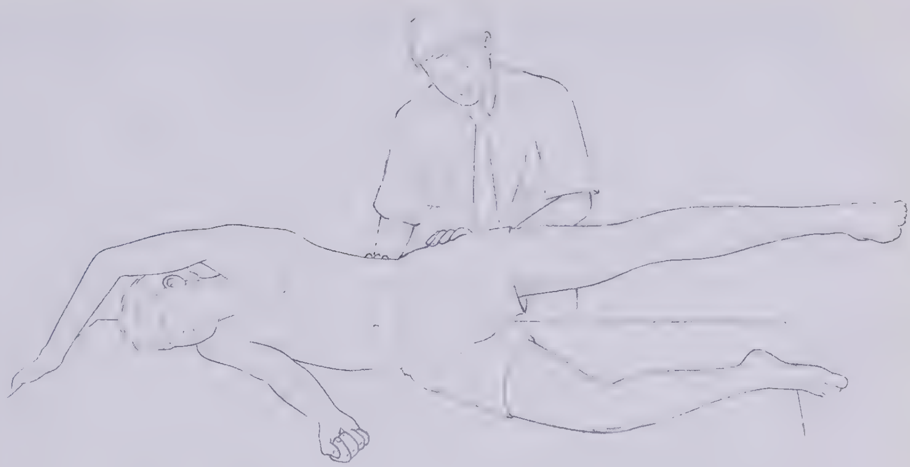


Fig. 4.22 Palpation assessment for quadratus lumborum overactivity. The muscle is palpated, as is the gluteus medius, during abduction of the leg. The correct firing sequence should be gluteus, followed at around 25° elevation by quadratus. If there is an immediate 'grabbing' action by quadratus it indicates overactivity, and therefore stress, so shortness can be assumed.

With the patient side-lying, have them take their upper arm over their head to grasp the top edge of the table. This 'opens out' the lumbar area and, with the operator standing and facing the front or back of the patient, allows easy palpation of the quadratus lateral border, a major trigger-point site, with the cephalad hand. Test for activity of quadratus on leg abduction with the cephalad hand while also palpating gluteus medius with the caudad hand. If they act simultaneously or if quadratus comes in first, then it is stressed and needs stretching.

Assessment: have the patient stand back to you, equalise any leg length disparity by using a thin book or pad under the short leg side foot, and with the patient's feet shoulder width apart, introduce pure side-bending, running their hand down the lateral thigh/calf. Normal level of side-bending excursion is to just below the knee. Judge to which side they travel furthest. If side-bending to one side is limited then quadratus on the opposite side is probably short.

Janda says that in this side-bending position:

> when the lumbar spine appears straight, with compensatory motion occurring only from the thoracolumbar region upwards, tightness of quadratus lumborum may be suspected.

This 'whole lumbar spine' involvement differs from a segmental restriction, which would probably involve only a part of the lumbar spine.

Does the visual evidence you have gained support what you could palpate on side-lying leg abduction?

Record your findings regarding this and all other exercises in this section.

EXERCISE 4.21a and 4.21b — *Time suggested* 15 MINUTES

ASSESSMENT OF SHORTNESS IN PARAVERTEBRAL MUSCLES

Exercise 4.21a

The patient is seated on the couch, legs extended, pelvis vertical. Flexion is introduced in order to approximate forehead to knees. An even curve should be observed and a distance of about 10 cm from the knees achieved by the forehead. No knee flexion should occur and the movement should be a spinal one, not involving pelvic tilting (Fig. 4.23), or:

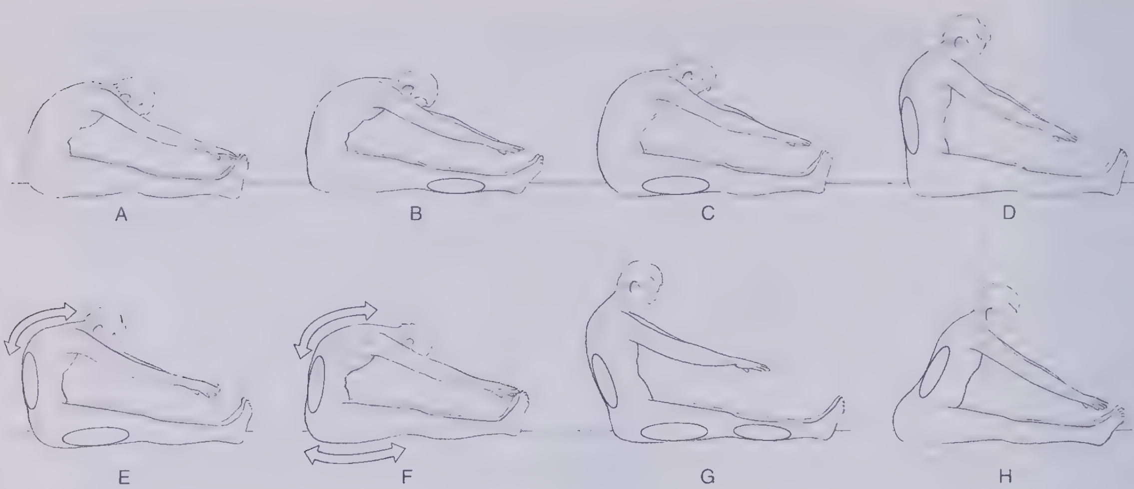


Fig. 4.23 Tests for shortness of the erector spinae and associated postural muscles.
A Normal length of erector spinae muscles and posterior thigh muscles.
B Tight gastrocnemius and soleus; the inability to dorsiflex the feet indicates tightness of the plantar-flexor group.
C Tight hamstring muscles, which cause the pelvis to tilt posteriorly.
D Tight low back erector spinae muscles.
E Tight hamstring; slightly tight low back muscles and overstretched upper back muscles.
F Slightly shortened lower back muscles, stretched upper back muscles and slightly stretched hamstrings.
G Tight low back muscles, hamstrings and gastrocnemius/soleus.
H Very tight low back muscles, with lordosis maintained even in flexion.

Exercise 4.21b

The patient sits at edge of couch, knees flexed and lower legs hanging over edge. Hamstrings are thus relaxed. Forward bending is introduced so that forehead approximates the knees. Pelvis is fixed. If bending of trunk is greater in this position than in 4.21a above, then there is probably tilting of the pelvis and shortened hamstring involvement.

During these assessments, areas of shortening in the spinal muscles may be observed; for example, on forward bending a lordosis may be maintained in the lumbar spine, or flexion may be very limited even without such lordosis. There may be obvious overstretching of the upper back and relative tightness of the lower back. Generally 'flat' areas of the spine indicate local shortening of the erector spinae group. There should be a uniform degree of flexion throughout.

Can you evaluate 'flat', tense areas of the spine?

If so, palpate lightly with your fingertips to assess the degree of hypertonicity, and/or use some of the skin palpation methods discussed in Chapter 3 to evaluate other findings in the tense tissues as compared with more normal ones.

Evaluate also whether these tight muscles alongside the spine are areas of facilitation, by using Exercises 4.1 to 4.3 again.

Record your findings.

EXERCISE 4.22a and 4.22b

Time suggested
4–5 MINUTES

ASSESSMENT OF THORACOLUMBAR DYSFUNCTION

Exercise 4.22a

This important transition region is the only one in the spine in which two mobile structures meet, and dysfunction results in alteration of the quality of motion between the structures (upper and lower trunk–dorsal and lumbar spines). In dysfunction there is often a degree of spasm or tightness in the muscles which stabilise the region, notably psoas, erector spinae of the thoracolumbar region, often quadratus lumborum and rectus abdominus.

Symptomatic diagnosis of muscle involvement is possible; for example:

- Psoas involvement usually involves abdominal pain, if severe, and produces flexion of the hip and the typical antalgesic posture of lumbago.
- Erector spinae involvement produces low back pain at its caudal end of attachment and interscapular pain at its thoracic attachment (as far up as the mid-thoracic level).
- Quadratus lumborum involvement causes lumbar pain and pain at the attachments on the iliac crest and lower ribs.
- Rectus abdominus contraction may mimic abdominal pain and result in pain at the attachments to the pubic symphysis and the xyphoid process, as well as forward bending of the trunk and restricted ability to extend the spine. There is seldom pain at the site of the lesion in thoracolumbar dysfunction.

Assessment is by direct palpation (NMT etc.) of the various muscles for contraction and sensitivity.

Do this and record your findings.

Exercise 4.22b

Screening involves having the patient straddle the couch in a slightly flexed posture (slight kyphosis). Rotation in either direction enables segmental impairment to be observed as the spinous processes are monitored. Restriction of rotation is the most common characteristic. (See also p. 121 (no. 3), 211, 214–215 for more on lumbodorsal junction dysfunction.)

EXERCISE 4.23

Time suggested
4–5 MINUTES

ASSESSMENT OF SHORTNESS IN PECTORALIS MAJOR

The patient is supine, lying with arms alongside the body and with the side to be tested close to the edge of the couch. The tested arm is held at the midhumeral level and is moved passively from the starting position upward and outward with the palm facing the ceiling. The upper arm should reach the horizontal plane and, with additional pressure, be able to increase its range of movement. It is possible in this position to lightly (fingertips only) palpate for tightened areas in the muscle. The upper arm will not reach the horizontal plane if there is shortening. The location of the shortening is discovered by palpation. (Fig. 4.24) The thorax should be stabilised during the raising of the arm so that no twisting of the thorax occurs and no increase in lordosis is noted. The humerus, not the forearm should be used to control the arm. Assessment of subclavicular portion of pectoralis involves abduction at 90° from the body. The tendon of pectoralis at the sternum should not palpate as tense even at maximum abduction of the arm.

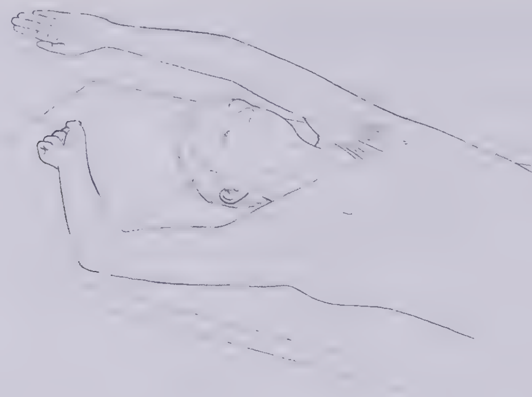


Fig. 4.24 Assessment of shortness in pectoralis major and latissimus dorsi. Visual assessment is used: if the arm on the tested side is unable to rest along its full length, shortness of pectoralis major is probable; if there is obvious deviation of the elbow laterally, probable latissimus shortening is indicated.

EXERCISE 4.24

Time suggested
3 MINUTES

ASSESSMENT OF SHORTENED TRAPEZIUS (UPPER)

The sitting patient's neck is side-flexed without flexion, extension or rotation, to its 'easy' barrier – i.e. no force at all – while the shoulder of the tested side is stabilised from above. (Fig. 4.25) The range is compared on each side and palpation discovers the location of shortened fibres. If sitting is not possible then, in a supine position, the same procedure is carried out with the ear being approximated to the shoulder.

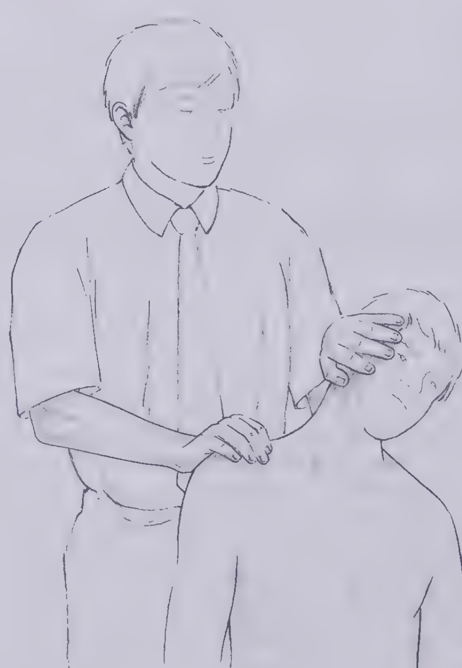


Fig. 4.25 Assessment of relative shortness of right side upper trapezius. The right shoulder is stabilised while the neck is side-bent to its first sign of resistance ('bind') without force. One side is compared to the other. Normal range is thought to be approximately 45°.

EXERCISE 4.25

Time suggested
3 MINUTES

ASSESSMENT OF SHORTENED LEVATOR SCAPULAE

The patient is supine with the neck flexed as well as being side-bent and rotated away from the side to be tested. At this point the operator, standing at the head of the table, uses a contact on the shoulder (tested side) to assess the ease with which it can be depressed (moved distally). There should be an easy springing sensation as the shoulder is pushed towards the feet, with a soft end-feel to the movement. If there is a hard, sudden end-point, levator scapula on that side is probably short.

The patient lies supine with the arm of the side to be tested stretched out with the hand and lower arm tucked under the buttocks, palm upwards, to help restrain movement of the shoulder/scapula. The operator's arm is passed across and under the neck to rest on the shoulder of the side to be treated. The other hand supports the head. With the forearm, the neck is lifted into full flexion (aided by the other hand) and is turned towards full side-bending and rotation away from the side to be tested. (Fig. 4.26)

Alternatively, the operator's knee can be used to sustain caudad pressure on the shoulder (locking the scapula) leaving two hands to achieve the desired head/neck position as described. With the shoulder held caudad either by hand or knee, and the head/neck in the position described, a stretch will be applied to levator from both ends and if dysfunction exists, and/or it is short, there will be marked discomfort reported at the insertion on the upper medial border of the scapula and/or pain near the spinous process of C2.

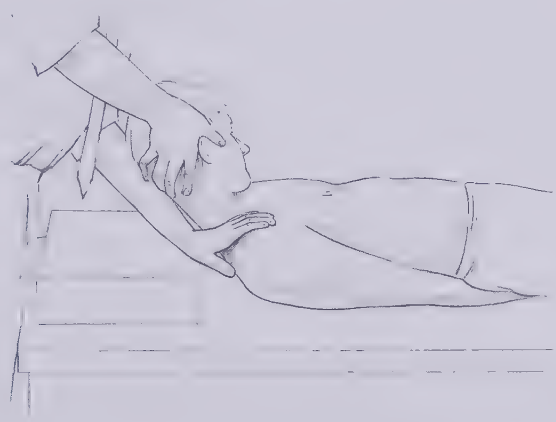


Fig. 4.26 Assessment of levator scapula shortness involves taking the neck into full flexion and side-bending rotation, away from the tested side, while maintaining firm shoulder pressure on the tested side to prevent this from elevating. Discomfort reported at the upper medial border of the scapula or the upper cervical spine suggests shortness in this muscle, as does nature of the resistance noted during performance of the assessment.

USING THE SHORTNESS TESTS AS PALPATION EXERCISES

Spend some time comparing the results of muscle tests as described above with the finding you made when searching for trigger points and other reflex activity.

Are muscles which house such points always short on testing? Usually, or only sometimes?

Begin the final exercises in this chapter with you and your partner running through all the assessments of postural muscles, noting on a chart those which are found to be shortened.

Results should then be compared with findings obtained after practising basic spinal NMT (or abdominal NMT) assessment, in which a note is kept on a chart of all areas, points, zones of soft tissue dysfunction (palpating as abnormal, indurated, contracted as well as sensitive).

Also practise Nimmo's assessment sequence (pp. 83, 84).

Philip Greenman (1989) describes a pattern of palpation of muscle in the spinal region which is well worth carrying out, many times, until the tissues he asks you to feel for are indeed clearly noted. The following is a summary of part of his 'palpation prescription' for this region, which commences with superficial palpation, always an exercise worth repeating – for we have done similar work before in Chapter 3.

EXERCISE 4.26

Time suggested
7–10 MINUTES

Sit or stand facing the seated patient's back and place your hands and fingers onto the upper portion of their scapulae, just overlaying the spines of these bones. Palpate the skin for variations in temperature, tone, texture, thickness and elasticity, as you move your hands downwards over the shoulder blades.

At the starting position, move the hands slowly and sequentially in all directions so that the skin moves on the subcutaneous fascia, and assess the degree of adherence between skin and fascia.

Gently lift the skin between thumb and index finger and perform skin rolling, moving medially and then laterally as well as superiorly, from whichever point you started palpating. This elicits information as to the thickness and pliability of the skin as well as giving information about painful tissues. Do this on both sides of the spine, symmetrically, and compare findings.

EXERCISE 4.27

Time suggested
7–10 MINUTES

Move the hands to a more central point and place the fingers of one hand so that they straddle the spine, one or two fingers on each side, close to the spine, between the shoulder blades.

Palpate the skin, moving it in various directions to assess the skin adherence. Compare the findings with those you assessed in tissue more lateral to the spine.

Now palpate through the skin in this region to the subcutaneous fascia, right down to the ligamentous structure (supraspinous) which lies between the segments, in the interspinous space.

Compare its feel to the way it feels as it inserts into the spinous process. Palpate the spinous process and note the feel of bone, overlayed by skin and ligament.

Resting a finger on each of two or three interspaces, at this level, have the patient slowly bend their head forwards and backwards. Spend some time doing this, gaining a sense of 'end-feel' of the ranges of motion involved.

EXERCISE 4.28

Time suggested
15–20 MINUTES

Now place the fingers of one hand on the soft tissues between the spine and the scapula on that side. Feel through the skin and subcutaneous fascia until you are aware of the fascia which overlays the first layer of muscle. Identify the direction in which the fibres of this muscle layer travel. Have the patient draw their shoulder-blade towards the spine as you continue to palpate. This movement should highlight the horizontal fibres of the trapezius muscle which you are palpating.

Move your pressure deeper to the next layer of muscle on one side, the rhomboid, and try to feel for the oblique direction of its pull, from above downwards. As you palpate this with one hand, you can highlight the action of these fibres by having the patient draw their bent elbow (on the same side) downwards against counter-pressure offered by your free hand.

Going yet deeper, feel for a muscle which has a more fibrous, ropy, texture which runs vertically alongside the spine.

Movement of your contact from side to side will help identify these fibres, which probably belong to the longissimus muscle, part of the erector spinae group.

Move your palpating contact to the side of this ropy bundle, closer to the spine, and go more deeply in order to find evidence of a deeper layer of muscles – the rotatores and multifidi – which run from one segment to another providing fine control movement possibilities. Their direction of pull is obliquely from the spine outwards (as in the case of the rhomboids).

Greenman suggests that you try to identify any of the small muscles which are tender, more 'full and tense', and which are therefore involved in a degree of local dysfunction.

Moving to the outside of the longissimus muscle, palpate deeply into the fascial tissue; with the angle of your palpation being somewhat towards the spine, introduce a movement upwards and downwards, as you feel for the hollows and rises of the transverse processes and the interspaces between them.

EXERCISE 4.29

Time suggested
15 MINUTES FOR EACH SEGMENT

Review the assessment and palpation methods used in Chapter 3 and consider whether you could combine one such approach, say the 'skin drag' test (p. 43) with, for example, Lief's NMT, or the methods of Nimmo or Chapman.

Does skin 'drag', or reduced skin elasticity correlate with, and help identification of the points described in Chapman's work, or with trigger points as elicited by the Nimmo or Lief approaches?

Try also to combine skin assessment with the postural muscle tests.

Having identified a short postural muscle, evaluate whether there are skin changes (drag, decreased elasticity, etc.) apparent near its origin and insertion, to a greater extent than in muscles which test as normal.

Are there more trigger points and/or localised areas of dysfunction in the soft tissues, and corresponding skin changes, in short postural muscles, and/or their antagonists?

Try to find out the answer to these questions and re-evaluate all the methods mentioned in this exercise after you have treated such muscles with whatever method you consider appropriate.

Record your findings.

Palpation skill status

In this chapter on muscle palpation you have been exposed to a variety of approaches useful for uncovering evidence of functional integrity or dysfunctional adaptation which adds to the knowledge gained in the previous chapter. If you have successfully completed the exercises given in this chapter, you should now be comfortably able to evaluate for muscle shortness in appropriate (postural) muscles, as well as being able to identify localised changes in these.

If you have worked on the two segments of the last exercise of all (4.29) you will now have combined the use of the information resident in the skin with that which the muscles and other soft tissues have to offer in respect of their structural changes.

As has been established, structure and function are intertwined to a degree that makes them inseparable in reality.

Just as we can use structural analysis and palpation to predict what structural changes are likely, so can we evaluate function to guide us towards what structural changes are probable.

In the next chapter, the methods used are no longer looking for structural change alone, but are concerned with the altered function which accompanies altered structure. Some of the methods are subtle, others less so. All are of proven value if you have the patience to develop the acuteness of touch needed to read the evidence which is waiting to be recognised.

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Red, white and black reaction

Many researchers and clinicians have described an assortment of responses in the form of 'lines', variously coloured from red to white and even blue-black, after application of local skin dragging friction, with a finger or probe.

In the early days of osteopathy in the 19th century, the phenomenon was already in use.

Carl McConnell (1899) states:

> I begin at the first dorsal and examine the spinal column down to the sacrum by placing my middle fingers over the spinous processes and standing directly back of the patient draw the flat surfaces of these two fingers over the spinous processes from the upper dorsal to the sacrum in such a manner that the spines of the vertebrae pass tightly between the two fingers; thus leaving a red streak where the cutaneous vessels press upon the spines of the vertebrae. In this manner slight deviations of the vertebrae laterally can be told with the greatest accuracy by observing the red line. When a vertebra or section of vertebrae are too posterior a heavy red streak is noticed and when a vertebra or section of vertebrae are too anterior the streak is not so noticeable.

Much more recently, Marshall Hoag (1969) writes as follows regarding examination of the spinal area using skin friction:

> With firm but moderate pressure the pads of the fingers are repeatedly rubbed over the surface of the skin, preferably with extensive longitudinal strokes along the paraspinal area. The blunt end of an instrument or of a pen may be used to apply friction, since the purpose is simply to detect colour change, but care must be taken to avoid abrading the skin. The appearance of less intense and rapidly fading colour in certain areas as compared with the general reaction is ascribed to increased vasoconstriction in that area, indicating a disturbance in autonomic reflex activity. The significance of this red reaction and other evidence of altered reflex activity in relation to (osteopathic) lesions has been examined in research. Others give significance to an increased degree of erythema or a prolonged lingering of the red line response.

John Upledger (Upledger & Vredevoogd 1983) writes of this phenomenon:

> Skin texture changes produced by a facilitated segment [localised areas of hyper-irritability in the soft tissues involving neural sensitisation to longterm stress] are palpable as you lightly drag your fingers over the nearby paravertebral area of the back. I usually do skin drag evaluation moving from the top of the neck to the sacral area in one motion. Where your fingertips drag on the skin you will probably find a facilitated segment. After several repetitions, with increased force, the affected area will appear redder than nearby areas. This is the 'red reflex'. Muscles and connective tissues at this level will:
>
> 1. Have a 'shotty' feel (like BBs under the skin);
> 2. Be more tender to palpation;
> 3. Be tight, and tend to restrict vertebral motion; and
> 4. Exhibit tenderness of the spinous processes when tapped by fingers or a rubber hammer.

Roger Newman Turner (1984) describes the research of another osteopath/naturopath, Keith Lamont, who first described the 'black line' phenomenon:

> It is a common observation of osteopaths who use a spinal meter, to detect the most active lesions, that pressure on either side of the spine with a hemispherical probe of approximately 0.5 cm diameter, will, in some patients, illicit a dark blue or black line. The pressure of the probe is usually very light since it is intended to register variations in skin resistance, but it has a pinching-off effect on the arterioles and venules of the capillary network beneath the skin. Local engorgement of the capillary bed with deoxygenated venous blood causes the appearance of the line which slowly fades as the circulation returns.

This is considered to relate to a nutrient deficit in those patients in whom this sign is seen.

Keith Lamont, who first drew attention to the black line phenomenon, has found that administration of vitamin E, bioflavonoid complex and homoeopathic ferum phosphate will correct this deficiency.

Bertrand DeJarnette, the developer of sacrocranial technique, writes extensively on the subject of the 'red reaction', with some complex interpretations suggested in his classic text *Reflex pain* (DeJarnette 1934).

DeJarnette initially makes assessments of patients (partly based on blood pressure readings) into various categories, during which process he has them treated in order to alter the relative oxygenation levels which are assumed on the basis of these categories. None of these methods are pertinent to this survey of skin reactions, but are a necessary preamble to his descriptions, which would be confusing otherwise. In a 'Type 1' patient, who has received the appropriate preliminary attention as outlined ('carbon dioxide elimination technic'):

> Sit or stand immediately behind the patient facing the patient's back. Have the patient bend slightly forward. Be sure the light is even on the patient's back to avoid shadows. Place the index and middle fingers of your right hand upon the 7th cervical vertebra, having the two fingers about an inch [2.5 cm] lateral from the spine of the 7th cervical vertebra. Keep the fingers evenly spaced as you go down the spine, so each line is as straight as possible. For the 'Type 1' patient (normal BP after appropriate techniques) use a light touch. To produce an even pressure of both fingers on the back they may be fortified by placing the fingers of the left hand over them. As you go down the spine, your pressure will be just hard enough to cause the fingers to dent the skin.
>
> *Now draw your fingers down the spine very quickly* ending at the coccyx. Step back and watch the reaction. A red line will usually appear all the way down the spine. This soon starts to fade and the fading is what you must watch. The area that appears Reddest *as this fading starts*, is the major [lesion] for this patient and should be marked with a skin pencil. You will often notice on this type of patient that the major area is much wider than any other area of your lines down the back. This is caused by tissue infiltration.

The 'Type 2' category patient will have slightly high blood pressure after DeJarnette's preliminary treatment. After adopting the same starting position:

> Making a firm pressure, draw fingers down the spine, with a fairly slow motion. You should be able to count to 15 while drawing the fingers from the 7th cervical to the coccyx, by counting steadily. With a good light on the back, the results should show a line which becomes red, some portions brighter and some very faintly coloured. Now watch the lines fade. The area which shows the Whitest is marked as the major [lesions] for this is the most anaemic spinal muscle area. It will be paler than any portion of skin on the patient's body.

Moving next to the final category which interests us in this survey, (patients with high blood pressure) DeJarnette asks that you adopt the same start position and then:

> Making heavy pressure, come down the spine slowly, counting 20 as you go from 7th cervical to coccyx. Now watch the reaction. The line that shows the Whitest is the major [lesion]. In this type the blood pressure is over 180 (systolic) the whitest area shows a waxy, pale colour and may persist for several minutes.

Professor Irvin Korr (1970), writing of his years of osteopathic research, described how this red reflex phenomenon was shown to correspond well with areas of lowered electrical resistance, which themselves correspond accurately to regions of lowered pain threshold and areas of cutaneous and deep tenderness.

He cautions:

> You must not look for perfect correspondence between the skin resistance (or the red reflex) and the distribution of deeper pathologic disturbance, because an area of skin

> which is segmentally related to a particular muscle does not necessarily overlie that muscle. With the latissimus dorsi, for example, the myofascial disturbance might be over the hip but the reflex manifestations would be in much higher dermatomes because this muscle has its innervation from the cervical part of the cord.

By use of a mechanical instrument which quantified the pressure applied at a constant speed, followed by measurement of the duration of the redness resulting from the action of the frictional stimulator on the skin, Korr could detect areas of intense vasoconstriction which corresponded well with dysfunction elicited by manual clinical examination. It could be said that the opportunity to 'feel' the tissues was being ignored during all these 'strokes', and 'drawing' of the fingers down the spinal musculature.

This thought was not lost on Marsh Morrison (1969), who describes his views as follows:

> Run your fingers longitudinally down alongside the dorsal and lumbar vertebrae (anywhere from the spinous processes extending laterally up to two inches [5 cm]) and stop at any spot of tissue which seems 'harder' or different from normal tissue. These thickened areas, stringy ligaments, bunched muscle bounds, all represent indurated tissue; they are usually protective and indicate irritation and dysfunction. Once these indurated areas are palpated press down and almost always they will be sensitive, indicating a need for treatment.

Morrison used a technique for easing such contractions similar to that later described by Lawrence Jones, in his strain/counterstrain system (Jones 1981).

Osteopathic researchers, Doctors, Cox, Gorbis, Dick and Rogers, writing (Cox et al 1983) regarding their work on identification of palpable musculoskeletal findings in coronary artery disease (see notes on facilitated segments in Chapter 4) describe their use of the 'red reflex' as part of their examination procedures (other methods included range of motion testing of spinal segments and ribs, assessment of local pain on palpation, and altered soft tissue texture). In this study the most sensitive parameters, which were found to be significant predictors for coronary stenosis, were limitation in range of motion and altered soft tissue texture:

> 'Red reflex' cutaneous stimulation was applied digitally in both paraspinal areas [T4 and T9–11] simultaneously briskly stroking the skin in a caudad direction. Patients were divided arbitrarily into three groups.
>
> - Grade 1 – erythema of the spinal tissues lasting less than 15 seconds after cutaneous stimulation.
> - Grade 2 – erythema persisting for 15 to 30 seconds after stimulation.
> - Grade 3 – erythema persisting longer than 30 seconds after stimulation.

In this context the Grade 3 – maintained erythema – is seen to represent the most dysfunctional response.

Making sense of the red reaction

Clearly there is a good deal to learn from and about the simple procedure of stroking the paraspinal muscles. Whether or not DeJarnette's preliminary methods are validated does not alter the possible wisdom of his subsequent observations, employing as it does variable pressures and looking as it does at the fading of redness, rather than the initial red reaction itself, for evidence of altered function.

Similarly, Lamont's nutritional observations would need verification, something which does not alter the fact that some patients demonstrate this unusual 'black streak'. As with so much in palpation there is little question of 'something' being felt or observed. It is the interpretation of what the 'something' means that excites debate.

The simpler observations of Upledger, Hoag, Morrison and McConnell are readily applicable, and should be tested against known dysfunction to assess the usefulness of these methods during assessment.

The research of Cox and his colleagues indicates that one musculoskeletal assessment method alone is probably not sufficiently reliable to be diagnostic; however, when, for example, tissue texture, changes in range of motion, pain and the 'red reaction' are all used, a finding of the presence of several of these is a good indication of underlying dysfunction which may involve the process of facilitation.

A simpler use for the reaction

A less complex use of the red reaction is to go back a century to McConnell's method, described earlier in this special topic note, in order to highlight spinal deviations. By creating erythema paraspinally you can stand back and visualise the general contours of the spine as well as any local deviations in the pattern created by application of your firm digital strokes.

QUESTION

How do you know whether your palpating fingers or thumbs are applying equal pressure bilaterally during such assessments, or when palpating elsewhere, bilaterally?

A useful guide to the uniformity of pressure can be obtained by comparing the relative blanching of your nail beds; are they equally white, pink, red?

SPECIAL TOPIC EXERCISE

Time suggested
20 MINUTES

Perform the various 'strokes' as described by McConnell, Hoag, Upledger, Morrison and Cox et al.

Run fingers or probes firmly down the tissues close to and parallel to the spine.

Observe the 'red reaction' as well as how it fades.

Look for areas which become more irritated and those which become less irritated, when compared with surrounding tissues.

Having marked the ones which respond most dramatically and those which do not, repalpate the tissues using some or all of the methods discussed in Chapters 3, 4, 5 and 8 in order to evaluate what it is you sense as being different about the tissues.

Do tissues which seem hypertonic respond differently to normal or flaccid tissues?

Do you note increased sensitivity in areas which redden or which blanch when stroked in this way, or is there little difference?

What is the degree of skin 'tightness' over these different areas?

What is the degree of skin adherence to underlying connective tissue (skin rolling or lifting) in the different areas?

If you scan from off the body can you sense differences in temperature in these contrasting areas?

Is eliciting of the 'red reflex' likely to be of any clinical value to you?

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5 Palpation of subtle movements (including circulation of CSF, energy; and, 'has tissue a memory?')

Evaluating movement

In seeking methods for evaluation of subtle movement in the body we can once again turn to Viola Frymann (1963) for an introduction, as she describes what we should expect as we begin to palpate muscular tissues for anything other than their mechanical status:

> If the hand is laid on a healthy muscle mass, of a resting limb, it is possible in the space of a few seconds to 'tune in' to the inherent motion within. A state of rapport, of fluid continuity between the examiner, and the examined is established and a whole new realm of exploration lies ahead. The continuity of fluid within the body is never interrupted in health – intra and inter-cellular fluid, lymph, cerebrospinal fluid – and it is in a constant state of rhythmic, fluctuant motion.

Frymann maintains that the vitality of tissue can be judged by the strength of such motions, with a wide variety of grades of tissue vitality being apparent. The example is given of the difference in the 'feel' noted when a previously paralysed and a presently paralysed limb are palpated. In the first a mere 'murmur' of motion will be felt, whereas in the latter there will be no detectable rhythmic motion at all. Frymann goes further and states that judgment can also be made as to the likelihood of improvement, based on information such as this.

EXERCISE 5.1 — *Time suggested* 3–5 MINUTES

If you have access to someone with a totally or partially paralysed limb (a stroke victim perhaps?), Frymann suggests you start by simultaneously placing one hand on the spinal segment which supplies the principal innervation to the affected limb, and the other on the affected limb itself.

Having done this, pause for a few minutes, all the while concentrating on any 'activity' under your hands. The spinal hand should begin to register a rhythm. The degree to which the ('rhythmically integrated') response is subsequently felt in the other hand as well is the key to the ultimate/potential viability of the presently paralysed tissue. Frymann calls this communication – which in normal tissue has a surging, rhythmic, nature – the 'vital fluid tide' within.

Can you sense this?

If you do not have immediate access to someone with a disability involving total or partial paralysis of a limb, then palpate for rhythmic activity such as that described by Frymann in normal tissue until the 'reading' of its presence becomes easy for you, and when a paralysed limb is accessible palpate this too, and register the profound difference.

What is the rhythmic 'fluid tide' which can be felt when we palpate? As in our investigation of the skin in Chapter 3, it is necessary to come to an understanding of aspects of physiological function as it relates to this vital fluid tide, most notably how cerebrospinal fluid circulates, possibly throughout the whole body, as well as something of the trophic function of nerves.

Ehrlinghauser's research – cerebrospinal fluid circulation

For a deeper understanding of the concepts being discussed here, the reader is referred to an article by Ralph Ehrlinghauser (1959) as well as to *Craniosacral therapy* (Upledger and Vredevoogd 1983).

Ehrlinghauser starts his discussion with the news that research has demonstrated that collagen (connective tissue) has a tubular structure (Kennedy 1955, Wyckoff 1952), a discovery which, he believes, will revolutionise our understanding of human physiology. Cerebrospinal fluid (CSF) motion is considered by many cranial osteopaths to play a major part in controlling a vital 'semiclosed' hydraulic system. This is bounded by the cranial vaults themselves and the dural membranes which, together, form the semiclosed aspects of the unit.

CSF enters and leaves this hydraulic system via the choroid plexuses and the arachnoid villi. As well as giving shape and stability (and, some believe, motion) to this system, the largely incompressible CSF also fluctuates through the tubular collagen fibrils of the connective tissues throughout the body. CSF is seen to act as a transport medium between the subarachnoid space and cells of the body.

The discovery of collagen's tubular structure indicates that, far from connective tissue being merely structurally supportive (as it anatomically connects epithelial, muscular and nervous tissues), it can also be assumed to be linked to these tissues histologically, biochemically, physiologically and of course pathologically, when dysfunction/disease is present.

Connective tissue, with its hollow, tubular fibril structure, is continuous throughout the body, from the fascia of the skull to that of the feet. It provides fascial planes, envelopes, reflections and spaces, as well as ligaments and tendons, giving protection, cohesion, form, shape and support to the circulatory, lymphatic and nervous systems which it separates, shapes and binds.

In 1939, W. G. Sutherland, having established that the cranial bones had a constant rhythmic physiological range of motion, postulated that CSF fluctuation provided the mechanism which moved these. Subsequent studies have confirmed that, although sutures provide a strong bond between cranial bones, they do allow movement. Other workers have considered that such motion as is observed relates to variations in venous, arterial and respiratory pressures, and these do undoubtedly have the potential for such an influence (Fig. 5.1).

It is also considered that there exist, within the brain, cells which provide a further rhythmic pulsation which influences fluid motion (the oligodendroglia). Pulsations of between 6 and 12 per minute are now considered to be the norm in good health for what has been termed the 'primary respiratory mechanism' in

A

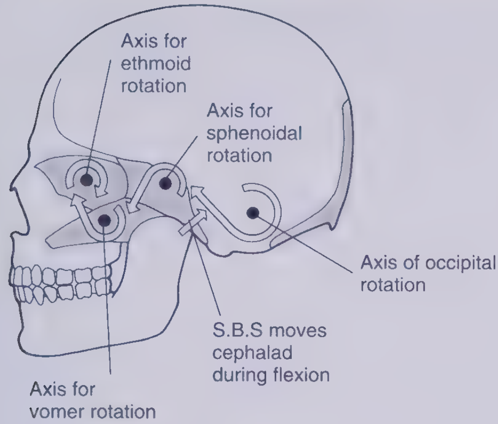

Fig. 5.1A Schematic representation of cranial motion. During flexion, the occiput is thought to move antero superior, which causes the sphenoid to rise at its synchondrosis. Simultaneous movement occurs in the frontal, facial and nasal bones as indicated. The extension phase of this motion involves a return to a neutral position.

B

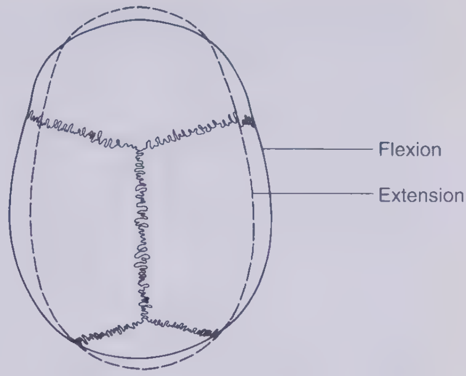

Fig. 5.1B The flexion phase of cranial motion (inhalation phase) causes the skull, as a whole, to widen and flatten.

cranial osteopathy. These rhythms are unrelated to normal respiration or heart rate, and are seen to operate in all mammals. Research indicates that oxygen reaches fine neural structures at this rate (8 to 12 waves per minute) and that administration of carbon dioxide (30%) stops the waves in humans. In animal studies, the administration to anaesthetised dogs of high concentrations of carbon dioxide has been shown to lead to a precipitous rise in CSF pressure.

In the rhythmical coiling and uncoiling of the oligodendroglial cells, which provide at least part of the pulsating impetus for CSF fluctuation, we may therefore have one explanation for its motive power through the channels which exist within connective tissue.

Erlinghauser provides ample research validation for this concept (much simplified in this account) of the circulation of CSF, from the subarachnoid spaces via tubular collagen fibrils to the intercellular spaces, where it combines with tissue fluids, being in turn reabsorbed by the end-lymph vessels, into the lymph system and thence to the venous system. This leads, naturally enough, to the conclusion that any derangement of the connective tissue system must result in limitations to the physiological flow of CSF within the collagen fibrils, with negative consequences to cellular health.

If we want to obtain palpatory evidence of dysfunction affecting the musculoskeletal system (which will always involve connective tissue) the ability of the palpator to 'read' the rhythmic pulsation of CSF becomes very important indeed. This is the 'vital fluid' which Frymann referred to in the opening paragraphs of this chapter.

Upledger places a different emphasis on factors involved in the motive force which drives the fluid fluctuations of CSF. He sees the fluid structure of this system as being 'primarily biphasic', with more or less stationary viscous fluid at the inner core and a lighter almost nonviscous CSF externally. The hydraulic contents of the system are, says Upledger:

> Subjected to the pulsatory motions of the arterial system, the venous system and the pulmonary system which transmits its effect to the dura mater through the vertebral connections along the cervical section of the spinal column. The lateral displacements which all these systems induce upon the fluid region set the latter into motion.

Whether the Erlinghauser or the Upledger model is more accurate is largely a side issue. What matters in our palpation studies is the fact that fluid fluctuations occur, that they can be palpated and they have significance. Upledger summarises the cranial (and other osseous and soft tissue) motions which result from, or which take part in, the rhythmic motion of CSF. Recall that this has a rhythm of 6 to 12 cycles per minute under normal circumstances. Primary respiratory flexion is the term applied to the extreme range of motion occurring during each of these cycles, at which time the head becomes wider transversely and shorter in its anteroposterior dimension. At the same time, the entire body externally rotates and widens. There is then a brief pause before the body returns to the starting position, termed extension, during which time the head narrows and elongates as the rest of the body goes into internal rotation. All these motions are very slight indeed but once you learn of their existence, palpation of them during the approximately 6–8 seconds of a full cycle, can be learned fairly quickly.

Upledger says:

> Once you tune into these motions, you can perceive your own body doing flexion–extension cycles as you stand or walk. After a time you will learn to tune yourself in and out of your own physiological body motion as well.

The craniosacral connection

One other anatomical link needs to be explained regarding this concept; the cranial link to the sacrum. The connection between the occiput and the sacrum is the dural membrane, which is itself continuous with the meningeal membranes. If the occiput moves (minutely) forward as the flexion phase of the cranial respiratory cycle commences, it will create a synchronous movement (pull) of the sacral base (see Fig. 5.2), which moves posteriorly during this phase (taking the sacral apex and coccyx anteriorly).

What should we be trying to learn from our palpation of these rhythms and cycles? Upledger summarises:

> From the diagnostic, prognostic and therapeutic points of view, we are interested in a qualitative estimate of the strength of the inherent energy which is driving the physiological motion, the symmetry of the body motion response (both of the craniosacral system and of the extrinsic body connective tissues), and in the range and quality of each cyclical motion. Is it fighting against a resistance barrier? (Fig. 5.2).

Not only is there useful information available when palpating the cranial and sacral components of this complex, but it is possible to feel the cycle in any tissues of the body, even in patients who are in a vegetative state.

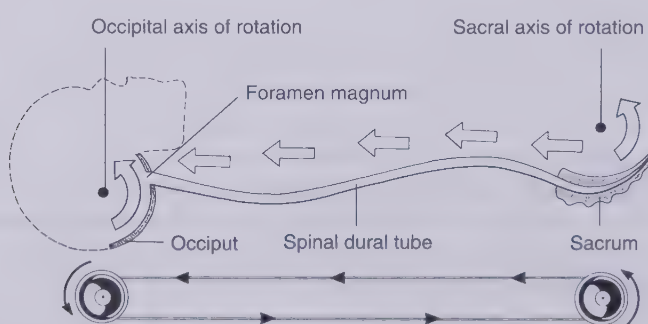

Fig. 5.2 Schematic representation of the synchrony of motion between the sacrum and the occiput.

EXERCISE 5.2

Time suggested
– TIMINGS AS FOR EXERCISES 2.17, 2.19, 2.20
PLUS 5–8 MINUTES

Go back to Chapter 2 and repeat Exercises 2.17, 2.19 and 2.20, which focused attention on cranial and sacral rhythms. Follow these with this exercise.

Your partner/patient lies on her side, pillow under the head in order to avoid any side-bending of the neck. You are seated behind and place one hand on the occiput (fingers going over the crown) and the other on the sacrum, fingers towards the coccyx.

Palpate the motions of the occiput and the sacrum. Are they synchronous? When you have satisfied yourself (5 minutes should be ample) have the model remove the pillow, so that the neck is side-bent (Fig. 5.3).

Repalpate and compare the results.

Can you feel the synchronous motions under your hands? What changes occur when the neck is not supported on the cushion?

Fig. 5.3 Palpation for the synchrony of motion between the sacrum and the occiput.

EXERCISE 5.3

Time suggested
10–15 MINUTES

With your partner/patient prone or seated palpate the paraspinal musculature for craniosacral motion. Upledger suggests this be done so that the spinous processes lie between your fingers. When a muscle has been denervated, he says, the rhythm will rise to 20 to 30 cycles per minute, which can help to differentiate pain caused by nerve root compression from other sources of pain.

Upledger again emphasises that practice is the only way to gain confidence in this form of palpation: 'Do not let your intellect obstruct the development of your palpatory skills.'

He is, of course, right to repeat this, for initially the 'feeling' of motion is nothing more than that, and is easily discounted by the sceptical mind.

Palpation hint: It is suggested that in all early exercises in which cranial motion or craniosacral rhythms are being assessed, you should think in terms of a slight 'surging' sensation, sometimes described as feeling 'as though the tide is coming in', or a feeling of 'fullness' under the palpating hand, rather than expecting to feel movement of a grosser nature. After a few seconds this 'surge' will be felt to recede; the tide goes out again. This is a subtle sensation, but once you have tuned into it, it is unmistakable, and very real indeed.

EXERCISE 5.4

Time suggested
3–5 MINUTES

Have your partner/patient lie face upwards. You stand at the foot of the couch cradling one foot (heel) in each hand. Close your eyes and feel for external rotation of the leg during the flexion phase of the craniosacral cycle and internal rotation as it returns to neutral during the extension phase (see Fig. 5.4).

Once you have become acutely aware of this motion, compare the ease of motion in the rotation of the two legs.

Does there seem to be an easier feel to the external or the internal rotation, symmetrically or in one or other of the legs?

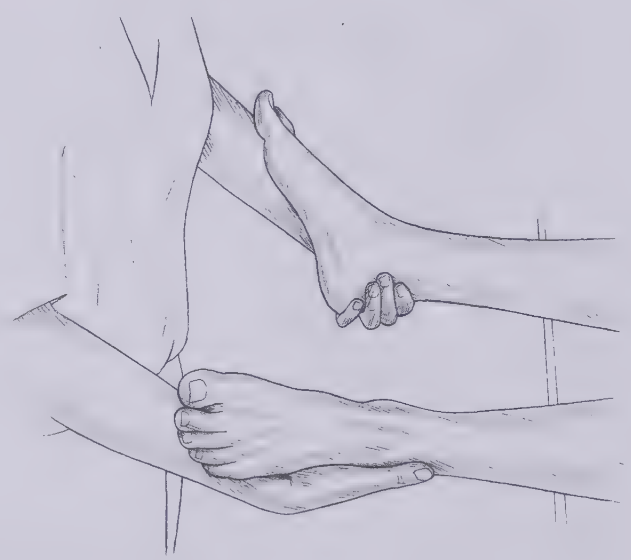

Fig. 5.4 Palpating craniosacral rhythmic motion via the feet.

CREATING A STILL POINT

Upledger's books are a treasure house of information for anyone who wishes to add craniosacral work to their repertoire. Instruction in workshop or seminar settings is, however, essential before this is applied therapeutically.

It is both possible and desirable during palpatory training for the student to learn to briefly interrupt the cranial cycles, a process known as inducing a 'still' point. This can be done from many places in the body, for example from the feet as in Exercise 5.4, or from the sacrum or occiput.

What is required is that the palpating hands follow the palpated part as it goes to the limit of the flexion or extension phase, and to then 'lock' the part(s) at this limit of motion, not by applying pressure but by means of a restraining of the tendency to go into the next phase of the cycle.

This attempt to halt normal motion is repeated after subsequent cycles until the rhythm stops completely, for some seconds or even minutes.

This is the 'still' point (see Exercise 5.5).

After a while, the palpating (restraining) hand(s) will begin to sense the movement trying to start again. The normal motion is then allowed and a general improvement is usually noted in the amplitude and symmetry of the motion. Therapeutically this has the effect of enhancing fluid motion, restoring flexibility and reducing congestion.

EXERCISE 5.5

Time suggested
10–12 MINUTES

As an exercise in establishing a 'still' point, go back to Exercise 5.4 and, when you have established a clear rhythm of external and internal rotation of the legs during the flexion and extension phases of the craniosacral fluid fluctuation, start to follow the external rotation while preventing any return to internal rotation of the legs when this phase is perceived. Do not forcibly rotate the legs, simply go with the external rotation each time it occurs, taking up additional slack to its limit, and then prevent any return to the neutral position. After a number of pulsations (Upledger says anywhere from 5 to 20 repetitions), during which a slight increased external rotation will be achieved, the impulses will cease. There may be sensations of tremor, shuddering or pulling noted through the contact hands from elsewhere in the system (as the cranial impulses try to deal with the restriction) but eventually this will cease and the 'still' point will have been reached. During this phase the patient will relax deeply, breathing may alter and corrections occur spontaneously within the musculoskeletal system.

CAUTION: The 'still' point may easily be initiated via cranial and sacral structures but practising of this approach on such structures is not recommended without guidance, as it is all too easy to traumatise the delicate craniosacral mechanisms.

DISCUSSION REGARDING EXERCISES 5.1–5.5

From a palpation point of view this is as far as we can go with our exercises in assessment and manipulation of cranial fluid fluctuations and rhythms.

By practising the exercises as described you should become sensitive to the subtle yet powerful phenomenon which has been described as the primary respiratory mechanism and which forms a major information source and therapeutic tool in cranial manipulation.

Just how this is integrated into your work must hinge on the degree of interest this avenue excites, and how much cranial study is undertaken. The heightened awareness of subtle rhythms which these palpation exercises will have produced are, however, of value, whether or not your work ultimately involves cranial manipulative methods.

Energy

The research and writing of a number of eminent clinicians in the field of osteopathy now takes us from the flow of CSF to an area which can best be described as the palpation of energy flow. This is clearly an area which many find difficult to deal with, either intellectually or practically. The best advice the author can give is that you temporarily suspend disbelief, and that you attempt the various exercises which are outlined below – based on the work of Becker, Smith and Upledger, amongst others – and see what you feel.

Whether or not you accept the explanations which these respected researchers and clinicians give for 'their' approach to reading and manipulating what they conceive as energy fluctuations in the body, is quite another matter.

If you have patience, you will undoubtedly feel movements and rhythms as you follow the exercises given below, and for the purpose of learning to 'feel' you are asked to accept that these represent, in one form or another, 'energy'. In Chapter 10 we will be looking at even more subtle energy manifestations, as used in methods such as 'therapeutic touch', and the discussion below should be kept in mind as that chapter is studied, for we are entering an area which is ill-defined, where function and concepts of energy interactions are mixed and blurred.

That something palpable exists which is called energy by numerous researchers and practitioners is not in question. What remains controversial is its nature and function.

Layers of energy?

Dr Fritz Smith (1986) outlines his model of energy patterns within and around the body in his excellent text *Inner bridges – a guide to energy movement and body structure.*

> There is a non-differentiated field which pervades the body, which extends some distance beyond the limits of the physical body. Currents which move within us are organised into:
>
> 1. A deep layer which flows through the skeletal system;
> 2. A middle layer which flows through the soft tissues (neurovascular bundles, fascia, muscle cleavages, and so on) as described in Traditional Chinese Medicine, and;
> 3. A superficial layer which is found just below the skin.
>
> These energy patterns are capable of disruption if the physical medium through which they pass (bone, soft tissue, skin) is traumatised or stressed, and the non-differentiated field may carry 'imprints' of imbalances caused by physical, toxic or emotional insults and traumas, especially if these have not been absorbed by specific tissues or systems.

Energy cysts and chakras

Before examining the work of Fritz Smith and Rollin Becker in relation to such energy patterns, we will also need to become familiar with Upledger's concept of the 'energy cyst' and in order to do so our first attention needs to be towards the chakra system, as described in Ayurvedic medicine.[1]

One of the palpable phenomena of the energy system is said to be the chakras, or energy centres, which are situated as specific sites on the body, and which can be palpated on the surface or just off the surface.

The original concept of chakras was Ayurvedic (Indian) as was the word *prana*

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[1]It is not necessary to accept the existence of chakras as such in order to palpate them; they can be seen merely as places where circulating energy is more organised or dense, or where neurological activity creates increased rhythmic patterns of subtle movement.

(energy) used to describe the vital 'substance' with which they are associated. The chakras are described as involving a clockwise circulation of energy at these places. They are said to range in size from about 3–15 cm in diameter and number 7 in all:

1. The root chakra is palpated just above the pubis, Upledger suggests, with one hand under the sacrum and the other resting on the lower abdomen. It is said to relate to sexual function.
2. The navel chakra is best palpated similarly, one hand under the lumbar spine, the other just below the navel (no hand pressure, just a touch). This is said to relate to emotions and sensitivity.
3. The spleen chakra is best palpated, says Upledger, with one hand over the lumbodorsal junction and the other over the epigastrium. It is said to relate to energy assimilation and immunity.
4. The heart chakra requires one hand under the mid-thoracic spine and the other touching the central sternal area. It is said to relate to emotions connected with love as well as 'hurt' feelings.
5. The throat chakra should be palpated with one hand behind the neck and the other over the centre of the throat. It may be felt as two centres of spinning energy. It is said to relate to personal communication and relationships.
6. The brow chakra may be palpated with a hand under the occiput and three fingers over the glabella. It has an intense energy 'feel' relating, it is said, to intuitive perception.
7. The crown chakra is palpated at the crown of the head where it may be felt as an energy outflow rather than a spinning energy centre, related, it is said, to the pineal gland and to spiritual factors.

EXERCISE 5.6

Time suggested
2 MINUTES PER 'CHAKRA' CENTRE

Palpate the chakras as outlined above. (See p. 245, Fig. 10.3)

Do you sense any surge, vibration, churning, fluctuation of motion under your hands?

This is an exercise to come back to, after completing some of the work suggested in further exercises below, if the chakra concept interests you.

Restricted energy flow: the Varma and Upledger models

Both traditional Chinese medicine and Ayurvedic medicine hold that there are channels over the surface of the body, and within it, which are conduits for the flow of energy. If these are blocked or altered, the result is dysfunction or disease. There are abundant texts which help the interested reader to a greater awareness of both chakras and the meridian system.

It may be useful to consider a similarity in the ideas of different researchers, separated by time and culture, whose concepts were very close, if not identical. Stanley Lief, the developer of neuromuscular technique (see Chapter 4) was greatly influenced by Dr Dewanchand Varma, an Ayurvedic practitioner working in Paris in the early 1930s, whose method of treatment of energy imbalances utilised a primitive form of NMT which he called 'pranotherapy'.

In his work Varma (1935) discussed the ways in which 'electro-magnetic currents' derived from the atmosphere (at the chakras) were capable of becoming obstructed:

> by certain adhesions in which the muscular fibres harden together so that the nervous currents can no longer pass through them.

It was his method of pranotherapy, a sort of manual soft tissue manipulation, which would release these palpable obstructions, which Lief incorporated into NMT.

Varma mentions changes in the skin when such obstructions occur, saying:

> If the skin becomes attached to the underlying muscle, the current cannot pass, the part loses its sensibility.

This is remarkably close to Lewit's description of hyperalgesic skin zones (see Ch. 3), is it not?

How were the obstructions and adhesions dealt with?

Varma suggested a two-stage treatment, which – as in NMT – is actually an assessment, during which treatment is imparted, or not, as the therapist deems appropriate. The first part of the assessment/treatment involved the tissues being prepared by rubbing with oil. The actual manipulation of the tissues was performed by first 'separating' skin from underlying tissue, followed by a gentle 'separation' of the muscle fibres, a process which required:

> highly sensitive fingers able to distinguish between thick and thin fibres, and . . . highly developed consciousness and sensitivity, attained by hours of patient daily practice on the living body.

While these are descriptions of some interest, they fail to instruct adequately; what did Varma actually do?

My uncle, Boris Chaitow (who at the time of writing is in his late 80s), was a codeveloper of NMT (with his cousin Stanley Lief). Chaitow has commented on Varma's methods (Chaitow 1983) saying that the most valuable essential which he derived from Varma came as a result of having treatment from him many times.

It was during one of these sessions that the 'variable pressure' factor become apparent, something which Chaitow still holds to be invaluable in both assessment and treatment. This subtle factor, which allows the palpating hand/digit to 'meet the tissues', not overwhelm them, is a factor which will be seen again when we come to examine the research work of Smith later in this chapter.

John Upledger (1987) describes how his concept of an 'energy cyst' developed as he worked with biophysicists, psychologists, biochemists, neurophysiologists and others at the Michigan State University College of Osteopathic Medicine:

> The energy cyst is a construct of our imagination which may have objective reality. We believe that it manifests as an obstruction to the efficient conduction of electricity through the body tissues (primarily fascia) where it resides, acts as an irritant contributing to the development of the facilitated segment [see Chapter 4] and as a localised irritable focus.

Varma hypothesised his 'obstructions' to energy flow over 60 years before Upledger's development of the 'energy cyst' theory, which is quite remarkably similar. (There is no suggestion whatever that Upledger or his fellow workers had, or have, any knowledge of Varma and his work, which quite simply vanished, almost without trace, during the Second World War.)

Upledger believes that the cyst interrupts the flow of *chi*, the Chinese term for energy, and that, by palpation, these obstructions can be readily found. They can result, says Upledger, from trauma, infection, physiological dysfunction (see commentary in Chapter 4 as to how soft tissue changes occur and progress) mental or emotional problems, or through disturbance of the chakras.

What do 'energy cysts' feel like? 'The cyst is hotter, more energetic, less organised and less functional than surrounding tissues.'

How does Upledger pinpoint a cyst? He uses a method which he terms interference arcing, in which he 'feels' for waves, or arcs of energy, relating to such dysfunctional centres. The cysts seem to generate interference waves which can be sensed (usually pulsating at a much faster rate than normal tissue) superimposed on the normal rhythms of tissue.

If these waves can be imagined as being like ripples on a pond surface after a pebble has disturbed the surface, it is possible to visualise that the palpating hands could 'zero in' on the centre of the wave pattern, to locate the source, the cyst.

It would not matter from which direction, in relation to the cyst, the hands were coming in their palpation, for the centre would remain constant, as would the wave pattern.

(Compare the image of an energy cyst, as pictured by Upledger, with that of the 'eye' of the disturbance which Becker describes in his work later in this chapter.)

EXERCISE 5.7

Time suggested
10–15 MINUTES

Palpate the soft tissues of your patient/partner, in an area of localised dysfunction (trigger point or other reflex activity, previously identified using the methods of Lewit, Lief or Nimmo) for 'energy cysts/arcs', as described above, by placing your finger(s)/hand(s) in touch with the surface being palpated, without force, waiting for a sense of the rhythmic patterns present in the tissues. Reposition your hands whenever you wish in order to more clearly localise the focal centre of any pattern you may be picking up.

Can you sense the waves?

Can you localise the centre of an area of disturbance?

If you find this particular exercise difficult in that the patterns being sought seem hard to identify, the work of Smith, as described below, may help.

A brief introduction to zero balancing

Fritz Smith has explained his concepts and methods in his book *Inner bridges* (Smith 1986). He has called his approach 'zero balancing', but it is the book's subtitle, *A guide to energy movement and body structure*, which gives the strongest clue as to the way he thinks and the imbalances and changes he is looking for, and hoping to correct, in therapy.

He describes the following realisation, after 10 years of study of both orthodox and traditional (mainly Oriental) medical methods:

> During this process I came to recognise a specific area in a person where movement and structure are in juxtaposition, similar to the situation in a sailboat where the wind (movement) and the sail (structure) meet. From the explanation of the interface, in 1973, I formulated the structural acupressure system of Zero Balancing, to evaluate and balance the relationship between energy and structure.

His book is not an instruction manual, but rather examines the relationship between ancient energy concepts and modern medicine, Eastern esoteric anatomy and Western human anatomy, subjective inner experiences and objective observation. This approach is of considerable value and importance to those practitioners who struggle to align the apparent contradictions faced when comparing the variables in theory and methodology which exist between Western and Eastern medicine.

Smith examines what he terms 'the foundations for the energetic bridge' and looks at, among other areas, 'foundation joints'.

These, he says, are the:

- Cranial bones of the skull
- Sacroiliac articulations
- Intercarpal articulations of the hand

- Pubic symphysis
- Intertarsal articulations of the foot.

These, he maintains, transmit and balance the energetic forces of the body, rather than being merely involved in movement and locomotion. What they have in common is that they have small ranges of motion and little or no voluntary movement potential.

In all cases, movement in them occurs in response to forces acting upon the area, rather than being initiated by the part itself.

Thus, if there is an imbalance or altered function in any of these joints, the body is obliged to compensate for the problem rather than being able to resolve the situation through adaptation. Such compensation can be widespread and will often involve other associated structures, commonly becoming 'locked into' the body, limiting its ability to function normally. Smith believes that these joints have the closest relationship with the subtle body and any limitation in them, he suggests, can be seen as a direct read-out of the energetic component of the body.

He reminds us of the basic law of physics which tells us that *the effect of stress on any mechanism will spread until it is absorbed or until the mechanism breaks down.*

What Smith is pointing to is the fact that stresses will spread into these 'foundation areas' and that, because they have no power of voluntary motion, they will absorb the strains until these become locked into them, or until there is a resolution of normality by outside forces. Clearly, from a vantage point which looks at the effects of joint dysfunction on muscles inserting into such structures, we can see that there is the likelihood of any pattern of continued stress resulting in just such shortening and contraction (see Ch. 4).

For example, if we think of the ramifications of pelvic dysfunction on the local musculature (piriformis, quadratus, psoas, and so on) and the possibility that changes in these soft tissues can produce or maintain pelvic (including SI and pubic) problems, we can appreciate the advantages of being able to both identify and release such contractions, as discussed in Chapter 4.

Smith further identifies what he terms 'semi-foundation' joints, such as the:

- Intervertebral articulations
- Rib joints (costovertebral, costochondral, costotransversus)
- Clavicular articulations with the first rib and sternum.

He describes a variety of assessment methods capable of identifying reductions in the normal energy flow in tissues associated with distressed foundation and semi-foundation joints, and describes methods which he uses to restore normal function when reduced energy flow is perceived. He makes much of the usefulness in assessment of the ability to identify 'end of motion range' in joint play (discussed in Special Topic 8 relating to joint play and end-feel).

Smith's 'essential touch' palpation

Smith's work, therefore, seems to be a bridge between the gross methods of Western physiological methodology and the apparently abstract concepts of 'energy' medicine. He explains the way he makes contact with the patient. He calls this 'essential touch' saying, quite rightly, that it is common in bodywork to be touched only on the physical level, not to have a significant energetic interchange take place. The connection which he wants to achieve transcends the physical touching and involves an instinctive, intuitive, yet conscious action on the part of the aware therapist.

What should we feel when this is achieved?

Smith describes it thus:

> There are a number of sensations, mostly involving the feeling of movement or aliveness, which let us know we are engaging an energy field. We may perceive a fine vibration in the other person's body or in the aura, a feeling we are making contact with a low voltage current. This may be described as tingling, buzzing, a chill sensation, 'goose bumps', as well as a subtle sensation that some people describe as 'vibration'. We may also perceive a grosser feeling of movement as though the person's body, or our own, were expanding or contracting, even though we see no physical change.

This is not dissimilar to Frymann's description early in this chapter. Smith uses the concept of a fulcrum in order to establish his contact, as do other workers in this field, notably Becker and Lief, although in each case the descriptions of their individual fulcrums are quite different. A fulcrum is defined, says Smith, as a balance point, a position, element or agency through, around, or by means of which vital powers are exercised:

> The simplest fulcrum is created by the direct pressure of one or more fingers into the body, to form a firm support, around which the body can orient.

The fulcrum needs to be 'deep' enough into the body so that the physical slack of the tissue is taken up; this is the point at which any further pressure meets with resistance in the tissue beneath the fingers. *Getting 'in touch' with the person's energy field is thus achieved by taking up slack from tissues, so that any additional movement on our part will be translated directly into the person's experience.*

Compare the similarity between this description and the request, by Lief and Chaitow, that digital or hand pressure being applied in use of NMT be 'variable', matching that of the tissues it is meeting.

EXERCISE 5.8

Time suggested
2–3 MINUTES

Smith suggests we learn to practise this approach using a water-filled balloon, 25 cm or so in diameter. Place this on a table and slip your fingers under it, raise them and be sensitive to the pressure on your finger tips. As the fingers are raised, slack is taken out of your own tissues as well as the slack of the balloon. As you increase pressure there comes a moment when you 'connect' with the mass of water in the balloon and, at that moment, the fingertips are acting as a fulcrum for the balloon.

> At any fulcrum or balance point one is in solid contact with the material, the mass orients around the finger, and any further pressure will affect the energy.[2]

Other ways of creating a fulcrum, apart from direct pressure with finger or hand, can involve stretching, twisting, bending or sliding contacts.

EXERCISE 5.9

Time suggested
10–15 MINUTES

Smith suggests you take a rubber band and stretch it, taking out the slack. At that point he likens what you have done to 'making contact' in the patient situation. Any further movement or stretch will involve the rubber itself.

With this experience, and the balloon, in mind, contact with your patient by placing a hand onto their tissues, anywhere, and lightly pull the hand towards yourself and slightly 'lift' it from the tissues.

[2]Smith insists that there should be frequent breaks (he calls these 'disconnects') from the patient when energy exercises (or therapy) are being performed. A loss of sensitivity – which he calls 'accommodation' – takes place as well as a draining of the therapist's vital reserves.

Smith describes this as a 'half-moon' vector, since it combines both lifting and pulling motions which translate into a curved pull. This is the key to what he seeks.

Once you have taken out the physical slack, and have established an interface (fulcrum) with the tissues, *any additional movement on your part will be felt by the patient and any movement in the person's body will be felt by you.*

At this point you are in touch at the energy level. Can you feel it?

Stay with the contact for some time and assess what you feel.

Record your description of the sensations you are feeling.

Fine-tuning

It is with such a contact, Smith states, that you should feel vibrations and currents, and by adding more movement yourself you can judge how the tissue (or the patient as a whole) responds. To fine-tune the fulcrum contact he asks himself, 'How does this feel to the patient?' or, 'How would this feel if it were done to me?'

The response helps him decide whether to pull harder or more gently, to twist more, or less. He also asks the patient how it feels to them, suggesting that with a straight pressure fulcrum a 'nice hurt' is what is desirable.

Long before I was aware of Smith's work (but possibly after reading Becker's ideas) I came to use a contact which achieves very similar results, in a diagnostic sense, to that described by Smith. I make a hand, mainly a palm, contact, with fingers lightly touching, but not usually involved. I try to think of the palm as though I were applying a suction pad to glass. Lifting and slightly turning the cupped contact until there is a feel of 'suction' between my hand and the patient. The writhing, pulsating or flickering sensations of the energy field are felt almost immediately. Try this, and see what you feel.

Compare it to the 'half-moon vector' exercise above.

Is it the same?

Smith suggests the following exercises to help in assessment of bone status.

EXERCISE 5.10

Time suggested
7–10 MINUTES

Take hold of your partner/patient's forearm, above the wrist and below the elbow, and – after taking out the slack by 'pulling' your hands apart until the point is reached where you have created a fulcrum – gently put a bend or 'bow' into the arm.

After taking up the slack of the physical body and soft tissues by pulling your hands apart (see Special Topic 8 notes on end-feel), the resistance of the bone itself will be encountered.

Any movement from this interface position will be felt by both the patient and yourself. Make a 'bowing' motion in one direction just as far as the tissues will allow, and then gently release the tension; then make a bowing motion in the opposite direction (see Fig. 5.5).

Try this several times, once with the eyes open, and once with the eyes closed. Repeat the exercise on the person's other forearm and compare the findings.

Record your findings.

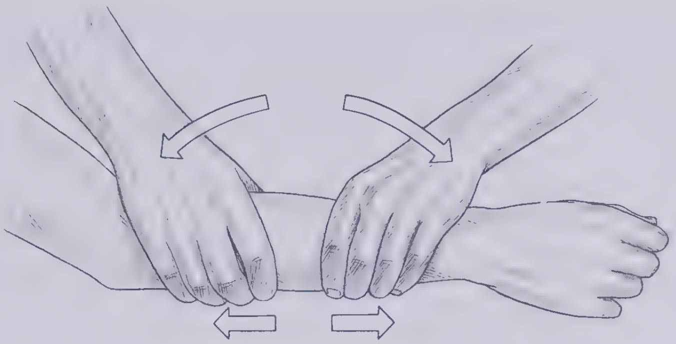

Fig. 5.5 Smith's palpation exercise to assess the interface between the physical and the 'energetic' structures of the arm.

INTERPRETATION

Smith states that if the arm is normal, not injured, it may bow more easily in one direction than the other; a bow in one direction may feel obstructed, or it may suggest a twisting motion, or have the feel of a steel bar or be more rubbery.

Great variations exist and it is up to each of us to establish what 'normal' feels like; to become aware of what is acceptable and what needs working on.

He then suggests a similar study/exercise involving the long bones of the lower leg, which are probably a better testing ground for practice than the forearm, which has a natural rotational tendency anyway, and so can confuse assessment.

EXERCISE 5.11

Time suggested
2–4 MINUTES

Place one hand just above the ankle and the other below the knee of one leg. Take up slack in the soft tissue (pull hands apart) and gently twist in one direction (hands going in opposite directions), feeling the bony resistance, introducing a twisting motion, as if gently wringing a sweater.

Repeat in the other direction.

What do you feel?

Smith says:

> Because the bones are denser in the leg than the forearm, and because the muscles are heavier, it takes a moment longer to perceive the energy currents interacting in the twisting motion. It is an exaggeration to say that energy on this level moves with the speed of molasses, but the principle is true.[3]

REPETITION AND COMPARISON

As with most exercises in this text, this exercise should be performed on several people, within a short space of time, making comparisons easier. By sharing experiences with others it is possible to validate the subtle perceptions derived from these palpation experiences.

If it is possible to palpate limbs which have previously been fractured and which have healed, energy current variations become very instructive.

[3]Smith's exercise is not an exercise in judging whether things are good or bad, but is designed to help you to become sensitive to motions and energies not previously registered.

Smith tells us that:

> Energy fields across a fracture may feel heavy and dense, have low vitality, or be disorganised and chaotic. These qualities relate to the process of reconnecting or bridging the energy fields across the damaged bone.

Can the palpated patterns be altered?

Yes, says Smith. He takes a forearm, for example, which has an old fracture, grasping it as in Exercise 5.9. He takes out the slack by stretching apart his hands:

> Holding this, I might add a further stretching force, and then, in addition, a bowing or twisting force. I hold this configuration, being sensitive to the resilience of the bone, for a brief period, possibly 15 to 20 seconds, and then gently release.

On re-evaluation he would expect a lessening of the asymmetry of the original force fields, a greater freedom of energetic movement through the long bone. He says that he allows three such attempts in order to create the greatest degree of 'shift' at any one session.

Caution regarding force: I suggest, when you are trying to introduce twisting or bowing or any other direction of motion to bony structures or soft tissues, that you do not try to produce this effect by means of force from your hands alone. Having made the initial contact and allowed time for a melding of the contours of your hands with the tissues, use your arms to take out the slack, or to introduce a direction of motion. Indeed, consider the hands in this situation to be the contact only, with the motive force coming from the shoulders and arms.

If you were trying to use a spanner, to free a tight nut say, you would not use the strength of the hands alone, but would introduce the effort through the whole arm. In a far more subtle manner the motion, or direction of effort, in this sort of exercise is best achieved by very subtle, whole arm movements rather than just the hands trying to achieve the desired objective.

Anyone who has performed work on the cranium (after suitable instruction) will know that motion in the skull can be palpated or introduced in a similar manner far more effectively – and with less chance of injury – if leverage is applied by subtle use of arm muscles to guide the hand, rather than letting hand strength act alone.

Soft tissue palpation using Smith's methods

Where energy motion in soft tissues is concerned, Smith tells us that a difficulty arises, since taking out the slack in pliable tissues is far less easily accomplished, making the reading of energy currents and movements in soft tissues more difficult. He suggests that a good way to start is to make two energetic contacts with the fingers and to 'read' the current as it flows from one point to the other.

EXERCISE 5.12

Time suggested
3–4 MINUTES

If one finger is placed on tissue below the elbow and a finger of the other hand is placed at wrist level, a sense of connection will be felt after a short while.

This may be noted as a pulsation, movement, buzzing or just a sense of 'connection' (compare this with Viola Frymann's Exercise 2.10).

Both the time taken for this connection to happen, and the strength and quality of the connection should be noted and recorded as you practise.

The link with traditional Chinese medicine

Smith introduces the debate as to whether the right hand receives such impulses or sends them, and states his conclusion that the operator's thoughts determine the direction of flow (Upledger concurs). Let both hands be neutral, is his advice, and allow the patient's body to organise itself around your two contact 'poles', allowing these to be organisational fulcrums rather than predetermining which direction you want flow to take place.

Smith suggests that traditional Chinese medicine (TCM) has long used just such energy readings, most obviously in use of pulse diagnosis, and that once you have convinced yourself that you can indeed feel energy flows, it is time to start understanding the subtle ways in which you can use this information in evaluating the state of the patient. Therapy using these energy flows is only a small step beyond the palpation stage. (See p. 237, Special Topic 10)

Smith states that evaluation of the superficial level of internal energy flow (known as *protective chi* in TCM) is best achieved using your hands just above the body surface, as in 'therapeutic touch' (Ch. 10), as well as scanning/palpating the skin texture and temperature (Ch. 3).

Beyond the energy fields which are related to the superficial soft tissue, and bones, lies an energy field which he terms 'background' energy, on which can be 'imprinted' past trauma – chemical, emotional and psychic as well as physical. This brings us close to Becker's concepts involving tissue 'memory' which we will examine below.

There is also an interesting resemblance between craniosacral still point concepts and something Smith describes in energy work.

EXERCISE 5.13

Time suggested
5–7 MINUTES

Introduce traction from the ankles of the supine patient until all slack has been removed. Sense the connection with the energy field of the patient.

Does it elongate, and eventually try to contract?

If so, slowly release it, like an elastic band.

EXPLANATION – MANIPULATING ENERGY

Once he has established the fulcrum between himself and the patient (as in Exercises 5.10, 5.11 and 5.13) a number of sensations are possible, Smith declares. As he holds traction for example, in Exercise 5.13, he states that he may sense that the patient's energy body is elongating, 'stretching' or 'flowing' into his hands, a process which at some point will stop.

If at that time there is not a feeling of contraction as though the energy body is returning to its previous state, but rather of a stillness, a resting in the 'elongated' state, Smith would gradually release the traction and rest the patient's legs on the table. The patient then remains in a very deep relaxed state for some moments before returning to normal (he watches eye movements, patient's colour and breathing pattern to assess states of consciousness).

However, if – for therapeutic reasons – Smith wishes to anchor the energy field as it tries to contract again, he can do so by maintaining traction. This would be very similar to the idea of holding the still point as the body tried to normalise ('organise' or 'unwind') itself around that fulcrum, in craniosacral methodology, or functional technique in osteopathy (see Ch. 7). If, however, he were to decide to go with the retraction, rather than anchoring it, this would be 'like letting a stretched rubber band slowly go back to its slack position'.

Were you aware of any of these sensations?

If not, please read the discussion below.

DISCUSSION REGARDING EXERCISES 5.6–5.13

In this series of palpation exercises you will have been trying to evaluate the presence or otherwise of fluctuating movements which seem to be housed in the soft and hard tissues of the body. The explanations regarding the reality or otherwise of chakras and of Smith's and Upledger's concepts of palpable energies are irrelevant to the reality that 'something' can be palpated. What 'it' is and what it means and how it can be used diagnostically, prognostically and therapeutically must remain a matter for each practitioner/therapist and their particular understanding of the body, their belief system and approach to health enhancement.

The very fact of being able to sense subtle motions is, at this stage, adequate reward for the time and effort you have put into these exercises thus far. If, on the other hand, you cannot feel what has been described, then repetition and quiet application of the methods outlined thus far in this section is essential before moving on to the remaining exercises in this chapter.

Reading the history of trauma

Smith suggests that we try to distinguish between palpable energy fields which lie beyond the surface of the body and reflect present states of body and mind (these vibrations not being 'imprinted' on the energy field), and those patterns of energy related to forceful trauma or stimulus of a physical, chemical, emotional or psychic nature.

These latter imbalances exist, he says, as freestanding energy wave forms, abnormal currents, vortices, or an excess or deficiency of energy within the field. These imprinted changes are more likely to develop in response to trauma of a physical nature, interacting with emotional trauma, or when a highly aroused or depressed state existed at the time of trauma.

This combination of stress factors interacting disrupts the subtle body. Smith uses a metaphor of 'wrinkled clothing' to describe these changes in the subtle energy fields around us; they may disappear on their own, or may require help to 'iron them out'.

Assessment of such changes involves two tasks.

1. First, we need to quiet the physical body so that we can feel the deeper energy patterns.
2. Second, we have to 'take up the slack', a common theme in Smith's work. We can achieve this reduction in slack by means of a traction fulcrum, through the legs, or a compression fulcrum through the shoulders.

Describing the latter he says:

> I sit at the head of the table, rest my hands firmly and comfortably over the person's shoulders, and gently press down towards the feet, compressing the body to the point of energetic contact. As I gently push . . . the body will move beneath my hands until it reaches its compression limit for the amount of pressure I am applying. In doing this I have taken up the slack. Having engaged the physical body fully, I add slight pressure, which establishes the connection with the energy fields. When I have made good contact with this I just hold the pressure. If there are abnormal waves in that area, I am able to feel the sensations from the person's body in my hands.

EXERCISE 5.14

Time suggested
5 MINUTES (REDUCING TO 30 SECONDS WITH EXPERIENCE)

Try to perform this energetic contact, from the shoulders, just as Smith describes it in the quoted text above.

Take your time, and see what you (and your patient/partner) feel.

Naturally this requires practice to do well, so practise over and over again.

Smith states that this particular evaluation takes him anything from 10 to 30 seconds. This is what you should aim for once you are comfortable with the concepts and your palpatory skills in this area are 'literate'.

Balancing energy

How does Smith balance any abnormal energy waves he perceives?

He could, he says:

- Override an abnormal pattern with a stronger, clearer energy field, or
- Introduce a force field which matches the aberrant pattern and by holding it allow the original field to diminish and vanish, or
- Make an 'essential connection' with the aberrant pattern and anchor this as the body tries to pull away.

Whichever he chooses, immediate re-evaluation will often show that the aberration is still present. However, reassessment some days or even weeks later may show that it has normalised. This is not dissimilar to many physical treatment results (trigger points especially) in which changes at the time of treatment may be apparent but minimal, the majority of change taking place later, as homeostatic mechanisms accomplish their self-regulating tasks.

EXAMPLE

Smith illustrates his ideas with clinical examples. In one instance he examined a patient who had been in pain since an automobile accident over a year before, in which no significant injury had occurred apart from bruising. Smith was unable to find any cause for the pain until he noted a strong twisting force in the energy field from the right side of the chest to the left abdomen. This represented the twisting force exerted at the time of the accident.

He used traction on the legs to 'engage' this force field (an alternative to the method mentioned previously of pushing down through the shoulders to engage it) and exerted a slightly stronger force field through his body, noting:

> A sensation of a rebounding effect along the energy imprint itself. By anchoring the new field I allowed the rebound to subside.

A gradual release of first the energy body and then the physical body, and a subsequent resting of the legs on the table, left the patient with a sense of well-being and quietness. 2 days later, on examination, he was free of pain and there were no twisting currents to be found. A number of zero balancing sessions may be needed if greater degrees of imprinting of forces exist.

EXERCISE 5.15

Time suggested
5–7 MINUTES

This is very similar to Exercise 5.13, with one important difference.

Introduce traction from the ankles until slack has been taken out. Hold this, with just a fraction more force, so that the energy field is engaged.

> What do you feel?
>
> Hold the position and use any of the approaches Smith suggests if you sense a 'lengthening' of the field and a subsequent 'still point', or 'retraction' (overriding it, matching it with a different force or making an 'essential connection' as described above).
>
> Take care and concentrate.

HORSES AND CAMELS

In palpating areas of trauma, Smith tells us of variations in patterns we may expect to palpate, depending upon the type of trauma a patient experienced, specifically detailing ancient Chinese distinctions between 'horse kick injury' and 'camel kick injury'. The first, involving hard hooves, results in local physical trauma, severe at the onset, with healing after days or weeks. The second, involving softer camel hooves, results in mild initial reaction with increasing symptoms as time passes, as the injury 'moves deeper'. It is as though the 'soft' injury fails to stimulate defence mechanisms and therefore disperses through the body/mind/energy fields of the person, with subsequent symptoms emerging.

Smith makes an important statement when he says:

> Energetic connections can be lost if our thoughts drift or we are focused elsewhere. Energy follows thought.

Upledger makes very similar pronouncements, as do most workers in the 'energy field', and this is something the beginner may find useful. When results don't come, ask yourself where your attention was.

Tissue memory

Upledger reports evidence showing that decerebrate laboratory rats are able to solve food-orientated maze problems, indicating a 'memory' and decision-making facility within the spinal cord. He also reports studies indicating a degree of decision making taking place in the hands of a musician without CNS input. He suggests:

> Perhaps these powers develop in these peripheral locations, in response to a person's need to develop certain skills.

Upledger employs techniques such as somatoemotional release in which emotional 'scars' are dealt with, and he, along with Smith (see above), holds to the concept that palpable changes occur in the energy fields of the body related to physical, chemical and emotional trauma.

Is this physiologically possible? Professor Irvin Korr, a physiologist of international stature, enters this controversial arena, albeit on a neurological rather than an energy level. In an article 'Somatic dysfunction, osteopathic manipulative treatment and the nervous system' Korr (1986) states:

> Spinal reflexes can be conditioned by repetition or prolongation of given stimulus. According to the hypothesis, like the brain, the cord can learn and remember new behaviour patterns. Whether the (memory) once recorded, needs reinforcement by some kind of afferent stimulation is an open question.

On the influence of somatic changes on the mind he says:

> Clinical experience indicates that somatic dysfunction (and manipulation) are powerful influences on brain function and on the perceptions and even the personality of the patient. This experience ... raises many fundamental questions and exciting clinical implications.

So Korr seems to be supporting both the idea of a 'memory' independent of the brain as well as of tissue changes (from whatever cause) having a continual impact on 'perceptions and personality' factors.

To conclude this survey of opinions, let us look at what Hans Selye, the premier researcher into stress, said on the subject (Selye 1976):

> The lasting bodily changes (in structure or chemical composition) which underlie effective adaptation or the collapse of it, are after effects of stress; they represent tissue-memories which affect our future somatic behaviour during similar stressful situations. They can be stored.

Speransky (1944), the great Russian researcher, not only hypothesised such a state of affairs, he also proved it and showed how to reverse it. He stated:

> Chemical and infectual trauma of nerve structures result in nervous dystrophy, this, in turn, gives the impulses for the development in the tissue of other pathological change, including those of an inflammatory character. Their disposition at the periphery can be predicted by us in advance, and their boundaries remain unchanged often throughout long periods.

Rollin Becker (see below) reports that Speransky changed these imprinted messages by 'manually flushing or washing the CNS with the animal's or human's own CSF, and the disabled condition in the peripheral tissues normalised' (Becker 1963).

Becker himself declares:

> Memory reactions occur within the CNS system in all traumatic cases . . . An area of the body that has been seriously hurt is going to send thousands of sensory messages into the spinal cord segments and brain areas that supply that part of the body. If the injury is severe, or long lasting, these messages will be imprinted into the nervous system similar to imprinting a message on a tape recorder.

Thus the tissues, and the nervous system 'remember' the injury and its pattern of dysfunction long after healing has occurred.

It becomes 'facilitated' to that pattern long after the trauma.

Finding the eye of the hurricane, the still-point, is the formula which Smith, Upledger and Becker advocate if we are to quieten those aberrant patterns of energy which exist after trauma or misuse.

The brilliant research of Bjorn Nordenstrom is outlined below. This former Chief of Diagnostic Radiation at the famed Karolinska Institute in Stockholm, has shown that there exists a previously unsuspected energy system which could help to explain the work of researchers such as Smith and Becker.

However, before examining his research results we should investigate the dedicated studies and palpatory techniques of Rollin Becker (1963, 1964, 1965) and Alan Becker (1973).

Becker's diagnostic touch

According to Rollin Becker, when a practitioner is first faced by any patient:

> The patient is intelligently guessing as to the diagnosis, the physician is scientifically guessing as to the diagnosis, but the patient's *body knows* the problem and is outpicturing it in the tissues.

Learning to read what the body has to say is the necessary task of diagnosis, and much of this depends upon palpation:

> The first step in developing depth of feel and touch is to re-evaluate the patient from the standpoint, just what does the patient's body want to tell you?

Having set aside the patient's opinions and your initial diagnosis:

> Place your hands and fingers on the patient in the area of his complaint or complaints. Let the feel of the tissues from the inner core of their depths come through to your touch and read, and 'listen' to their story. To get this story it is necessary to know something about potency ... and something about the fulcrum.

'Potency' and 'fulcrum' are two areas which we must examine closely as we learn of Becker's remarkable palpatory method.

Potency tells us the degree, the power of strength, of whatever is being discussed; it also, Becker reminds us, speaks to the ability to control or influence, something. The diagnostic tool which Becker will teach us to use, as we learn to read and understand potency, is the fulcrum, in which the fingers and hands create a condition in which potency becomes apparent.

Becker asks us to acknowledge that:

> At the very core of total health there is a potency within the human body manifesting itself in health. At the core of every traumatic or disease condition within the human body is a potency manifesting its interrelationship with the body in trauma and disease. It is up to us to learn to feel this potency.

He likens this concept to the eye of a hurricane, which carries the potency, or power, of the whole storm. In just this way, within each trauma or disease pattern there is an 'eye', 'within or without the patient', which carries in itself the potency to manifest the condition. This eye is a point of stillness, the existence of which he asks you to accept as you take the time to develop a sense of touch which can perceive it.

The ***fulcrum*** is a support, or point of support, on which a lever turns in raising or moving something, therefore being a means of exerting pressure or influence.

- Lief used the term fulcrum to describe the still resting state of the fingers as the thumb moved towards them in its searching mode in NMT methodology.
- Smith uses the term fulcrum to describe a 'balance' point via which the therapist 'gets in touch' with the energy body. It is established once the 'slack has been taken out' of the tissues, and an interface created.
- Becker suggests that his fulcrum should be understood as a 'still-leverage' junction, which may be shifted from place to place, all the while retaining its leverage function.

The would-be palpator achieves this by placing her hand(s) near the site complained of by the patient. A fulcrum is then established using the elbow, forearm, crossed legs, or other convenient area as a supporting point (the fulcrum) allowing the contacting fingers/hand(s) to be gently yet firmly moulded to the tissues. The fulcrum provides the working point, free to move if needed, yet stable as the palpation proceeds.

EXAMPLE OF BECKER'S FULCRUM

An example is given in which a supine patient with a low back problem is to be examined. The operator sits beside the patient, placing a hand under the sacrum, fingers extended cephalad, and the elbow of that hand resting either on the table or on the operator's own knees. 'By leaning comfortably on his/her elbow, the physician establishes a fulcrum from which to read the changes taking place in the back.'

It is the elbow which is the fulcrum.

By applying increased pressure at the fulcrum, causing a slight degree of compression at the sacrum, the operator will, 'initiate a kinetic energy that will allow the structure–function of the stress area to begin its pattern to be reflected back to his/her touch'.

If the other hand were similarly placed, under the low back, the fulcrum could be the edge of the table, against which the forearm rests (or an elbow on the knee). Either or both fulcrums may be employed to feel 'the tug of the tissues deep within'. The operator will also become aware, says Becker, of 'a quiet point, a still-point, an area of stillness within the stress pattern, that is the point of potency of that particular strain'.

He makes it clear that he is discussing the kinetics of the energy fields that make up the stress pattern, and not anatomical/physiological units of tissue when he describes the point of potency.

EXERCISE 5.16

Time suggested
5 MINUTES

Palpate a sacrum using Becker's fulcrum, as described above. Compare this with the sensations noted when using Upledger's sacral assessment (Fig. 5.6).

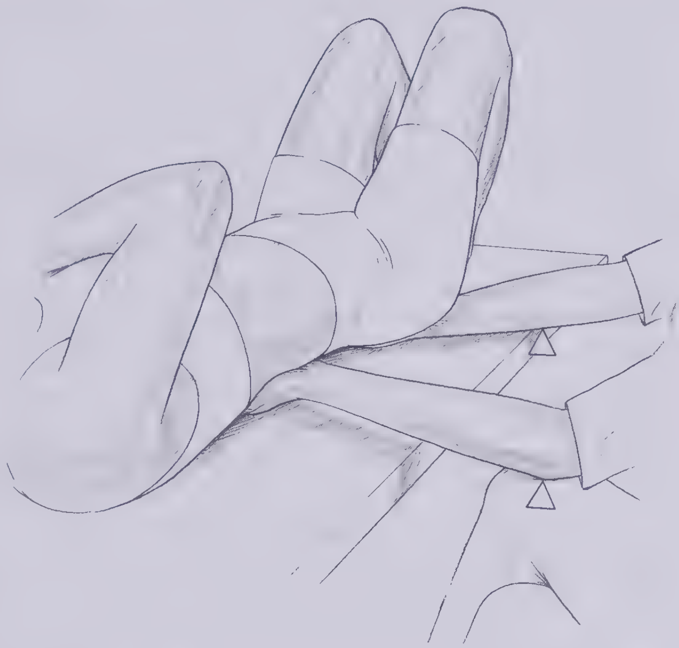

Fig. 5.6 Low back palpation. Hands under sacrum and low back apply no pressure – contact only. Forearm resting on edge of table acts as Becker's fulcrum. Increased pressure downwards at the fulcrum enhances palpator's awareness of tissue status.

WHAT ARE WE PALPATING?

What is the form of energy being assessed here? Becker does not know, and says that it no more matters that we know than that we need to know the nature of electricity before being able to safely use it.

This thought has been found to be deeply satisfying to those practitioners, aware of the effectiveness of these ideas and methods, who are unable to accept the Upledger/Smith/chakra/acupuncture models of 'energy'.

Is there any other model?

It would be appropriate at this point to bring in Nordenstrom's research results, since they may answer the question as to what the form of energy being palpated represents. Nordenstrom, formerly chair of the Karolinska Nobel Assembly, which selects Nobel prize winners in medicine, is hardly a rebel, or maverick. His discoveries are, however, revolutionary. He described his results in his book *Biologically closed electric circuits* (Nordenstrom 1983). It was when using a small spot X-ray technique, in order to define breast and lung tumours, that he first noted an unusual zone around some tumours. He called this a 'corona', and decided to investigate the phenomenon as there was no histological evidence of change in these tissues. By inserting fine needles into these tissues he demonstrated an electric flow, continuing his research on humans and animals, alive and dead, before developing a series of principles.

The first was that energy conversion in tissues over a biologically closed electric circuit can be defined as a fluctuation in electrical potential in a limited area, resulting from injury, tumour and healing. He found that there was an electric flow in tissues which followed selected pathways and that large blood vessels function as insulated electricity conducting cables. He also demonstrated that biologically closed electric circuits produce magnetic changes around an area which can be measured from a distance.

Nordenstrom also discovered that biological factors which cause cancer, of a chemical or physical nature, have the ability to polarise tissues and that therefore 'inactivated biologically closed electric circuits' may represent a common factor in carcinogenesis. He was able to show that there exist differences in electrical potential over an area of a few millimetres around injured (or malignant) tissues.

Is this electricity the energy Smith and Becker are feeling? Are polarisations and fluctuations what is being palpated in an energy cyst? What Nordenstrom has proved is that there is another circulation in the body, that of electricity (or energy) and that it changes measurably in response to disease or injury.

It can be assessed by machine, and probably, therefore, by palpation.

Reviewing this book, Martyn Richardson (1988) states:

> I had a chemistry professor in college who demonstrated that the molecule consisted of atoms, which consisted of electrons, protons and neutrons, which were not 'solid matter' but electric charges. Therefore everything was nothing – except a collection of electric charges.

Clyde Ford (1989) explains a different energy research study which evolved from the simple observation of a chiropractor I. N. Toftness, that skin drag occurred on palpation of 'problem areas'.

His research showed that microwave emissions emanating from the body could be measured, that these varied in relation to areas of excess or diminished activity, and also that they changed after sustained light pressure was applied to such areas:

> Toftness used light pressure to manipulate the body and had a wealth of clinical studies to document the effectiveness of this method. To this he now added the ability to objectively monitor the human electromagnetic field and demonstrate its relationship to the physical condition of the human body. Typically, the radiometer detected abnormally high or abnormally low microwave readings in problem areas of the body. After sustained light pressure, these peaks and valleys normalised – the high readings were reduced and the low readings raised. Monitoring the electromagnetic field produced by the body is a unique form of diagnosis because it is truly non-invasive.

Clearly, this 'electromagnetic' or microwave transmission from body tissues is a strong contender for what Smith and Becker (and the others we have discussed) are palpating when they speak of 'energy'.

Whatever Becker is palpating, it is obviously significant, and worthy of our learning to do the same.

How long does it take to make an assessment using Becker's methods?

Less than 10 minutes is necessary to identify the focal point of potency, he says, and with practice it becomes possible to date old strains (are they weeks, months or years old?) and to tell the difference between the energy patterns of these and those found with new strains. The following exercise, which Rollin Becker describes, is well worth attempting several times until the principles he is teaching become clear.

EXERCISE 5.17

Time suggested
5–7 MINUTES FOR EACH STAGE

Stage 1: First sit facing a patient/model who is seated on the edge of a treatment table. Place your hands around the knee, fingers interlocked in the popliteal space. Try to sense as much as you can about the knee, applying a compression force towards the hip to see what you can tell about that area. You may get some information, but not much.

Stage 2: Now adopt the same contact with the knee, but this time rest your own elbows on your knees as you do so. Apply the same compression towards the hips and assess what you feel, *using the fulcrum points.*

Becker describes what you might feel this time:

> Feel how the innate natural forces within the thigh and pelvis want to turn the acetabulum either into an internal rotation or an external rotation position. Note the quality and quantity of that turning. Note that if you lean lightly on your elbow fulcrum points you get a more superficial reading from the tissues under your hands even though your hands and interlaced fingers remain light in their control.
>
> Note that if you then lean more firmly on your elbow fulcrum points you get a deeper and deeper impression from the tissues under examination.

Becker's 'diagnostic touch'

The depth of perception is dependent on the firmness of the fulcrum contacts, *not on the firmness of the examining finger contacts.* If there exists a deep strain in the tissues, it is the fulcrum pressure which is increased in order to reach these tissues and their patterns of dysfunction.

This can be done anywhere by the simple expedient of creating a contact under the tissues to be examined, establishing a fulcrum point and tuning in to the information waiting to be uncovered.

There are two important riders to this though, says Becker:

- You must know your anatomy and physiology in order to make sense of the information, and
- You must divorce yourself from any sense of 'doing'. Just let the story come through. The fulcrum points are listening posts only.

And yet this is not quite the case. For Becker does ask that there be an introduction of a slight compression force, or traction, not in order to actively test the tissues but to 'activate already existing forces within the patient's body'. The example of the pressure towards the acetabulum is useful, for, having applied this, it would be the innate tendency to externally and internally rotate which would then be palpated.

Becker is asking for contact with the '*interface*' which Smith described, and the '*still point*' which Upledger described, in different terms perhaps, but in essence in much the same manner.

What he adds is the concept of being able to gain deeper perception of, and access to, tissue (or energy) states by use of the fulcrum.

Becker calls this diagnostic touch:

> It is a form of palpation that one might call an alert observational type of awareness for the functions and dysfunctions from within the patient, utilising the motive deep energy,

deep within the tissues themselves. It is not the patient voluntarily turning the acetabulum but his tissues within the acetabulum turning it for you to observe.

What should you feel as the body's forces play around the fulcrum?

To the outside observer watching our work, our hands are apparently lying quietly on the patient, but the motion, the mobility, the motility we sense from within the patient is considerable, depending on the problem. There is a deliberate pattern that the tissues go through in demonstrating the strain that is within them. Kinetic-energy-wise, they work their way through to a point at which all sense of motion or mobility seems to cease. This is the point of stillness. Even though it is still it is endowed with biodynamic power.

The 'potency within the strain' and 'interference waves'

This then is the point of potency within the strain pattern, the still point in this functioning unit which changes as the contact is held, following which a new pattern emerges, and is felt. Normality has been encouraged, or achieved.

Upledger describes the 'interference waves' which result from restriction lesions or trauma. These waves superimpose on normal physiological body motions. Once you identify where the interference waves are coming from the source of the problem is found.

Symmetrical placement (gently) of your hands on the head, thoracic inlet, inferior costal margins, pelvis, thighs and feet of the patient allows your hands to perceive the arcs or inherent wave patterns. If these are symmetrical all is well. If the arcs are asymmetrical then you are asked to visualise the radii of these arcs and to determine where they interact. That will be the location of the lesion (restriction or trauma). You need to place your hands on as many sites as necessary to pick up the information required to make this assessment. It is as if there were an infinite number of concentric globes around the lesion, each vibrating and describing arcs. Where is the centre of all the concentric globes? The closer you get, the smaller are the arcs.

Hands may be placed, one on the anterior, one on the posterior surface of the body; both hands will describe arcs, which you should evaluate in order to find a point of intersection. This gives the depth of the lesion. This is Upledger's way of finding 'the eye of the hurricane'. When you have performed a number of Becker's exercises (below) and you come to Exercise 5.28, try comparing the methods of Upledger and Becker (as well as Smith).

One of these may well suit you better than the others, something you can only discover by trying them all.

(See also pp. 267, 268, Figs 11.1, 11.2)

Becker's exercises

Rollin Becker gives a series of examples in which he palpates different body regions and describes his contact and fulcrum points. It is suggested that all of these be used in any sequence, on appropriate patients/partners, selecting if possible areas where there is, or has been dysfunction or pathology, so that variations in what is perceived can be observed and learned from. Take as much time as possible.

EXERCISE 5.18

Time suggested
5–7 MINUTES

To assess the sacrum and pelvis (see Fig. 5.7). Have the patient supine, knees flexed. Sit on a stool of appropriate height on the patient's right side, facing the head, and place your right hand under the sacrum, fingertips on spinous processes of 5th lumbar vertebra. Your right elbow rests on the table as the fulcrum. Your left hand and arm bridge the anterior superior spines of the ilium so that either the left hand on the left ASIS or the left elbow on the right ASIS can act as fulcrums if pressure is applied through them. You may alternate the use of one or the other ASIS as a fulcrum point in examining the opposite ilium in its functioning relationship with the sacrum.

The pelvis and its relationships with the sacrum, lumbar spine and hips below can all be assessed. It is particularly useful for assessment of sacral involvement in whiplash injuries.

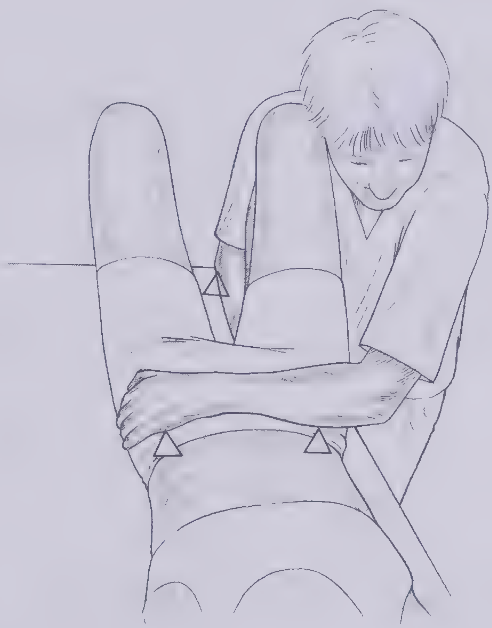

Fig. 5.7 Palpation of sacrum and pelvis. Becker's fulcrum points are the right elbow on table and contacts on anterior iliac spines with left hand/arm.

EXERCISE 5.19

Time suggested
5–7 MINUTES

To assess sacrum/iliosacrum and low lumbar. Have the patient in the same position as 5.18 above, with one hand under the sacrum as above, same fulcrum point. The other hand lies under the iliosacral articulation, fingertips on the lower lumbar spinous processes. That hand's fulcrum is on your crossed knee, or on the edge of the table. In this position low back and sacroiliac dysfunction can be assessed and treated 'using the forces within the problem'.

EXERCISE 5.20

Time suggested
5–7 MINUTES

Assessment of psoas and upper lumbar problems. The examining (cephalad) hand is under the supine patient's lumbar spine, fulcrum point on operator's crossed knees. The other hand and arm (caudad) bridge the patient's drawn up knees. Light compression on the fulcrum point allows assessment of superficial lumbar strains. Increased compression on the fulcrum point allows assessment of psoas. Compression of the acetabulae by pressing through the knees towards the hips, further activates the psoas while it is being examined.

EXERCISE 5.21

Time suggested
5–7 MINUTES

Assessment of lower thorax. Sit at the head of the table with hands under supine patient's upper back at the level of the insertion of trapezius, bilaterally (mid-thoracic area). Elbows/forearms are the fulcrums, resting on the table. Information from this area is combined with that gained in the previous assessment, above.

EXERCISE 5.22

Time suggested
5–7 MINUTES

Assessment of upper thorax. Seated at head of patient (head on pillow) one hand slides under the pillow and rests against the upper thoracic spinous processes, fingers fanned out to contact ribs as well. Elbow is fulcrum point. The other hand rests on the sternum. The elbow of that arm can also find a fulcrum, on the patient's pillow.

Becker reports that ideally the sternum should move dorsally (i.e. towards the spine) on inhalation, and ventrally (towards the ceiling) on exhalation. It is common for the normal pattern to be achieved after this 'palpation':

> Upper thoracic strains are readily found (and easily corrected) in this position, using biodynamic and biokynetic forces and potencies within the patient.

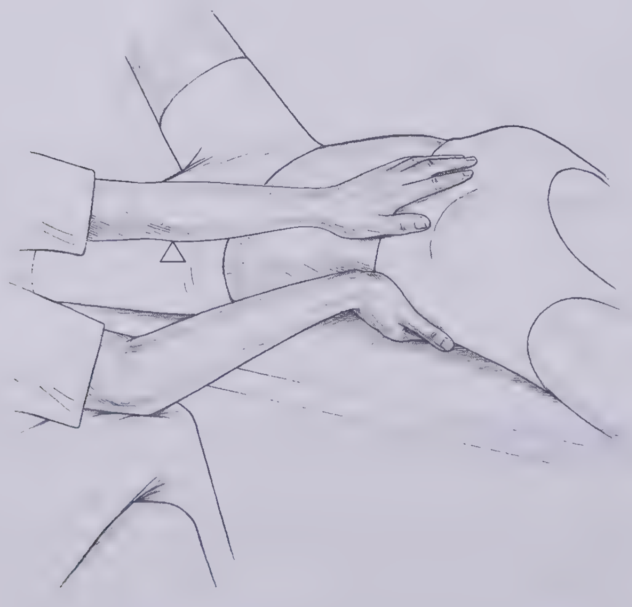

Fig. 5.8 Palpation of rib cage. Becker's fulcrums are on the operator's crossed knees and patient's anterior superior iliac spine (left).

EXERCISE 5.23

Time suggested
5–7 MINUTES

To assess the rib cage (Fig. 5.8). The operator sits to the side of the supine patient, the caudad hand lies under the rib cage with fingertips resting just short of the spinous processes. The fulcrum point is on the operator's crossed knees. The other hand rests on the anterior ends of the same ribs, fulcrum point being the forearm which rests on the patient's ASIS. A slight compression at the fulcrum points initiates motion at the heads of the ribs being examined, allowing strains to be evaluated and treated. The entire rib cage can be assessed, the hands changing position as needed.

EXERCISE 5.24

Time suggested
5–7 MINUTES

Palpation of the liver. The operator sits on the left side of the supine patient, caudal hand under the lower ribs, fulcrum point on crossed knee. The other hand rests over the liver, spanning the lower costal border. Pressure through the fulcrum point allows biodynamic and biokinetic (disturbed) forces to be felt and assessed.

EXERCISE 5.25

Time suggested
UP TO 20 MINUTES FOR COMPLETE CERVICAL EVALUATION

Assessment of cervical spine (Fig. 5.9). Sit at the head of the supine patient with hands bilaterally bridging the entire cervical region from the base of the skull (hypothenar eminence contacts here) to the upper thorax, where the fingertips lie. The fulcrum points are the forearms which lie on the table. General assessment is possible in this position and individual segments can be localised by finger contact.

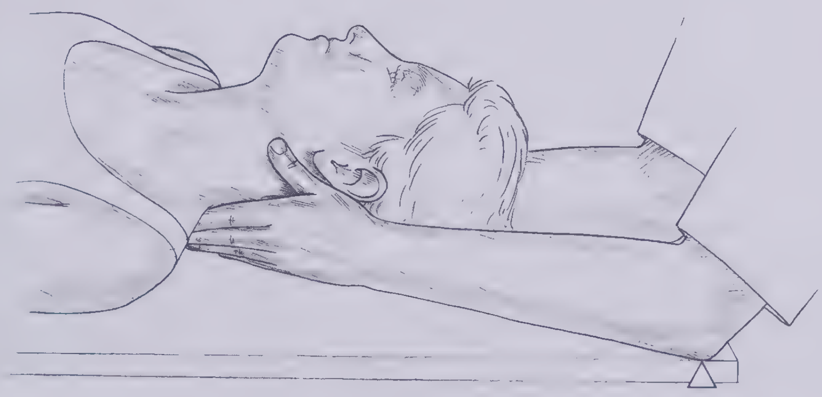

Fig. 5.9 Palpation of cervical spine. Becker's fulcrums are forearm contacts on the table.

EXERCISE 5.26

Time suggested
5–7 MINUTES

Assessment of occipito–atlantal articulation. Sit in same position as for Exercise 5.25 above. Base of skull rests on palm of hand, fingers curved upwards to contact posterior tubercle of atlas. The forearm rests on the table as a fulcrum point. The other hand rests on the vertex of the head bringing it into slight forward bending on the neck to facilitate the other hand's contact. Pressure on the fulcrum brings strain patterns into palpable view.

EXERCISE 5.27

Time suggested
5–7 MINUTES

Assessment of basilar area of skull. Operator's hands are lightly interlaced, with patient's head resting on them, thumbs lie superior to ears extending towards face. The forearms on the table are the fulcrum points. Very slight compression through the fulcrum allows assessment to begin.

THE 'OTHER' BECKER'S VIEWS

There are two Dr Beckers, and we have so far been involved with the work of Rollin Becker.

Alan Becker (1973) discusses ingrained patterns which we all carry – in much the same way as computers which have been programmed – whether these allow normal or abnormal function. In assessment and treatment he carries Rollin Becker's 'diagnostic touch' concepts further, stating:

> I make contact with the involved tissues and apply enough pressure to get the patient's attention and to initiate the automatic response. Then I ask the patient to close his eyes and look at my fingers, to be aware of what is happening to his body. By this means I persuade him to take conscious control of the program and re-evaluate his standards of normal, acceptable and tolerable data. Then as I lead the structures towards increased ease and balance, the patient senses the changes and tends either to install new action programs which include the new data or to re-establish the ones which were in effect before abnormal data was encouraged.

In discussing a whiplash injury he illustrates this, saying:

> The problem is complicated by the fact that the body has been subjected to forces that entered it in a direction that crosses the normal direction of movement. Such forces tend to produce wavelike movement within the fluid cells of the body, and the inertia of the body, which is trying to continue whatever programs are in action at the time, causes a counterwave directed towards the point of impact.

These two forces, according to Alan Becker, set up a wave-like pattern, a ridge of energy, a built-in distortion around which the defensive patterns are built. These have to be removed by dissipation of the energy rather than by force. Only then, Becker insists, can new, more appropriate, patterns be established by the patient. The resistance of built-in patterns, whether these relate to habit or to injury, is something the palpating practitioner should be acutely aware of, for this is a key feature of the territory being explored.

We are now entering the area of structural reintegration, postural re-education, Alexander technique, Feldenkrais's work, somatics (Thomas Hanna) and other methods which require a relearning of how we use ourselves.

Alan Becker's contribution seems to be that he calls on a conscious awareness from the patient, as methods such as those of Rollin Becker's are applied, in order to have them become aware of the changes which are taking place, and to have them support and encourage these.

EXERCISE 5.28

Time suggested
– OPEN ENDED DEPENDING UPON YOUR SELECTION OF OPTIONS, BUT AT LEAST 30 MINUTES IF POSSIBLE

The final exercise in this section asks you to incorporate at one time the concepts of Upledger, Smith and Rollin Becker, as you palpate the motions of CSF, energy and other intrinsic expressions of function in various areas of your patient/partner. Move from the methods of Smith to those of Becker and back again.

Which gives you the most information?

Which do you feel more comfortable with?

Do you now agree that tissue has a memory?

Are these exercises likely to be of value in a clinical setting?

DISCUSSION REGARDING EXERCISES IN THIS CHAPTER

Where have we come to by performing the exercises in this chapter?

Have we simply acquired a series of experiences which we find hard to use or find relevance for?

Or have the subtle skills which these exercises have encouraged a practical value?

Consider the words of one of the leading American osteopathic clinicians and academics, Philip Greenman (1989) who, when discussing myofascial release technique, a subtle yet extremely clinical tool, states:

> This [myofascial release] is directed towards a biomechanical effect and a neurophysiological effect. Ward has coined a mnemonic: POE(T2). POE stands for point of entry into the musculoskeletal system. Entry may be from the lower extremity, the upper extremity, through the thoracic cage, through the abdomen, or from the cranial cervical junction. The two 'Ts' stand for traction and twist. In most of the techniques, traction produces stretch along the long axis of the myofascial elements that are shortened and tightened. The stretch should always be applied in the long axis rather than transversely across myofascial elements. Introduction of a twisting force provides the opportunity to localise the traction, not only at the point of contact with the patient, but also at points some distance away.

He suggests that beginners try to develop the ability to sense change in the freedom or restriction of tissues, some distance from the point which is being contacted. Thus, if the ankles are being grasped and traction introduced, an attempt should be made to feel 'through the extremities' to the knee, hip, sacroiliac joint up into the spine itself. Concentration and practice can allow this skill to develop.

In his text Dr Greenman describes exercises which will allow the practitioner to develop the skills necessary to perform myofascial release techniques.

These involve palpation of a body area, starting from above the skin, moving to a light contact which attempts 'to sense the inherent movement of the patient's tissues under your hand' (an 'inherent oscillation') – a concept which we have met, described in other ways, many times in this chapter.

A first step in being able to do this involves the ability to apply pressure, or make contact, without movement, followed by being able to palpate the motions which are constantly at work within the tissue without influencing them. These skills are precisely what the various exercises given in this chapter should allow you to do.

Greenman gives a concluding exercise, palpation of the motion of the sacrum, with the patient first supine and then prone. This you should by now also be able to perform, based on previous exercises.

As Greenman says:

> When you have been able to identify inherent soft tissue and bony movement you are well on your way to being able to use myofascial release technique.

Hopefully, the methods described above, based on the work of these marvellous researchers into human physiology, will allow greater skill in our diagnostic and therapeutic endeavours.

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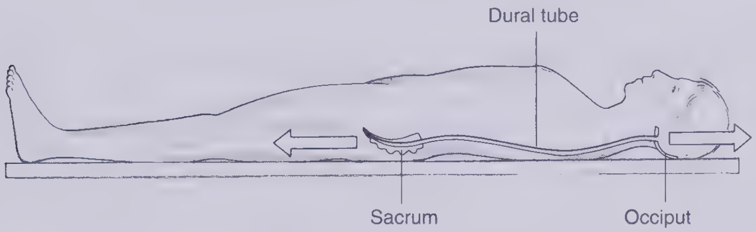
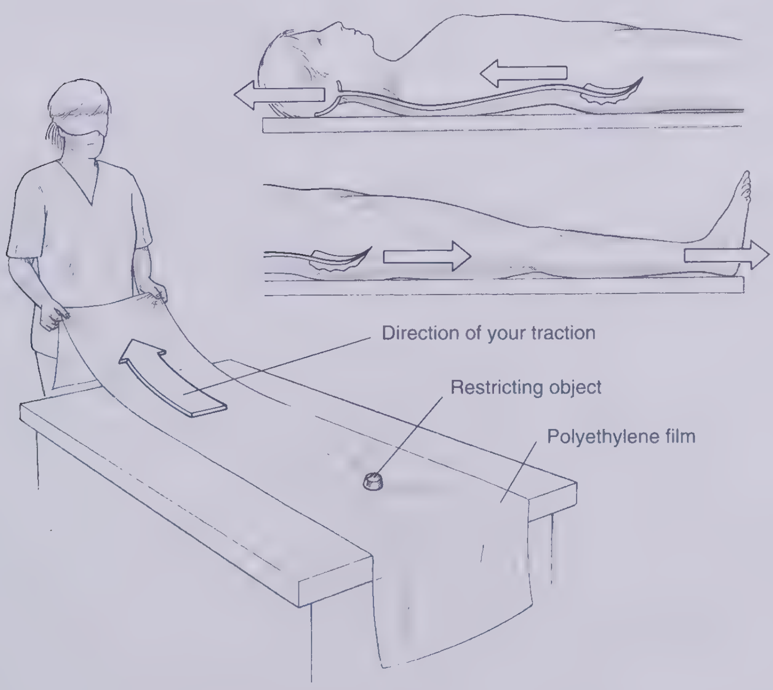
Assessing dural restriction

Dr John Upledger (1987) explains how difficult it is to prescribe techniques used to localise restrictions imposed upon the spinal dural tube. It is not that the techniques themselves are difficult, it is describing them that is hard. The dura is firmly attached along the entire circumference of the foramen magnum as well as to the posterior bodies of the 2nd and 3rd cervical vertebrae. From there it is free until it reaches the 2nd sacral segment (anterior portion). After this it attaches, via the filum terminale to the periosteum of the coccyx.

Adhesions and restriction can occur, not only at the points of attachment, but anywhere along its length, notably at intervertebral foramina. Simultaneous testing of motion at the occiput and sacrum allows mobility of the dura to be assessed, movements of which will be synchronous, if normal mobility exists. Any 'lag' of one bone or the other indicates restriction. (Special Topic Fig. 6A)



Special Topic Fig. 6A Traction on the sacrum (or legs) will ensure a direct pull, via the dura, on the occiput, while traction from the occiput will ensure direct pull on the sacrum via the dura.



Special Topic Fig. 6B Upledger's skill training exercise for assessment of dural restrictions. This utilises polyethylene cling film (to represent the dura) and a 'restricting' object (to represent adhesion or restriction in the dural sheath). By standing at the feet (or by using the sacrum) or the head, restrictions can be assessed via gentle and highly focused traction.

Upledger suggests palpating the motion in these bones simultaneously as the patient lies supine. If a normal synchronous motion is palpated, he advocates experimentally slightly inhibiting the motion of either the occiput or the sacrum with one hand, and noting the effect on the motion being perceived by the other hand.

If, in the assessment, dural drag is presumed, due to a 'lag' between the occipital and sacral motions, he asks you to see whether you can tell whether this drag is coming from one end or the other, or from somewhere in between (within the dural tube or on one of its spinal nerve sleeves).

A further assessment is possible by simply introducing gentle occipital traction (patient supine) in order to cause the mobile dural tube to move gently towards you. If there is any restriction in this 'glide', ask yourself how far down the tube the restriction is taking place.

Light traction pulls on the tube closer to your hands (upper cervical) and as force builds up, this influences the dura further down its course. With practice, one segment at a time can be palpated by gently stretching the dura. Of course, traction from the sacral end is also possible in the same manner.

SPECIAL TOPIC EXERCISE

Upledger describes an effective training exercise which sharpens perception of such restrictions as may be present.

Take a good length of clingfilm and flatten this along the length of a smooth, clean table. The polyethylene will cling to the surface to a degree, offering resistance to any movement along the length of the table as you pull on one end. (Special Topic Fig. 6B)

Initially he suggests you apply traction and see how much effort is required to cause some movement of the film. After establishing this he suggests placing an object (e.g. a glass of water) on the film before repeating the exercise to see how the degree of traction needs to be increased, to take account of the weight of the object.

Repetitive exercising in this way, with the weight in different positions, will increase perception of how motion is restricted in different localities.

After becoming familiar with variations in position of any restriction, he suggests you perform a series of exercises of this sort blindfolded (someone else places the object on the film) to see whether you can assess how far down the table the object has been placed, purely by assessing the resistance in the film as you pull on it.

You will be surprised how quickly you can develop accuracy at touching the object which offers the restriction to your traction while you are blindfolded.

After this, retest the 'feel' of dural resistance with a patient or model supine, as you apply light traction to the occiput or sacrum.

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6 Assessment of 'abnormal mechanical tension' in the nervous system

In this chapter we will be examining some extremely important assessment techniques relating to what has been described as 'abnormal tension in the neural structures'. Before doing so it is necessary to look at some of the potential implications, other than pain, which such 'abnormal tensions' hold. We need therefore to briefly examine one physiological component which may be involved: the trophic function of nerves.

Irvin Korr, the primary researcher into the neurological and pathophysiological processes involved in osteopathic medicine over the past half century, has studied the phenomenon of the transport and exchange of macromolecular materials along neural pathways. Among his pertinent (to our study) findings are that the influence of nerves on target organs and muscles depends largely upon the delivery to them of specific neuronal proteins. There is also evidence of a return pathway by means of which messenger substances are transferred back from target organs to the central nervous system and brain along neural structures.

In one of Korr's examples (Korr 1981) it is shown that red and white muscles, which differ morphologically, functionally, chemically (and as we have seen in Chapter 4, differently in response to stress) can have all these differences reversed if their innervation is 'crossed', so that red muscles receive white muscle innervation and vice versa. 'This means, in effect that the nerve instructs the muscle what kind of muscle to be, and is an expression of a neurally mediated genetic influence,' says Korr.

In other words, it is the nerve which determines which genes in a muscle will be suppressed and which expressed, and this information is carried in the material being transported along the axons. When a muscle loses contact with its nerve (as in anterior poliomyelitis, for example) atrophy occurs, not as a result of disuse but because of the loss of the integrity of the connection between nerve cells and muscle cells at the myoneural junction, where nutrient exchange occurs irrespective of whether or not impulses are being transmitted.

These and other functions depend upon the flow of axonally transported proteins, phospholipids, glycoproteins, neurotransmitters and their precursors, enzymes, mitochondria and other organelles.

Korr's words can help us to appreciate this phenomena further:

- The rate of transport of such substances varies from 1 mm/day to several hundred mm/day, with 'different cargoes being carried at different rates'.
- 'The motor powers (for the waves of transportation) are provided by the axon itself.'

- Retrograde transportation seems to be 'a fundamental means of communication between neurons and between neurons and non-neuronal cells'.
- Korr believes this process to have an important role in maintenance of 'the plasticity of the nervous system, serving to keep motor-neurons and muscle cells, or two synapsing neurons, mutually adapted to each other and responsive to each other's changing circumstances'.

Implications

What are the clinical implications of this knowledge and, more specifically, how is this related to our study of palpation?

For a start, we certainly ought to understand what influences are operating on the tissues we palpate. For example, as discussed in previous chapters, knowledge of the craniosacral rhythmic fluid fluctuations, and of the tubular structure of collagen fibrils which many researchers believe are transport channels for CSF, gives us an awareness of what we might be feeling as we palpate for these rhythms.

Similarly, awareness of the trophic influence of neural structures on the structural and functional characteristics of the soft tissues they supply carries at least as much importance, especially when we realise just how vulnerable these nutrient highways are to disruption. Korr explains:

> Any factor which causes derangement of transport mechanisms in the axon, or that chronically alters the quality or quantity of the axonally transported substances, could cause the trophic influences to become detrimental. This alteration in turn would produce aberrations of structure, function, and metabolism, thereby contributing to dysfunction and disease.

Among the negative influences frequently operating on these transport mechanisms, Korr informs us, are:

> deformations of nerves and roots, such as compression, stretching, angulation and torsion.

These stresses occur all too often in humans, says Korr, and are particularly likely where neural structures are most vulnerable:

> In their passage over highly mobile joints, through bony canals, intervertebral foramina, fascial layers, and tonically contracted muscles (for example posterior rami of spinal nerves and spinal extensor muscles).

Korr further amplifies his concern over negative influences on neural trophic function when he discusses 'sustained hyperactive peripheral neurons (sensory, motor and autonomic)'.

For when there is a high rate of discharge from neural structures (facilitated segments and trigger points, for example) the metabolism of neurons is affected, 'and almost certainly their synthesis and turnover of proteins and other macromolecules'.

These thoughts (and others of Korr's given below) relating to the vital trophic role of the nervous system, over and above its conduction of impulses, should be borne in mind as we examine methods of assessing adverse mechanical tension in the nervous system.

Assessment of adverse mechanical tension (AMT) in the nervous system

Testing for, and treating, 'tensions' in neural structures offers us an alternative method for dealing with some forms of pain and dysfunction, since such adverse mechanical tension is often a major component cause of musculoskeletal dysfunction as well as more widespread pathology (bear Korr's research in mind).

Maitland (1986) suggests that we consider this form of assessment and treatment to involve 'mobilisation' of the neural structures, rather than simply stretching them. He and others recommended that these methods be reserved for conditions which fail to respond adequately to normal mobilisation of soft and osseous structures (muscles, joints and so on). Maitland and Butler (Butler & Gifford 1989) have over the years discussed those mechanical restrictions which impinge on neural structures in the vertebral canals and elsewhere.

Base tests

Butler and Gifford (1989), taking Maitland's concepts further, have outlined a series of 'base tests' which can be used to discover precise mechanical restrictions relating to the nervous system.

Five of the 'Base (tension) tests' which will be described are useful not only for diagnosis but for passive mobilisation of the structures involved. The tissues involved in 'mechanical tension' often include the nerve itself, as well as its surrounding muscle, connective tissue, circulatory structures, dura and so on.

The five tension test methods which will be described are:

- Straight leg raising (SLR)
- Prone knee bending (PNB)
- Passive neck flexion (PNF)
- A combination of these called 'slump' position
- The upper limb tension test (ULTT).

These tests are often performed in conjunction with each other (for example, 'slump' together with PNB). Despite some of these tests being familiar in other settings, if reliable results are wanted it is vital that the methodology for their use, as described in this particular context, should be followed closely.

SIMPLE EXAMPLES

Butler and Gifford report that studies have shown that changes in tension in lumbar nerve roots have been demonstrated during PNF stretching manoeuvres, and that there is often an instant alteration in neck and arm (and sometimes head) pain via the addition of ankle dorsiflexion during SLR. Additional stretches, such as ankle dorsiflexion performed during SLR, are described in this work as 'sensitising' manoeuvres.

CORRECT POSITIONING VITAL

The Butler/Gifford approach calls for careful positioning of the region being tested, as changes in pain are assessed, as well as the use of passive stretches as a means of inducing release of restrictions when they are discovered. The developers of tension tests for adverse mechanical tension in the nervous system point out that *body movements (and therefore these tests) not only produce an increase in tension within the nerve but also move the nerve in relation to surrounding tissues.*

Meet MI

The tissues which surround neural structures have been called the mechanical interface (MI). These adjacent tissues are those which can move independently of the nervous system (e.g. supinator muscle is the MI to the radial nerve, as it passes through the radial tunnel).

Any pathology in the MI can produce abnormalities in nerve movement, resulting in tension on neural structure with unpredictable ramifications. Good examples of MI pathology are nerve impingement by disc protrusion or osteophyte contact, and carpel tunnel constriction. These problems would be regarded as *mechanical* in origin as far as the nerve restriction is concerned. Any symptoms resulting from mechanical impingement on neural structures will be more readily provoked in tests which involve movement rather than pure (passive) tension.

Chemical or *inflammatory* causes of neural tension also occur, resulting in 'interneural fibrosis' which leads to reduced elasticity and increased 'tension', which would become obvious with tension testing of these structures. (See Ch. 4 – discussion on progression from acute to chronic in soft tissue dysfunction.)

Pathophysiological changes resulting from inflammation, or from chemical damage (i.e. toxic), are noted as commonly leading on to internal mechanical restrictions of neural structures in a different manner to mechanical causes such as those imposed by a disc lesion, for example.

Adverse mechanical tension changes do not necessarily affect nerve conduction, according to Butler and Gifford; however, Korr's research shows it to be likely that axonal transport would be affected.

AMT AND PAIN SITES NOT NECESSARILY THE SAME

When a tension test is positive (i.e. pain is produced by one or another element of the test – initial position alone or with 'sensitising' additions) it indicates only that there exists adverse mechanical tension (AMT) somewhere in the nervous system and not that this is necessarily at the site of reported pain.

Butler and Gifford report on research indicating that 70% of 115 patients with either carpal tunnel syndrome, or lesions of the ulnar nerve at the elbow, showed clear electrophysiological and clinical evidence of neural lesions in the neck. This is, they maintain, because of a 'double crush' phenomenon in which a primary, and often longstanding, disorder, perhaps in the spine, results in secondary or 'remote' dysfunction at the periphery.

This can also work in reverse, for example where wrist entrapment of the ulnar nerve leads ultimately to nerve entrapment at the elbow (they term this 'reversed double crush').

Neural vulnerability

Let us again refer to Korr's evidence of retrograde transportation of axonal flow, as this is one possible factor influencing such changes. In one of his texts (Korr 1970) he says:

> To appreciate the vulnerability of the segmental nervous system to somatic insults it must be understood that much of the pathway taken by nerves as they emerge from the cord is actually through skeletal muscle. The great contractile forces of skeletal muscles with the accompanying chemical changes exert profound influences on the metabolism and excitability of neurons. In this environment the neurons are subject to quite considerable mechanical and chemical influences of various kinds, compression and torsion and many others . . . slight mechanical stresses may, over a period of time, produce adhesions, constrictions and angulations imposed by protective layers. [Perhaps involving friction protectors such as meningeal extensions including nerve sheaths or nerve sleeves.]

Such mechanical stresses also, of course, interfere with axoplasmic flow:

> Flowing down every single nerve fibre is a stream of nerve cell cytoplasm in a volume so great that the nerve is said to 'turn over' its material completely three or four times a day, and this flow is essential to the continual nourishment of the fibres themselves along their entire length.

Since this axoplasmic flow also nourishes target tissues, in addition to which the nerves are known to carry back chemical messages from the tissues towards the cord in the same way, interference with the flow of chemical messages due to increased 'tensions' has major health implications. Korr further elaborated on four types of disturbance of nerve function which can result from local tissue impingement:

1. Increased neural excitability at the point of disturbance.
2. Triggering of supernumerary impulses (frequency of discharge from and into the spinal cord, as well as to the periphery increases, the patterns becoming 'garbled').
3. 'Cross-talk' which occurs when nerve fibres pick up electrical stimuli from neighbouring nerves.
4. Local stresses continually report to the spinal cord, thus 'jamming' normal transmission of patterned feedback.

Tension points and test descriptions

Butler and Gifford note that certain anatomical areas, where the nervous system moves only a small amount relative to the surrounding interface during motion, or where the system is relatively fixed, are the most likely regions for AMT to develop. This is often noted where nerves branch or enter a muscle. Such areas are called 'tension points' and these are referred to in the test descriptions:

1. A positive tension test is one in which the patient's symptoms are reproduced by the test procedure *and* where these symptoms can be altered by variations in what are termed 'sensitising manoeuvres', which are used to 'add weight to', and confirm, the initial diagnosis of AMT.

   Adding dorsiflexion during SLR is an example of a sensitising manoeuvre.
2. Precise symptom reproduction may not be possible, but the test is still possibly relevant if other abnormal symptoms are produced during the test and its accompanying sensitising procedures. Comparison with the test findings on an opposite limb, for example, may indicate an abnormality worth exploring.
3. Altered range of movement is another indicator of abnormality, whether this is noted during the initial test position or during sensitising additions.

Variations of passive motion of the nervous system during examination and treatment

1. An increase in tension can be produced in the *interneural component*, where tension is being applied from both ends, so to speak, as in the 'slump' test.
2. Increased tension can be produced in the *extraneural component*, which then produces the maximum movement of the nerve in relation to its mechanical interface (such as in SLR) with the likelihood of restrictions showing up at 'tension points'.
3. Movement of *extraneural tissues* in another plane can be engineered.

Before beginning the exercises below, look at Box 6.1, which gives some general precautions and contraindications for their use.

Box 6.1 General precautions and contraindications for Exercises 6.1–6.5

1. Take care of the spine during the 'slump test' if disc problems are involved or if the neck is sensitive (or the patient is prone to dizziness).
2. Take care not to be excessive in side-bending of neck during ULTT.
3. If any area is sensitive, take care not to aggravate existing conditions during performance of tests (arm is more likely than leg to be 'stirred up').
4. If obvious neurological problems exist, take special care not to exacerbate by vigorous or strong stretching.
5. Similar precautions apply to diabetic, MS or recent surgical patients or where the area being tested is much affected by circulatory deficit.
6. Do not use the tests if there has been recent onset or worsening of neurological signs, or if there is any cauda equina or cord lesion.

EXERCISE 6.1

Time suggested
3–4 MINUTES FOR EACH 'SENSITISING' ADDITION

STRAIGHT LEG RAISING (SLR) TEST

See text relating to hamstring test (for shortness) on page 97 (Exercise 4.18). The leg is raised in the sagittal plane, knee extended. It is suggested that this test should be used in all vertebral disorders, all lower limb disorders and some upper limb disorders to establish the possibility of abnormal mechanical tension in the nervous system in the lower back or limb.

Sensitising additions:

- Ankle dorsiflexion (this stresses the tibial component of the sciatic nerve).
- Ankle plantar flexion plus inversion (this stresses the common peroneal nerve, which may be useful with anterior shin and dorsal foot symptoms).
- Passive neck flexion.
- Increased medial hip rotation.
- Increased hip adduction.
- Altered spinal position (the example is given of left SLR being 'sensitised' by lateral flexion to the right of the spine).

Perform the SLR test and incorporate *each* sensitising addition to assess changes in symptoms, new symptoms, restrictions etc.

Can the leg be raised as far, and as easily, without force and without symptoms (new or old) appearing when the sensitising additions are incorporated?

NOTES ON SLR TEST

- On SLR there is caudad movement of the lumbosacral nerve roots in relation to interfacing tissue (which is why there is a 'positive' indication – pain and limitation of leg raising potential – from SLR if a prolapsed intervertebral disc exists).
- Less well known is the fact that the tibial nerve, proximal to the knee, moves caudad (in relation to the mechanical interface) during SLR, whereas distal to the knee it moves cranially. There is no movement of the tibial nerve behind the knee itself, which is therefore known as a 'tension point'.
- The common peroneal nerve is attached firmly to the head of the fibula (another 'tension point').

EXERCISE 6.2

Time suggested
3–4 MINUTES FOR EACH 'SENSITISING' ADDITION IN EACH POSITION (1 AND 2)

PRONE KNEE BEND TEST (PKB)

1. The patient is prone and the knee is flexed, taking the heel towards the buttock to assess reproduction of existing symptoms, or other abnormal symptoms, or altered range of movement (heel should approximate buttock easily). During the test the knee of the prone patient is flexed while the hip and thigh are stabilised and this moves the nerves and roots from L2, 3, 4 and, particularly, the femoral nerve and its branches.
2. If, however, the test is conducted with the patient side-lying, the hip should be maintained in extension during the test (this alternative position is thought more appropriate for identifying entrapped lateral femoral cutaneous nerve problems).

The PKB test stretches rectus femoris and rotates the pelvis forward, thus extending the lumbar spine, which can confuse interpretation of nerve impingement symptoms.

Reliance on *sensitising manoeuvres* helps with such interpretation. These include (in either prone or side-lying use of the test):

- Cervical flexion
- Adopting the 'slump' position (Exercise 6.3) – but only in the side-lying variation of the test
- Variations of hip abduction, adduction, rotation.

EXERCISE 6.3

Time suggested
3–4 MINUTES FOR EACH 'SENSITISING' ADDITION

THE 'SLUMP TEST'

This is regarded by Butler as the most important test in this series. It links neural and connective tissue components from the pons to the feet and requires care in performing and interpreting. (Fig. 6.1)

It is suggested for testing in all spinal disorders, most lower limb disorders and some upper limb disorders (especially those which seem to involve the nervous system).

The test involves the patient/model introducing the following sequence of flexion/motion:

- Thoracic and then lumbar flexion, followed by
- Cervical flexion
- Knee extension
- Ankle dorsiflexion
- Sometimes also with hip flexion (produced by either bringing the trunk forwards on the hips, or by increasing SLR).

Sensitising manoeuvres during 'slump testing' are achieved as a rule by changes in the terminal positions of joints. Butler gives examples:

- Should the 'slump position' reproduce (for example) lumbar and radiating thigh pain, a change in head position – say away from full neck flexion – could result in total relief of these symptoms.
- A change in ankle and knee positions could significantly change cervical, thoracic or head pain.

In both instances this would confirm that AMT was operating, although the site would remain obscure.

- Additional sensitising movements with the patient/model in the slump position might involve, for example. Other modifications which can be used include the addition of trunk side-bending and rotation or even extension; hip adduction, abduction or rotation; and varying neck positions.

The 'slump test' involves *tension* on the nervous system rather than *motion*.

NOTES ON SLUMP POSITION

- Cadaver studies demonstrate that neuromeningeal movement occurs in various directions, with C6, T6 and L4 intervertebral levels being regions of constant state (i.e. no movement, therefore 'tension points').
- Butler reports that many restrictions, identified during the 'slump' test, may only be corrected by appropriate spinal manipulation.
- Butler points out that SLR is more likely to pick up neural tension in the lumbosacral region.
- It is possible for SLR to be positive (e.g. symptoms are reproduced) and 'slump' negative (no symptom reproduction), and vice versa, so both should always be performed.

The following findings have been reported in research using the 'slump test':

- Mid-thoracic to T9 are painful on trunk and neck flexion in 50% of 'normal' individuals.
- The following are considered normal if they are symmetrical
  —hamstring and posterior knee pain occurring with trunk and neck flexion when the knees are extended and increasing further with ankle dorsiflexion
  —restrictions in ankle dorsiflexion during trunk/neck flexion while the knee is in extension
  —there is a common decrease in pain noted on release of neck flexion, and an increase in range of knee extension or ankle dorsiflexion, on release of neck flexion.

If the patient's symptoms are reproduced by the slump position, and can be relieved by sensitising manoeuvres, you have a positive test.

This is further emphasised if, as well as symptom reproduction, there is a symmetrical decrease in the range of motion which does not happen when tension is absent. For example, bilateral ankle dorsiflexion is restricted during slump but disappears when the neck is not flexed.

In some instances, anomalous reactions are observed in which, for example, pain increases when the neck is taken out of flexion, or when trunk on hip flexion decreases symptoms. Mechanical interface (MI) pathology may account for this.

EXERCISE 6.4

Time suggested
1–2 MINUTES FOR EACH VARIATION

PASSIVE NECK FLEXION (PNF) TEST

As with SLR, this test takes up slack from one end only.

It allows movement of neuromeningeal tissues in relation to the spinal canal, which is its mechanical interface (MI).

22% of patients with back pain were shown to have a positive PNF test in an industrial survey.

Variations such as neck extension, lateral flexion and PNF, in combination with other tests, should be used for screening purposes for AMT.

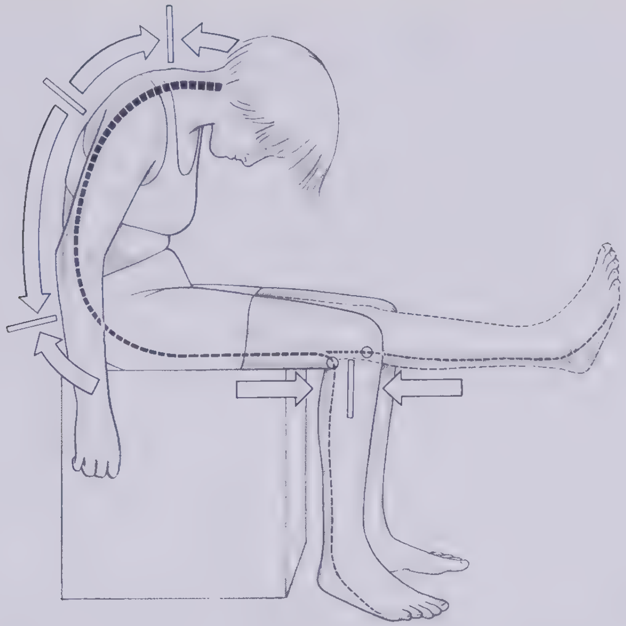

Fig. 6.1 The slump test position stretches the entire neural network from pons to feet. Note the direction of stretch of the dura mater and nerve roots. As the leg comes from position A to position B, the movement of the tibial nerve in relation to the tibia and femur is indicated by arrows. No neural movement occurs behind the knee or at levels C6, T6 or L4 ('tension' points).

EXERCISE 6.5

Time suggested
3–4 MINUTES FOR EACH 'SENSITISING' ADDITION TO EACH VERSION OF THE TEST

UPPER LIMB TENSION TESTS (ULTT)

These tests have been called the 'SLR of the arm'.

Use of both versions of the ULT test is suggested in cases involving thoracic, cervical and upper limb symptoms, even if this involves only local finger pain.

ULTT(1) is performed on the supine patient in the sequence of:

1. Abduction, extension and lateral rotation of the glenohumeral joint
2. Supination of the forearm and elbow extension
3. Wrist and finger extension.

As this position is held, *sensitisation* is performed by

- Adding cervical lateral flexion away from the tested side, or
- The addition of ULTT(I) on the other arm simultaneously, or
- The simultaneous use of SLR bi- or unilaterally, or
- Using pronation rather than supination of the wrist.

NOTES

- A great deal of nerve movement occurs during this test. In cadavers, up to 2 cm movement of the median nerve in relation to its mechanical interface has been observed during neck and wrist movement.
- 'Tension points' in the upper limb are found at the shoulder and elbow.

ULTT(2). Butler developed this test and finds it more sensitive than ULTT(I). He maintains that it replicates the working posture involved in many instances of upper limb repetition disorders ('overuse syndrome').

In using ULTT(2), comparison is always made with the other arm.

Example of right side ULTT(2):

For a right side test the patient/model lies close to right side of the couch so that the scapula is free of the surface. The trunk and legs are angled towards the left foot of the bed so that patient feels secure. The operator stands to the side of the patient's head facing the feet with the operator's left thigh depressing the shoulder girdle. The patient's fully flexed right arm is supported at both elbow and wrist by the operator's hands. Slight variations in the degree and angle of shoulder depression ('lifted' towards ceiling, held towards floor) may be used, by alteration of thigh contact.

Holding the shoulder depressed, the operator's right hand grasps the patient's right wrist while the elbow is held by the operator's left hand. (Fig. 6.2)

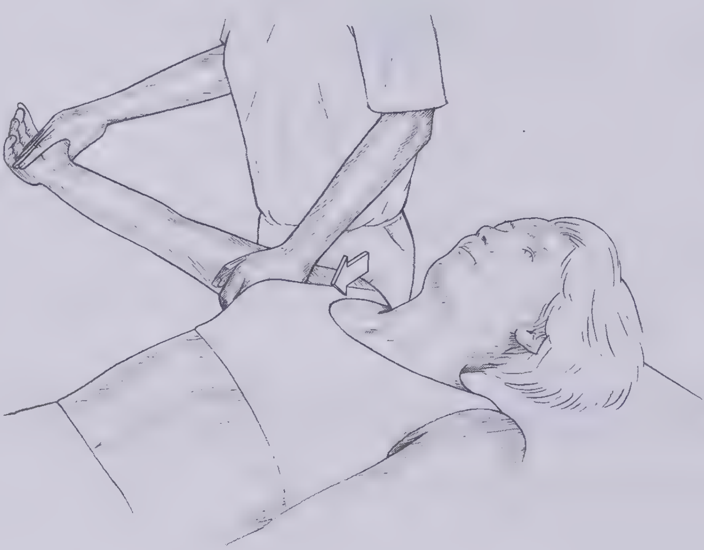

Fig. 6.2 Upper limb tension test (2). Note operator's thigh depresses shoulder as the upper arm is placed in maximum internal rotation of the shoulder, elbow extension and forearm pronation as hand is also pronated and extended.

Sensitisation alternatives. With these contacts the tested arm can be taken into:

- Shoulder internal or external rotation
- Elbow flexion or extension
- Forearm supination or pronation.

A combination of shoulder internal rotation, elbow extension and forearm pronation (with shoulder constantly depressed) is considered to offer the most sensitive test position.

When an arm position such as this has been adopted, the operator slides his right hand down onto the patient's open hand, with thumb between patient's thumb and index finger.

Further sensitisation changes such as:

- Supination or pronation, or
- Stretching of fingers/thumb, or
- Radial and ulnar deviations, can all be introduced in this way, with good control.

Further sensitisation may involve:

- Neck movement (side-bend away from tested side, for example), or
- Altered shoulder position, such as increased abduction or extension.

NOTES

- Cervical lateral flexion away from the tested side causes increased arm symptoms in 93% of people, and cervical lateral flexion towards the tested side increases symptoms in 70% of cases.
- Butler reports that ULTT mobilises the cervical dural theca in a transverse direction (whereas the 'slump' mobilises the dural theca in an anteroposterior direction as well as longitudinally).

PRECAUTIONS

Review the general precautions and contraindications for the above exercises, given in Box 6.1.

IMPLICATIONS

It is logical, bearing in mind Korr's evidence as to the many ways in which soft tissue (and osseous) dysfunction can impinge on neural structures, that maximum relaxation of any muscle involved in interface tissue should be achieved, by normal methods, before such tests (or subsequent treatment based on such tests) are considered.

It is not within the scope of this text to describe methods for releasing abnormal tensions, except to suggest that, as in (most of) the examples of tests for shortened postural muscles given in Chapter 4, *the treatment positions are a replication of the test positions.*

Butler suggests that in treating adverse mechanical tensions in the nervous system in this way, initial stretching should commence well away from the site of pain in sensitive individuals and conditions.

Re-testing regularly during treatment is also wise, in order to see whether gains in range of motion or lessening of pain provocation during testing are being achieved.

CAUTION: *It is critical that any sensitivity provoked by treatment should subside immediately. If it does not the technique/test should be stopped or there is the possibility that irritation could be caused to the neural tissues involved.*

DISCUSSION REGARDING EXERCISES 6.1–6.5

The inclusion of descriptions of these tests, in a text primarily aimed at enhanced palpatory literacy, may be questioned. What have they to do with palpation?

I consider that the tests previously described (Ch. 4) for muscle length as well as those for joint play (Ch. 8 and Special Topic 8 on joint play) as well as those in this chapter, which evaluate possible adverse mechanical tension in nerves, are all logical extensions of palpation of the skin (and indeed of the region just above the skin) as well as of muscles and fascia.

The concepts of 'end-feel', range of motion, and restrictive barriers are discussed elsewhere and assessment of such barriers and restrictions, as well as normal 'end-feel', requires a delicacy of touch which must be considered to be a major element of palpatory literacy. These skills are likely to be enhanced if the tests described in this chapter are performed with delicacy and care.

Awareness of what Butler calls 'tension' points, can be added to the knowledge we hold in mind, as we palpate and test in other ways than those described above. As we use the methods developed by Lief, Nimmo, Lewit, Beal, Smith or Becker (or any other method of palpation) such knowledge is potentially very useful indeed.

If, for example, on NMT palpation, or application of Becker's palpation methods, soft tissue changes were palpated in 'tension' point areas as described by Butler, the possibility of nervous system involvement would be clear only if the concepts of AMT were understood. Use of one, or other, or all, of the tests described above might then either confirm or deny this possibility.

Use of additional tests to assess for shortened muscle structures (Ch. 4) and joint restrictions (Ch. 8) would also be appropriate, as such changes could easily be the cause of adverse tension in the nervous system.

The inclusion of this series of tests is designed to encourage a different way of evaluating somatic dysfunction using some familiar procedures (SLR) as well as the enhancement of the palpation skills required in the performance of some quite complex manual procedures (ULTT(2), for example).

Clinical use of the tests involved in, as well as the underlying concepts of AMT in neural structures, requires adequate professional training in use of these methods. If you have succeeded in performing these tests and their sensitising additions, and have acquired useful feedback and information which points towards AMT in the nervous systems of the model(s) you have worked with, then you may feel inspired towards further training in this subject, which has emerged out of physiotherapy methodology in recent years.

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Source of pain: is it reflex or local?

Palpation of an area which the patient reports to be painful will produce increased sensitivity or tenderness if the pain is originating from that area. If, however, palpation produces no such increase in sensitivity, then the chances are strong that the pain is being referred from elsewhere.

But where is it coming from?

Knowledge of the patterns of probable targets of distribution of trigger point symptoms can allow for a swift focusing on suitable sites in which to search for an offending trigger (if the pain is indeed coming from a myofascial trigger).

The discomfort could, however, be a radicular symptom coming from the spine. Gregory Grieve (1984) reports:

> When pain is being referred into a limb due to a spinal problem, the greater the pain distally from the source, the greater the index of difficulty (the further distal, the more difficult) in applying quickly successful treatment.

Dvorak and Dvorak (1984) state:

> For patients with acute radicular syndrome there is little diagnostic difficulty, which is not the case for patients with chronic back pain, some differentiation for further therapy is especially important, although not always simple.

Noting that a mixed clinical picture is common, Dvorak and Dvorak then say:

> When testing for the radicular syndrome, particular attention is to be paid to the motor disturbances and the deep tendon reflexes. When examining sensory radicular disorders, the attention should be towards the algesias.

However, the referred pain may not be from either a trigger or the spine. Kellgren (1938, 1939) showed that:

> The superficial fascia of the back, the spinous processes and the supraspinous ligaments induce local pain upon stimulation, while stimulation of the superficial portions of the interspinous ligaments and the superficial muscles results in a diffused (more widespread) type of pain.

Clearly, ligaments and fascia must be considered as sources of referred pain, and this is made clearer by Brugger (1960), who describes a number of syndromes in which altered arthromuscular components produce reflexogenic pain. These are attributed to painfully stimulated tissues (origins of tendons, joint capsules, and so on) producing pain in muscles, tendons and overlying skin.

As an example, irritation and increased sensitivity in the region of the sternum, clavicles and rib attachments to the sternum, through occupational or postural patterns, will influence or cause painful intercostal muscles, scalenes, sternomastoid, pectoralis major and cervical muscles. The increased tone in these muscles and the resultant stresses which they produce may lead to spondylogenic problems in the cervical region, with further spread of symptoms. Overall, this syndrome can produce chronic pain in the neck, head, chest wall, arm and hand (even mimicking heart disease).

Dvorak and Dvorak have charted a multitude of what they term 'spondylogenic reflexes' which derive from (in the main) intervertebral joints. The palpated changes are characterised as:

> Painful swellings, tender upon pressure and detachable with palpation, located in the musculofascial tissue in topographically well defined sites. The average size varies from 0.5 cm to 1 cm and the main characteristic is the absolutely timed and qualitative linkage to the extent of the functionally abnormal position (segmental dysfunction). As long as a disturbance exists, the zones of irritation can be identified, yet disappear immediately after the removal of the disturbance.

The Dvoraks also see altered mechanics in a vertebral unit as causing 'reflexogenic pathological change of the soft tissue, the most important being the "myotendinoses", which can be identified by palpation'.

Some would argue that the soft tissue changes precede the altered vertebral states, at least in some instances (poor posture, overuse, misuse, abuse).

Wherever you stand in this debate, this brief survey of some opinions as to 'where the pain is coming from', shows clearly that we need to keep many possibilities in mind.

As we palpate and evaluate, the question that we need to be asking ourselves almost constantly is 'which of this patient's symptoms, whether of pain or other forms of dysfunction, are the result of reflexogenic activity such as trigger points?'

In other words, what palpable, measurable, identifiable evidence is there which connects what we can observe, test and palpate to the symptoms (pain, restriction, fatigue, etc.) of this patient?

And what, if anything, can be done to remedy or modify the situation, safely and effectively?

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7 Introduction to functional palpation

In essence, the learning experience in palpation depends upon the development of an awareness of what normal feels like, and what abnormal feels like – and on remembering these feelings.

In this chapter we will look at functional palpation which, at its most basic, asks you to feel tissues as normal demands are made on them.

Healthy, well-adjusted and soundly functioning tissues will respond in a certain way and unhealthy dysfunctional tissues in another. It is up to you to start to recognise and imprint on your memory what these responses – normal and abnormal – feel like.

The following series of exercises includes reference to, and thoughts derived from, the research work of: Edward Stiles (Johnston et al 1969); C. A. Bowles (1955); William Johnston (1966, 1988a, 1988b); Philip Greenman, Professor of Biomechanics at the College of Osteopathic Medicine, Michigan State University (Greenman 1989); as well as descriptive observations from British osteopath Laurie Hartman (1985). Also included later in this section (Exercises 7.3, 7.8) is a functional exercise based on the work of the developer of functional technique, H. V. Hoover (1969).

Hartman analyses this 'indirect palpation technique' saying that the operator's objective is to palpate the affected tissues, seeking 'a state of ease and release, rather than looking for the point of bind and barrier', which characterises so many other manipulative approaches (high velocity thrust, articulation, muscle energy methods and so on).

Finding dynamic neutral

The term 'functional technique' grew out of a series of study sessions held in the New England Academy of Applied Osteopathy in the 1950s under the general heading of 'a functional approach to specific osteopathic manipulative problems'.

In the 1950s and 1960s research, most notably by Irvin Korr (1947) coincided with a resurgence of interest in this approach, largely as a result of the clinical and teaching work of Hoover. In functional work, palpation for 'a position of ease' involves a subjective appreciation of tissue as it is brought through positioning towards 'ease', to a state of 'dynamic neutral', rather than relying on a report by the patient as to reduction in pain as positioning is pursued, as is the case in Laurence Jones's strain/counterstrain (Jones 1982). Theoretically (and usually in practice) the palpated position of maximum ease (reduced tone) in the distressed tissues should correspond with the position which would have been found were pain being used as a guide.

Bowles gives an example:

A patient has an acute low back and walks with a list. A structural diagnosis is made and the fingertips palpate the most distressed tissues, within the area of most distress. The operator begins tentative positioning of the patient, preferably sitting. The fingertips pick up a slight change toward a dynamic neutral response, a little is gained, a little, not much, but a little. A little, but enough so the original segment is no longer the most distressed area within the area of general distress. The fingers then move to what is now the most acute segment. As much feeling of 'dynamic neutral' (ease) is obtained here as possible. Being temporarily satisfied with slight improvements here and there, this procedure continues until no more improvement is detectable. That is the time to stop. Using tissue response to guide the treatment the operator has step by step eased the lesioning and corrected the structural imbalance to the extent that the patient is on the way to recovery.

Functional objectives

Hoover (1957) summarises the key elements of functional technique:

- Diagnosis of function involves passive evaluation as the part being palpated responds to physiological demands for activity made by the operator or the patient.
- Functional diagnosis determines the presence or absence of normal activity of a part which is required to respond as part of body activities (say respiration or the introduction of passive or active flexion or extension). If the participating part has free and 'easy' motion it is normal; however, if it has restricted or 'binding' motion it is dysfunctional.
- The degree of ease and/or bind present in a dysfunctional site when motion is demanded is a fair guide to the severity of the dysfunction.
- The most severe areas of dysfunction are the ones to treat initially.
- The directions of motion which induce ease in the dysfunctional sites indicate precisely the most desirable pathways of movement.
- Use of these guidelines automatically precludes undesirable manipulative methods since bind would result from any movement towards directions of stress.
- Treatment using these methods is seldom, if ever, painful and is well received by patients.
- The application requires focused concentration on the part of the operator and may be mentally fatiguing. Functional methods are suitable for application to the very ill, the extremely acute and the most chronic situations.

Bowles is definite in his instructions to those attempting to learn to use their palpating contacts in ways which will allow the application of functional methods:

- The palpating contact ('listening hand') must not move.
- It must not initiate any movement.
- Its presence in contact with the area under assessment/treatment is simply to derive information from the tissue beneath the skin.
- It needs to be tuned into whatever action is taking place beneath the contact and must temporarily ignore all other sensations such as 'superficial tissue texture, skin temperature, skin tension, thickening or doughiness of deep tissues, muscle and fascial tensions, relative positions of bones and range of motion'.
- All these signs should be assessed and evaluated and recorded separately from the functional evaluation which should be focused single-mindedly on tissue response to motion. 'It is the deep segmental tissues, the ones that sup-

port and position the bones of a segment, and their reaction to normal motion demands that are at the heart of functional technique specificity.'

Terminology

Bowles explains the shorthand use of these common descriptive words:

> Normal somatic function is a well-organised complexity and is accompanied by an easy action under the functionally-orientated fingers. The message from within the palpated skin is dubbed a sense of 'ease' for convenience of description. Somatic dysfunction could then be viewed as an organised dysfunction and recognised under the quietly palpating fingers as an action under stress, an action with complaints, an action dubbed as having a sense of 'bind'.

In addition to the listening hand and the sensations it is seeking, of ease and bind, Bowles suggests we develop a 'linguistic armament' which will allow us to pursue the subject of functional technique without 'linguistic embarrassment' and without the need to impose quotation marks around the terms each time they are used.

He therefore asks us to become familiar with the additional terms, 'motive hand', which indicates the contact hand which directs motion (or fingers, or thumb or even verbal commands for motion–active or assisted); and also 'normal motion demand' which indicates what it is that the motive hand is asking of the body part. The motion could be any normal movement such as flexion, extension, side-bending, rotation or combination of movements – the response to which will be somewhere in the spectrum of ease and bind, which will be picked up by the listening hand for evaluation.

At its simplest, functional technique sets up a 'demand–response' situation which allows for the identification of dysfunction – as bind is noted – and which also allows for therapeutic intervention as the tissues are guided into ease.

Bowles's summary of functional methods

In summary, whatever region, joint or muscle is being evaluated by the listening hand, the following results might occur.

1. The motive hand makes a series (any order) of motion demands (within normal range) which includes all possible variations. If the response noted in the tissues by the listening hand is ease in all directions then the tissues are functioning normally.
2. The motive hand makes a series of motion demands which includes all possible variations; however, some of the directions of movement produce bind when the demand is within normal physiological ranges. The tissues are responding dysfunctionally.
3. For therapy to be introduced in response to an assessment of bind relating to particular motion demands, the listening hand's feedback is required so that, as the motions which produced bind are reintroduced, movement is modified so that the maximum degree of ease possible is achieved. 'Therapy is monitored by the listening hand and fine-tuned information as to what to do next is then fed back to the motive hand. Motion demands are selected which give an increasing response of ease and compliance under the quietly palpating fingers.'

The results can be startling, as Bowles explains: 'Once the ease response is elicited it tends to be self-maintaining in response to all normal motion demands.

In short, somatic dysfunctions are no longer dysfunctions. There has been a spontaneous release of the holding pattern.'

EXERCISE 7.1

Time suggested
3–4 MINUTES

BOWLES'S FUNCTIONAL EXERCISE

Stand up and place your fingers on your own neck muscles paraspinally so that the fingers lie – very lightly, without pressing, but constantly 'in touch' with the tissues – approximately over the transverse processes.

Start to walk for a few steps and try to ignore the skin and the bones under your fingers.

Concentrate all your attention on the deep supporting and active tissues as you walk.

After a few steps, stand still and then take a few steps walking backwards, all the while evaluating the subtle yet definite changes under your fingertips.

Repeat the process several times, once while breathing normally and once while holding the breath in, and again holding it out.

Standing still, take one leg at a time backwards, extending the hip and then returning it to neutral before doing the same with the other leg.

What do you feel in all these different situations?

COMMENT

This exercise should help to emphasise the 'listening' role of the palpating fingers and of their selectivity as to what it is to which they wish to listen.

The listening hand contact should be *'quiet, non-intrusive, non-perturbing'* in order to register the compliance of the tissues and evaluate whether there is a greater or lesser degree of ease or bind on alternating steps and under different circumstances as you walk.

EXERCISE 7.2

Time suggested
3–4 MINUTES (7.2A), 7–10 MINUTES (7.2B AND 7.2C)

STILES AND JOHNSTON'S SENSITIVITY EXERCISE

Exercise 7.2a

Stand behind your seated partner/model, resting your palms and fingers over their upper trapezius muscle, between the base of the neck and shoulder. The object is to evaluate what happens under your hands as your partner takes a deep inhalation.

This is not a comparison between inhalation and exhalation, but is meant to help you assess how the areas being palpated respond to inhalation.

Do they stay easy, or do they bind?

You should specifically *not* try to define the underlying structures or their status in terms of tone or fibrosity, simply assess the impact, if any, of inhalation on the tissues.

Do the tissues resist, restrict, bind or do they stay relaxed on inhalation?

Compare what is happening under one hand with what is happening under the other during inhalation.

Exercise 7.2b

You are palpating your partner who is seated with you standing behind. The objective this time is to map the various areas of 'restriction' or bind in the thorax, anterior and posterior, as your partner inhales.

In this exercise, try not only to identify areas of bind but assign what you find into large (several segments) and small (single segment) categories.

To commence, place a hand, mainly fingers, on (say) the upper left upper thoracic area over the scapula, and have your partner inhale deeply several times, first while seated comfortably hands on lap, and then with the arms folded on the chest (exposing more the costovertebral articulation).

After several breaths with your hand in one position resite it a little lower, or more medially or laterally as appropriate, until the entire back has been 'mapped' in this way.

Remember that you are not comparing how the tissues 'feel' on inhalation as compared with exhalation, but how different regions compare (in terms of ease and bind) with each other *in response* to inhalation.

Map the entire back and front of the thorax in this way, for location of bind and for size.

Go back to any large areas of bind and, within them, see whether you can identify any small areas, using the same simple contact, and inhalation as the motion component.

Individual spinal segments can also be mapped by sequentially assessing them one at a time as they respond to inhalations.

How would you normally handle the information you have uncovered in your 'patient'?

Would you try in some way to mobilise what appears to be restricted?

If so, how?

Would your therapeutic focus be on the large areas of restriction or the small ones?

Would you work on areas distant from or adjacent to the restricted areas?

Would you try to achieve a release of the perceived restriction by trying to move it mechanically towards and through its resistance barrier, or would you rather be inclined to try to achieve release by some indirect approach, moving away from the restriction barrier?

Or, do you try a variety of approaches, mixing and matching until the region under attention is free or improved?

There are no correct or incorrect answers to these questions. However, the various exercises in this section should open up possibilities for other ways being considered, ways which do not impose a solution but allow one to emerge.

Exercise 7.2c

Your partner is seated, arms folded on the chest, and you are standing behind with your listening hand/fingertips placed on the upper left thorax, on or around the scapula area.

Your motive hand is placed at the cervicodorsal junction so that it can indicate to your partner your request that he move forward of the midline (dividing the body longitudinally in the coronal plane), not into flexion but in a manner which carries the head and upper torso anteriorly.

The movement will be found to be more easily accomplished if your partner has arms folded as suggested as above.

The repetitive movement forwards, into the position described, and back to neutral, is initiated by the motive hand, while the listening hand evaluates the changes created by this.

The comparison which is being evaluated is of one palpated area with another in response to this normal motion demand.

As Stiles and his colleagues state:

> It is not anterior direction of motion compared with posterior direction, but rather a testing of motion into the anterior compartment only, comparing one area with the ones below and the ones above, and so on.

Your listening hand is asking the tissues whether they respond easily or with resistance to the motion demanded of the trunk. In this way, try to identify those areas, large and small, which bind as the movement forward is carried out.

Compare these areas with those identified when the breathing assessment was used.

COMMENT

The patterns elicited in Exercise 7.2c involve movement initiated by yourself, whereas the information derived from 7.2a and 7.2b involved intrinsic motion, initiated by exaggerated respiration.

Stiles and his colleagues have, in these simple exercises, taken us through the initial stages of palpatory literacy in relation to how tissues respond to motion, self-initiated or externally induced.

IMPLICATIONS

Other ways of using the information gathered during Exercise 7.2c are further expanded:

> In this particular testing what you have been doing is changing the positional relationship of the shoulders and the hips. Clues about this shoulder-to-hips relationship, elicited at the restricted area in this way, can become criteria for you in picking the technique you may want to use to effectively change the specific dysfunction being tested ... We feel that a better chance of 'correction' may be established if you use a technique which will take the dysfunctional area and deal not only with the flexion–extension component, the sidebending and the rotation, but also see that the shoulders are properly positioned in relation to the hips.

Hoover's 'experiments'

Hoover poses a number of questions in the following exercises ('experiments' he calls them), the answers to which should always be 'yes'. If your answers are indeed positive at the completion of the exercise then you are probably sensitive enough in palpatory skills to be able to effectively utilise functional technique.

EXERCISE 7.3

Time suggested
7–9 MINUTES (7.3A), 3–4 MINUTES EACH (7.3B AND 7.3C)

HOOVER'S THORACIC EXERCISE

Exercise 7.3a

You should be standing behind your seated partner whose arms are folded on their chest. Having previously assessed by palpation, observation and examination the thoracic or lumbar spine of your partner, lightly place your listening hand on those segments which you judge to be the most restricted or in which the tissues are most hypertonic.

Wait, and do nothing as your hand 'tunes-in' to the tissues.

Make no assessments as to structural status.

Wait for at least 15 seconds.

Hoover says:

> The longer you wait the less structure you feel. The longer you keep the receiving fingers still, the more ready you are to pick up the first signals of segment response when you proceed to induce a movement demand.

With your other hand, and by voice, guide your partner into flexion and then extension. The motive hand should apply very light touch, just a suggestion, to indicate to your partner in which direction you want movement to take place.

The listening hand does nothing but wait to feel the functional response of ease and bind as the spinal segments move into flexion and then extension.

A wave-like movement should be noted as the segment being palpated is involved in the gross motion demanded of the spine.

A change in the tissue tension under palpation should be noted as the various phases of the movement are carried out.

Can you feel this?

Practise the assessment at various segmental levels and try to feel the different status of the palpated tissues during the phases of the process, as bind starts and then becomes more intense as the first barrier approaches, then eases somewhat as the direction of movement reverses and then becomes very easy before a hint of bind reappears and then becomes intense again, as the opposite barrier is approached.

Decide where the maximum bind is felt and where maximum ease occurs. These are the key pieces of information required for functional technique as you assiduously avoid bind and home in on ease.

Can you feel this?

Try also to distinguish between the bind which is a normal physiological response to an area coming towards the end of its normal range of movement, and the bind which is a response to dysfunctional restriction.

Can you feel this?

Exercise 7.3b

Return to the starting position as in 7.3a and while palpating an area of restriction or hypertonicity, induce straight side-bending to one side and then the other while assessing for ease and bind in exactly the same way as in 7.3a.

Can you feel this?

Exercise 7.3c

Return to the starting position and while palpating an area of restriction or hypertonicity, induce rotation to one side and then the other while assessing for ease and bind in exactly the same way as in 7.3a and 7.3b.

Can you feel this?

COMMENT

Hoover describes variations in what might be felt as the response of the tissues palpated during these various positional demands.

1. *Dynamic neutral.* This response to motion is an indication of normal physiological activity. There is minimal signalling during a wide range of motions in all directions. Hoover states it in the following way:

> This is the pure and unadulterated unlesioned (i.e. not dysfunctional) segment, exhibiting a wide range of easy motion demand–response transaction.

2. *Borderline response.* This is an area or segment which gives some signals of some bind fairly early in a few of the normal motion demands. The degree of bind will be minimal and much of the time ease, or dynamic neutral, will be noted. Hoover states that 'most segments act a bit like this', they are neither fully 'well' nor 'sick'.

3. *The lesion response.* Note that the use of the word 'lesion' predates the introduction of the term 'somatic dysfunction' to describe abnormally restricted segments or joints. To update this term we should call this a 'dysfunctional response'. This is where bind is noted almost at the outset of almost all motion demands, with little indication of dynamic neutral.

Hoover suggests that you:

> Try all directions of motion carefully. Try as hard as you can to find a motion demand that doesn't increase bind, but on the contrary, actually decreases bind and introduces a little ease. This is possible. This is an important characteristic of the lesion [dysfunction].

Indeed, he states that the more severe the restriction the easier it will be to find one or more slight motion demands which produce a sense of ease, dynamic neutral, because the contrast between ease and bind will be so marked.

Hoover's summary

Practice is suggested with dysfunctional joints and segments in order to become proficient. Three major ingredients are required for doing this successfully according to Hoover.

1. A focused attention to the process of motion demand and motion response, while whatever is being noted is categorised, as 'normal', 'slightly dysfunctional', 'frankly or severely dysfunctional' and so on.

2. A constant evaluation of the changes in the palpated response to motion in terms of ease and bind, with awareness that this represents increased and decreased levels of signalling and tissue response.

3. An awareness that in order to thoroughly evaluate tissue responses, all possible variations in motion demand are required, which calls for a structured sequence of movement demands. Hoover suggests that these be verbalised (silently):

> Mentally set up a goal of finding ease, induce tentative motion demands until the response of ease and increasing ease is felt, verbalise the motion-demand which gives the response of ease in terms of flexion, extension, side-bending and rotation. Practise this experiment until real skills are developed. You are learning to find the particular ease-response to which the dysfunction is limited.

In addition, depending upon the region being evaluated, the directions of abduction, adduction, translation forwards, translation backwards, translation laterally and medially, translation superiorly and inferiorly, etc., need to be factored into this approach.

Bowles describes the goal

Charles Bowles's words summarise succinctly what is being sought:

> The activity used to test the segment (or joint) is largely endogenous, the observing instrument is highly non-perturbational, and the information gathered is about how well or how poorly our segment (being palpated) of structure is solving its problems.
>
> Should we find a sense of ease and non-distorted following of the structures we diagnose the segment as normal. If we find a sense of binding, tenseness, tissue distortion, a feeling of lagging and complaining in any direction of the action, then we know the segment is having difficulty properly solving its problems.

The diagnosis would be of dysfunction.

The treatment would be functional – by holding a segment, an area, in its position of ease, resolution of dysfunction begins.

The whole key to successful normalisation of dysfunction lies in the finding of the position of dynamic neutral – of ease – and the degree of your palpatory sensitivity is what decides whether this will be achieved or not.

Spinal application of functional technique

In order to practise functional evaluation and treatment of the spine or a joint, an area (of the spine, for example) needs to be identified as being dysfunctional, different, or abnormal as compared with the rest of the spine, using one of the many forms of assessment already described.

The identification of areas of muscle fullness during the seated and standing spinal flexion tests (Ch. 8), or of 'flat' spinal areas, as described in the assessment sequence for tight muscles in Chapter 4, or the previous exercise in this chapter, could all direct you to such a 'different' area, requiring further investigation or normalisation.

Hartman suggests another possibility, after initial suspicion has been alerted:

> Diagnosis of textural abnormality in the tissues is made in the normal way with palpation. A gradient of abnormality can be felt in a particular area and the centre of this area is made a focus.

Hartman suggests light tapping be introduced over the spinous processes and paravertebral musculature to emphasise and localise the area of difference. There will be a variation in the resonance noted which, he suggests, will be subjectively picked up by the patient, and which can guide you to the most central portion of the dysfunctional tissues. (See Special Topic, p. 221)

EXERCISE 7.4

Time suggested
10–15 MINUTES

Evaluate the spine of your patient/model, assessing areas of flatness or fullness as you observe the flexed spine from the side or in front.

Palpate the area and seek out the central site of tissue dysfunction, greatest hypertonia or sensitivity.

Using the flexed fingertips of one hand, tap lightly and steadily on the tissues identified as well as on those surrounding the area. (See Special Topic Fig. 9A, p. 222)

Can you identify a different sound in the most affected tissues?

Once this has been identified, one hand (the listening hand) is placed on these tissues. The patient can be sitting, lying or standing. The other hand is used to introduce motion into the region, passively or with some active cooperation, but only if directed to do so by you.

A sequence of normal physiological motions is introduced to the region and in each instance (in each direction) the palpating hand, on the tense dysfunctional tissues, is feeling for greater ease or greater bind, trying to find a point where a combination of the greatest points of ease (as assessed in all directions of motion – see below) are summated, in order to achieve absolute relaxation of the tissues.

This, says Hartman, is a form of inhibition for the tense tissues, 'in that areas of irritability are quieted, the operator constantly looking for the state of ease and release'.

The movements introduced (sequence is irrelevant) for assessment of ease and bind are:

- Flexion and extension
- Side-bending both ways
- Rotation both ways
- Translation anterior and posterior
- Translation laterally, both ways
- Translation cephalic and caudad (traction and compression).

Followed by:

- Respiration involving both inhalation and exhalation.

Greenman describes the process of achieving the sequentially arrived at point of ease of the first six motions as 'stacking' (the order in which these are applied is not significant; simply it is useful to apply them sequentially so that none are forgotten). This should, however, be followed by the final respiratory screening for the phase of the cycle which produces maximum ease.

After a position of ease has been established, using one of the directions of movement, that position of ease is used as the starting point for the next direction to be assessed for its position of greatest ease. When this is discovered you will have found a combined position of ease for the first two directions of movement used, say side-bending and rotation.

You will have 'stacked' the second onto the first, and from that combined position of ease you would then introduce the next direction for assessment, say translation right and left . . . and so on, until all directions have been evaluated and their positions of ease stacked one onto the other. (Fig. 7.1)

Then the respiratory assessment is introduced, and the final position of ease held for a minute or so before complete re-evaluation of previously identified restrictions.

A sense of a wider range of normal (greater ease) should be felt by the operator as these releases occur.

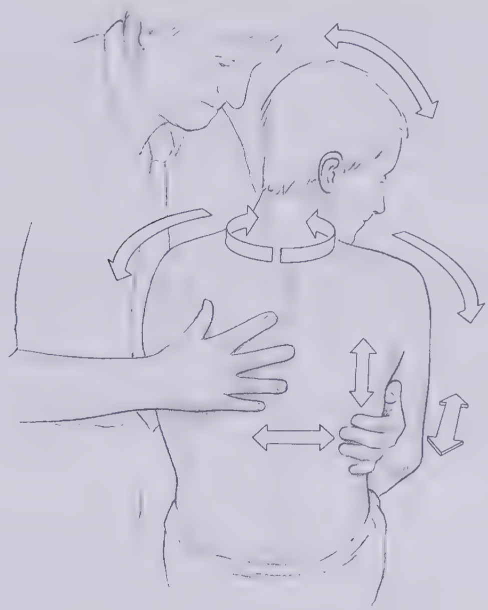

Fig. 7.1 Arrows show directions of movement, as 'ease' and 'bind' are assessed by the 'listening' hand on the spinal tissues during functional evaluation of spinal segments. Movements are:
Flexion–extension
Rotation left and right
Side-bending left and right
Translation to each side
Translation forward and back
Translation up and down (traction and compression).

EXERCISE 7.5

Time suggested
15–20 MINUTES

Greenman describes a sequence of exercises for achievement of 'functional literacy'. The following is a modified summary of his sequence.

Exercise 7.5a

Stand behind and to the side of a seated patient/model whose arms are folded, so that their hands are holding their opposite shoulders. Place a 'listening' hand somewhere on the upper thoracic spine where tissue tightness, fullness, have been identified. Allow the hand to be very still. Wait until it feels 'nothing' (no movement).

The other hand ('motor' hand) should be placed on the patient's head, which it leads through specific motions such as flexion and extension (very slowly performed, without jerking).

The palpating hand tries to identify tissue changes in terms of increased ease or increased bind.

Keep repeating flexion, back to neutral, flexion, back to neutral, noting where the point of maximum ease is. Then introduce slow repetitive backward bending of the head as you palpate for ease.

Is the ease greater with the head flexed or extended?

Exercise 7.5b

Return to neutral and introduce side-bending right and rotation to the left, of the head and neck on the trunk, several times (back to neutral after each excursion) and then side-bending left and rotation to the right of the neck and head on the trunk, all the while palpating the dysfunctional area or area being assessed for alterations in ease or bind characteristics.

In which parts of the movement process do the tissues relax or become more tense?

Find the point – somewhere between extreme side-bending left, rotation right and side-bending right, rotation left – in which the palpated tissues feel at their most relaxed.

Is there a symmetrical range of ease and bind to both sides?

Where in this combination movement is there the most ease in any given direction?

Exercise 7.5c

Go back to neutral and introduce, and try to combine, the following movements as you palpate for ease and bind: small amount of forward bending, accompanied by right side-bending and right rotation, of the head and neck on the trunk; follow this with slight flexion, side-bending left and rotation, of the head and neck on the trunk to the left.

Palpate constantly for ease in the thoracic segment under your listening hand. Evaluate the symmetry of the findings.

Was ease/bind found at the same place left and right?

COMMENT

Greenman suggests that similar palpation exercises be performed in various regions of the spine.

In each case what you are looking for in normal tissue, or where there is only minimal dysfunction, is a wide range of motion accompanied by minimal signalling (i.e. most of the tissue being palpated is in relative ease).

Where significant degrees of dysfunction exist there will be narrow ranges of position which produce signals of ease or decreased bind. Experience is the only teacher as to what is and what is not significant clinically.

Johnson's views on the barrier

Johnson explains the terms direct and indirect as follows:

> When the incremental aspects of these cues [directions of motion restriction] are appreciated as an immediately increasing resistance towards a sense of barrier in one direction, and an immediate increasing ease towards a sense of potential release in the opposite direction, then the terms direct [towards the sense of resistance] and indirect [away from the sense of resistance] offer a classification of osteopathic manipulative procedures, based on diagnosed asymmetry, to be addressed.

It is easy to move from such a diagnostic assessment into active treatment.

His summary of the planning and criteria involved in a functional approach to treatment can be expressed as follows:

- It is necessary to introduce motion in any one direction at a time which involves minimal force.

- Motion direction is towards a sense of increasing ease which is manifested by a lessening in the sense of resistance to pressure from the palpating fingers.
- Combinations of direction elements are combined, such as rotation and translation, producing variations in torsion.
- Active respiration is also monitored for its influence on ease.
- The examiner follows the continuous flow of information, signalling increasing ease/decreasing resistance during all procedures.

EXERCISE 7.6

Time suggested 20 MINUTES

Note that this is more or less the same exercise as 7.5 with the difference that you first practise it on a dysfunctional segment and then a normal one.

Exercise 7.6a

The model/patient is seated, you stand behind and to one side, palpating a previously identified area of dysfunction in the thoracic spine.

Adopt a contact where the patient has their arms folded and you embrace the shoulder furthest from you with one hand, drawing the opposite shoulder into your axilla, so that you have the ability to control the various directions of motion.

Sequentially introduce the elements of forward bending followed by backward bending, left side-bending, right side-bending, rotation left, rotation right, then a combination of side-bending in one direction with rotation to that side during flexion and then extension.

Then introduce side-bending in the other direction with rotation to the opposite side during flexion and then extension. Add to positions of 'maximum ease' thus discovered, elements such as translation anterior and posterior, translation from side to side, and translation cephalad and caudad, in order to discover where the maximum point of ease occurs.

Can you sense ease and bind?

Can you find a 'most easy' position, by combining elements of these motions?

Maintain the final position of ease and after a minute return the area to neutral.

Re-evaluate the positions of ease.

Have they changed?

Exercise 7.6b

Perform exactly the same sequence on a segment lower down the spine which does not display evidence of dysfunction.

Compare your findings of range and position of ease and bind with the previous exercise.

EXERCISE 7.7

Time suggested 20–30 MINUTES

Exercise 7.7a

Repeat all the components of Exercise 7.6a but now introducing long-held (as long as is tolerable to the patient) breath, in both inhalation and exhalation, in each of those positions in which maximum ease was palpated.

Is there any additional release (or increase) of resistance during or after either phases of held breath?

The secret of this approach is learning to apply all specific directions of motion which enhance ease, along with the respiratory component which produces maximum ease.

Exercise 7.7b

Repeat the sequence of Exercise 7.6a but this time identify the most extreme positions of bind, so that you can eventually engage the restriction barrier (exactly the opposite from what you were doing in 7.6 and 7.7).

In this position (whatever combination of sequence has led to maximal bind), have the patient gently try to return to the starting position (normal) against your resistance for a 10-second hold.

Retest the area of dysfunction after this and see whether you have increased the range, pushed back the barrier, increased ease?

This is a muscle energy procedure in which an isometric contraction of the tight soft tissues has allowed an increase in their elasticity after the contraction.

Which approach appeals to you most, seeking ease, or obliging the barrier to retreat after engaging it?

Hoover's clavicle 'experiment'

The developer of functional technique, H. V. Hoover, explained the essence of this approach in the words of the founder of osteopathy, Andrew Taylor Still: 'I am doing what the body tells me to do.'

He asks the beginner to perform the following three 'experiments', here grouped together in Exercise 7.8.

In each case a question is posed, the answer to each being 'yes'.

Your answers will tell you whether you are ready to use this method – whether you have achieved palpatory literacy.

EXERCISE 7.8

Time suggested
20–30 MINUTES

Exercise 7.8a

1. Does the clavicle move in a definite and predictable manner when demands are made upon it by definite movements of an adjacent part?

Standing facing the seated patient, place the pads of the (relaxed) fingers of your right hand, lightly over the right clavicle, just feeling the skin overlaying it. This hand is the listening hand. It is there to listen to what happens.

With your left hand, hold the right arm just below the elbow (this is your motor, or moving hand). The patient must be relaxed, passive and cooperative, not helping or hindering the introduction of movements by your hand. The feeling hand should barely touch the skin, no pressure, at all being applied to the clavicle.

Raise and lower the arm slowly several times until you are certain that there is no shoulder movement, that you have the weight of the arm without assistance from the patient. Now the exercise proper begins.

Slowly take the arm backwards from the midline just far enough to sense a change in the tissues under the palpating hand. Do not move quickly or wiggle or jerk the arm, so that the sensations being felt by that hand are accurately perceived.

Repeat this several times, slowly, so that you become aware of the effect of a single, simple, movement (remember the question you have been asked).

Now take the arm forward of the midline and again assess the effect on the palpated tissues (clavicle and surrounding tissue). Abduct and then adduct the arm, rotate the arm outwards and subsequently inwards, each time slowly and if necessary repeatedly, noting the tissue response to that single direction of movement.

What response was noted to single physiological movements?

Exercise 7.8b

2. Are there differences in ease of motion and feeling of tissues of this clavicle when it is caused to move in different physiological motions?

Follow the same starting procedure until the exercise proper begins. Move the patient's arm backwards into extension very slowly as you palpate the changes in the tissues around the clavicle. Compare the feeling of the tissues as you take the arm into flexion, bringing it forwards. Now compare the feelings in the receiving hand as you abduct and then adduct the arm, slowly, deliberately, gently.

Compare the tissue changes as you first internally and then externally rotate the arm.

Did there appear to be directions of motion which produced altered feelings of ease in the tissues?

Exercise 7.8c

3. Can the differences of ease of motion and tissue texture be altered by moving the clavicle in certain ways?

Repeat the introductory steps up until the exercise proper begins. Flex the patient's arm, bringing it forward of the midline, slowly and gently until you note the clavicle moving or the tissue texture under the palpating hand changing. Stop at that point.

Now extend the arm backwards from the midline, slowly and gently until you note the clavicle moving or the tissue texture under the palpating hand changing. Stop at that point. Find a balance between these two states, a point of balance from which movement in any direction causes the clavicle to move along with a change in tissue texture. Hold this point of physiological balance, which Hoover calls neutral.

Starting from this balanced point you should next find the point of balance between adduction and abduction. Again starting from the point of balance (between flexion and extension as well as adduction and abduction), you move on to find the point of balance between internal and external rotation. You have now achieved a state of reciprocal balance between the arm and the clavicle. From here Hoover leads you to another important finding.

Exercise 7.8d

With the arm and clavicle in reciprocal balance, as at the end of 7.8c above, see whether you can move through the six physiological motions to see which of these, singly, gives a sensation of improving tissue texture compared with the other physiological motions. One of the directions may be found which does not increase bind, or increases ease, more than the others. Having found this motion, slowly and gently continue to repeat it for as long as the sensory hand continues to report that tissue conditions, motion of the clavicle, are gaining in ease.

Should bind begin to be noted as this is done, Hoover suggests that the various directions of motion are rechecked, to find that which introduces the most ease. If none do, then stop at this point, noting what it is that you have been feeling. If a further direction of motion producing ease is found, this is repeated until bind seems to occur again. Repeat the retesting procedure of various directions of motion.

Hoover says:

> This process of finding the easy physiological motion and following it until bind starts and then rechecking may go on through two or more processes until a state of equilibrium is found from which tissue texture indicates ease *in all physiological motion.*

Exercise 7.8e

In order to perform this final part of Hoover's experiment, the untreated, opposite clavicle should be taken through stages 7.8a, b and c.

At this point, having reached a reciprocal balance between arm and clavicle, reliance is placed on the tissues to 'tell' you what movements are required by it to achieve maximum ease.

The operator relaxes and becomes entirely passive as her sensory or listening hand detects any change in the clavicle and its surrounding tissues.

A change in the clavicle and its surrounding tissues, if felt, by the sensory hand, sends the information to the reflex centres which relay an order to the motor hand to move the arm in a manner so as to maintain the reciprocal balance, or neutral.

If this is the proper move there will be a feeling of increasing ease of motion and improved tissue texture. This process continues through one or more motions until the state of maximum ease or quiet is attained.

This is, of course, very much the objective Upledger seeks in fascial unwinding methods as discussed in Chapter 5.

This method can be employed, with the addition of translation motions, for any extremity or spinal joint, as a means of identifying directions of ease and bind. The choice then remains yours, whether to use functional or active approaches in restoring normality (as in the two methods described in Exercise 7.7).

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Joint play/'end-feel'/range of motion: what are they?

Joint play refers to the particular movements between bones associated with either separation of the surfaces (as in traction), or parallel movement of joint surfaces (also known as translation or translatoric gliding).

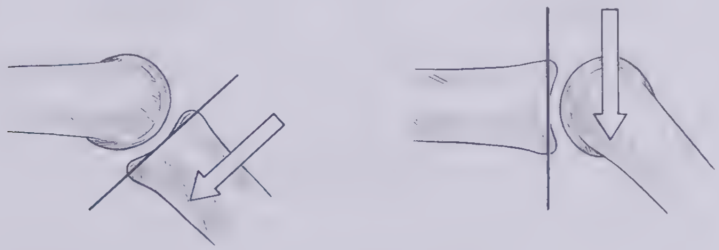
Some degree of movement is possible between most joints, restricted only by the degree of soft tissue elasticity. Any change in length of such soft tissues, therefore, automatically alters the range of joint mobility – also known as the degree of 'slack' – which is available.

In applying traction to a joint (at right angles to the joint surface) a slight separation, merely removing the intrinsic compressive force of surrounding tissues, is known as a Grade I degree of traction. When the 'slack' is removed by further separation, tightening the surrounding tissues, this is a Grade II degree of traction. This increases to a Grade III when actual stretch of the tissues is introduced.

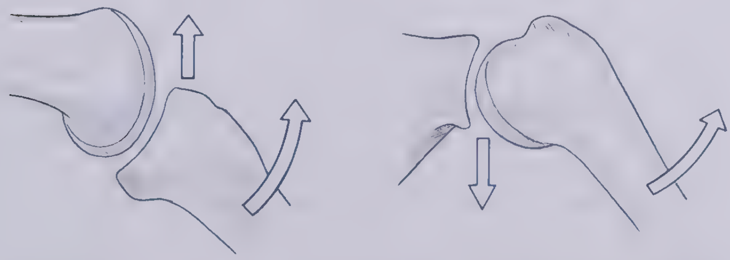
When a gliding translation between joint surfaces occurs, this takes place with the surfaces parallel to each other (also called 'rollgliding'). (Special Topic Fig. 8A) Only a portion of the joint will be able to move parallel with its opposing surface in this way, at any time, since the surfaces are not flat, only one part being parallel at any moment (due to the surfaces being incongruent).

A Grade I glide involves slack being taken up and a degree of tightening of the soft tissues. Grade II involves actual stretching of these as translation continues.

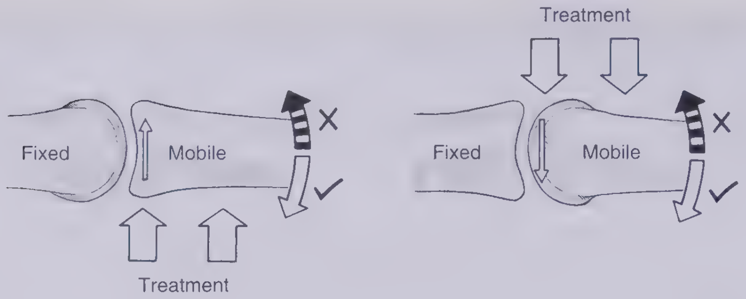
An important rule relating to whether the joint surface is concave or convex is described by Professor Freddy Kaltenborn (1985). This states that if a concave surface moves in relation to another surface, then the direction of gliding and the direction of the movement of the bone are in the same direction. This means that the moving bone and the concave surface of the joint are on the same side as the axis of motion. (Special Topic Fig. 8B)



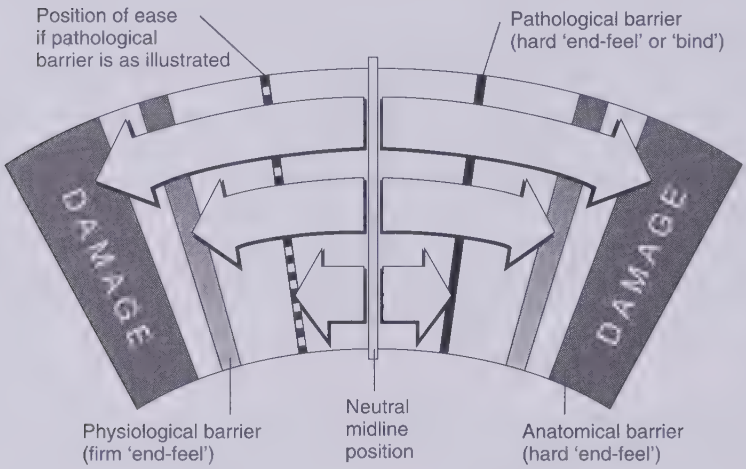
Special Topic Fig. 8A Parallel displacement of a bone involving translatoric gliding (after Kaltenborn). One bone is moved parallel to the treatment plane until the tissues surrounding the joint are tightened (grade II) or the tissues crossing the joint are stretched (grade III).



Special Topic Fig. 8B The direction of gliding in a joint depends upon whether the surface on which movement is occurring is concave or convex. If concave gliding occurs it is in the same direction as the bone movement (left) while convex gliding occurs in the opposite direction to the movement of the bone (right).



Special Topic Fig. 8C This figure illustrates the 'convex-concave rule' in which a mobile bone moves on a fixed structure. In the left hand example the joint surface is concave (as would be the case in the tibia, ulna or a phalangeal joint). If the mobile bone was restricted in an upward direction (striped arrow) the direction in which a gliding mobilisation would be made during treatment would also be in an upward direction (as indicated by the two large arrows).
In the right hand example there is a mobile bone associated with a convex surface (as in the head of the humerus, the femur or the talus). If this were restricted in an upward direction (striped arrow) the direction in which a gliding mobilisation would be made in treatment would be in a downward direction (large arrows).



Special Topic Fig. 8D Schematic representation of a range of motion indicating normal restriction barriers (anatomical and physiological) as well as a pathological barrier and a position of maximal ease. The quality of the 'end-feel' of each of these positions will vary markedly.

However, when a convex joint surface is in a gliding motion the bone movement will be in the opposite direction to the glide. This means that the moving surface and the bone lie on opposite sides of the axis of rotation. Thus, when there is a joint restriction, ascertained by careful assessment of joint play (i.e. gliding) it is essential to know the relative shape of the articulation.

In the case of a convex joint surface (for example head of humerus) the bone will need to be moved by the therapist in a direction opposite to the direction of restricted bone motion in order to increase improved range of motion in the joint.

In the case of a concave joint surface (for example, proximal head of ulna) the bone will need to be moved in the same direction as the direction of restriction of bone movement in order to improve range of motion in the joint. (Special Topic Fig. 8C)

All joints have a 'normal' range of motion, and guidelines as to these are found in Chapter 8 (p. 181). Palpation should involve a screening of these for abnormal restriction or hypermobility.

The end of a range of motion of a joint may be described as having a certain feel and this is called 'end-feel'. If a joint is taken actively or passively to its maximum range of normal motion it reaches its *physiological barrier*. This has a firm but not harsh end-feel.

If this is taken to its absolute limit, the *anatomical barrier* is engaged, and this has a hard end-feel, beyond which any movement would produce damage.

If there is, for any reason, a restriction in the range of motion then a *pathological barrier* would be apparent on active or passive movement in that direction.

If the reason for the restriction involved interosseous changes (arthritis for example) the end-feel would be sudden, or hard. However, if the restriction involved soft tissue dysfunction the end-feel would have a softer nature. (Special Topic Fig. 8D)

Kaltenborn summarises end-feel variations thus:

- Normal soft end-feel is due to soft tissue approximation (such as in knee flexion) or soft tissue stretching (as in ankle dorsiflexion).
- Normal firm end-feel results from capsular or ligamentous stretching (internal rotation of the femur for example).
- Normal hard end-feel occurs when bone meets bone as in elbow extension.

However, pathological end-feel can involve a number of variations such as:

- A firmer, less elastic feel when scar tissue restricts movement or when shortened connective tissue exists.
- An elastic, less soft end-feel when increased muscle tonus restricts movement.
- An empty end-feel is one in which the patient stops the movement (or asks for it to be stopped) before a true end-feel is reached, as a result of extreme pain (fracture or active inflammation) or psychogenic factors.

Hypermobile joints

Ligaments and muscles which are hypermobile do not adequately protect joints and therefore fail to prevent excessive ranges of motion from being explored. Without this stability, overuse and injury stresses evolve and muscular overuse is inevitable.

Janda (1984) observes that in his experience:

> In races in which hypermobility is common there is a prevalence of muscular and tendon pain, whereas typical back pain or sciatica are rare.

Logically, the excessive work rate of muscles which are adopting the role of 'pseudoligaments' leads to tendon stress and muscle dysfunction, increasing tone in the antagonists of whatever is already weakened and complicating an already complex set of imbalances including altered patterns of movement (Beighton et al 1983).

What to do with barriers when you find them

One objective of palpation of restrictions is to establish the degree of limitation by establishing the range of motion in various directions. Another is the assessing of the nature of those restrictions through, among other factors, determination of the softness or hardness of the end-feel. Some manipulative techniques involve engaging the pathological barrier before a variety of methods are employed to increase the range of motion; pushing the barrier back, so to speak.

This can involve the use of isometric contractions of the agonist (shortened muscle or group of muscles) of their antagonists, as in muscle energy technique, or it might involve active adjustment/manipulation as in chiropractic or osteopathic treatment. It might also involve mobilisation using long leverage or use of joint play techniques.

A different approach would be to move towards the direction opposite the direction of restriction, going away from the barrier, as in functional osteopathic techniques such as strain/counterstrain.

Whichever approach is used, there remains the importance of knowing how to 'feel' the end of range of motion in any direction, without provoking sensitive tissues further. Practising on normal tissues and joints makes recognition of restricted ones simpler.

Kaltenborn states:

> The ability to see and feel the quality of movement is of special significance in manual therapy, as slight alterations from the normal may often be the only clue to a correct diagnosis.

If pain occurs anywhere in a range of movement (active or passive) which is preceded and followed by pain-free motion, the range in which the pain is noted is called a *painful arc*.

Deviations of normal pathways during such a painful arc indicate avoidance strategies and are important diagnostically. As a rule, *active movements* test all anatomical structures as well as the psychological willingness of the patient to move the area.

Passive movements test only non-contractile tissues with such movements being compared with accepted norms as well as the corresponding opposite joint. End-feel, painful arcs, shortened muscles, restricted or exaggerated joint function, are all assessed this way. As a general rule, a greater degree of motion is achieved passively than actively.

Many of the exercises in Chapter 8 will provide the opportunity for you to refine your skills in 'reading' end-feel.

REFERENCES

Beighton P et al 1983 Hypermobility of joints. Springer Verlag, Berlin
Janda V 1984 Low back pain – trends, controversies. Presentation, Turku, Finland 3–4 September 1984
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8 Palpation and assessment of spine and pelvis

The assessment of the functional integrity, or otherwise, of joints has been exhaustively covered in many osteopathic, orthopaedic and chiropractic textbooks over the past half century or more. The intent in this chapter is not to duplicate such information but rather to summarise some of the most important elements of joint palpation, together with the provision of guides as to what some 'normal' ranges of motion might be expected to be.

In addition, some novel, sequential, approaches will be covered.

Any serious student of joint palpation will need to seek elsewhere for more comprehensive descriptions.

Observe, palpate, actively and passively test

Dysfunction of joints can be demonstrated in three different ways, all of which form part of a comprehensive assessment of the musculoskeletal system: observation, palpation and testing of function (which is itself separated into active and passive movements).

We have already seen (Chs 4 and 5) that there exist useful sequential screening patterns for uncovering evidence of shortened muscles (postural muscle screening) or changes within those muscles (NMT assessment, Nimmo's method, etc). Mitchell, Moran and Pruzo (1979) provide further useful guidance for practitioners wishing to find succinct methods for eliciting information as to where to focus attention, or where more detailed examination is required.

Such an approach is necessary, since it is patently impossible during any normal consultation examination to cover each and every muscle, joint and test.

As Mitchell puts it, 'The purpose ... is to identify a body region, or body regions, which deserve(s) more detailed evaluation.'

The following process of evaluation contains elements of the methods suggested by Mitchell, Moran and Pruzo, with many other researcher's ideas also being incorporated.

NOTES

Each of the segments numbered below can be considered to be an individual exercise for anyone developing and practising the palpation and observational skills necessary for enhancing their ability to evaluate the mechanical and functional integrity of the musculoskeletal system.

As expertise and confidence is gained in the application of the skills described in each individual exercise below, the sequence should be combined with others, so that what emerges is a comprehensive evaluation process.

Note that not all joints, or functions of joints, are covered since this book is not meant to provide detailed instruction in structural and functional analysis, but rather to enhance the skills needed to do so.

EXERCISE 8.1

Time suggested
10–12 MINUTES (REDUCING TO 3–5)

Observe the patient/model walking, slowly and briskly.

Look for:

- Normal and equal length of stride
- Good weight transfer from heel to lateral foot to metatarsal joints, with a push off from the big toe
- External or internal rotation of the legs
- Normal flexion and extension of hips, knees and ankles.

Pay particular attention to the presence, or otherwise, of a well developed arch during mid stride on the weight-bearing foot.

Normal gait should involve:

- Weight being placed evenly on each foot
- Pelvis virtually horizontal, with a slight sway being normal (more so in women)
- The spinal column curves, when observed from behind, should move from side to side, in a wave-like manner, with the greatest range in the mid-lumbar area
- The thoracolumbar junction should remain above the sacrum at all times (see notes on long leg/short leg later in this chapter, p. 207)
- A swing of the arms should come from the shoulder with little head motion
- Asymmetry of arm position
- The upper shoulder fixators should appear relaxed.

Look for:

- Asymmetrical patterns, stiffness and any tendency to rock or limp
- Symmetrical levels of knees and malleoli
- Morphological asymmetries – scars, bruises, etc.

Lewit (1992) suggests listening to the sounds made as the patient walks. He also points out that, 'certain faults become more marked if the patient closes her eyes, walks on tiptoe or on the heels, and these should be examined as required.'

Always ask patients to adopt their typical work posture/position as part of the evaluation.

Try to read any body language which hints at unresolved or somatised emotional issues – inhibited/withdrawn, extrovert, 'military', depressed or other stereotypical postures.

Record all findings.

EXERCISE 8.2

Time suggested
10–12 MINUTES (REDUCING TO 3–5)

Posture should then be viewed from behind, attention being given to:

- Head balance (are ear lobes at the same height?)
- Neck and shoulder symmetry
- Levels of scapulae
- Any lateral spine curves

- The distance the arms hang from the side of the body
- The levels of the folds at waist level (are they symmetrical?)
- Gluteal folds (are they the same height from the floor?)
- Morphological changes.

The side view is examined for:

- Normality of anteroposterior spinal curves
- Head position relative to the body
- Abdominal ptosis
- Winging of the scapulae
- The angle of the feet
- Morphological changes.

Record and chart all findings.

EXERCISE 8.3

Time suggested
10–12 MINUTES (REDUCING TO 3–5)

The patient/model is observed from the front and the following are observed and recorded:

Symmetry or otherwise of:

- Stance (foot placement)
- Patella height
- Intercostal angle
- Clavicles.

The side view is then evaluated.

Is the head/centre of gravity over the body, or forward or backwards of it?

The patient is asked to bend backwards. Range should be around 35° with a sharp bend at the lumbosacral junction or at the thoracolumbar junction (in cases of increased mobility).

Anteflexion has a normal range of around 60° when the knees are extended. Hamstring shortness affects this test; thus, seated anteflexion is a more accurate assessment of lumbar flexibility.

Side-bending, with strict care that no ante- or retroflexion accompanies this, should achieve a range of 20° to each side.

Assessment of this range can involve (sighting from behind) evaluation of the shift achieved by the axilla, on the side away from which the patient is bending, as it comes to the end of the range of side-bending. The axilla can shift as far as a point beyond the lateral aspect of the buttock on the side to which the bend is taking place, or more normally, to being above that buttock. A restricted excursion would be to a point above the intergluteal line (midline).

Note that hypermobility of the lumbar spine is, according to Lewit, indicated most strongly by hyperlordosis when standing relaxed, together with exaggerated lumbar kyphosis when sitting relaxed.

Record all findings.

EXERCISE 8.4

Time suggested
2–4 MINUTES

The barefoot patient/model stands erect with back to you (your eyes at level of iliac crests), their feet should be apart, ankles directly below the hip sockets (heels 10–15 cm apart), toes pointing straight ahead. Place your hands laterally, inferior to iliac crests and push in a superior-medial direction until the index fingers rest on the crest.

If your fingers are level, there is no anatomical leg length difference. If there is a difference (and there is no iliac rotation or spinal scoliosis), then an anatomical leg length difference can be assumed (see also, later in this chapter, the detailed segment on leg length discrepancy, p. 207).

A slim book should be used to equalise leg length until symmetry is achieved so that the following tests (below) can be performed.

Is there an anatomical leg length difference?

Can you balance the iliac crest heights by 'building up' the short leg?

EXERCISE 8.5

Time suggested
2–3 MINUTES

Assessment of the posterior superior iliac spine (PSIS) position is achieved by palpating on or just below the sacral dimples for osseous prominences. These are palpated for symmetry.

Is one anterior or posterior in relation to the other?

If one PSIS is anterior to the other, then either the external rotators on that side (iliopsoas, quadratus femoris, gemellus (superior and inferior) and obturator (internal and external, if the hip is not flexed; piriformis if the hip is flexed), or the internal rotators on the other side (gluteus medius and minimus and hamstrings, if the hip is not flexed, and adductor magnus and hamstrings, if it is flexed), are short.

Posterior displacement indicates precisely the opposite pattern of shortening.

Is one PSIS superior or inferior to the other as you palpate? Inferior displacement may involve short hamstrings, iliac or pubic dysfunction.

At this stage, simply record whether one PSIS is anterior or posterior in relation to the other, and whether either PSIS appears superior or inferior, compared with the other.

EXERCISE 8.6

Time suggested
3 MINUTES

Standing flexion test. With thumbs placed firmly on the inferior slopes of PSIS, patient/model should be standing as in Exercise 8.4 above (iliac crests having been levelled by placing a slim book under the short leg if asymmetry was discovered).

The patient keeps his knees extended as he bends forwards towards the toes, while your contact thumbs retain their positions on the same tissues overlying the PSIS.

Is there movement of your thumbs?

Assess the thumb which moves most as the patient bends forwards. Any obvious movement of either thumb takes place if the ilium has become 'fixed' to the sacrum during flexion, indicating iliosacral dysfunction (restriction) on that side.

The standing flexion test indicates iliosacral status because the muscular influences from the lower extremity determine iliac relationships with the sacrum when standing. This influence disappears when the patient is seated (see Exercise 8.8 below) at which time a positive test indicates sacroiliac dysfunction (i.e. if asymmetry of PSIS movement occurs during flexion as evidenced by thumb movement).

Did your thumbs move symmetrically during flexion, or not at all? Which iliosacral joint, if any, is dysfunctional?

Fig. 8.1 Standing flexion test for iliosacral dysfunction. The restricted side is the one on which the thumb moves during flexion.

EXERCISE 8.7

Time suggested
3–5 MINUTES

While the patient/model stands fully flexed you should move to a position so that the spine may be viewed from directly in front (looking down the spine), for paravertebral (erector spinae) symmetry, and evidence of greater 'fullness' on one side. Note what is found for comparison with subsequent evidence noted when the patient is seated (Exercise 8.9).

Compare also with your findings from tests for tight postural muscles (Ch. 4) relating to quadratus lumborum and iliopsoas; repeat these tests now if necessary.

Mitchell suggests that:

- If there is greater paravertebral fullness on one side of the spine this is evidence of a degree of rotoscoliosis (transverse processes would be posterior on the side of greater fullness) and that if this is more evident in standing flexion than seated flexion, muscular tightness/shortness (postural muscles of the leg/pelvis) are probably a primary factor, with the rotoscoliosis a compensatory feature.
- If, however, seated flexion displays greater paraspinal fullness, then rotoscoliosis is probably primary, with pelvic imbalance and postural muscle shortness being compensatory.
- If the evidence of fullness on one side is the same seated and standing, then rotoscoliosis is primary with no leg muscle compensation.

Is there increased 'fullness' in the paraspinal muscles during flexion?

If so, what does it relate to, according to Mitchell's guidelines, described above?

EXERCISE 8.8

Time suggested
2–3 MINUTES

The seated flexion test evaluates sacroiliac dysfunction and adds to evidence relating to erector spinae tightness.

The patient/model is seated on a low, firm surface, legs wide apart, hands behind neck. You should be behind, eyes at level of PSIS while your thumbs palpate inferior aspect of PSIS, on both sides. (Fig. 8.2)

The patient goes into a slow forward bend, as far as possible.

While sitting, the ischia are locked, making any motion between the sacrum and the ilia dependent on sacral freedom. This therefore helps to isolate sacroiliac dysfunction.

The thumbs should be stable or be 'dragged' upwards to an equal slight degree if there is no restriction.

If one thumb (on the PSIS) travels more superiorly than the other, it indicates that there is a restriction of the sacroiliac articulation, on that side. Further tests (not described here) are needed to determine whether torsion or flexion of the sacrum are involved.

Did the PSIS (and your thumb) move more on one side than the other?

Is there a sacroiliac lesion, and if so, on which side?

Fig. 8.2 Seated flexion test for sacroiliac dysfunction. The restricted side is the one on which the thumb moves during flexion.

EXERCISE 8.9

Time suggested
2–3 MINUTES

In this same position the fullness of the paravertebral muscles are again observed as you move to the front of the patient, with findings being interpreted as described in Exercise 8.7 above (rotoscoliosis and so on).

If fullness is more apparent on one side during seated flexion, and there is no appreciable degree of rotoscoliosis, suspect quadratus lumborum shortening on that side. This can produce a pelvic tilt as well as interfering with respiration (through its influence on both 12th rib or diaphragm with which it merges).

Direct palpation of the lateral border of quadratus can give evidence of spasm or asymmetrical tightness, or of trigger point activity above the iliac crest.

Is there asymmetry in the paraspinal muscles during this test?

If so, how do you interpret it?

EXERCISE 8.10

Time suggested
3–5 MINUTES

Dr C. Downing (1935) describes a sacroiliac test which might usefully be compared with, or added to the seated flexion test as a source of information:

> The patient is asked to lie on the back and SI joint mobility as evidenced by changes in leg length is tested, first by flexing and externally rotating one leg and flexing and internally rotating the other leg, and then reversing the procedure. Normally, the external rotation manoeuvre should cause an apparent lengthening of the leg, and the internal rotation manoeuvre an apparent shortening. Restriction in motion in the SI joints should be suspected if there is alteration in this motion pattern.

Why should these alterations in length occur?

Dr I. Rumney (1967) elaborates on these findings:

> A backwards rotation of the ilium foreshortens the acetabular position in relation to the long axis of the leg. A forward rotation of the ilium forelengthens the acetabular position in relation to the long axis of the leg.

Does the test as described above confirm your findings made in the standing flexion test?

EXERCISE 8.11

Time suggested
15 MINUTES

It is important in evaluating the evidence from the tests described so far in this chapter that comparison be made with evidence of postural muscle tightness (Ch. 4). Mitchell gives the example of unilateral hamstring tightness preventing iliac motion and presenting a false positive test result on the opposite side; or of a bilateral hamstring tightness preventing a true assessment of PSIS excursion from taking place, resulting in false negative findings in the standing flexion test as described.

Therefore, at this stage, all muscles relating to pelvic function should be tested for length/shortness (and says Mitchell, strength) as described in Chapter 4.

Is there hamstring shortness?

On one or both sides?

What do tests for shortness of adductors, piriformis, tensor fascia lata, rectus femoris and psoas show?

EXERCISE 8.12

Time suggested
2–3 MINUTES ON EACH SIDE

You should now perform the F–AB–ER–E test, so called because it simultaneously assesses flexion–abduction–external rotation–extension, of the hip, in that sequence.

This test pinpoints hip pathology but also adds information which might be useful in pelvic dysfunction.

The patient/model lies supine, you stand on the side of the table closest to the leg being tested. The patient flexes the hip, allowing external rotation so that the foot of that leg rests just above the opposite knee. The knee on the tested leg is allowed to drop towards the table. It should reach a position where the lower leg is horizontal with the table.

If this is not possible, carefully try to take it to that position by depressing the knee towards the floor.

Compare the range with the other side. If there is pain in the hip as the knee drops (or is taken) towards the floor, there is probably hip pathology.

Is there any hip dysfunction, evidenced by this test in your patient (model)?

EXERCISE 8.13

Time suggested
3–4 MINUTES

Mitchell and his colleagues also suggest other assessments be made of this region, such as the test for pubic tubercle height.

This involves palpating the superior pubic crest with two index fingers (resting on the tubercles), patient supine.

Deep palpation of the bony prominence of the tubercles allows assessment as to whether one side is more cephalad or caudad than the other.

If they are level there is no problem.

If one is more cephalad it is only possible to discover which side is in lesion by referring to the standing flexion test (Exercise 8.6 above). The side of lesion is shown by relative motion of the palpated PSIS (thumb) in that test.

Does one side of the pubis palpate as being nearer the head than the other?

If so, is that side superior or is the other side inferior?

To find out, you must refer back to the standing flexion test.

If that showed an iliosacral lesion on one side, then that side of the pubis is the side that is dysfunctional.

EXERCISE 8.14

Time suggested
3–4 MINUTES

Assessment of ischial tuberosity height. Place the heels of your hands over the ischial tuberosities of the prone patient, with contact from the inferior gluteal folds directed towards the head. The most inferior aspect of the tuberosities is located with the thumbs, and the relative height is assessed with eyes directly above them.

If they are level there is no dysfunction. If one side is more superior than the other, it is presumed to involve a superior subluxation on that side.

This is confirmed by assessment of the sacrotuberous ligaments. To test these, the thumbs now slide in a medial and superior direction (towards the coccyx) bilaterally, until they meet the resistance of the sacrotuberous ligament.

If there is a superior ischial subluxation/dysfunction, the ligament on that side will palpate as being slack compared with its pair.

Are the ischial tuberosities level?

If not, which is superior?

EXERCISE 8.15

Time suggested
3–4 MINUTES

Apparent ('functional') short leg assessment. This is described in more detail later in this chapter. At this stage compare the levels of the internal malleoli, with the patient supine (where a short leg is likely to be due to iliosacral and pubic lesions), and prone (where a short leg is likely to be due to sacroiliac or lumbar lesions).

Is there an apparent short leg?

If so, is this due to iliosacral or sacroiliac problems?

EXERCISE 8.16

Time suggested
5 MINUTES EACH (8.16A AND 8.16B)

Tests of ASIS positions indicate iliac rotation dysfunction and iliac flare patterns.

Exercise 8.16a

The patient/model lies supine and straight. Locate and palpate the inferior slopes of the anterior superior iliac spines (ASIS) with your thumbs and view from directly above the pelvis with your dominant eye (see Special Topic 2 on eye dominance) in order to compare the levels for superior/inferior asymmetry.

If the ASIS are level there is no imbalance.

INTERPRETATION

If one ASIS is more superior than the other it could indicate a posterior iliac restriction on that side, or an anterior iliac restriction on the other side. (Fig. 8.3)

This is differentiated by comparison with the results of the standing flexion test (Exercise 8.6 above).

For example, if the flexion test revealed a left side iliosacral lesion, and the ASIS test showed left side superior this would indicate that there was a left side, posterior, iliac restriction.

Fig. 8.3 Operator adopts a position offering a birds-eye view of ASIS prominences on which rest the thumbs.

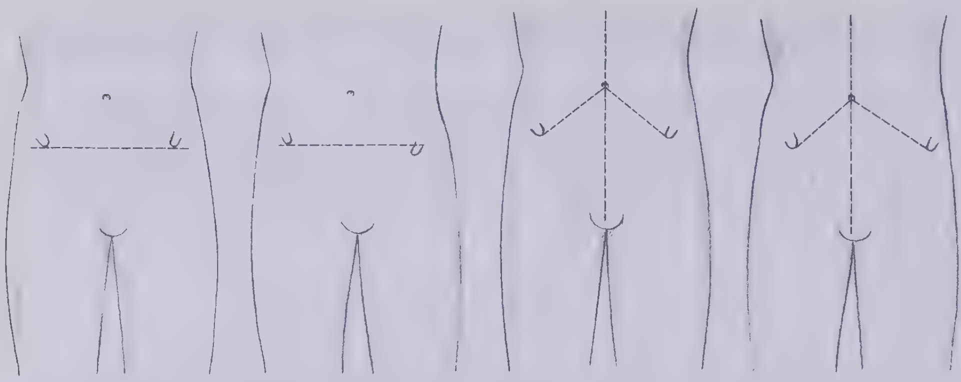

Fig. 8.4A The ASISs are level and there is no rotational dysfunction involving the iliosacral joints.

Fig. 8.4B The right ASIS is higher than the left ASIS. If a thumb 'travelled' on the right side during the standing flexion test this would represent a posterior right iliosacral rotation dysfunction. If a thumb 'travelled' on the left side during the test this would represent an anterior left iliosacral rotation dysfunction.

Fig. 8.4C The ASISs are equidistant from the umbilicus and the midline, and there is no iliosacral flare dysfunction.

Fig. 8.4D The ASIS on the right is closer to the umbilicus/midline which indicates that either there is a right side iliosacral inflare (if the right thumb moved during the standing flexion test), or there is a left side iliosacral outflare (if the left thumb moved during the standing flexion test).

Conversely, if there was a right side lesion indicated by the flexion test, and the left side were superior in this ASIS assessment, it would indicate that this was due to a right anterior iliac lesion.

Spend a little time (draw a sketch, or examine the patient) working out why this is so, if it appears confusing.

Is one ASIS more superior than the other?

If so, does it relate to a posterior iliac lesion on that side, or to an anterior iliac lesion on the other side? (Fig. 8.4)

Exercise 8.16b

Now palpate, and place your thumbs on, the medial slopes of ASIS, with eyes above and directly over the midline. Compare the distances from the umbilicus (if scars make this unreliable use xyphoid as landmark instead) to ASIS contacts on both sides.

If the distances are equal there is no imbalance.

INTERPRETATION

If there is a difference it could mean that on the greater side (longer distance from umbilicus to ASIS) an outflare of the ilium had occurred, or that an inflare had occurred on the shorter distance side.

Again, reference to the standing flexion test (8.6) gives the answer.

If the flexion test showed an iliosacral restriction on the right, and the ASIS umbilicus distance is greater on that side, there is indeed an iliac outflare on that side.

What would it indicate if the flexion test (8.6) had shown an iliosacral restriction on the right, and the ASIS–umbilicus distance was greater on the other side?

What difference, if any, is there in the distances from ASIS to umbilicus (or other landmark) as you view them?

What does this indicate in relation to your patient?

DISCUSSION REGARDING EXERCISES 8.1–8.16

If you have comfortably and competently completed the exercises in this chapter, up to this point, then you should be able to observe your patient for signs of asymmetry and functional imbalance, as well as being capable of both noting whether or not an iliosacral or sacroiliac restriction exists, and what type of iliosacral restriction is present.

The variations in the presence or otherwise of increased paraspinal muscle fullness in seated and standing flexion tests will have alerted you to the presence of rotoscoliosis and the possible influence of postural muscle shortness on such patterns.

The next few test exercises focus on identification of spinal dysfunction.

Individual spinal segments may be assessed for a variety of restrictions and motions: flexion, extension, side-bending (left and right), rotation (left and right) as well as such translatory movements as separation (traction), compression, and lateral and anteroposterior translations. These were all discussed in the context of 'functional analysis' in Chapter 7.

General observation assessment is made by viewing the patient standing upright, standing flexed, seated and seated flexed, as well as in such other positions (extension and so on) as may be desired by the examiner.

The following exercises, *which are not meant to provide a completely comprehensive spinal assessment*, include methods derived from a number of texts, including: Sutton (1977), Lewit (1987) and Grieve (1984). Also much consulted in the devising of these exercises were the words of William Walton (1971).

EXERCISE 8.17

Time suggested
7 MINUTES (8.17A AND 8.17B), 3 MINUTES (8.17C AND 8.17D), 10–15 MINUTES (8.17E)

Exercise 8.17a

Cervical spine palpation. With the patient/model supine, palpate the posterior and anterior aspects of the transverse processes for local tenderness.

In this position, the pads of your middle fingers can be placed gently on the articular pillars of C2 to C7, successively, in order to palpate for any reduction in the symmetrical range of movement as the supporting palms of the hands guide the head into forward and backward bending. Note any sense of bind on any movement as well as the quality of 'end-feel' as an indication of the presence of dysfunction/restriction.

Exercise 8.17b

With the patient seated, assess gross ranges of motion in rotation right and left, side-bending right and left as well as flexion and extension. Achieve this by placing the pads of your thumb and third finger of one hand over the articular pillars of each vertebrae in turn (C2 to C7) while the other hand introduces the sequence of normal motions listed above, successively.

What do you feel – in terms of altered end-feel, or increased bind – on any of these movements?

Exercise 8.17c

With the head in full flexion (supine or seated) the atlantoaxial joint may be palpated for restrictions in rotation. (Flexion locks joints below C2.)

Exercise 8.17d

For occiptoatlantal joint assessment the patient should be supine, with you at the head of the table. The patient is asked to first tilt the head backward and then to tip the chin towards the chest. If the chin is observed to deviate to one side from the midline that is the side towards which the occiput is deviated.

What restrictions in normal motion did you find in this region using these approaches?

Exercise 8.17e

Compare the results with the following, more precise palpation approach (Walton's).

The supine patient's head may be flat or on your flexed knee, which is placed appropriately on the table. The occiput is cradled in the palms of both hands, leaving the pads of the fingers free to palpate the entire cervical spine, both lightly and deeply.

First the pads press lightly over the facets and transverse processes until palpable changes (tension, oedema, fibrosis, sensitivity, temperature changes, lessened skin elasticity and so on) are found. Increased pressure is then introduced to investigate for deeper changes in these tissues, such as oedema, deep muscular tension, interosseous changes and restrictions in mobility.

The suggestion of a flexion or extension restriction can be assessed by placing the pads of your fingers between the spinous processes of the vertebral segments being evaluated. The space is compared with that present in the segments above or below. Where an increased degree of separation is palpated, check the segment by extending the head/neck at that level to assess the relative range of movement. If movement is less than is noted in the segments above and/or below, then that segment can be stated to be 'locked in flexion' (unable to extend fully).

Similarly, if the space between segments (between their spinous processes that is) palpates as narrower, compared with those above and/or below, the implications can be simply checked by introducing flexion and monitoring the degree/range of movement.

If flexion range seems less than it ought, as compared with its neighbours, or a hard end-feel is noted, it can be said to be 'locked in extension' (unable to flex fully).

Side-bending is assessed by placing the pads of the palpating fingers between the transverse processes while laterally flexing the cervical spine down to the segment being checked.

If this shows that transverse processes on one side (say the left) are over-approximated, then side-bend the head and neck to the right until the segment being checked should move (i.e. the transverse processes on the left should separate). If they fail to do so, then that segment can be said to be 'lesioned', or 'subluxated', or 'locked', in side-bending to the left.

Rotation is assessed through use of deep palpation over the articular facets. If one facet feels more posterior than the one above or below it, the cervical spine should be rotated towards the opposite side (away from the palpated posterior transverse process). If this fails adequately to rotate (compared with its neighbours), or even if it does rotate but with signs of increased tissue resistance or bind, then it is said to be lesioned or restricted in rotation to the side of the posterior transverse process.

What findings did you make using this last assessment (8.17e) as compared with the previous ones (8.17a–8.17d)?

Record your findings.

EXERCISE 8.18

Time suggested
7–12 MINUTES FOR EACH METHOD

Thoracic palpation

Method a. The patient/model should be seated. You place both thumbs on the transverse processes of T1 to T3 successively as the patient first flexes, returns to neutral and then extends the head/neck repetitively, slowly, until evaluation is complete.

Was there any asymmetry or one-sided or bilateral sense of excessive bind during any of the movements?

Method b. The patient/model should be prone with chin on table, head in the midline. Your thumbs are placed sequentially on the transverse processes of T4 to T9. Firm ventral pressure is exerted, after soft tissue slack has been removed, in order to evaluate resistance of each segment to hyperextension.

Any sense of unilateral or bilateral resistance or 'bind' should be noted. A rotation restriction, towards the side of maximum resistance, is assumed.

Method c. The prone patient arches the back by supporting the upper body on the elbows, chin on heels of hands. You are at the head of the table, palpating the tips of the transverse processes from T7 to L5 with your thumbs, noting any increased posteriority, which indicates rotation towards that side, of the involved segment. Note also any sense of tissue tension/bind.

Method d. An alternative or additional evaluation could involve having the seated patient (straddling the table for stability is a good idea, or on a high, fixed stool) in a variety of positions as follows:

- With the patient's arms folded, you stand at the side grasping the far shoulder and fixing the other shoulder with your axilla. This leaves a hand free to palpate the tips of the thoracic spinous processes for tenderness. Periosteal pain points on the spinous processes (see Ch. 4) indicate chronically increased tonus in the inserting muscles.
- The patient then places their hands behind the neck, elbows together in front of the face. Both elbows are grasped in one of your hands, from below, allowing spinal extension to be easily introduced, as a finger of the other hand palpates between the spinous processes for the degree of movement and the quality of the end of the range of motion at each segment, sequentially.

  The patient is taken from neutral into retroflexion (backwards bending) and back to neutral, repetitively, slowly, until evaluation is complete. If the spinous processes fail to 'close', then a flexion restriction is probable (i.e. it cannot extend). (Fig. 8.5)

- The elbows are then held from above and sequential flexion is introduced as the tension of the end of the range of movement of each segment is palpated with the other hand. The patient is taken from neutral into anteflexion (forward bending) and back to neutral, repetitively, slowly, until evaluation is complete.
  Any failure to easily flex indicates an extension restriction (i.e. it cannot flex). (Fig. 8.6)
- For side-bending assessment the examiner stands behind the seated patient, one thumb resting on the interspace to be tested as the other hand introduces pressure towards the palpated side through the shoulder on the opposite side, to produce side-bending over the palpating digit. This palpating hand therefore acts as a fulcrum and the end range of motion is sequentially assessed in the thoracic spine. Any sense of increased bind, or altered quality of 'end-feel' may indicate an inability to side-bend and therefore a restricted segment. (FIg. 8.7)
- Rotation is examined with the patient seated astride the table, hands behind neck. You stand to one side and pass a hand across the chest to grasp the opposite shoulder, forearm lying across the chest. Flexion is introduced and the patient is sequentially rotated as the individual segments are palpated. (Note that rotation must be around the body's axis so that the palpating fingers – one each side of the spine – can palpate accurately the degree of rotation available in each direction.)
  Any sense of bind or altered end-feel might indicate a rotation restriction in the segment being evaluated.

What restrictions in normal motion or altered quality of end-feel did you find in this region using these methods?

Record your findings.

Method e. Compare them with those achieved using Walton's approach as follows:

- After use of a superficial stroking palpation of the seated patient's thoracic spine and paraspinal tissues, any suspicious areas (evidenced by tension, tenderness, skin changes, oedema) are palpated more deeply, into the periaxial structures.
  One side at a time is examined. You should be standing to the side of the seated patient, so that if the right side of the thoracic spine were being examined you would stand slightly behind and to the right of the patient. Your right hand is placed on the patient's left shoulder with your forearm crossing behind the patient's neck, allowing your elbow to rest on the patient's right shoulder. This gives the contact arm the ability to introduce a great variety of possible directions of movement, controlling the patient into flexion, extension, side-bending and rotation with relative ease.
  The free (in this case, left) hand is able to palpate any segment (spinous process intervals and transverse processes, as well as facet prominences) while motions are introduced by the right hand/arm. Obviously, all hand positions (and your position) are reversed for checking the opposite side.
- After assessing the relative space between spinous processes, any which appear more widely separated than their neighbours are checked by you moving the contact arm to the front of the patient, grasping the opposite

axilla, and introducing extension over the palpating thumb or finger(s).

If the spinous processes fail to approximate when this is done, then the superior vertebral segment is probably locked in flexion.

- With the control arm behind the patient's upper back once again, passive flexion is used to test the range of motion of any segments where over-approximated spinous processes have been palpated. Any which fail to flex adequately are probably restricted in extension.
- Palpation with your finger or thumb, between the transverse processes allows you to identify segments where approximation seems greater than in neighbouring segments. Side-bending is easily introduced (via the control hand or elbow) away from the palpating digit. If the transverse processes fail to separate, then a side-bending restriction towards that side is probable.
- Rotation can be assessed by fixing, with a thumb pad, the transverse process and articular facet of the vertebra below the one being checked. The control arm then introduces rotation up to the vertebra being tested. If it fails to move normally in rotation, say to the left, then it is said to probably be locked in rotation to the right.

  The articular facet of that vertebra will be posterior on the side in which rotation is locked.

  Walton wisely warns that any restrictions in this area are possibly linked to viscerosomatic reflex activity producing paraspinal muscular tension (see Ch. 4).

Method f. Dr J. Denslow suggests the following thoracic palpation exercise (Denslow 1960):

> Patient is sitting. Palpate spinous processes of T1, T6 and T12. Note whether or not bony prominences appear to be hard and clean cut (as would be felt if a similarly shaped piece of metal with rounded edges were palpated through a velvet cloth) or if the tissues over, and investing the spinous processes appear to be thickened . . . Examination for motion under voluntary control is achieved by placing the tip of the middle finger of one hand between the spinous processes at the cervicothoracic area. With the other hand flex and extend the patient's neck. Move the finger from interspace to interspace until the spines of C7 and T1 are identified. Check for the ease and range of motion.
>
> Examination for motion not under voluntary control is achieved by repeating the procedure described above and at the end of the range of motion, which is under voluntary control, spring the joint to produce further flexion or extension and check for 'give' in the restraining tissues.

This last element, the springing of the joint, allows you to evaluate the quality of the end of the range of motion.

Is it elastic, hard, spongy, firm but not excessively so . . . or what?

Which of the diagnostic methods gave you the best results?

Which of the positions allowed you the most sensitive assessment contacts?

Record your findings.

Fig. 8.5 Palpation of retroflexion (extension) of the thoracic spine.

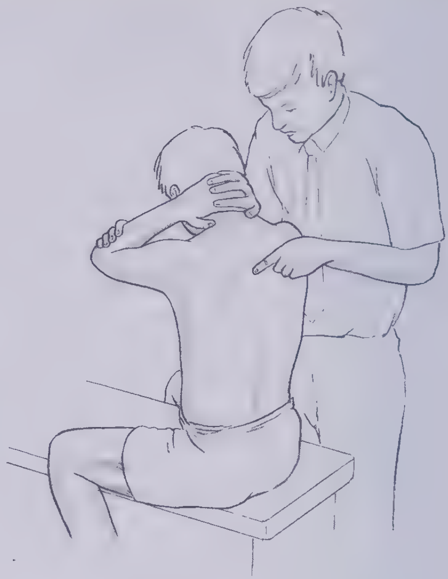

Fig. 8.6 Palpation of gapping of spinous processes during flexion.

Fig. 8.7 The patient is side-bent (towards the right in this instance) over the palpating thumb which assesses the nature of the 'end-feel'. A sense of unusual 'bind' might indicate a restriction.

EXERCISE 8.19

Time suggested
7–10 MINUTES FOR EACH METHOD

Lumbar palpation

Method a. The patient is prone. This palpation involves sequential 'springing' of individual segments. It is performed with two fingers of one hand resting on the transverse processes of a segment, while the hypothenar eminence of the other – extended – arm rests over them. Slack is taken out and a springing movement to the floor is made as intrinsic resistance is assessed. If resistance is palpated, and if there is pain, a restriction exists. If only pain is felt, a disc lesion is possible.

With the patient side-lying these segments are again palpated by gentle springing of each segment under review, first with the patient anteflexed and then retroflexed. (See methods b and c below)

This palpation method tells you whether something is not moving freely, i.e. that it is 'blocked', but does not tell you what form that restriction takes (locked in flexion, rotation, etc.)

What restrictions in normal motion did you find in this region so far?

Method b. The patient lies on one side facing you, knees and hips are flexed. You lean across the patient while contacting the bent knees with either your abdomen or thighs. Direct pressure is made through the long axis of the femurs, which introduces retroflexion (backwards bending) to the lumbar spine.

Your hands palpate individual segments, stabilising with one hand the lumbar spinous process above the segment to be assessed, while a finger of the other hand lies between the spinous processes. After taking out the slack, the segment is sprung by pressure through the femurs towards the palpating hands. On springing, a movement of the vertebrae below the one being fixed by the cephalad hand should be felt. If a 'blocked' segment exists, then little or no motion will be palpated.

Once again, such palpated restrictions tell you that there is a problem, but not what the problem is.

Method c. The patient lies on their side, knees and hips flexed, facing you as you lean across the patient to fix (stabilise) the thoracic region with the cephalad forearm. The patient's knees and hips should be fully flexed so that their thighs press against their abdomen/chest, held there by the pressure to the lower legs, exerted by contact with your abdomen or thighs.

This induces a great deal of anteflexion of the lumbar spine. The caudad forearm contacts the buttocks and repetitively increases and decreases anteflexion, as both hands palpate individual segments for decreased, increased, or normal ranges of flexion, as the region is gently sprung in this manner.

What restrictions in normal motion did you find in this region?

Method d. Walton suggests having the patient seated astride the end of the table with hands clasped behind the neck. You stand to the side and behind the patient, passing an arm through the 'loop' of the patient's arms on one side to rest the hand on the opposite upper arm. This provides you with control over flexion, extension, rotation and side-bending motions while your other hand palpates for normal mobility in the same manner as in thoracic examination described in method 8.18e.

Walton's palpation helps you to identify the form of any restriction/dysfunction you may have palpated using methods 8.19a, b or c.

Which of the various methods of lumbar palpation have provided you with the most useful information?

Record your findings and repeat the exercises.

DISCUSSION REGARDING EXERCISES 8.17–8.19

Exercises 8.17, 8.18 and 8.19 provide a wide range of palpation possibilities for evaluating whether localised segmental dysfunction is present, as well as ways of identifying what the nature of such dysfunction is. This is not a text which is designed to comprehensively teach all methods for such evaluation. It does, however, provide the tools which can enhance the skills necessary for using these or other methods of evaluation in spinal assessment.

In spinal palpation and evaluation you should aim to be able to assess and describe the characteristics of a restricted spinal segment (a blocked, dysfunctional/lesioned or subluxated spinal joint – terminology from physical medicine osteopathy and chiropractic).

In a flexion restriction (segment unable to extend fully) in the thoracic spine, for example, you should be able to be aware of, and describe whether or not:

- There is an ability for the spinous process of the vertebra in question to separate from the one below it.
- There is a greater degree of protuberance of the spinous process of the vertebra in question compared with those above and below it.
- There is an overall increase in the degree of flexion in the area being evaluated.
- There is an overall decrease in the degree of extension in the area in question.
- There are any associated motion restrictions (side-bending, rotation, etc.).
- There is any muscular hypertonicity or spasm in the area.
- There is tenderness on palpation.
- There is pain without palpation in the area.
- The effect of the restriction, if any, on the associated ribs.

Most of these findings should be answerable during the sequence of assessment described above, in all the joints of the spine, almost without thought, once your palpation skills are sufficiently sensitive.

Refer back to the previous chapter and those methods which focus on more 'functional' approaches and which ask the palpating hand to recognise both normal and abnormal responses in the region being assessed when a normal function is being performed – whether this involves a movement or a function such as breathing.

Our next attention is towards evaluation of an aspect of breathing function and of individual rib restrictions.

EXERCISE 8.20

Time suggested
2–3 MINUTES

The patient should be placed prone, and the breathing 'wave' observed. This is a wave-like motion starting in the lumbar region and spreading all the way up to the upper thoracics when spinal mechanics are free. If there is restriction in any of the spinal segments, the movement will seem to stop.

Does the wave start at the sacrum?

Does it start elsewhere?

Chart this, as well as the directions it moves in after its commencement (upwards, downwards, both directions).

Where does the wave cease – mid-thoracic area? base of neck?

Compare what is observed with findings of restriction during palpation (previous spinal assessment exercises) and the observed paraspinal 'fullness' in earlier assessments.

EXERCISE 8.21

Time suggested
5–7 MINUTES

Palpation for depressed ribs

Ribs restricted in expiration are depressed.

These are identified by palpation, which should be performed from the side of the table which brings the dominant eye over the centre-line (see Special Topic 2 on the dominant eye). The eyes should be focused between the palpating digits so that peripheral vision picks up any variation in the movement of the ribs.

Examination is performed while the supine (knees flexed) patient breathes deeply and steadily. The rib positions (right and left, same level) at full inhalation and exhalation are compared for relative rise and fall (upper ribs), as well as lateral excursion (lower ribs).

A digit resting on a rib which fails to rise (or move laterally) as far as its pair, lies on a depressed rib, and there will usually be a series of such ribs forming a group. It is necessary to identify the most cephalad of a group of ribs which fails to rise as far as its twin – this is the key rib locked in exhalation (i.e. it is depressed).

Just as such a rib can affect those below it, so can one locked in inhalation (see below) affect those above it, making the most caudad of such a group the key one.

1st and 2nd ribs are often depressed, producing pain and numbness in the shoulder, suggesting thoracic outlet syndrome or scalene anticus syndrome, (anterior and medial scalene insert into the first rib and posterior scalene inserts into the 2nd rib).

Such depressed ribs are often found in patients with asthma or obstructive pulmonary problems, or where there is a tendency to hyperventilation.

If the 1st and/or 2nd ribs are found to be depressed this may be treated using the scalenes in a muscle energy manoeuvre.

If lower ribs are depressed then muscle energy methods which use the pectorals will assist in normalisation.

Tender points (see Ch. 5) for depressed ribs lie on the mid-axillary line (in the intercostal spaces above and/or below the rib in question).

What restrictions in normal rib motion did you find in this region?

Are there any depressed ribs?

Did you find a group of these, and if so did you identify the most cephalad of that group?

Do these findings correlate with tender points on the mid-axillary line at the same level?

Can you identify associated scalene and/or pectoral shortness relating to any depressed rib dysfunction?

EXERCISE 8.22

Time suggested
5–7 MINUTES

Palpation for elevated ribs

Ribs restricted in inhalation are elevated.

These are identified by palpation (one or two fingertips) in which the hands are placed flat on each side of the sternum, with wrists on the same plane as the hands (not flexed).

Exaggerated breathing effort is called for in both inhalation and exhalation during testing. Motion of both bucket (up and down motion of upper ribs) and pump-handle (lateral and medial movement of lower ribs) movements is assessed. The eyes should be focused between the palpating digits so that peripheral vision picks up any variation in the movement of the ribs.

A palpating digit which is raised by the deep breathing, and which does not fall as far as its pair, lies on an elevated rib.

This is one which is locked in inhalation.

When an elevated rib is identified, all pairs of ribs below are checked until a pair of normal ones are found (i.e. both rise and fall equally). The abnormal rib cephalad to the normal pair is the key rib (this being the most caudad of the elevated group) and probably affects all ribs above it. It is thus always essential to identify the most caudad of a group of elevated ribs.

The intercostal muscles superior to an elevated rib will usually be sensitive and will palpate as tense. The 5th rib is commonly noted to be locked in elevation. There may be a deep radiating chest pain on deep breathing, and tightness in the pectoralis minor. Cardiac or pulmonary disease may need to be excluded.

There may be swelling indicating costal chondritis. Treatment by muscle energy procedures is recommended.

Test all other ribs for range of motion and treat the most caudad of those found to be restricted.

Tender points for elevated ribs lie at the angles of the ribs posteriorly. Rib interspace dysfunction tender points are found at the insertion at the sternum. These tender points often accompany overapproximated ribs which are not necessarily elevated or depressed.

What restrictions in normal motion did you find in this region?

Did you identify an elevated rib?

If so, did you identify a group of these, and most importantly, the most caudad of this group?

Did these findings correlate with tender points in the intercostal spaces around the angles of the ribs, posteriorly?

Did you palpate any interspace sensitivity, especially in the space above an elevated rib and close to the sternum?

EXERCISE 8.23

Time suggested
3–5 MINUTES

Philip Greenman (1989) suggests additional palpation processes for assessment of rib dysfunction.

Sitting behind the seated or standing patient, palpate the most posterior aspects of the ribcage from above downwards, feeling for a ‘smooth’ convexity which gets wider from above downwards. What is being felt for is any rib angle which seems to be more or less posterior than others.

At the same time, any increase in tone in the muscles overlaying or between the ribs (as well as pain) is sought. The muscles which attach to the angles of the ribs are the iliocostalis group and they become hypertonic when rib dysfunction occurs.

Can you identify any rib dysfunction using this form of palpation?

EXERCISE 8.24

Time suggested
5–7 MINUTES

The patient/model is seated or prone and you sit behind or stand to one side.

With fingertips, palpate along the shafts of the ribs feeling for differences one from the other. The inferior margins of ribs are more easily palpated than the superior ones.

Assess the intercostal width, evaluate differences in symmetry and feel for changes in tone in the intercostal muscles. Trigger points and fibrous changes may be found.

Move towards the spine and locate the articulation between the ribs and the transverse processes. Palpate these as the patient deeply inhales and exhales. Assess intercostal motion as well as rib mobility in relation to its spinal articulation.

Could you palpate all the elements described in this assessment?

Compare your findings with those established in your previous rib function assessments as outlined above.

NOTES ON ACROMIOCLAVICULAR AND STERNOCLAVICULAR DYSFUNCTION

Whereas spinal/neck and most other joints are seen to be moved by, and to be under the postural influence of muscles, and therefore to an extent to be capable of having their function modified by muscular influences, articulations such as those of the sternoclavicular, acromioclavicular and iliosacral joints seem far less amenable to such influences, although muscle energy techniques in particular are widely used in the osteopathic profession to help restore the functional integrity of these joints.

EXERCISE 8.25

Time suggested
3–5 MINUTES

Assessment of acromioclavicular (AC) dysfunction

Stiles suggests beginning evaluation of AC dysfunction at the scapula, the mechanics of which closely relate to AC function.

The patient sits erect and the spines of both scapulae are palpated by the operator, standing behind. The hands are moved medially, until the medial borders of the scapulae are identified, at the level of the spine. Using the palpating fingers as landmarks, the levels are checked to see whether they are the same. Inequality suggests AC dysfunction.

The side of dysfunction remains to be assessed and each is tested separately. To test the right side AC joint, the operator is behind the patient, with the left hand palpating over the joint. The right hand holds the patient's right elbow. The arm is lifted in a direction, 45° from the saggital and frontal planes. As the arm approaches 90° elevation, the AC joint should be carefully palpated for hinge movement, between the acromion and the clavicle.

In normal movement, when there is no restriction, the palpating hand/finger should move slightly caudad, as the arm is abducted beyond 90°. If the AC is restricted the palpating hand/digit will move cephalad, and little or no action will be noted at the joint itself, as the arm goes beyond 90° elevation.

Muscle energy technique is employed with the arm held at the restriction barrier, as for testing above.

If the scapula on the side of dysfunction had been shown to be more proximal than that on the normal side, then the humerus is placed in external rotation, which takes the scapula caudad against the barrier, before the isometric contraction commences.

If, however, the scapula on the side of the AC dysfunction was more distal than the scapula on the normal side, then the arm is internally rotated, taking the scapula cephalad against the barrier before the isometric contraction commences.

The left hand (we assume this to be a right-sided problem in this example) stabilises the distal end of the clavicle, with caudad pressure being applied by the left thumb which rests on the proximal surface of the scapula. The first finger of the left hand lies on the distal aspect of the clavicle. The combination of the rotation of the arm as appropriate (externally if the scapula on that side was high and externally if it was low) as well as the caudad pressure exerted by the left hand on the clavicle and the scapula, provides an unyielding counterforce. The arm will have been raised until the first sign of inappropriate movement at the AC joint was noted (as a sense of 'bind'). This is the barrier, and at this point the various stabilising holds (internal or external arm rotation, etc.) are introduced. An unyielding counter-pressure is applied at the point of the patient's elbow by the right hand, and the patient is asked to try to take that elbow towards the floor with less than full strength. After 7–10 seconds the patient and operator relax, and the arm is once more taken towards the barrier. Again greater internal, or external, rotation are introduced, to take the scapula higher or lower, as appropriate, as firm but not forceful pressure is sustained on the clavicle and scapula in a caudad direction.

The mild isometric contraction is again called for, and the procedure repeated several times. The procedure is repeated until no further improvement is noted in terms of range of motion or until it is sensed that the clavicle has resumed normal function.

Do both your model/partner's AC joints respond normally to abduction of the arm?

If not, is the scapula on the dysfunctional side superior or inferior to the normal side?

Take the arm into the appropriate position (internal rotation if dysfunctional side scapula is caudad and vice versa) and work your way through the appropriate MET treatment.

EXERCISE 8.26

Time suggested 3–5 MINUTES

Assessment of restricted abduction in the sternoclavicular joint ('shrug test')

As the clavicle abducts, it rotates posteriorly. To test for this motion the patient lies supine, or is seated, with arms at side. You place your index fingers on the superior surface of the medial end of the clavicle. The patient is asked to shrug the shoulders as you palpate for the expected caudal movement of the medial clavicle. If it fails to fall caudad there is a restriction preventing normal abduction. (Fig. 8.8)

Do your model/patient's sternoclavicular joints respond normally to a shrug?

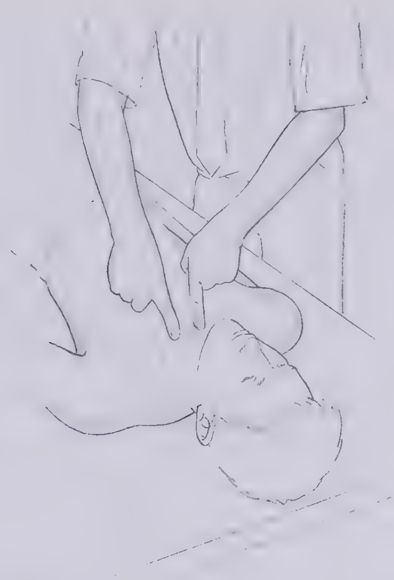

Fig. 8.8 Assessment ('shrug test') for restriction in clavicular mobility.

EXERCISE 8.27

Time suggested 1–2 MINUTES

Assessment of restricted horizontal flexion of the upper arm (sternoclavicular restriction) – 'Prayer' test

The model/patient lies supine and you stand to one side with your index fingers resting on the anteromedial aspect of each clavicle.

The patient is asked to extend the arms forwards in front of their face, in a 'prayer' position, palms together, pointing to the ceiling. On pushing the hands forwards towards the ceiling, the clavicular heads should drop towards the floor, and not rise up to follow the hands. If one or both fail to drop there is a restriction. (Fig. 8.9)

Do your patient's sternoclavicular joints respond normally to the prayer test?

EXERCISE 8.28

Time suggested 1–2 MINUTES

Scapulohumeral rhythm test – observation of functional imbalance

If there exists an imbalance between overactive/tight upper trapezius and levator scapulae and inhibited/weak lower and middle trapezius, there may be a loss of the normal scapulohumeral rhythm.

Observe your seated patient/model as they raise the abducted and flexed arm from a position in which it is below the horizontal to one in which it moves past the horizontal.

Normal – if elevation occurs of the shoulder after 60° of arm abduction.

Abnormal – if elevation of the shoulder or winging of the scapulae occurs within the first 60° of shoulder abduction.

Fig. 8.9 Assessment (prayer test) for restricted horizontal flexion of the sternoclavicular joint.

DISCUSSION REGARDING EXERCISES 8.20–8.28

This series of exercises started with breathing taking centre stage – first with an appreciation of the breathing wave as a means of seeing how muscular and spinal restrictions might impinge on a normal function pattern and then by introducing specific rib restriction characteristics which can be both palpated and observed. The possibility of the presence of clavicular restrictions was shown to require some very rapid assessment methods, which can involve observation or palpation, or both.

In this chapter, overall, we can see that observation and palpation go together intimately and that general evaluation needs to provide a background to specific local restrictions and dysfunctions. We can also see that functional and structural evaluations are inseparable.

Palpation of the skull

The next palpation exercise is a structural one pure and simple, and focuses on the anatomy and landmarks of the skull.

In Chapters 2 and 5 some of the exercises assessed elements of cranial and sacral rhythm function. The next palpation exercise is aimed specifically at learning more about cranial sutures and articulations.

Whether or not you intend to use cranial osteopathic methods, the exercise should be a useful one in enhancing your palpatory skills.

This exercise should be performed on a living model/patient and in order to derive maximum benefit it is suggested that a good reference manual and a disarticulated skull (human or plastic) be kept handy for reference and comparison of anatomical landmarks, suture patterns and general familiarisation with individual articulations.

Extensive osteopathic research has shown that the sutures of the skull permit a degree of plasticity, or motion, and that the sutures themselves, in life, contain connective tissue fibres arranged in specific patterns related to the functional motions of the area. There are also blood vessels and small neural structures (including free nerve endings and unmyelinated fibres).

The following palpation is not comprehensive as it leaves out most of the face and orbital structures. It is meant as a palpation exercise, not as a lesson in cranial work.

EXERCISE 8.29

Time suggested 15–25 MINUTES

Start by having the supine patient/model lying without a pillow, yourself seated at the head of the table, forearms supported on the table, as you palpate, with pads of fingers, the vertex of the skull, just over half way posteriorly, for the saggital suture. Trace its path and note its pattern of serration which is wider posteriorly and narrows anteriorly. A suture may be palpated by very lightly running the pad of a single digit from side to side so as to sense the path of the meandering joint.

As you move (from side to side) along this suture, anteriorly, you will come to a depression or hollow known as the bregma, where the coronal suture meets the saggital suture.

Was one side of the suture more prominent than the other?

Were there any areas of unexpected rigidity?

Now, using one hand on each side (finger pads) palpate laterally from the bregma along the coronal suture (asking the same questions) until you reach the articulation between the frontal and parietal bones.

Ask yourself also whether or not the sutures are symmetrical.

As your finger pad reaches the end of the coronal suture it will palpate a slight prominence, after which it reaches the pterion, the meeting point of the temporal, sphenoid, parietal and frontal bones.

Review these landmarks, sutures and bones on an atlas or model of the skull.

Are the depressions and prominences symmetrical on each side of the skull ?

Moving slightly more inferiorly you will palpate the tip of the greater wing of the sphenoid, a most important contact in cranial work.

Is it more prominent on one side?

Is one side higher or lower than the other?

Move back to the pterion to follow the articulation between the parietal bone and the temporal squama. This curves backwards over the ear (the temporal squama is bevelled on its interior surface to glide slightly over this articulation).

Following this very subtle articulation (best palpated by repetitively running a finger pad lightly from the parietal bone down towards the ear, noting the slight bump as you pass over the articulation. As you progress posteriorly you eventually reach the asterion, another junction point, this time between the temporal, parietal and occipital bones.

Ask yourself constantly the same questions regarding symmetry, prominences, depressions, rigidity.

Pass from the asterion superiorly (medially) along the lambdoidal suture until you once again reach the midline. Here the lambdoidal suture meets the saggital suture at the L-shaped lambda.

Move back again to the asterion and palpate your way towards the mastoid process along the occipital–mastoid suture, which will vanish below soft tissue as you approach the neck.

CAUTION: *Never use more than a few grams of pressure on these sutures when palpating.*

The time needed to perform this palpation exercise well is at least 15 minutes.

Repeat the exercise many times, until these landmarks are familiar to you and you are instantly aware of the answers to the questions raised.

Knee palpation exercise

The following exercise is the only one in this chapter devoted to a joint which is not in some way associated with the spine or pelvis.

EXERCISE 8.30

Time suggested
10 MINUTES

Denslow describes a series of useful functional tests for the knee.

The patient is supine.

Place the thumb and middle finger of your left hand in the groove between the femur and tibia of the patient's right knee. Grasp the ankle with your right hand. Have the patient actively flex and extend the knee (with some assistance from you). Check for the ease and range of motion, and for changes in the width and depth of the grooves you are palpating. Repeat this on the other leg and compare the ease of total motion on the two sides.

Now repeat the palpation exercise as described but this time add slight springing force at the end of the extremes of flexion and extension of the knee.

Check the amount of elastic 'give' in the restraining (soft) tissues, and compare your findings on both knees.

Finally, examine the knee by placing the heel of your left hand against the lateral aspect of the patient's straight (extended) right knee with your middle finger in the groove between tibia and femur on the medial aspect. Place your right hand on the ankle and spring the joint of the knee medially by exerting force with your two hands in opposite directions (pushing medially with the right and laterally with the left).

Do the same on each leg.

Check and compare the degree of elastic 'give' in the restraining soft tissues and for changes in the configuration of the groove in each leg.

Notes on palpation and evaluation of long leg/short leg problems

The following notes and exercises relate to an all-too-common musculoskeletal problem, and are meant to help you to integrate your palpatory and assessment skills. These notes should not be considered to be definitive on this topic, although they do include the opinions and methods of many leading clinicians. They provide a starting point for using palpatory skills in a complex setting for those who wish to explore body mechanics. The major usefulness of this section will be to encourage the use of palpatory skills to both joint and soft tissues through the use of the various exercises.

Before coming to these, it is necessary to present the viewpoints of a number of experts (some of whom disagree on aspects of the problem) so that what is being palpated and evaluated makes some sense. Refer also to the pelvic and spinal assessments, discussed in this chapter.

EXERCISE 8.31

Time suggested
15 MINUTES

Mitchell, Moran and Pruzo, who were extensively referred to earlier, make the following observation regarding 'functional', or apparent, short leg assessment. They stress that the assessment is needed to give evidence of the success or otherwise of subsequent treatment, offering a 'baseline' from which to work.

Carry out their suggested protocol:

- The height of the pelvic (iliac) crest, as assessed with the patient standing (Exercise 8.4), gives evidence of an anatomical leg length difference.
- To assess for a functional (apparent) short leg the patient is first placed supine, lying quite straight. The distances of the inferior slopes of the internal malleoli, from the trunk, are compared by placing the thumbs on them and the eyes directly over them. If one side is shorter – i.e. malleolus closer to the trunk – there is an iliosacral lesion on that side producing this apparent shortness (presuming the iliac crests were level when the patient was standing).
- Retest for an iliosacral lesion with the patient performing the standing flexion test as PSIS excursion is noted.
- If no shortness is observed, with the patient supine, place the patient in a prone position, lying straight. Again measure and compare by viewing medial malleoli, with the thumbs on their inferior slopes.
  If the malleoli are level there is no functional shortness.
  If one appears shorter – i.e. the malleolus is closer to the trunk – it is on the side of a sacroiliac lesion.
- Retest for a sacroiliac lesion by performing the seated flexion test with thumbs on the PSIS, looking for the one which has the greatest excursion on flexion of the patient.

A variety of iliosacral, sacroiliac, pubic and lumbar lesions may cause this apparent shortness, according to Mitchell, Moran and Pruzo.

Did either the supine or prone assessments of the relative levels of the malleoli confirm either iliosacral or sacroiliac restrictions determined by standing or seated flexion tests?

Fryett's short leg observations

(Fryett 1954)

1. Legs are usually of unequal length, running to as high as 90% of people.
2. This is probably a major cause of sacroiliac dysfunction.
3. Other factors such as:
   — unilateral psoitis
   — unequal lumbar tension
   — shortened fascia in the hip region
   — shortened or relaxed ligaments
   — flat feet

may all make the legs appear to be of unequal length when actually they are not.

4. Measuring to identify short-leg problems is best achieved by X-ray. To avoid distortion, the tube must be absolutely in the centre of the target, horizontal to the heads of the femur, patient standing still, knees extended. This gives accurate definition of the height of the trochanters (to within 0.5 cm) but distorts the sacrum and lumbar spine.

5. All individuals with leg length differences (no matter how slight) have a degree of functional disturbance of the SI joints, unless a heel-lift correction has been made.

6. Bone, young and old, is plastic, and conforms with Wolff's Law which states, 'Every change in the use or static relations of a bone leads not only to a change in its internal structure and architecture but also to a change in its external form and function.'

7. In chronic cases the SI joint is not perfectly normal in form and cannot be treated as though it were. As a rule the problem has been present since the patient first began to walk.

8. Compensation always occurs, sometimes adequately, so that severely lopsided, deformed pelvis, associated with leg-length differences of up to 1 cm, may produce no pain whatever.

9. Fryett does not like the term 'short' leg, for often the problem is one of a long leg. He points out that the degree of load carried by a leg will influence its growth.

10. Some authorities believe that right handed people brace themselves more on the left leg which develops more than does the right. Many right handed people have a left foot which is larger than their right in consequence.

11. Janda has pointed out that we spend at least 80% of our time standing on one leg (when we are not sitting or lying down that is).

12. The angle of the neck of the femur varies, normally being about 125°. If it inclines towards the perpendicular (coxa valga), however, it would appear to make the leg longer than normal. The opposite situation, an inclination more to the horizontal (coxa vara), tends to make the leg shorter than normal.

13. The idea of increasing the length of a short leg is not futile, Fryett insists. It is always worth trying in the young. Where there is no apparent pathology in a child with unequal leg lengths, it is safe to assume that it is the short leg that is 'at fault'.

14. *Gray's Anatomy* instructs us that, 'Growth in leg length of the femur takes place chiefly from the lower epiphyses.'

This is on line with the adductor tubercle.

Fryett's treatment

Fryett suggests attention to the epiphyses of the femur, tibia and fibula. All these receive attention from Fryett (he 'manipulates and tries to stretch' these epiphyses) in order to try to encourage greater circulation at the openings for the arterial supply to these bones. He also encourages hopping and kicking (a football, for example) with the short leg, and adjusts the heels of young patients, while they are on a pair of scales, so that they carry more weight on the shorter leg.

Discussing the general effects of such anomalies, Fryett reminds us that it may be necessary to deal with more than the local and obvious: 'There is a law in physics to the effect that stress in any mechanism will spread until it is absorbed, or until the mechanism breaks down.'

Fryett's treatment protocol requires consideration of the following physiological factors:

1. If there is a normal or exaggerated antero posterior (AP) lumbar curve the bodies of the lumbar vertebrae rotate to the low side. If, for example, there is a long left leg, the right side of the pelvis will be low and if the AP curve is normal the bodies rotate to the right. Treatment (according to Fryett), in this instance, should involve lowering the left side in the hope of thus levelling the base plane and correcting compensatory lesions.

2. To the degree that the lumbar spine is in flexion, the bodies are forced to rotate to the high side. Therefore, if we find vertebrae rotated to the high pelvic side, we know that, whatever the appearance, those vertebrae are abnormally posterior.

In such a case a heel lift is contraindicated. The best approach is to increase the AP curve. As the curve passes into the normal range, the vertebrae (the body's, not the spinal processes) will release and rotate to the low side.

This may require release of contracted, shortened psoas muscle(s), as this can hold the lumbar spine in exaggerated flexion (see below, p. 214, for more on psoas and other associated muscles).

3. If there are problems of restricted motion with the SI joint(s) or the lumbar vertebrae, then heel lifts are deferred until these problems have been dealt with by mobilisation (adjustment, muscle energy methods, stretching exercises and so on).

4. Any leg length adjustment by means of heel lifts in a chronic case should not exceed 0.25 cm initially. This small change is often enough to allow compensation to take place. Too large a compensating lift can create excessive demands in terms of adaptation requirements and an increase in symptoms. 6 weeks later, after reassessment, a further lift may be used.

5. Fryett suggests that in some instances (and he does not know why), it is better to lower the long leg. This can be done by removing part of the heel of *all* shoes currently being worn.

6. In some instances all symptoms associated with poor compensation can be relieved by manipulative work without any lifts. This may be the best first approach, using methods which stretch all shortened postural muscles (see tests below and in Ch. 4).

Mennell's short-leg viewpoint

Mennell (1964) suggests that Achilles tendon tightness be assessed. In using lifts, he says that store-bought shoes can never be raised at the heel by more than 1 cm without throwing stress onto the foot as a whole, due to alteration of the slope of the sole. This can be overcome by raising the sole as well.

When there is any shortness of the Achilles tendon, a full correction of heel height must not be attempted or the remaining resilience in the tendon will be lost. He places great emphasis on identification and correction of TFL shortness related to low back and SI joint problems (see below and Ch. 5, p. 97).

Cailliet and the short leg

Cailliet (1962) says that measuring from the ASIS to the malleolus (as suggested by some experts) is, at best, inaccurate and offers little of significant value. He suggests three landmarks:

1. Standing barefoot, both legs close together, fully extended at the knees. Examiner places fingers on pelvic brim and determines the horizontal levels of his fingertips. This is quite accurate.
2. Note the dimples over the SI joints (where the gluteus maximus attaches to the periosteum over the sacrum), and estimate from these the pelvic level. This will only be difficult when the patient is very overweight or underweight (see Exercises 8.6 and 8.8, above, for more on pelvic palpation/assessment).
3. Observe the lumbar spine at its 'take-off' from the sacrum. The posterior–superior spines of the vertebrae are usually prominent and observable. If an oblique take-off is seen, this implies obliquity of the sacral base.

If these three clinical methods indicate a leg-length discrepancy, the exact amount of this can be assessed by using a series of boards of varying thickness (0.25, 0.75, 1.25, 2 and 2.5 cm). These can be placed under the foot of the short leg until the pelvis reaches a balanced level.

Cailliet insists that it is, after all, a level pelvis (and therefore a straight spine) which we desire, rather than leg symmetry. He reminds us that a history of polio, or genu valgum or varum, or a previous fracture may all result in significant leg-length discrepancies. It is only the effect on pelvic and spinal mechanics which matter.

Karel Lewit's views

Lewit (1985) has much to say on the subject of short legs.

He reminds us that an artificial difference of more than 1 cm in leg length changes the balance in the coronal plane, and is immediately felt and resented, whereas raising both heels is hardly noticed. Using a plumb line, Lewit observes for lateral shift of the pelvis from the midline.

Note: This can be used to test spinal mechanics in patients if we insert heelpads and watch the changes in deviation.

PHYSIOLOGICAL RESPONSE TO A SHORT LEG (LEWIT)

Reaction (adaptation) to unequal leg length (as presented by the patient or initiated by the operator) is normal if:

1. There occurs a convex curve to the low side
2. There is rotation of the vertebral bodies to the low side (provided there is a lordosis, in agreement with Fryett)
3. The lumbodorsal junction remains vertically above the sacrum
4. The pelvis as a whole shifts to the high side.

Note: If there is an obliquity of the sacral base on standing, this should always be observed again on sitting. If it remains when seated then the cause is not a short leg. (We should therefore compare sitting and standing sacral obliquity before using Cailliet's boards.)

Testing for equal weight distribution requires standing on two scales and ensuring that they display more or less equal weights. Only then can a plumb-line assessment be valid. As heel lifts are placed for the assessment of deviation, the weight must be seen to be equally balanced. If weight is placed on one foot more than the other, the whole body deviates to that side, with the head deviating furthest.

The patient should be assessed for weight distribution on two scales, with and without a heel pad on the lower side (of the pelvis). A subjective reaction should also be sought: do they feel happier with or without the pad? If there is a one-sided flat foot, an arch support is likely to be more effective than a heel lift.

Lewit agrees that leg length is of no concern unless it causes obliquity at the sacral base and the spine. How to measure differences, he says, is beside the point, for what is important is what we see on X-ray in relation to spinal mechanics.

PATHOLOGICAL FINDINGS RELATED TO SHORT LEG (LEWIT)

1. A tilt (obliquity) without compensating scoliosis, or with insufficient scoliosis, so that the lumbodorsal junction does not find itself above the lumbosacral junction.
2. No pelvic shift to the high side.
3. No rotation of the vertebral bodies when there is a scoliosis and lordosis, or actual rotation to the opposite side from the scoliosis (away from the convexity), or scoliosis to the high instead of the low side.

OBJECTIVES OF CORRECTION INVOLVING HEEL LIFTS

1. The achievement of a sufficient degree of compensation to bring the lumbodorsal junction over the lumbosacral junction (or close to this point).
2. A return of the pelvis from the high side to the centre.
3. A decrease in the degree of scoliosis.

In some instances of complex pelvic distortion a leg may appear shorter in the supine position, whereas on sitting this is reversed. There is usually a muscular 'blockage' involving spasm of the iliacus, and/or there may be imbalance between the gluteals.

Lewit suggests that an assessment should also always be made of any difference in leg length *below* the knee, by having the supine patient bend both knees, feet on the table. The knee which is highest in relation to the table belongs to the long leg.

COMMON PATTERNS

Bailey and Beckwith (1966) summarised their analysis of over 400 cases of short leg determined by standing X-ray. Average shortness was 0.88 cm, 53% were left sided. In 88% of short leg the iliac crest was low on the side of shortness. In 72% the upper border of the sacrum was low on the short side. In 39% the symphysis had deviated to the short side. It was in the midline in 30%.

LIFTS – YES OR NO?

Strachan (1966) says that:

- Lifts should be used with care in stiff spines.
- Age should not be the deciding factor but rather the mobility of the spine and therefore its ability to adapt to new demands.

- In children, a lift almost equal to the difference in leg length is suggested.
- Lateroflexion mobility is important in deciding whether to use a lift. If the ability to side-bend is restricted unnaturally this should be dealt with prior to a lift being used, if one is indicated.
- Spinal distortions caused by short legs occur low in the spine.
- Lateral curves which do not include at least two lumbar vertebrae are unlikely to be helped by a lift, even if a short leg is present.

WILLIAMS ON THE QUESTION OF LIFTS FOR A SHORT LEG

Williams (1965) tells us that a lift is most beneficial if there exists a low sacrum on that side and a lumbar side curve convex on the short side. Any variations on that simple picture may be complicated by lifts, and that a lift is called for when such a picture exists *unless* there is pain radiating into the short extremity.

If pain is into the long extremity, then a compensatory lift on the short side often relieves nerve pain. If there is nerve pain in a leg which seems to relate to foraminal encroachment, and there is no leg length difference, a temporary lift on the opposite extremity may relieve symptoms.

EXERCISE 8.32

Time suggested
15–20 MINUTES

Observe your standing patient/partner's pelvic landmarks (pelvic brim, SI 'dimple', spinal 'take-off' angle) and decide:

Is there a short leg, and if so which side is it on?

Do the spinal and pelvic changes reflect good or poor adaptation to a short leg (see Lewit's criteria p. 210)?

Check for piriformis, psoas, TFL and Achilles tendon shortness, flat feet, as well as spinal mobility and side-bending limitations.

Record your findings.

Ask yourself what these findings mean in relation to short leg problems.

If you have a plumb line, assess lateral shift of the body.

EXERCISE 8.33

Time suggested
2–3 MINUTES

Compare the pelvic/spinal changes which you can observe with the patient both standing and seated.

Is the 'low' side still low?

If not, what does it mean?

EXERCISE 8.34

Time suggested
7–10 MINUTES

If there is no leg length discrepancy when standing, use a pad, folded paper or other tool to raise first one heel (increasing the leg length) and then the other. In each case observe for normal or abnormal changes, bearing in mind the differences which occur when there is a normal or exaggerated lumbar curve and when this is flat (see Fryett's notes above, p. 208).

Is the lumbar spine convex towards the low side (short leg)?

Do the vertebral bodies rotate towards that side?

Is there a pelvic shift to the high side?

Is the lumbodorsal junction directly over the lumbosacral junction?

Decide whether the spinal mechanics are physiologically normal or not.

EXERCISE 8.35

Time suggested
5 MINUTES

Evaluate all your recorded findings from the above exercises (8.32–8.34) and decide whether or not a lift is required.

Does a lift produce the normalisation effects which Lewit demands?

Now go through De Jarnette's sequence below and compare results with the above. (De Jarnette 1935)

De Jarnette and the short leg

Much of SOT (sacrooccipital technique) work depends upon assessment of a short leg and associated dysfunction.

Heel tension is usually assessed since the Achilles with the greatest tension is thought to be the strong leg (in most cases). The complexities of defining category 1, 2 and 3 patients in SOT, and the use of supporting blocks to normalise leg length, together with a host of odd 'signs' (dollar sign, crest sign, fossa signs and so on) defy easy explanation, so this will not be attempted. If these concepts interest you, try to learn SOT from professional seminars.

In a handbook of chiropractic first aid, De Jarnette provides the following insights into short leg problems:

> Patient is supine, grasp ankles and pull these into extension and assess for the superior inner malleolus, thus identifying the short leg.
>
> Correct the long leg first by placing the foot of that leg on the extended knee of the short leg, rotating the hip externally so that the knee of the flexed (long) leg falls towards the floor.
>
> Hold this stretch until relaxation of the tense musculature is felt (30 seconds or more). Go back to a normal supine position. Next, hold the ankle of the short leg firmly with one hand, having flexed that leg at the knee, and adduct the knee so that it is forced across the extended knee of the long leg. Pull the ankle laterally to increase stretch in the musculature around the pelvis/hip area, holding this position for 40 seconds (there may be some discomfort).
>
> Patient lies with feet flat on table, knees flexed and well separated. Hold the knees in this position as patient tries strongly to bring them together for 10 seconds or so.
>
> Same position but this time knees are together, as patient tries strongly to separate these while you resist for 10 seconds or so. The resisted approximation and separation are repeated alternately, 3 times each, in order to improve tone in the supporting soft tissues of the SI joints and pelvis.

This sequence is recommended by De Jarnette for low back, hip and leg problems of many types.

EXERCISE 8.36

Time suggested
25–30 MINUTES

Go through this entire De Jarnette sequence after you have performed all the assessments described above (Exercises 8.30–8.33) and then see whether a reassessment (after De Jarnette's sequence) gives you any different information or indications.

Also incorporate elements from the suggestions in the following notes on specific muscle assessments.

ADDITIONAL NOTES ON PALPATION/ASSESSMENT METHODS FOR SPECIFIC MUSCLES WHICH CAN OFTEN BE INVOLVED IN SHORT LEG PROBLEMS

See also Chapter 4 for specific tests for shortness of these muscles.

EXERCISE 8.37

Time suggested 4 MINUTES

Are TFL or psoas overactive?

The side-lying patient has her pelvis firmly stabilised by the operator, who is standing in front, and who simultaneously palpates the trochanter of the upper side (side being tested).

The untested (lower) leg is slightly flexed at hip and knee. The tested leg is extended at the knee and slightly hyperextended at the hip. The operator's whole hand should be over the ASIS and also palpating the trochanter.

Abduction of the extended leg, actively, should take it through 45° against slight resistance from the operator's other hand. Movement should be felt in the trochanter (it slips away) if the leg, rather than the whole pelvis, is being moved.

If performed normally this is graded as a 5 or 4 (Janda).

Lewit suggests that in this position the cephalad hand resting on the anterior pelvis should be placed so that the fingers rest on the TFL and the thumb on gluteus medius. The caudad hand is on the lower thigh, applying resistance as the leg is abducted.

In this position it is possible to palpate the difference between true abduction involving TFL and gluteus, or rotation, because of malcoordination between them, with gluteus being felt to 'come in' too late.

If abduction is difficult with resistance, do the same test without it (grade 3).

In the side-lying position there should be a vertical line from one ASIS to the other, to the table surface. True abduction takes place without any pelvic motion. If the pelvis is elevated during the test, quadratus is being used, and motion is taking place in the lumbosacral region.

If there is lateral rotation and flexion at the hip, TFL and iliopsoas are dominating the glutei.

If abduction is very weak do the same test lying supine (grade 2 or 1).

It is also useful to perform TFL assessment as described in Chapter 4.

Is psoas shortness involved?

Janda says: 'The most important imbalance in the pelvic region is between the hip flexors and the trunk erectors' (he calls this 'lower crossed syndrome'). He continues: 'This imbalance causes an altered position of the pelvis producing stress in standing and walking, especially at L5–S1, producing pain and irritation. A similar imbalance occurs between the lateral corset muscles, gluteus medius and minimus and quadratus. Again L5-S1 will be irritated, this time in the sagittal plane.'

Lewit says:

> The thoracolumbar junction is the most unstable of the four major key transition regions as here two mobile structures meet, and the quality of the motion suggests possible changes. To stabilise this region muscular forces are required (involving mainly iliopsoas, thoracic erector spinae, quadratus and rectus abdominus). Psoas spasm causes abdominal pain, flexion of the hip and typical antalgesic posture. If a number of

these muscles are involved normalising one often corrects the others, as does treatment of the thoracolumbar restriction.

Cailliet provides the following guides as to the role of psoas in contraction:

- If the lumbar spine is fixed, contraction of the psoas results in flexion of the femur on the pelvis.
- If the femur is fixed, the psoas insertion becomes the origin and the origin in turn becomes the insertion on the lumbar spine. Shortening in this situation causes traction on the anterior lumbar spine and an increase in lumbar lordosis.

This view is disputed by osteopathic researchers (Fryett 1954, Kappler 1973) who state that chronic contracture of psoas muscles (usually) results in loss of normal lumbar AP curve with flattening and even reversal of that curve. Fryett goes on:

In unilateral psoitis the muscle shortens and works from both ends with the result that the patient is drawn forward and sidebent to the involved side. The ilium on that side rotates backwards on the sacrum and the thigh is everted.

Psoas is extremely sensitive to strain and toxaemias such as dead teeth, prostatitis, gonorrhoea, common cold, etc . . . the primary predisposing cause is usually an articular lesion at 1st or 2nd lumbar.

When both muscles are involved, and the tensions are equal, the patient is drawn forward with the lumbar curve locked against backward bending and side bending. Forward bending can usually increase though.

Flexion stress is the main mechanical cause of problems in psoas. If osteopathic research is right, diagnosis can therefore often be based on observation of AP curve status, fixation of the upper lumbars in flexion, restricted in extension, being the hallmark.

If the lumbar AP curve is normal this suggests that psoas is unlikely to be involved, unless a paradoxical situation exists (see below). Despite what Kappler and Fryett state above (i.e. that the spine goes into flexion if psoas is bilaterally short) a paradoxical, opposite, effect is also seen.

Psoas paradox

If there is marked erector spinae shortening, together with marked bilateral tightness of iliopsoas, the action of psoas switches to a dorsal direction; it no longer acts as a flexor of the spine but as an extensor, or rather it supports hyperlordosis of the lumbar segments. This was observed many times in cases of poliomyelitis (says Janda) and in this situation the patient can sit up with iliopsoas activity alone, without abdominal assistance.

So, the tighter the trunk erectors the more likely the psoas paradox is to exist. Such a patient will never strengthen the abdominals until the erectors are dealt with (due to constant reciprocal inhibition) at which time psoas reverts to being a lumbar flexor. Psoas contraction bilaterally will show different clinical pictures depending on whether the erectors are overtight or normal.

Psoas symptoms

Symptoms of acute psoas dysfunction include the positional factors already mentioned, as well as pain which seems to start at the midline and lumbosacral area (where the majority of stress forces concentrate, producing increased extension, when lumbodorsal junction is fixed). Pain usually radiates laterally and abdominal pain is common. As psoas contracts, if the upper lumbars become fixed in flexion, the lumbosacral area builds up accommodating stresses, the posture alters accordingly. As postural side shift occurs, pain develops on the side of the greater instability in the gluteal and SI regions. Therapy is often misguidedly directed at the lumbosacral and sacroiliac regions, making matters worse (Fryett 1954, Kappler 1973).

EXERCISE 8.38

Time suggested
3 MINUTES

Examination of psoas, including modified Thomas test

Patient stands at end of table with back to it, one knee and hip are flexed which patient clasps close to stomach. Patient lies backwards with coccyx close to end and avoiding lordosis. (See p. 96, Exercise 4.16)

Free thigh should be horizontal to table; if not, psoas is short.

Calf should be almost at right angle to thigh; if not, rectus femoris is short. If this is so and patient's knee is passively bent to 90°, there will be involuntary flexion of hip.

If there is groove in lateral thigh and patella deviates laterally, suspect TFL shortening. If this is so and leg is adducted, hip will flex involuntarily.

Place patient's arms above head (supine), observe if length is equal.

What findings have you observed regarding your patient's psoas status?

EXERCISE 8.39

Time suggested
3 MINUTES

Psoas strength test

Patient should be in the same position, both legs hanging down. Stand between your patient's legs, their feet pressed against your lateral calves, your hands resting on their thighs, have them try to 'lift' you from the floor with their feet.

Assess relative strength. Compare with tightness test.

According to Mitchell et al (1979), if a psoas is both tight and strong, stretching is called for. If tight and weak, deal with other factors (such as tight erector spinae muscles) first.

If psoas is short, the modified Thomas test proves it (this is usually confirmed by overarm test for length equality – the side of the short arm is on the side of the short psoas).

Stretching is achieved by hip extension with the lumbar spine stabilised (isometric muscle energy methods).

What were your findings?

Was there relative weakness or strength in the sort psoas?

COMMENT

Observation of psoas incompetence shows:

- The ribcage tips forwards and down as abdominal recti pull on it.
- The rhomboids become incompetent.
- The body becomes flexed at the groin, i.e. psoas is 'glued down' as it crosses

the pelvic brim, preventing truly erect posture. (Psoas always produces aberrations around the groin when in trouble).

On spinal flexion psoas should 'fall back' if recti and psoas are interacting well. This shows as a flattening of the stomach rather than a bulging, as you bend forwards.

EXERCISE 8.40

Time suggested 3 MINUTES

Have your model/patient lie on the floor and draw the legs up, together, dragging the heels and keeping them together. If the small of the back arches, psoas is inadequate to its job. The waistline should 'fall back'.

Have the patient lie on their back and extend both legs skywards. Does the belly mound up?

If so, then the recti and psoas are not in balance. A competent psoas function should allow raising of legs to the vertical position without hardening of recti.

COMMENT

Cailliet (1962) reminds us that SLR to 30° is accomplished by iliopsoas.

Beyond 30°, the abdominals can take over SLR as iliopsoas becomes less effective.

Cailliet suggests SLR exercises aimed at abdominal strengthening should only ever begin from the 30° position to minimise stress on the lumbar spine and psoas.

Lewit says that attention to tight erector spinae would take care of lack of tone in the abdominals without much need for exercise of this sort.

IS PIRIFORMIS SHORTNESS A FACTOR?

Piriformis involvement in any pelvic or lower extremity problem may be suspected if there exists:

- Pain near greater trochanter
- Pain in inguinal area
- Local tenderness over piriformis tendon and muscle
- SI joint pain on opposite side
- Unilateral splay foot attitude on affected side
- Sciatic type pain to knee
- Pain unrelieved by position, patient is happiest when upright and moving
- Limitation of internal rotation of leg, producing pain in hip region
- Affected side short
- Pain and limitation of motion at T10 and T11
- Tension in area of T3 and T4
- Pain and limited motion at C2 on opposite site to dysfunction and concomitant atlanto-occipital lesion on same side due to shortness of affected leg (treatment of the secondary lesions will be ineffective until piriformis is corrected).

SYMPTOMS

The symptoms of piriformis syndrome are commonly as follows:

- Persistent, severe, radiating low back pain extending from sacrum to hip joint, over gluteal region and posterior portion of upper leg to the popliteal space.

- Change of position usually does not relieve symptoms, sitting, squatting, lying and standing all being uncomfortable.
- The buttock will be extremely tender.
- There is usually persistent external rotation of the leg, which appears short.

These symptoms, in the absence of the short leg sign, indicate some other factor than piriformis, as a rule.

PATTERN

The spinal and pelvic pattern usually associated with piriformis dysfunction is as follows:

- Right piriformis contraction produces left oblique axis rotation of sacrum.
- Sacral base on the right goes anterior in relation to PSIS; sulcus overlying the spine is palpated as being deeper; apex of sacrum moves left of midline and posteriorly at level of PSIS; sulcus on left side appears and palpates as more shallow because of posterior movement of sacrum, on that side.

Mitchell's piriformis assessment protocol

Mitchell suggests an assessment of relative strength and shortness of external rotators of the hip in which the following sequence is adopted (see next exercise):

Patient is prone, knees flexed. You grasp and abduct the ankles and place the hips into full unforced internal rotation. You should then compare the range of motion available (degree of movement from midline) which has been possible without undue force (passive range).

Equality of rotation indicates no imbalance.

Inequality could mean tightness one side or weakness on the other.

You then stand at the foot of the table, between the patient's legs. Their knees should be flexed to 90°. You stabilise the lower legs at the limit of their range of motion of internal rotation of the hips and ask the patient to bring their ankles to the midline against your resistance. This action involves them trying to externally rotate the hip.

You should grade the relative strength of the effort.

If there is evidence of shortness on one side, with no obvious weakness in the opposite piriformis, the shortness should be treated using MET, according to Mitchell.

COMMENT

Piriformis shortness can lead to pudendal nerve and blood supply disruption and serious problems involving the genitalia in both sexes, as well as extreme pain on intercourse in women due to leg position.

EXERCISE 8.41 *Time suggested* 15–20 MINUTES

Carry out a full assessment sequence for piriformis as follows:

Observe for shortness and external rotation (patient supine).

Palpate piriformis insertion area for sensitivity (patient side-lying, insertion point is found where a line from the ASIS to the ischium intersects one from the PSIS to the trochanter).

Assess the relative freedom of internal and external rotation of the leg (patient supine).

Assess the passive range of motion of internal rotation of the hip (patient prone) and then relative weakness from same position (as per Mitchell's method, above).

With the patient supine, cross the suspected side leg over the extended other leg, foot alongside the opposite knee, angle of thigh on tested side around 60°.

Apply medial pressure in order to stretch piriformis. Any resulting pain behind the trochanter suggests piriformis shortness.

Use the guidelines in Special Topic 4, which discusses the ways in which we can evaluate whether any given pain is of muscular or joint origin.

Do passive and active motions in opposite directions produce the pain?

Does stretching of the muscle produce the pain?

Look at sacral landmarks to see if this coincides with what is anticipated in piriformis dysfunction (see notes above, p. 218).

If there is sciatic pain on straight leg raising, does it vanish with external rotation (if so, piriformis is probably involved)?

By working your way through this and the various tests associated with short leg/long leg problems, as described above, based on the writing and teaching of various experts, and by also evaluating (palpating and observing where appropriate) associated pelvic and postural muscular involvement, you will have had the opportunity to assess a wide range of the palpatory and observational skills discussed in this chapter.

EXERCISE 8.42

Time suggested
10–15 MINUTES

This final exercise in this chapter is based on the work of W. L. Johnston (1982). Johnston selected a number of areas and methods which he used to gain an 'initial impression' during physical examination, a screening for evidence of dysfunction in particular regions. Any evidence elicited by such gross testing called for further detailed investigation. Such tests do not say what is wrong, only that something is wrong.

Note: Johnston uses the term 'active' to mean operator induced, not patient induced (common terminology in Europe has this as passive, since that is the patient's role in the performance of the tests).

He selected his methods to, firstly, gain an initial impression of motion performance for each region of the body, and, secondly, to sample the major movement patterns of the body. For example:

- Rotational movement is introduced, with the patient seated, to the head/neck and shoulders, and with the patient standing, to the hips.
- Side-bending is introduced to the neck with the shoulders stabilised on the side from which bending is occurring, and to the trunk by downward pressure on the shoulders.
- Translatory movements – side to side – are introduced at the femoral trochanters with the patient standing.
- A lateral swing of the legs with the patient supine is followed by,
- Passive elevation of the arms (supine), which completes a sampling of motions for each spinal and extremity region.

Johnston points out that:

> Patient cooperation is gained by the operator briefly describing the procedure and asking the patient . . . to go along with it and not offer resistance.
>
> Placement of hands is light, and . . . the operator's active role is merely to initiate and guide the motion and complements the operator's need to sense response throughout the test.

> Position of the operator should be comfortable and flexible to minimise any additional proprioceptive sensory interference to reception of palpable cues. The movements introduced should not challenge the patient's sense of balance without the operator supplying an element of coordinated support. Postural challenge will evoke responses . . . that will reflect a false positive.
>
> Criteria for a positive finding are palpatory. Once the operator has developed the palpable sense of a normal resistance barrier typically present at the end of a gross motion range, he or she applies this measure with respect to timing and quality; to go beyond this point will require additional operator force. For one example, with the patient supine, do the legs (supported together at the ankles by the operator's hands to just clear the table level) swing easily to right and left without encountering abnormal degrees of resistance?
>
> Is the end point encountered sooner in one direction than in the opposing direction? (Palpable cues are more sensitively measured by the hands with the eyes closed.)
>
> Does the quality of the end point retain a normal sense of resiliency or slight give, or is it perceived as a hard firm barrier?

Johnston's tests include:

Seated:
1. Rotation of the head left and right
2. Side-bending of the neck with opposite shoulder stabilised (side-bend left/right shoulder stabilised)
3. Rotation introduced through the shoulders (arms folded)
4. Side-bending introduced through the shoulders.

Standing:
5. Rotation of the hips left and right

Supine:
6. Side to side motion (translation) applied from the trochanters
7. Lateral swing of the legs
8. Arms taken overhead.

Perform these tests and record results.

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Percussion palpation

Percussion has been used as a means of manual treatment and diagnosis for many years.

The first major definitive study of the topic was that of Albert Abrams (of 'Black Box' fame) whose vast text *Spondylotherapy* was first published in 1910 (Abrams 1910). The preface to that book tells us that:

> In spondylotherapy the employment of mechanical vibration fills one of the most useful roles in therapeutics. It is easily controlled and is practical and effective of application in the hands of those familiar with the methods for employing spinal percussion.

Abrams described how he applied the percussive force:

> For simple concussion [I] employ a piece of soft rubber or linoleum about 6 inches [15 cm] long, 1.5 inches [4 cm] wide and about a quarter of an inch [0.5 cm] in thickness, as a pleximeter for receiving the stroke, and a plexor with a large rubber head for delivering the blow. In the absence of the latter a mallet or even an ordinary tack-hammer will suffice. One may also strike the spinous process with the knuckles, or better still the fingers may be used as a pleximeter and the clenched fist as a plexor . . . [Ideally] the strip of linoleum is applied to the spinous process or processes to be concussed, and with hammer a series of sharp and vigorous blows are allowed to fall on the pleximeter. Naturally the blows jar the patient somewhat, but beyond this no inconvenience is suffered.

Some years later, Dr A. C. Johnson (1939) described the use of the hand or a mechanical instrument to apply percussive vibrations, 'which are only effective when applied with sufficient rapidity'.

In this palpation text, lengthy discussion of the therapeutic use of these methods is inappropriate; however, Abrams and others are absolutely clear as to the potential diagnostic value of this neglected art.

Percussion as a means of defining the position, and to some extent the status of organs, has a long history, with major variations in its use in Western and Oriental traditions of medicine. (See Exercise 7.4, p. 170)

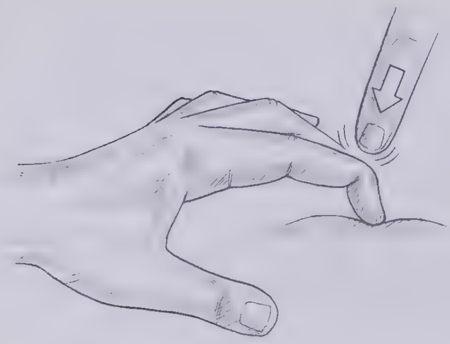
A wide range of sounds may be heard when percussion is employed and their interpretation has been described in numerous medical texts, but in few more thoroughly than in that of Sir Robert Hutchinson (1897), published around a century ago and still in print. He described in detail the ways in which percussion examination can determine organ boundaries as well as the normal and abnormal variations in resonance of individual organs.

For example in discussing thoracic percussion he describes both quantitative (ranging from hyper-resonance to absolute dullness) and qualitative sound differences (various tympanic pitches, skodaic, boxy, cracked-pot, bell-sound/coin percussion, amphoric, etc.). Each of the qualitative variations is of potential diagnostic and prognostic value as it is interpreted in relation to other information available to the examiner.

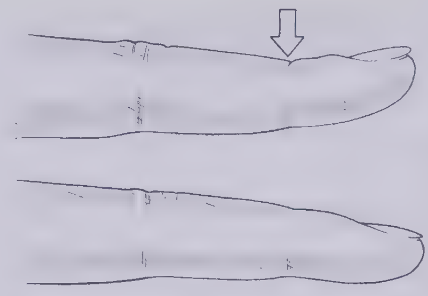
Variations in sound will depend upon the relative solidity or hollowness, as well as the shape of the palpated organ, the nature and degree of intervening tissues – whether these are of bone, muscle, fat or other soft tissues, and the amount of air in the tissues being evaluated, as well as the manner in which percussion is applied. (Special Topic Fig. 9A,B)

Method

Hutchinson suggests that the middle finger of the left hand be used as a pleximeter. This is laid firmly on the tissues to be percussed so that no air intervenes between finger and skin, and the middle finger of the right hand then strikes this. The pleximeter finger can also be useful as a source of information regarding tissue resistance during percussion:



Special Topic Fig. 9A Distal phalanx position held as vertical to the palpated surface as possible, as described by Abrams, for percussion ('orthopercussion') assessment.



Special Topic Fig. 9B A finger which is to be used as a pleximeter should have the distal phalanx slightly raised (upper finger) and not resting along its length on the palpated surface (lower finger) [after Abrams]. The arrow represents the ideal point which should be struck for optimal percussion efficiency.

> The back of the middle phalanx (of the left middle finger) is struck with the tip of the middle finger of the right hand. The stroke should be delivered from the wrist and finger-joints and not the elbow, and the percussing finger should be so bent that when the blow is delivered its terminal phalanx is at right angles to the metacarpal bones, and strikes the pleximeter perpendicularly. As soon as the blow has been given, the striking finger must be raised, lest it should impair the vibrations it has excited, just as the hammers of a piano fall back from the wires as soon as these have been struck. In cases where percussion requires to be firmer, several fingers may be used; but it is better, whenever possible to employ only one percussing finger . . . It is seldom necessary to deliver more than two or three strokes at any one situation. The points to be noted on percussion are the volume and *pitch* of the resonance elicited, and the sense of *resistance* experienced by the finger.

There are three cardinal percussion rules, states Hutchinson:

> The first is that in defining the boundaries between contiguous organs the percussion should invariably be performed from the resonant [more hollow] towards the less resonant [more solid]. The second is that the longer axis of the pleximeter [finger] should be parallel to the edge of the organ whose delimitation is being attempted, and the line of percussion should be at right angles to that edge. The third is that the pleximeter finger must be kept in firm contact with the tissues [being evaluated].

In abdominal percussion, Hutchinson tells us that the pitch we hear depends upon the depth of the air space and the tension of the containing wall of the organ, and that these two important elements vary greatly in the same viscus at different times. For example, the presence of free gas in the peritoneal cavity causes the normal dullness elicited in liver or spleen percussion to disappear. If abnormal dullness is detected we need to find out whether this is constant in all positions or whether it shifts when the position of the patient is altered, something of particular importance if an unnatural degree of fluid presence is suspected, as in ascites. He gives the example of an unusual distension of the abdomen which could result from gas, ascites or a new growth. Both a tumour and fluid would produce a dull percussion sound but the fluid would move (and the sound would therefore change) if the patient's position were altered, while the tumour would not.

SPECIAL TOPIC EXERCISE

Percussion of the upper and lower borders of the liver

To make out liver dullness, it is suggested that the patient be supine for anterior percussion and seated or standing for posterior percussion.

Percuss from the 2nd rib downwards, to get a good lung note:

> Percuss down from rib to rib till impairment is detected. Then repeat the process, going from space to space instead of from rib to rib. Percuss in this way down the mammary, midaxillary and scapular lines. The upper limit of liver dullness in the middle line cannot be distinguished from heart dullness. To map it out, draw a straight line from the apex beat to the angle where the right edge of the heart and the deep liver dullness meet. The upper limit of liver dullness forms an almost horizontal line around the chest.
>
> In defining the lower border of the liver, use very light percussion and pass upwards. The exact position of the lower edge of the liver is extremely variable. Usually it coincides with the costal margin in the mammary line. It may be considerably above or below this without there being any pathological change in the organ.
>
> In percussing the surface of the liver where it is not covered by the lung, it should be observed that the organ has a certain degree of *resistance* or *resilience.* The normal amount of this can only be learned by practice. If the organ is enlarged or congested, its resistance to percussion is increased owing to its being more firmly pressed against the chest wall.

Percuss the liver as suggested – can you define its borders?

Percussion is a form of palpation which deserves to be more widely used. The use of percussion therapeutically is a natural extension of the acquisition of this skill.

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9 Visceral palpation and breathing function assessment

There is really only one way to learn visceral palpation and that is to achieve a high degree of palpatory literacy and to practise, practise, practise.

And there is much to practise on. Goldthwaite and his colleagues, in their classic text (Goldthwaite et al 1935), described the changes which were commonly found in association with a loss of diaphragmatic efficiency and abdominal ptosis:

- Breathing dysfunction and restrictions develop.
- There is drag on the fascia supporting the heart, displacing this organ and resulting in traction on the aorta. Nerve structures supplying the heart are similarly stressed mechanically.
- The cervical fascia is stretched (recall that this can lead to distortion anywhere from the cranium to the feet, as the fascia is continuous throughout the body).
- Venous stasis develops below the diaphragm (pelvic organs and so on) as its pumping action is inhibited and diminished, leading to varicose veins and haemorrhoids.
- The stomach becomes depressed and tilted, affecting its efficiency mechanically.
- The oesophagus becomes stretched, as does the coeliac artery. Symptoms ranging from hiatus hernia to dyspepsia and constipation become more likely.
- The pancreas is mechanically affected, interfering with its circulation.
- The liver is tilted backwards, there is inversion of the bladder, the support of the kidneys is altered and the colon and intestines generally become mechanically crowded and depressed (as does the bladder). None of these can therefore function well.
- The prostate becomes affected due to circulatory dysfunction and increased pressure, making hypertrophy more likely. Similarly, menstrual irregularities become more likely.
- Increased muscular tension becomes a drain on energy, leading to fatigue which is aggravated by inefficient oxygen intake and poor elimination of wastes.
- Spinal and rib restrictions become chronic making this problem worse.
- Postural joints become stressed, leading to spinal, hip, knee and foot dysfunction, increasing wear and tear.

All these changes are palpable. And all are correctable, if caught early enough. A more precise examination of mechanical visceral dysfunction is now available through texts such as the highly recommended *Visceral manipulation* (Barral & Mercier 1988) which gives a host of directions, instructions and useful hints for anyone interested in this area of palpation and treatment. These British-trained osteopaths have developed the art of visceral palpation and manipulation to a very high level of expertise, constantly maintaining the precepts of osteopathic philosophy and practice. There is no way that it will be possible in the space available in this chapter to do more than indicate the sort of palpation exercise required to start emulating their work.

In their opening chapter they outline what we need to know about visceral motility and mobility:

> There is an inherent axis of rotation in each of these motions (mobility and motility). In healthy organs, the axes of mobility and motility are generally the same. With disease, they are often at variance with one another, as certain restrictions affect one motion more than another. What a surprise it was for us to discover that the axes of motion reproduce exactly those of embryological development! Neither preconceived ideas nor hypotheses directed this research. The discovery of this phenomenon was purely empirical, and tends to confirm the idea that 'cells do not forget'.

The various motions concurrently acting in the body are numerous and potentially confusing as palpation takes place.

Visceral motion is influenced by:

1. The somatic nervous system (body movement, muscular tone and activity, posture). An example by Barral and Mercier is of the motion of the liver during flexion, as it slides forwards over the duodenum and the hepatic flexure of the colon below. Similar motions occur in all viscera, determined by the particular support they have and their anatomical relationships.
2. Autonomic nervous system, including diaphragmatic motion, cardiac pulsation and motion as well as peristaltic activity. Clearly these automatic motions influence those organs closely associated in terms of locality as well as some at a distance (diaphragmatic motion, 24 000 times daily, influences and to some extent moves – or vibrates – all organs).
3. Craniosacral rhythm, as we have seen in earlier chapters, involves palpable movement throughout the body, most certainly including the viscera.

Embryological influences

These three influences produce visceral mobility. And there is also inherent organ motility which, Barral and Mercier have indicated, relates very much to the embryological development phases. As an example, the authors describe how during the development of the foetus the stomach rotates to the right in the transverse plane and clockwise in the frontal plane. The transverse rotation therefore orients the anterior lesser curve of the stomach to the right, and the greater posterior curvature to the left. The pylorus is therefore rotated superiorly and the cardia inferiorly.

The authors found that these directions 'remain inscribed in the visceral tissues' with motion occurring around an axis, a point of balance, as it moves further into the direction of embryological motion and then returns to neutral (very similar to what takes place in the craniosacral mechanisms during flexion and extension of the structures of the skull).

Inspir and expir

The motility cycle is divided into two phases which are termed *inspir* and *expir*.

These are unrelated to the breathing cycle, being similar to the descriptions used in cranial osteopathy for cranial motion, flexion and extension.

Inspir describes the inherent motion and expir the return to neutral afterwards (7 to 8 cycles per minute).

An example of this is that the liver's inherent inspir phase involves rotation posterosuperiorly (its mobility, as influenced by inhalation's diaphragmatic movement, is almost exactly opposite, anteroinferior).

In palpation, it is often easier to feel the expir phase (although inspir is more 'active' as there is less resistance to it), being a return to neutral.

Chronobiology

An additional vital, yet confusing, element is chronobiological influence. It is necessary to take account of the 'energy clock' initially described in traditional Chinese medicine (TCM) but now universally recognised as describing very pertinent changes in physiological function through the 24-hour period. The peak for energy circulation through the associated meridians in TCM is as follows:

- For the lungs it is between 3.00 and 5.00 a.m.
- Large intestines 5.00 and 7.00 a.m.
- Stomach 7.00 to 9.00 a.m.
- Spleen 9.00 to 11.00 a.m.
- Heart 11.00 am to 1.00 p.m.
- Small Intestine 1.00 p.m. to 3.00 p.m.
- Bladder 3.00 to 5.00 p.m.
- Kidney 5.00 to 7.00 p.m.
- Pericardium 7.00 to 9.00 p.m.
- Triple Burner 9.00 to 11.00 p.m.
- Gall Bladder 11.00 p.m. to 1.00 a.m.
- Liver 1.00 to 3.00 a.m.

Other monthly, seasonal and annual cycles require consideration in visceral palpation/manipulation.

Visceral articulation

Just as joints have articulations, so do viscera have 'articulations'. These are made of sliding surfaces (meninges in the CNS, pleura in the lungs, peritoneum in the abdominal cavity and pericardium in the heart) as well as a system of attachments (including ligaments, intercavity pressure, various folds of peritoneal structures forming containment and supportive elements). Unlike most joints, few muscular forces directly move organs.

Factors such as adhesions and fixations within the supporting tissues and 'articulations' influence visceral motion negatively, as does overall displacement via ptosis (sagging or laxity), the influence of muscular restriction through spasm as well as anything which disturbs the associated rhythmic factors in the body, such as the diaphragm's action.

THREE VISCERAL PALPATION ELEMENTS

Barral and Mercier (1988) suggest that there are three elements involved in evaluation of visceral function, and these are the traditional ones of:

- Palpation, (which informs as to tone of the walls of the visceral cavity)
- Percussion, (which informs about the position and size of the organ in question), and
- Auscultation, (which informs as to factors such as circulation of air, blood and secretions such as bile).

Muscular influences

These authors stress the importance of the influence on visceral function of muscular activity and urge mobility tests to identify dysfunction in the musculoskeletal system. However, they state that:

> We believe that visceral restrictions are the causative lesions much more frequently than are musculoskeletal restrictions.

HOW DO YOU PALPATE AN ORGAN FOR MOBILITY?

By precise movements, say Barral and Mercier. In order to do this though, you need to know the normal movements of the organ in question. They give an example of the liver which, 'you literally lift up to appreciate the elasticity of its supporting structures and the extent of its movement'.

Mobility assessment (which provides information as to elasticity, laxity/ptosis, spasm and structural injury of muscular or ligamentous supports) requires less skill than does finer evaluation of inherent motility and variations in it from the norm.

HOW DO YOU PALPATE ORGANS FOR MOTILITY?

The most effective method for evaluating motility, say Barral and Mercier, is the method described by Rollin Becker (see Ch. 5) in which the hand 'listens' for information. This is how the French osteopaths describe application of Becker's work to this task:

> Place your hand over the organ to be tested, with a pressure of 20-100 g, depending on the depth of the organ. In some cases the hand can adapt itself to the form of the organ. The hand is totally passive, but there is an extension of the sense of touch used during this examination. Let the hand passively follow what it feels – a slow movement of feeble amplitude which will show itself, stop and then begin again (7 to 8 per minute in health).
>
> This is visceral motility.

It is desirable, then, after a few cycles, to estimate elements such as frequency, amplitude and direction of the motility. The advice is very much as given by Becker, Upledger, Smith and others (see Ch. 5). Do not have preconceived ideas as to what will be felt. Trust what you feel. Empty the mind and let the hand listen. (Both organs of a pair should be assessed and compared.)

One visceral palpation exercise – for motility (based on the work of Barral and Mercier) – is suggested below. Those exercises relating to Becker's work, as outlined in Chapter 5, should have been performed satisfactorily before performing this exercise. Study of visceral manipulation and attendance at seminars and workshops covering this subject is suggested for those keen to explore this subtle and rewarding field.

EXERCISE 9.1

Time suggested
10 MINUTES

Palpation for liver motility

Patient is supine. The examiner (seated or standing on the right of the patient, facing her) places the right hand over the lower ribs, moulding to their curve, covering the outer aspect of the liver.

Lay the left hand over the right, and allow the mind to become still. If it helps, visualise the liver.

Remember that you are trying to assess the return to neutral (expir phase of the motility cycle), which means that the actual direction of active motion would be the opposite to that palpated in this phase. Barral and Mercier suggest that this expir phase is the easiest for the beginner to palpate.

During this expir phase, three simultaneous motions may be felt: firstly, on the frontal plane, a counter-clockwise motion from right to left around the sagittal axis (of your hand and therefore the liver). This takes the palm of the hand towards the umbilicus. (Fig. 9.1)

Secondly, in the sagittal plane the superior part of the hand should rotate anteroinferiorly around a transverse axis through the middle of your hand.

Thirdly, in the transverse plane, the hand rotates to the left around a vertical axis, bringing the palm off the body as the fingers seem to press more closely.

Each of these planes of movement can be assessed separately before they are simultaneously assessed, providing a clear picture of liver motility in the expir phase of the cycle (inspir is the exact opposite).

Try performing this palpation exercise with your eyes closed and also have the patient periodically hold the breath for 20-second periods to see whether this gives you a less confused feeling of motion.

Remember also Becker's method of assessment (Ch. 5), using his elbows or forearm as a fulcrum. Use this to enhance palpatory sensitivity and see whether it in fact increases your perception.

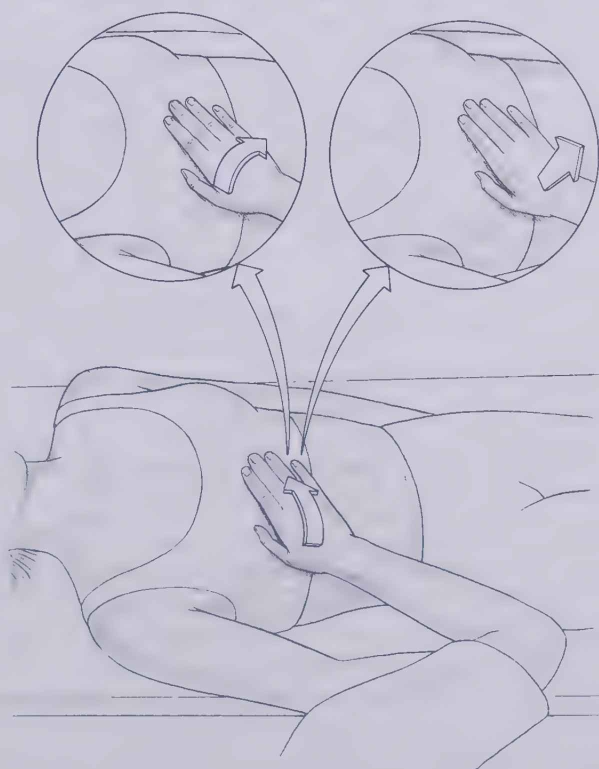

Fig. 9.1 Palpation of the liver (after Barral and Mercier) in which frontal, saggital and transverse planes of motion are sequentially assessed.

Respiration assessment

Lewit (1992) has synthesised much of the current knowledge about respiratory influence on body mechanics, and describes useful methods for assessing its efficiency and coordination:

> Thinking of breathing, one naturally has in mind the respiratory system.
>
> Yet it is the locomotor system that makes the lungs work, and the locomotor system that has to coordinate the specific respiratory movements with the rest of the body's locomotor activity. This task is so complex that it would be a miracle if disturbances did not occur.

Structural considerations

Garland (1994) has summarised the structural modifications which are likely to inhibit successful breathing retraining as well as psychological intervention, until they are at least in part normalised.

He describes a series of changes including:

> Visceral stasis/pelvic floor weakness, abdominal and erector spinae muscle imbalance, fascial restrictions from the central tendon via the pericardial fascia to the basi-occiput, upper rib elevation with increased costal cartilage tension, thoracic spine dysfunction and possible sympathetic disturbance, accessory breathing muscle hypertonia and fibrosis, promotion of rigidity in the cervical spine with promotion of fixed lordosis, reduction in mobility of 2nd cervical segment and disturbance of vagal outflow . . . and more.

These changes, he states:

> Run physically and physiologically against biologically sustainable patterns, and in a vicious circle, promote abnormal function which alters structure which then disallows a return to normal function.

In simple terms, until there is some degree of normalisation of the machine it cannot be used normally, whatever directions the individual gives it. However:

> If assistance can be given to an individual who hyperventilates by minimising the effect of somatic changes and if these structural changes can be provided with an ability to modify, therapeutic interventions via breath retraining and counselling will be more effective.

He concludes:

> In hyperventilation, where psychology overwhelms physiology the role of the osteopath can be very beneficial.

Lewit (1980) has given due attention to structure and function as it relates to respiration. He states that:

> The most important disturbance of breathing is overstrain of the upper auxiliary muscles by lifting of the thorax during quiet respiration.

The implications of this have been described by Garland, as detailed above.

Other researchers have examined the relationship between respiration and the function of the musculoskeletal system. For example, Cummings and Howell (1990) have looked at the influence of respiration on myofascial tension and have clearly demonstrated that there is a mechanical effect of respiration on resting myofascial tissue (using the elbow flexors as the tissue being evaluated).

They also quote the work of Kisselkova and Georgiev (1976), who reported that resting EMG activity of the biceps brachii, quadriceps femoris and gastrocnemius muscles 'cycled with respiration following bicycle ergonometer exercise, thus demonstrating that nonrespiratory muscles receive input from the respiratory centres'.

The conclusion was that:

> These studies document both a mechanically and a neurologically mediated influence on the tension produced by myofascial tissues, which gives objective verification of the clinically observed influence of respiration on the musculoskeletal system and validation of its potential role in manipulative therapy.

Breathing and muscle pain

Dr Mark Pellegrino (1993/1994) of Ohio State University has studied fibromyalgia syndrome and its link with chest pain.

He notes that 'FMS patients are more prone to getting anxiety or panic attacks, especially when placed in a stressful situation.'

Breathing irregularities often have a connection with the symptoms of anxiety. Hyperventilation, and anxiety also have an intimate link with poor stress-coping abilities.

At its simplest, the connections can look as follows:

- A person responds habitually to what they find to be a stressful situation by breathing shallowly, using the upper chest and not the diaphragm.
- This breathing pattern becomes a habit, so that it continues even when whatever they see as stress is not present (even when sleeping), although it tends to be much more obvious when they are stressed.
- With such a pattern of breathing the accessory breathing muscles become overactive and tense and often develop painful local areas.
- Headaches due to irritation of local nerve structures in these muscles and/or interference with circulation to, and drainage from, the head can occur – with lightheadedness, dizziness and possibly headaches resulting.
- The overbreathing pattern leads to excess carbon-dioxide being exhaled, causing carbonic acid levels in the blood to be lowered, leading to the blood stream becoming too alkaline.
- Alkalisation leads automatically to a feeling of apprehension/anxiety and the abnormal breathing pattern becoming worse. Panic attacks and even phobic behaviour are not uncommon following this.
- Alkalisation also leads to nerve endings becoming increasingly sensitive so that the individual is more likely to report pain when previously only discomfort would have been reported.
- Alkalisation results also in vasoconstriction of the blood vessels in the head, reducing further oxygenation of the region.
- Along with heightened arousal/anxiety, and cerebral oxygen lack there is also a tendency for what oxygen there is in the blood stream to become more tightly bound to its haemoglobin carrier molecule, leading to decreased oxygenation of tissues and easy fatiguability.
- Inadequate oxygenation and retention of acid wastes in over-used muscles takes place, and these become painful and stiff.
- The muscles being overused in the inappropriate breathing pattern are mainly postural stabilising muscles (scalenes, SCS, trapezius, pectoral, levator scapulae) and will, with the repetitive stress involved in the overbreathing, become short, tight and painful and will develop trigger points.

  Remember that the most common sites for tender points of FMS – and trigger points – lie in just these muscles of the neck, shoulder and chest.
- The increased tension in these muscles adds to feelings of fatigue since the muscles are constantly using energy in a non-productive way even during sleep.

- The poor breathing pattern leads to a restriction of the spinal joints which attach to the ribs, which, because they are not moving much due to shallow breathing, are deprived of regular (each breath) movement, leading to stiffness and discomfort.
- The rib attachments to the sternum are also restricted leading to pain.
- A similar lack of movement of the diaphragm leads to digestive organs missing out on a regular (each breath) rhythmic 'massage' as the diaphragm rises and falls.
- Shallow breathing restricts the pumping mechanism between the chest and the abdomen – which normally assists in the return of blood from the legs to the heart. Cold feet and legs could be caused, or at least aggravated, by this.
- The intercostal muscles become tense and tight with the likelihood of chest pain and a feeling of inability to get a full and deep breath.

The consequences of respiratory dysfunction which falls short of actual hyperventilation should not be underestimated since, although the impact on health may well be less dramatic than the sequence indicated above, the same tendencies will be apparent (see Special Topic 11 on hyperventilation).

Breathing and muscle and joint activity

In general, muscular activity is enhanced by inspiration and inhibited by expiration. There are exceptions to this, such as the abdominal muscles, which are facilitated by forced exhalation. Flexion of the cervical and lumbar spines is enhanced by maximum exhalation whereas flexion of the thoracic spine is enhanced by maximum inspiration, and these phases of respiration can be usefully employed in mobilisation (and assessment, including palpation) of this region.

A further influence on spinal mechanics of respiration is described by Lewit:

> The most surprising effect of inspiration and expiration is the alternating facilitation and inhibition of individual segments of the spinal column during sidebending, discovered by Gaymans (1980). It can be regularly shown that during sidebending, resistance increases in the cervical as well as the thoracic regions, in the even segments (occiput–atlas, C2 etc. and again T2, T4 etc.) during inspiration; during expiration we gain the mobilising effect in these segments. Conversely, resistance increases in the odd segments during expiration (C1, C3 etc., T3, T5 etc.). There is a neutral zone between C7 and T1.

Inspiration increases resistance to movement in the atlas–occiput region in all directions, while expiration eases its motion in all directions, a most useful piece of information, of value during manipulation or assessment/palpation of motion. Where maximum muscular effort is required we tend to neither inhale nor exhale, but to hold the inhaled breath (Valsalva manoeuvre).

This achieves postural stability (no facilitation of spinal motion in any segments) at the cost of momentary loss of respiratory function. The diaphragm has therefore been described (according to Lewit) as 'a respiratory muscle with postural function', while the abdominal muscles are 'postural muscles with respiratory function'.

These comments highlight the role of the diaphragm in supporting the spine. As Lewit explains, the abdominal cavity is a fluid-filled space which is not compressible just as long as the abdominal muscles and the perineum are contracted (the shout of the judo wrestler, ski jumper and weight lifter all attest to this enhanced stability being used).

A further stabilising feature is the fact that, as we rise on our toes, the diaphragm contracts (at start of a race, or when jumping for example) this being interpreted as a postural reaction. Lewit sees inspiration as largely dependent on contraction of the diaphragm which lifts the lower ribs just as long as the central tendon is supported by counterpressure from sound abdominal muscles. This, he says, is the only explanation of the widening of the thorax from below (see also Latey's assessments of this function in Ch. 11, p. 258).

The thorax must be widened from below to achieve postural stability during respiration, never raised from above. Therefore the shoulders, clavicles and upper ribs are not lifted but rotate slightly to accommodate the movement from below as the thorax widens. This does not happen when supine or on all fours, where no postural stabilising effect is needed, and pure abdominal respiration becomes physiologically normal, with the abdomen bulging while its wall remains relaxed.

Assessing breathing function

These preliminary explanations are necessary to understand what we should look for when respiratory dysfunction is active. What then should we observe and palpate?

1. Inactive abdominal muscles are clearly undesirable for respiratory and postural normality, for the spine then loses its diaphragmatic support. The abdominal tone can be assessed with the patient seated and relaxed. There should be no flabbiness on palpation. On stooping from the standing position the abdominals should be felt to contract.

Recall that Janda has shown (Ch. 4, p. 88) that tight erector spinae muscles will effectively reciprocally inhibit the abdominal musculature, and that no amount of toning exercise can restore normalcy until the erector spinae group is stretched and normalised.

The test for abdominal muscle efficiency involves having the patient sit up from the supine position while knees and hips are flexed. In order to have co-ordinated action from the glutei (maximus) in this action the heels may press *backwards* against a firm cushion or support. If this is difficult, then lying backwards from a seated position will train the abdominals.

The spine is flexed first and one segment at a time is laid on the table/floor without raising the feet from the floor. If the feet start to leave the floor, stop the move backwards at this point and slowly return to the upright seated position. Keep repeating the lay back, trying to increase the distance travelled before the feet start to rise.

2. The thorax must be seen to widen from below on inhalation. Also, when sitting flexed or lying prone, there must be a visible ability to breathe 'into' the posterior thoracic wall. This is evidenced by the respiratory 'wave' described previously (p. 198).

Where this wave is absent, starting in the low lumbars and progressing throughout inhalation up to the cervicodorsal junction, there will be palpable restrictions in the thoracic spine due to the absence of the mobilising effect of the breathing function.

3. The most obvious evidence of poor respiratory function is the raising of the upper chest structures by means of contraction of the upper fixators of the shoulder and the auxiliary cervical muscles (upper trapezius, levator scapulae, scalenes, sternomastoid and so on).

This is both inefficient as a means of breathing and the cause of stress and overuse to the cervical structures. It is clearly evident (see below) when severe, but may require a deep inhalation to show itself, if only slight.

EXERCISE 9.2

Time suggested
20 MINUTES

Assessing respiratory function

Patient seated, stand behind and place hands, facing forwards, over lower ribs. Patient inhales.

Is there a lateral widening?

Or do your hands seem to be raised upwards?

The hands should move apart, but they will be felt to rise if inappropriate breathing is being performed.

Does one side seem to move more than the other?

If so, local restrictions or muscle tensions are involved.

Try to evaluate 'continuity of motion' in the inhalation/exhalation phases. Observe any starting and stopping, or asymmetry, or apparent malcoordination; any unexpected departures from smooth mobility.

Rest the hands over the upper shoulder area, fingers facing forwards.

On inhalation, do the hands rise?

Does the clavicle rise on inhalation?

Neither the clavicle nor your hands should rise, even on forced inhalation.

While in this position, assess whether one side moves more than the other. If so, local restrictions or muscle tensions are involved.

Observe the upper trapezius as they curve towards the neck.
Are they convex (bowing outwards)?

If so, these (so-called 'gothic' shoulders) are very taut and probably accompany inappropriate breathing, lifting the upper ribs (along with scalenes, sternomastoid and levator scapulae).

Palpate these muscles, and test them for shortness (see Ch. 4).

Palpate the abdomen, still with the patient seated, as he inhales deeply.

Does the abdomen (slightly) bulge on inhalation?

This is normal. In some instances, breathing is so faulty that the abdomen is drawn in on inhalation and pushed outwards on exhalation.

Go back to the first position, hands on the sides of the lower ribs.

Feel the degree of contraction on exhalation.

Does this seem to be a complete exhalation?

Or does the patient not quite get the end of the breath exhaled before commencing the next inhalation?

If so, this leads to retention of excessive levels of tidal air, preventing a full inhalation. Inhalation efficiency can be said to depend on the completeness of the exhalation.

Ask the patient to take as long as possible to breathe in completely.

How long did it take?

If less than 5 seconds, there is probably dysfunction.

Next, after a complete inhalation, ask them to take as long as possible to exhale, breathing out slowly all the time (not a fast exhalation followed by a period during which nothing happens).

This should also take no less than 5 seconds, although people with dysfunction, or who hyperventilate, and those in states of anxiety, often fail to take even as long as 3 seconds to inhale or exhale.

Time the complete cycle of breathing. This should take not less than 10 seconds in good function.

Patient lies supine, knees flexed. Rest a hand, lightly, just above the umbilicus and have the patient inhale deeply.

Does your hand move towards the ceiling?

Are the abdominal muscles relaxed?

Or did the hand actually drop towards the floor on inhalation?

The answer to the first two questions should be 'yes', and to the third a definite 'no'.

If the abdomen rises, was this the first part of the respiratory mechanism to move, or did it inappropriately follow an initial movement of the upper or lower chest?

Paradoxical breathing such as this involves the mechanism being used in just such an uncoordinated manner.

Lie the patient prone and observe the wave as inhalation occurs, moving upwards in a fan-like manner from the lumbars to the base of the neck. This wave can be observed by watching the spinous processes or the paraspinal musculature, or palpated by a featherlight touch on the spine or paraspinal structures.

CROSS REFERRAL TO OTHER PALPATORY fiNDINGS

Whatever restrictions or uncoordinated movements you observe or palpate during this exercise can now usefully be related to findings of spinal restrictions, rib and clavicular dysfunction (Ch. 8), respiratory and postural muscular shortening as well as trigger point activity – especially in the intercostal muscles (Ch. 4), postural imbalance, pelvic dysfunction and short leg anomalies (Ch. 8), emotional involvement (Ch. 11). Integrating the various components of palpation as described throughout the book will help to sharpen the palpatory literacy which is the objective of the work.

Charting results

Boxes 9.1 and 9.2 give examples of the kind of forms you could draw up to record breathing dysfunction in individual cases.

Box 9.1 Primary and accessory respiratory muscle assessment for shortness

E = Equal (circle if both are short)
L and R (circle if left or right are short)

1.	Psoas	E	L	R
2.	Quadratus lumborum	E	L	R
3.	Pectoralis major	E	L	R
4.	Latissimus dorsi	E	L	R
5.	Upper trapezius	E	L	R
6.	Scalenes	E	L	R
7.	Sternocleidomastoid	E	L	R
8.	Levator scapulae	E	L	R
9.	Spinal flattening: seated, legs flexed	LowL MidT	LDJ UpperT	LowT
10.	Cervical spine extensors short?	Yes	No	

Box 9.2 Palpation assessment and evaluation

Seated

a.	Is lateral rib expansion symmetrical?	YES	NO
	Specify		
b.	Measure range of unforced expansion*:	EXHALED	INHALED
	From:	.... cm	to .... cm
c.	Measure range of full expansion*:	EXHALED	INHALED
	From:	.... cm	to .... cm
d.	Does inhalation start before exhalation complete?	YES	NO
e.	Does clavicle rise on inhalation?	YES	NO
f.	If there is movement, is it symmetrical?	YES	NO
	Specify		
g.	Does abdomen draw inwards paradoxically on inhalation?	YES	NO
h.	Time breathing elements		
	Does inhalation last at least 5 seconds?	YES	NO
	Record inhalation..secs		
	Does exhalation last at least 5 seconds?	YES	NO
	Record exhalation.......................................secs		
	Does full cycle last at least 10 seconds?	YES	NO
	Record cycle...secs		
i.	Evaluate thoracic spinal restrictions.		
j.	List and chart findings.		

Prone

k.	Observe 'breathing wave' of prone patient as they take full breath.		
	Is there a wave-like movement from the base of the sacrum to the base of the neck?	YES	NO
	Where does the wave start and stop?		
	LowL LDJ LowT MidT UpperT		

Supine

l. Evaluate for elevated or depressed rib restrictions.
m. Note any asymmetry in breathing function (e.g. lateral expansion).

*1. To measure the amount of expansion taking place, sit or stand facing your patient/model and place your thumbs, with their tips touching, on the anterior midline, and the index fingers so that they lie along the shafts of a pair of ribs, say the 6th, with fingertips facing posteriorly. As your partner/patient inhales, either fully or normally, your thumbs will separate.
Judging the degree of expansion by this means is rapid and accurate.
2. Alternatively, use a flexible tape-measure to record the unexpanded circumference and the expanded circumference in order to measure the range of expansion.

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Palpating the traditional Chinese pulses

A method of diagnosis which has existed and been refined over a period of 5000 years deserves to be taken seriously, even if its precepts and conclusions seem to fly in the face of current medical thinking.

Not surprisingly, there are different versions and interpretations of pulse diagnosis. However, the basic methodology is similar in all schools.

As an exercise in palpation the methods of pulse diagnosis have much to commend them, even if the interpretations of what is being palpated are not accepted.

Precisely the same can be said for cranial palpation, in which there is little dispute that 'something' is being felt when 'cranial impulses' are being assessed, although there is a great deal of debate as to what 'it' is and what 'it' may mean in health terms.

History

Mary Austin (1974) points out that in Western medicine, taking the pulse is an important part of the diagnostic process:

> How many beats to each breath, strong or weak, even or irregular? and the blood flow, when it is felt where a blood vessel is conveniently near the surface, is the flow full or thin, strong or weak, hard or soft, regular or intermittent, etc.?

TCM pulses

The Chinese pulse is however quite a different story:

> The truly great discovery made by the Chinese, as regards the pulse, was that *through the pulse it is possible to read not merely the health of the organism as a whole, but that of each inner organ separately* – whether it had much or little energy, whether it was congested, over-full, or escaping, deficient; whether it was hyper or hypo active; whether the polarity predominance and polarity changes were in proper order, and so on.

The Chinese identified 12 (some say 14) positions on the radial pulse which could be used to indicate the status of specific organs and functions. How is this possible?

Dr Austin explains:

> If you have fluid flowing through a resilient tube, a rubber or plastic tube attached to a water tap, and very lightly touch the tube with a finger, the flow of water can be felt. The tube need hardly be compressed at all for us to feel the flow quite distinctly. Let the finger tip linger a while, so that the kind of sensation of flow registers in you; now steadily compress the tube by increasing the pressure until you have stopped the flow, then lift ever so slightly – maintain this pressure and note what you are feeling. The kind of sensation you now experience in your finger tip is different from that of the first light touch. You may, for example, be more aware of the resilience of the tube itself, at one pressure level rather than another; or of volume, water pressure, speed of flow etc. Continue your experiment by varying the surface on which the tube rests. A tube resting on a hard surface will feel different from when it is resting upon a soft surface (folded towel for example). This will apply to both levels of palpation. There will also be a difference if one places a layer of material between finger and tube.

If, instead of the tube described by Austin, we think of an artery, and of the hard surface as an underlying bone, and of the gauze as soft tissues, we can see that it may indeed be quite possible for palpation to detect variations in flow depending upon what lies between your finger and the vein and what lies below the vein.

SPECIAL TOPIC EXERCISE 1

Connect a plastic or rubber tube to a bath or kitchen tap and conduct the experiment as described by Austin.

Can you sense differences depending upon the surface the tube rests on and materials between your finger and the tube?

SPECIAL TOPIC EXERCISE 2

Learn to assess your own pulses and those of patients or volunteers. Sit in a relaxed manner and with your right hand feel the pulses of the left wrist. Resting the back of your, or your patient's, left hand on the palm of your right hand, curl your fingers so that they rest on the radial artery.

Place the middle finger at the level of the styloid prominence just below the wrist crease. Your forefinger will then rest naturally on the crease, near the thenar eminence, and the ring finger will fall naturally onto the third pulse position.

George Ohsawa (1973) states that:

> The extreme end of the finger, the pulp, which is the most sensitive part, should be used to evaluate the pulses. The last phalanges should be perpendicular to the plane of the wrist. The nails must be cut short.
>
> The superficial yin pulse corresponds to the hollow organs; the deep yang pulse corresponds to the full yang organs. You judge the superficial pulse by feeling the position lightly and then gradually increasing the pressure of the finger. To determine the deep pulse, one compresses the artery completely at the beginning and then releases it little by little. The deep pulse corresponds to the blood pressure, to the fundamental composition of blood; the superficial pulse to the variable blood pressure.

Adopt the palpation position as described, right hand palpating the left radial pulse.

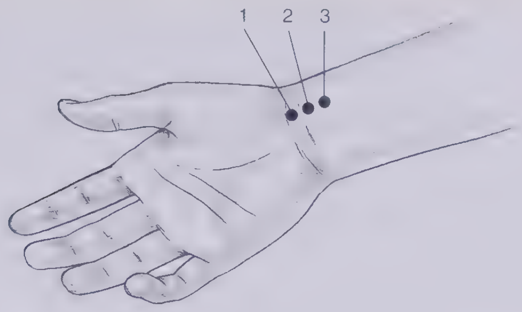
Position 1 is where your index finger rests, position 2 is where the middle finger rests and position 3 is where the ring finger rests.

Left wrist

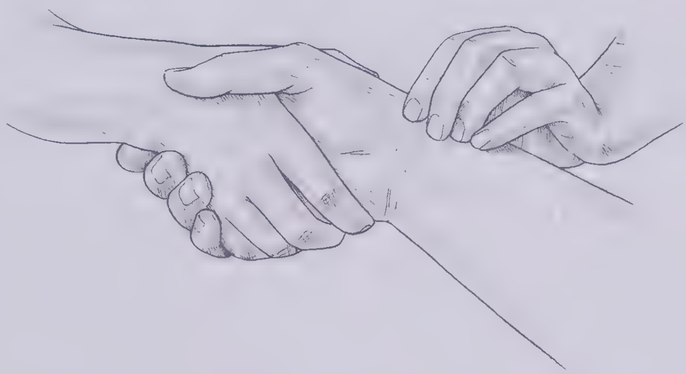
Position 1 light pressure is said to relate to the Small Intestine meridian. Deep pressure detects the Heart meridian status.
Position 2 superficial relates to Gall Bladder and deep pressure to Liver.
Position 3 superficial relates to Bladder meridian and deep to the Kidney meridian.

Right wrist

When the right wrist pulses are read, the various positions are as follows:
Position 1 superficial is for Large Intestine and deep is for Lungs.
Position 2 superficial is for Stomach and deep is for Spleen.
Position 3 superficial is Triple Heater and deep is Circulation.



Special Topic Fig. 10A Location of pulses (right hand only illustrated) for assessment in Traditional Chinese Medicine.



Special Topic Fig. 10B Taking the pulse in TCM. One finger at a time would apply suitable degrees of pressure to make an assessment, superficially or at depth.

Note: Oshawa states that the allocation of organs to pulses on the right and left hand as described above relates to men only. The pulse allocations are said by him to be reversed in women. This sort of controversial statement helps to explain why so many Western trained therapists find difficulty in accepting the conclusions drawn from TCM pulse diagnosis.

Dr Stiefvater (1956) gives the following simplified breakdown of what pulse readings may indicate:

Small, thin, fine indicates insufficiency.
Full and hard indicates hypertension and hyperfunction.
Soft and strong indicates inflammation.
Small, hard and pointed indicates spasticity, contracture and the associated organ will usually be painful.
Overflowing and large indicates excess, usually with inflammation and pain.
Very weak, scarcely perceptible indicates energy depletion.

As you palpate, try to gain a sense of normal (score of 4), excess (score of 5 to 8), deficiency (score of 0 to 3).

Denis Lawson-Wood (1965) states that a score of 0 is applicable to someone who is almost dead and a score of 8 represents a patient *in extremis*:

> When feeling the pulses the practitioner 'listens' to them much as one listens to an orchestra – each pulse representing one of the instrumentalists. Taken together the 'melody' should be a happy and harmonious one. If the melody is not joyous and harmonious at least one of the players is out of tune. You need to locate which is

the discordant player. You must be relaxed and receptive and when you palpate each level quite deliberately say to yourself, 'I am now listening to the pulse of (name of meridian) to hear and understand what it has to say to me'.

It is suggested that best results will be obtained if you or the patient has been resting for at least 10 minutes prior to the assessment and that the best times for taking the pulses is between 5 a.m. and 1 p.m.

This exercise is meant to help you to achieve a sense that there is a difference in what you feel in the various indicated pulse positions. You are not meant to make a diagnosis on this basis, or to accept the interpretations of TCM, merely to gain an awareness of what is being suggested by TCM.

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10 Palpation without touch (therapeutic touch)

The field of the 'laying on of hands', 'bioenergy', 'spiritual healing', intercessory prayer, 'absent healing', Qigong, Reiki, 'chakra balancing' and various other methods of non-touch manipulation have been researched scientifically for many years.

The results of what is known of these phenomena have been collected, collated and discussed by Dr Daniel Benor (1992a).

To put it at its simplest, the results (in many clinical studies) of non-touch healing are mind-boggling in their range and implications, ranging as they do from beneficial changes in patients with anxiety, pain and chronic headaches; improvements in haemoglobin and haematocrit levels; the healing of dermal wounds; improved blood pressure levels; significantly reduced complications in patients in a coronary care unit; prevention of stroke in hypertensive patients, and improved myopia.

The fact that such methods are also shown to be effective in helping in recovery of enzymes, single-celled organisms, fungi, bacteria, plants and animals – as well as humans – should remove most of the 'its all in the mind' suggestion as to the efficacy of such healing methods.

Clearly, anyone holding their hands above the surface of the body is not really palpating or manipulating the physical tissues themselves. However, the boundary between what we take to be the physical and something distinctly palpable above the surface, requires investigation. As we can see from Fritz Smith's work (and that of other 'energy' workers, discussed in Ch. 5) it helps if we can 'visualise' an energy field/body when working in this as yet ill-defined area.

Therapeutic touch

Therapeutic touch, as developed by Dolores Krieger, is a modern derivative of the laying on of hands, which involves barely touching the patient's body, or the holding of hands away from the body surface, with an intent to help or heal. This method is now taught to many members of the nursing profession worldwide, and recent research has validated its therapeutic value.

A fascinating, if somewhat inexplicable benefit, under controlled conditions, has been reported by Keller and Bzdek (1989).

Sixty volunteers with tension headaches were divided randomly into two groups. In one group patients were treated either with therapeutic touch – in which 5 minutes of non-touching energy balancing with healing intent was applied – while in the other group patients received 5 minutes of apparently identical methodology (hand position the same and so on) but with the therapist deliberately concentrating on mental arithmetic during the treatment.

Both groups were asked to sit quietly and breathe deeply during the real and placebo sessions, and *no physical contact was used on either group.*

Standard McGill–Melzack pain assessment questionnaires were used before, immediately after and 4 hours after each treatment or placebo treatment. 90% of those exposed to therapeutic touch experienced sustained reduction in intensity in headache pain with an average of 70% pain reduction, twice the average achieved immediately after therapeutic touch.

Dummy therapeutic touch (placebo) reduced pain in 80% of patients but only by a level of 37% for a shorter duration, since half the placebo group resorted to medication in the 4 hour period after, as compared with only 5 of the therapeutic touch group.

So what do the therapists actually do?

Keller and Bzdek:

> The intervention began with the researcher centering herself into a meditative quiet and making conscious intent to help the subject. She then passed her hands 6 to 12 inches [15–30 cm] from the subject without physical contact to assess the energy field . . . and to redirect areas of accumulated tensions out of the field. She then let her hands rest around (not on) the head or solar plexus in areas of energy imbalance or deficit and directed life energy to the subject.

Those who do not, thus far, use such methods might care to think more about just what happens under these conditions, and to learn how to 'feel' the fluctuations in energy, something which is apparently palpable with practice.

As part of an attempt to achieve this, and to understand the mechanics of such interventions we will now assess the methods recommended by a number of experts in this field for palpating and treating, using 'energy'.

Dr Dolores Krieger

During the 1960s, a series of experiments was conducted involving enzymes, plants and animals, in which the 'laying on of hands' was demonstrated to have profoundly protective effects in the face of a variety of negative influences, ranging from a deficiency diet to irradiation. Anyone who wishes to read a succinct account of these should study *Vibrational medicine* by Richard Gerber (1988).

It was following the publication of such research – specifically research by Dr Bernard Grad, of McGill University, indicating an increase in chlorophyll in plants nourished by water which had been 'treated' by healers – that Dolores Krieger, a professor of nursing at New York University, began to investigate the human potential of these methods. It was reasoned that since chlorophyll was chemically identical to haemoglobin, except that in the former a magnesium atom exists instead of iron, it should be possible to improve haemoglobin levels in humans by similar means.

A healer who had been involved in the plant experiments 'magnetically charged' rolls of cotton batting for a group of sick people to keep with them, as well as conducting a laying on of hands. A year later these patients were compared with a control group who had received no such 'treatment' and were found by Dr Krieger to have significantly raised haemoglobin levels. This was confirmed in later experiments and led Dr Krieger to begin teaching her method, dubbed 'therapeutic touch', to senior nurses. By this time Krieger had become convinced that what was being manipulated was *prana* (subtle energy) as described in Hindu and yogic tradition.

In its simplest terms, the method was conceived as the balancing of the energy field of someone in whom it had become disrupted or weakened, either as a result of ill-health or as a predisposing factor to that ill-health. Individuals who are basically healthy have an abundance of energy and can use this to help those in whom it is disturbed, with profoundly beneficial effects, both physically and emotionally.

The potential to apply this form of healing resides in us all, says Krieger (her book *The therapeutic touch* is highly recommended) (Krieger 1979) and its use can be developed by simple exercises. Krieger states that its two most noticeable effects are the eliciting of a profound, generalised relaxation as well as being good at relieving pain. What is called for, before practising or performing therapeutic touch, is a 'centering' process in which you learn to find within yourself an inner reference of stability.

Krieger says:

> Centering . . . can be thought of as a place of inner being, a place of quietude within oneself where one can be truly integrated, unified and focussed. This place is well known to those who practise meditation and deep relaxation. It cannot be found by effort or strain: It is a conscious direction of attention inwards, an 'effortless effort' that is conceptual but that can be experiential.

It is not within the scope of this text to teach the reader to find that quiet state; numerous texts and tapes exist, as well as opportunities for individual or group instruction which can all lead to this state of 'balance, of equipoise, and of quietude that marks the experience of centering'.

Once you have achieved this, Krieger provides clear guidelines as to how we should begin palpating energy variables.

EXERCISE 10.1 *Time suggested* **10 MINUTES**

Learning to palpate energy

Centre yourself and sit comfortably with both feet on the floor and place your hands so that the palms face each other.

Your elbows should be held away from your trunk, the lower arms unsupported by anything. Bring the palms as close together as you can without actually allowing them to touch (perhaps as close as under 0.5 cm). Slowly separate your hands to a gap of around 5 cm and then return them to the first position (0.5 cm gap). Next take them 10 cm apart and then slowly return them to the first position. Now go to a 15 cm gap (always very slowly) and come again to the first position. (Fig. 10.1)

Do you feel anything as the hands come close together?

A build up of 'pressure' in that small space perhaps?

Or do you feel any other sensation, such as a tingling or vibration?

Now take your palms 20 cm apart and this time do not bring them together again immediately, but rather do so in 5 cm increments; first to 15 cm apart, then 10 cm, 5 cm and finally, the starting position. At each position stop and sense and 'test' what you can feel between your hands. (Fig. 10.2)

Do you sense a 'compression' of something between your hands? A 'bouncy' feeling?

If so, at what distance did this become apparent?

Take a minute or more to practise this exercise over and over again.

Try to experience what you are feeling and note the characteristics of the elastic, bouncy, energy field you are holding between your hands.

Do you feel heat, cold, tingling, pulsation, or something else altogether?

This exercise can be practised whenever you have a spare moment until you are confident that what you feel is real and its characteristics become familiar.

Do it with your eyes closed or open, and see which is best for you. As Krieger says, 'You do not stop at your skin,' and this exercise proves this to you and allows you to develop the sensitivity for application of therapeutic touch.

Krieger provides a series of exercises which incrementally help you to become more aware of your own potential in this field and her book is suggested as a working tool for those attracted to these methods.

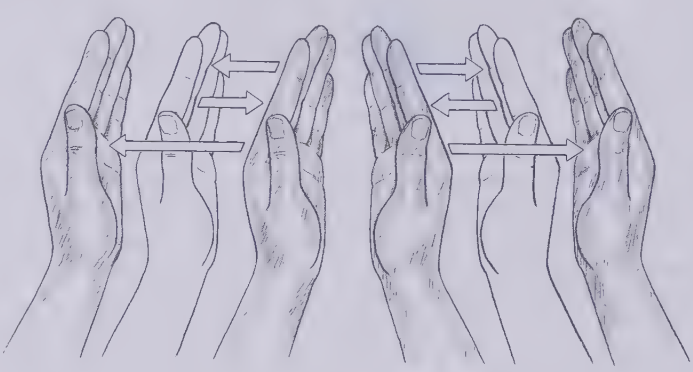

Fig. 10.1 Bring hands as close together as you can without the palms touching each other. Then bring hands apart about 5 cm. Return hands slowly to original position. Repeat, and on each repetition separate the palms by an additional 5 cm, until they are finally 20 cm apart.

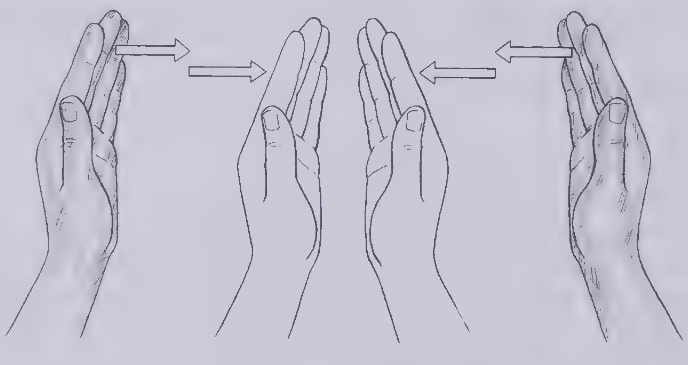

Fig. 10.2 When the hands are about 20 cm apart, slowly bring them together. Every 5 cm, test the field between your hands for a sense of bounciness or elasticity.

EXERCISE 10.2

Time suggested
10–15 MINUTES

Scanning someone's energy field

Having developed your skills in energy palpation, and having centred yourself, practise the following assessment of someone else's energy field.

Have a 'model', or a real patient, who is sitting or lying. Place your hands 5–8 cm from their skin surface, perhaps starting at the head. Test the area to the left of the head and compare this with the right side.

Scan from the top of the head, over the face to the chin, taking about 10 seconds to cover that area. Be aware of whatever you feel, changes in sensation, temperature and so on, but do not dwell on questions such as 'Did I or did I not feel something?' Simply sense what comes through your hands.

Gradually move over the entire front of the body and then move to the back. Speed of movement is slow but steady.

When the complete scan is finished, recheck any areas which seemed unusual, and recheck your first impressions.

It may be that where there are significant variations in the energy field you will note temperature fluctuations through your hands. Or you may feel pressure changes, tingling, vibration, electric shock type sensations or pulsations instead.

All may be significant. Note and record what you sense.

EXERCISE 10.3

Time suggested
5 MINUTES

Beginning to scan the chakras

Relax and centre yourself and then scan the body of a partner or patient to see whether you feel any variations or changes in the texture and nature of the energy field in the regions of the 'chakras', as described in Chapter 5 by Upledger (pp.120–121). (Fig. 10.3)

Compare what you feel in the various chakra positions with findings from 'normal' healthy energetic individuals and those who are unwell.

See whether particular forms of ill-health relate to particular patterns of energy fluctuation.

Note and record your findings.

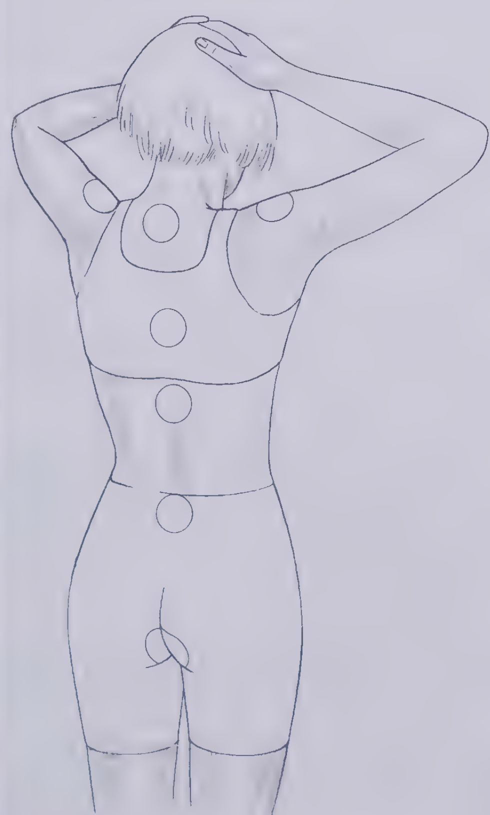

Fig. 10.3 Map of 'energy (or chakra) fields' of spinal region.

The concepts of Brugh Joy

Along with Dr Krieger's book, a thoughtful and delightful introduction to energy medicine will be found in *Joy's way* by Dr Brugh Joy (1979). There is much which is similar to Krieger, but a good deal which is unique, with abundant material to help the reader in developing the ability to feel radiating energy fields as well as guidance in methods for 'transfer of energy to others'.

Joy describes what he teaches as 'transformational therapy' and stresses that one set of exercises should be mastered before the next is attempted, describing them under the headings of:

1. Resonation circle
2. Exploration of greatly amplified musical sounds
3. Modified spiral meditation
4. Dyadic exercises
5. Triadic exercises
6. Hand scanning
7. Energy transfer.

It can be seen from this list alone that before getting to the place where Krieger starts, Joy suggests a good deal of work. Joy's book is the best way of obtaining detailed directions in the first five of the above requirements. His description of hand scanning of chakras is worth studying as it gives a clear outline of his approach:

> During the hand-scanning phase of body-energy work the consciousness of the scanner must become totally receptive and his/her awareness must be centred entirely in the hand or hands. The witness state of consciousness is activated. One must be careful not to project what one thinks should be there into the space surrounding the person to be scanned. Instead the task is to explore that space in order to find out what is actually there. The hand that is acting as the detector is relaxed. The fingers should be slightly apart and may be bent, as in the classical ballet pose. A rigid flat hand, with the fingers held tightly together, is not nearly so effective a detector.

Joy suggests rolling up long sleeves exposing the skin of the forearm as this is often a more sensitive detector than the hand.

He also suggests that beginners should start with the right hand (if they are right handed) as it is hard to be efficient with both hands at first; both will eventually become suitably sensitive.

Speed of movement is important, as going too quickly prevents the mind from registering sensory input, and going too slowly allows the scanner's own energy to be reflected back from the body surface, so that all surfaces feel the same. Covering approximately 30 cm every two seconds is about the right speed (faster than Krieger's suggested speed of 10 seconds for the face alone).

A common sensation for the beginner is to feel 'overcharged', characterised by a tingle or pulsation or even an ache or pain. This prevents awareness of incoming stimuli. Joy suggests flicking the hands to relieve the sensation, or patting them on your own thigh. This may result from too much *trying*, which is not what is called for as you palpate the energy fields. The feeling has to be allowed to come through.

Joy likens the process of learning this subtle palpation to what happens to medical students as they learn to detect heart murmurs: 'First they must learn where to centre their hearing awareness, because their ordinary hearing mechanism simply does not listen to the ranges where these murmurs can be heard. The same is true with the subtle sense of touch, at least at the beginning stages.'

The distance from the body of the scanning hand should be 20–30 cm, says Joy, with the person to be scanned lying face upwards on a wooden bed or table (metal apparently interferes with the energy field). All jewellery should be removed, as should metal buckles and watches. The person being scanned should feel relaxed and free to move (to scratch, for example, or stretch) if they wish. Talking, however, should be discouraged.

Joy suggests a start be made by taking the pulse of the 'patient' in order to attune the scanner's consciousness to the patient's. With the other hand, scanning can then begin over the chest and upper body and lower abdomens, as here the energy fields are strong and relatively easy to assess. He suggests the scanning hand starts off from the side of the body, beyond its edge, and moves into the area above the body and then out again for a contrast to be noted. As one becomes familiar with the 'feel' of an energy field this is less necessary. He recommends the eyes be closed when working in this way (as in skin or muscle palpation, for better focusing of the mind).

He gives a most important pointer when he says: 'The fields are not felt when the hand is held over them *but as the hand moves through them.* This principal is fundamental. *During a scan the hand must be in perpetual motion. It must pass in and out of the fields.'*

Thus, by 'slicing' through the energy fields at different levels, its shape can be determined, as well as its distance from the surface, its density and its degree of 'health'.

Joy notes that after years of experience he can detect a field two or three times further from the body surface than can a beginner. At first, simply registering the fact that an energy vortex exists over a chakra is a major step forward. The ones over the groin and the top of the head are relatively easy to detect. The variations in intensity should be registered as the scanning hand passes from chakra to chakra.

The region over the throat chakra requires that the patient hold their breath for a short while, so that it does not confuse the scanning process. Practise in a group, if possible, so that the differences one from another are available to reinforce the learning process. After scanning the front of the body, the patient turns over and the back is assessed in much the same manner.

EXERCISE 10.4

Time suggested **7–10 MINUTES**

Chakra scanning without a map

Try scanning the back of the body, from the head to the base of the spine, without having first studied a 'map' of where the fields are most dense, and compare your findings with such a map later.

EXERCISE 10.5

Time suggested **10 MINUTES**

Scanning through another medium

With your patient lying face down, palpate the energy fields on the front of the body by scanning under the table. Compare your findings with what you assessed when they were face upwards. The energy field is said to pass through the material of the table readily and should be easily palpable at the same distance from the body as previously.

Before attempting to transfer energy (as in therapeutic touch), Joy suggests, it is essential to be able to scan in this way. He urges you to practise until all the chakras can be readily detected. It is not within the scope of this text to instruct in that phase of energy work, since detection of the energy fields, and any possible imbalances, are our first objectives.

Following the guidelines of Krieger and Joy (as well as those given below) will open this area of palpation and those interested in carrying their knowledge further will find excellent help in the books referred to in this chapter.

Brennan's methods

Barbara Ann Brennan, in her fine explanation of her approach to healing through the human energy fields (Brennan 1987), explains what is known via scientific enquiry, and much that is still speculated upon, as she leads the reader through a series of training processes towards an ability to work in this area with confidence.

She describes a series of exercises which can assist in helping you to visualise the human aura (energy field) which she says is the manifestation of universal energy intimately involved in your (human) life. This is divided into various 'layers' or 'bodies' which interpenetrate each other, each succeeding one being of finer vibrational quality than the body which it surrounds and interpenetrates.

EXERCISE 10.6 — *Time suggested* 10–15 MINUTES

Group work

If you are in a group, make a circle in which you all hold hands. Sense a pulsating flow of energy if you can. In which direction is it travelling? (Almost always from left to right around the circle). Ask your neighbour whether they feel the same thing.

Without moving anything, or altering the hand contact, Brennan asks you to 'stop the flow of energy'. Everyone in the circle should simultaneously hold this energy still for a short while before allowing it to flow again. This should be repeated several times as you feel the difference between energy flow and stillness.

EXERCISE 10.7 — *Time suggested* 10 MINUTES

Transferring energy

Sit opposite a partner with your palms facing theirs. Let any energy flow occur naturally. Then direct energy out of your left palm to their hand. Then stop this and bring energy into your right palm from their hand. Reverse and vary these flows and then stop it all together. Then attempt to 'push' energy out of both hands at the same time, and finally 'suck' energy into both simultaneously.

A feeling of tickling, 'tingling or pressure', something like static electricity, indicates that the energy fields are touching the skin or that the fields are touching each other. 'Push, pull and stop are the three basic ways of manipulating energy in healing,' says Brennan.

EXERCISE 10.8

Time suggested
10 MINUTES

Manipulating energy

She then suggests you practise the exercise (10.1 above) given by Krieger as a first step in assessing the field between your hands, as you take them to varying distances apart and then slowly bring them together again until you feel the compressed energy in the space between your hands: 'If your hands are one and a quarter inches [3 cm] apart (when you feel the compression forces) you have touched your etheric body edges together (first layer of the aura). If your hands are three to four inches [7–10 cm] apart, you have touched the outside edges of your emotional body together (second layer of the aura).'

Brennan suggests you hold the hands about 18 cm apart and point your right index finger at the palm of the left hand and slowly draw circles with it. See whether you can feel this (eyes closed, centred) as a tickling sensation.

EXERCISE 10.9

Time suggested
10–15 MINUTES

Visualising energy

Dim the room lights and hold your hands, fingertips pointing towards each other. The hands should be held in front of your face, about 60 cm away from your eyes. Have a plain white wall behind your hands. Relax your gaze and softly look at the space between your fingertips which should be about 4–5 cm apart.

Moving the fingers towards and away from each other slightly, or taking one hand slightly upwards and the other down slightly, she asks that you note what you might be seeing between your fingers or around the hand.

Brennan suggests that in 95% of people it will be as follows: 'Most people see a haze around the fingers and hands . . . it looks somewhat like the heat haze over a radiator. It is sometimes seen in various colours, such as a blue tint . . . The energy bodies pull like toffee between the fingers as the haze from each fingertip connects to the haze at the fingertip of the opposite hand.'

As you move the fingertips so that different ones face each other, the haze may follow the old pattern before jumping back to the presently closest fingertip.

Energy blocks

Brennan takes her reader through a host of gradually more complex exercises towards a full ability to palpate and manipulate the subtle energies around us all.

Of practical value to those working in bodywork are her instructions regarding identification and interpretation of 'energy blocks' which she divides into six types. The way these are formed will depend largely, she believes, on variations of tactics we all adopt in our 'energetic defence systems', which we use to defend ourselves aggressively or passively, to repel incoming threatening forces. The end results of such defensive/protective strategies are palpable in the space just away from the body's 'energy blocks' which she categorises as follows:

1. The 'blah' block. The result of 'depressing one's feelings' causing a stagnation of energy, with accumulation of fluid in the region involved. The physical body will be bloated at this region, the energy having a low intensity rather than 'high

energy'. The related emotions often have a despairing quality, or are associated with anger (in a blaming manner). Colitis or angina pectoris are examples of an end result. The 'feeling' of such a block is sticky, like mucus.

2. Compaction blocks are related to suppressed feelings, containing accumulated rage (volcanic, ready to explode). An 'ominous' feeling is associated with palpation or observation of such a block. Body fat or muscle accumulates in the regions affected. Diseases such as pelvic inflammatory disease may occur. The individual is usually aware of the suppressed rage, with a feeling of being trapped. Sexuality and a sense of humiliation may also be involved.

3. 'Mesh armour' is another pattern of block, used to help the individual avoid feelings, especially fear. The blocks are therefore shifted around when there is a challenge. Thus, if therapy releases associated tensions, they reappear elsewhere very rapidly. This type of block may not result in disease, the individual often appearing a 'perfect wife and mother', but with a vague sense of something lacking in life. Deep feelings are usually only tolerated for brief periods with intermittent crises occurring (sudden illness, affair, accident) as a pattern of life.

4. Emotions in the person with 'plate armour' are frozen. There is a palpable high-tension quality in the energy fields around the body. This allows the person to apparently build an effective, well structured life. Physically they seem to be firm, well-built, with good muscular tone. The individual is, however, often unfulfilled due to a low level of sensitivity. Cardiac or ulcerative conditions may develop, as well as musculoskeletal problems such as tendonitis. While appearing to have a well ordered life, the lack of feeling often leads to a life crisis, such as a coronary attack, which may prove a watershed for restructuring their life.

5. In some people an 'energy depletion' block exists, in which the flow of energy to the ends of the limbs is drastically reduced (making it obvious during scanning) and resulting in weakness or even physical problems related to the limbs. The energy and physical alterations may be a metaphor for an inability to 'stand on their own two feet' in life or as a representation of a feeling of failure.

6. Finally, there is the 'energy leak' where, instead of a smooth flow onwards from particular joints, energy seems to 'leak' from them. This may relate to an unconscious desire to be unable to respond to the environment or circumstances (based perhaps on a belief gained in childhood that response is dangerous or 'improper'). Physically, it will relate to malcoordination or other physical joint abnormalities or problems. The limbs will be cold and may feel vulnerable. The leaking energy is palpable close to the joints in such limbs.

Brennan asks you to ask yourself – which blocks have you used in your life as a result of early experience or conditioning?

Fritz Smith again

Let us briefly return to the work of Fritz Smith (1986), who gives this view of the energy body which Krieger, Joy and Brennan have shown us how to palpate in their respective ways:

> The working energy model of the human body is composed of three functional units: first, the non-organised background field of energy; second, the vertical movement of current conducted through the body which orients us to our environment; and third, the internal flows of the body which are produced because of the body's unique and individualised presence and which organise us into discrete functioning units. The last pattern – energy flow within the body – is further divided into three levels: the deep current through the bone and skeletal system; the middle currents through the soft tissues of the body; and the superficial level of vibration beneath the skin surface.

It is Smith's aim to make direct contact with these vibrational fields and he uses his unique 'bridging' methods (pressure, traction, bending, twisting or a non-moving fulcrum), as described in earlier chapters, to achieve this end.

Via these means, he assesses the clarity, density, pliability and other characteristics of energy, as well as the speed with which it responds (as evidenced by changes in rapid eye movement or breathing pattern, for example) to such contact (or to needles in acupuncture).

Particular areas of energy dysfunction relate, he believes, to specific forms of mento-emotional discord. Thus sexual problems relate to the sacral area, security/insecurity to the pelvic bowl, power to the lumbar area, anger and frustration to the hips and jaw, compassion to the heart, sadness to the chest, creativity to the throat, and intuition to the brow. He uses these generalisations (his word) to help assess the physical–emotional (or energetic) nature of the patient.

Pavek's physioemotional release

Richard Pavek (1987) has developed a system of 'physioemotional release therapy' called SHEN, which uses methods similar to those described in this chapter to release, or normalise, energy dysfunction (SHEN calls this biophysical) resulting from emotional stress. He states that it is not difficult to feel the 'physioemotional' field, in the same ways described by Krieger, Joy and Brennan, in the palm of the scanning hand(s) as 'changes in temperature, tingles, prickles, pressure, 'electricity' or 'magnetism''.

He amplifies these views as follows:

> The sensations [felt by the scanning hand] are usually different when the hand is over an area of physical pain, inflammation, tension and/or when release of emotion occurs when the hand is over an emotion region. The sensations picked up over an area of pain do not feel the same as the ones over a centre that is releasing emotion.

A series of exercises are given, some of which are the same as those already described in this (and previous) chapter(s), but with some useful variations.

EXERCISE 10.10

Time suggested 5–7 MINUTES

Playing with energy

Do Exercise 10.1 again (feeling the 'bounce' of the energy field between the palms of your hands as you vary the distance between them) and after sensing the energy as a pressure, hold this and then begin to rotate your palms in small circles as though you were holding a ball between the palms, the hands travelling in a series of circular motions away and then towards yourself, one hand travelling forward as the other travels back, all the while keeping the palms facing each other, as far apart as you noted the sense of 'pressure'. The circles described should be about 25 cm in diameter.

Does the field change?

Pavek suggests that this process should alter the feel, as it 'energises' the field, much as a nail stroked across a magnet will become energised.

This is a useful way of enhancing sensitivity prior to performing energy balancing or diagnosis.

SHEN, as a system, demands a great deal of practice, as do all the clinical applications of the methods touched on above. These few examples are by no means a complete representation of the depth of the work described by Krieger, Joy, Brennan, Smith or Pavek, being merely introductory concepts and exercises, which can be carried further if they trigger an interest.

NOTES FOR THE ENQUIRING MIND

Those who would like to explore this apparently uncharted area of healing further should also read the research work of L. E. Eeman (1947). Eeman was a pioneer in his studies of human energy patterns who finally concluded:

> Do not the experiments described recall the aura so frequently described by occultists, mystics and clairvoyants?
>
> Do they not combine to suggest that there may, in fact, be, for right handers:
>
> a. a flow of electro-magnetic(?) force down the left and up the right side of the body (clockwise), and also
> b. clockwise inner vortices, and
> c. the reverse for left-handers?

He appeals for research to continue in this field, since physical medicine has no evidence to offer on the subject. Study should also be made of three other areas:

1. The Japanese system of Aikido, excellently explained in two books (Japan Publications 1978a, 1978b).
2. The Chinese system of Qigong (China Sports Magazine 1985).
3. Polarity therapy, on which numerous books exist (e.g., Stone 1954, Seidman 1986).

As mentioned at the start of this chapter a compilation of research into this mystifying area has been made by Dr Daniel Benor (1992), and this is highly recommended.

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About hyperventilation

The effect of over-breathing is to reduce swiftly the levels of carbon dioxide in the blood, altering the acid–alkaline balance, producing increased nociceptor sensitivity and a sense of apprehension and anxiety, resulting in a variety of unpleasant symptoms.

Many studies have concentrated on the widespread problem of over-breathing. Much of this has related to its connection with anxiety states, panic attacks of an incapacitating nature and, all too often, phobic behaviour.

The symptoms most often associated with hyperventilation include:

- Giddiness, dizziness, faintness, numbness in the upper limbs, face or trunk, loss of consciousness (fainting), visual disturbances in which blurring or even temporary loss of vision is experienced, headaches of a general nature often accompanied by nausea and frequently diagnosed as migraine, inability to walk properly (ataxia) as well as trembling and head noises. A number of symptoms often associated with cardiac function can become apparent during or after hyperventilation, including:
- Palpitation, chest discomfort, difficulty in taking a deep breath, feelings of pressure in the throat, insomnia, fatigue, weakness in the limbs, and much more.

Of patients diagnosed with hyperventilation, more than half are found to be undergoing stress, related to marriage, work or finance. Hyperventilation is not, however, always associated with psychiatric stress and this is made clear in correspondence in the *Journal of the Royal Society of Medicine* (1987) in which it is stated that:

> The underlying disorder (of hyperventilation) may be psychiatric, organic, a habit disorder or a combination of these.

Indeed, one of the leading researchers into this topic, Dr L. Lum (1984) states:

> Neurological considerations can leave little doubt that the habitually unstable breathing is the prime cause of symptoms. Why they breathe in this way must be a matter for speculation, but manifestly the salient characteristics are pure habit.

Lum has summarised some of the confusion surrounding the phenomenon:

> Although Kerr et al (1937) had pointed out that the clinical manifestations of anxiety were produced by hyperventilation, it was Rice (1950) who turned this concept upside down by stating that the anxiety was produced by the symptoms and, furthermore, that patients could be cured by eliminating faulty breathing habits. Lewis identified the role of anxiety as a trigger, rather than the prime cause. Given habitual hyperventilation, a variety of triggers, psychic or somatic, can initiate the vicious cycle of increased breathing, symptoms, anxiety arising from symptoms exacerbating hyperventilation and thus generating more symptoms and more anxiety.

Despite the literature providing evidence of various symptom patterns being linked to hyperventilation, the concept of selecting patients for treatment and breathing retraining on the basis of symptoms alone might be flawed according to some.

Bass (Bass & Gardner 1985) points out:

> Diagnostic criteria for the hyperventilation syndrome are imprecise. The practice of basing diagnosis on symptom checklists is unreliable and equivalent to diagnosing diabetes on the basis of symptoms without measuring blood glucose concentrations.

When Bass and Gardner examined 21 patients with unequivocal hyperventilation and a host of unexplained symptoms they found that all but one complained of 'inability to take a satisfying breath' but that there was enormous variety when a host of different physical and psychological markers and signs were evaluated. They concluded: 'Severe hyperventilation can occur in the absence of formal psychiatric or detectable respiratory or other organic abnormalities.'

However, not everyone agrees with Bass's view that symptoms cannot provide a clue as to whether HVS exists. The questionnaire was evaluated by van Dixhoorn and Duivenvoorden (1985).

They compared the results of use of the questionnaire when completed by 75 confirmed HVS patients and 80 non-HVS individuals (health workers!).

There were three dimensions measured in the questionnaire

- Shortness of breath (HVS1)
- Peripheral tetany (HVS2)
- Central tetany (HVS3).

> All three components had an unequivocally high ability to differentiate between HVS and non-HVS individuals. Together they provided a 93% correct classification. Statistical double cross validation resulted in 90 to 94% correct classifications. The sensitivity of the Nijmegen Questionnaire in relation to diagnosis was 91% and the specificity 95%.

How to deal with hyperventilation

In most instances of hyperventilation a combination exists of a learned pattern of breathing coming into operation in response to real or assumed stressful situations. This is usually found to coexist alongside severely contracted muscles relating to the rib cage, spinal regions and the diaphragm area. These are readily palpable or observable. Such changes are a common feature amongst people who are chronically fatigued, since the combination of energy wastage, through long-held tension, and reduced oxygenation due to impaired respiratory function, can produce profound fatigue.

Muscles which are chronically hypertonic, shortened or contracted, cannot function normally and this is usually the case in people who hyperventilate who it seems have learned to overbreathe excessively in response to both stressful events and non-stressful ones.

It is perfectly normal to hyperventilate when excessive demands are required of the body, for example on physical exertion. If, however, this response occurs inappropriately, in the face of a perceived but unreal crisis, such as exists when we are abnormally anxious about something, then the sequence of over-breathing would lead to imbalanced blood gas levels, changes in acidity/alkalinity, and the whole sequence of hyperventilation symptoms previously listed (p. 253).

This may become an habitual method of responding to all minor stress situations leading to the complete misery of phobic states compounded by panic attacks and virtual incapacity and inability to function.

Such people respond well to breathing retraining and recognition of the fact that if they can learn to use more appropriate patterns of breathing in the face of a stressful (real or imagined) situation they can stop the symptoms, because they simply will not hyperventilate.

Ample research evidence exists to indicate that arousal levels can be markedly reduced via the incorporation into habitual use of specific patterns of breathing.

Bonn et al (1984), Cappo and Holmes (1984), Grossman et al (1985), among many others have shown that breathing retraining is a valid and highly successful approach; however, none of them incorporated physical therapy into their protocols which, it is suggested, would have allowed for even better results.

PRANAYAMA BREATHING

Cappo and Holmes in particular have incorporated into their methodology a form of traditional yoga breathing which produces specific benefits which have gone largely unrecognised in the protocols of most other workers.

The pattern calls for a ratio of inhalation to exhalation of 1:4 if possible, but in any case for exhalation to take appreciably longer than inhalation. Research indicates that this pattern markedly lowers arousal.

Conclusion

There is a clear link between abnormal breathing patterns, excessive use of the accessory breathing muscles, upper chest breathing, etc., and increased muscle tone, which is itself a major cause of fatigue, over and above the impact on the economy of the body of reduced oxygenation and the unbalanced, mal-coordinated patterns of use which stem from the structural and functional changes, as detailed by Garland (p. 230).

These patients will be fatigued, plagued by head, neck, shoulder and chest discomfort and a host of minor musculoskeletal problems as well as feeling apprehensive or frankly anxious. Many will have digestive symptoms (bloating, belching and possibly hiatal hernia symptoms, etc.) associated with aerophagia which commonly accompanies this pattern of breathing, as well as a catalogue of symptoms.

And yet none of the major medical researchers into hyperventilation seem to have examined the structural machinery of respiration!

There is scant attention in the quoted literature to the status of the muscles which perform the task of breathing.

And none of them seem to have considered that modifying the structural component (muscles, rib cage, spinal attachments, etc.) could encourage more normal function, despite evidence from manual medicine that this is possible (Lewit 1991).

Nor is there any seeming concern for those many patients who do not fit into the strict criteria of hyperventilation, those whose breathing is demonstrably out of balance but who fail to display evidence of arterial hypocapnia.

There is always a spectrum in such cases, with some being patent and obvious, others being borderline, and many being somewhere on their way towards a point where they will indeed show evidence of arterial hypocapnia and thus achieve the status of 'real' hyperventilators.

The fact that before someone displays frank symptoms they are possibly progressing towards that state, comes to the centre of what should be our concern in breathing dysfunction, to recognise people who are borderline hyperventilators, and to prevent that progression, as well of course as our trying to help those already entrenched in this pattern of dysfunction.

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11 Palpation and emotional states

Sherrington (1937) asked:

> Can we stress too much that . . . any path we trace in the brain leads directly or indirectly to muscle?

Wilfred Barlow (1959) stated, 'There is an intimate relationship between states of anxiety and observable (and therefore palpable) states of muscular tension.'

Use of electromyographic techniques has shown a statistical correlation between unconscious hostility and arm tension as well as leg muscle tension and sexual themes (Malmo 1949).

Sainsbury (1954) showed that when 'neurotic' patients complained of feeling tension in the scalp muscles, there was electromyographic evidence of scalp muscle tension.

Wolff (1948), in his famous book *Headache and other head pains*, proved that the majority of patients with headache showed:

> Marked contraction in the muscles of the neck . . . most commonly due to sustained contractions associated with emotional strain, dissatisfaction, apprehension and anxiety.

Even thinking about activity produces muscular changes. Jacobson (1930) demonstrated that:

> It is impossible to conceive an activity without causing fine contractions in all those muscles which produce the activity in reality.

Barlow sums up the emotion/muscle connection thus:

> Muscle is not only the vehicle of speech and expressive gesture, but has at least a finger in a number of other emotional pies – for example, breathing regulation, control of excretion, sexual functioning and above all an influence on the body schema through proprioception. Not only are emotional attitudes, say, of fear, and aggression mirrored immediately in the muscle, but also such moods as depression, excitement and evasion have their characteristic muscular patterns and postures.

Ford (1989), in his book *Where healing waters meet*, summarises the early, less controversial, work of Wilhelm Reich, who rejected the exclusivity of the concepts that underlying physical conditions created the environment in which psychological dysfunction would occur, or that physical dysfunction was necessarily the result of psychological forces.

Rather, he synthesised the two positions stating that:

> Muscular attitudes and character attitudes have the same function . . . They can replace one another and be influenced by one another. Basically they cannot be separated.

As Ford puts it:

> When he encountered difficult psychological resistance (character armouring) in a patient, he moved to the corresponding areas of physical tension (muscular armouring) in the body, and used various forms of somatic therapy to correct the underlying physical distortions . . . Similarly if he was unable to affect a change in the tension of the patient's body through somatic therapy, he resorted to working with the psychological issues beneath the tension.

Palpation, insofar as it relates to emotional states, therefore requires the ability to observe (patterns of use, posture, attitudes, tics and habits) and feel for changes in the soft tissues which relate to emotionally charged states, acute or chronic. One of the key elements in this relates to breathing function which is intimately connected with emotion (see Ch. 9).

British osteopath Philip Latey (1980) has described patterns of distortion which coincide with particular clinical problems. He uses an analogy of 'three fists' because, he says, the unclenching of a fist correlates with physiological relaxation while the clenched fist indicates fixity, rigidity, overcontracted muscles, emotional turmoil, withdrawal from communication and so on:

> The lower fist is centred entirely on pelvic function. When I describe the upper fist I will include the head, neck, shoulders and arms with the upper chest throat and jaw. The middle fist will be focused mainly on the lower chest and upper abdomen.

Postural interpretation

He describes the patient who enters the consulting room as showing an 'image posture', which is the impression the patient subconsciously wishes you to see, of him. If instructed to relax as far as possible, the next image we see is that of 'slump posture', in which gravity acts on the body and it responds according to its unique attributes, tensions and weakness. Here it is common to observe overactive muscle groups coming into operation, hands, feet, jaw and facial muscles may writhe and clench or twitch.

Finally, when the patient lies down and relaxes, we come to the deeper image we wish to examine, the 'residual posture'.

Here we find the tensions the patient cannot release. It is palpable and, says Latey, leaving aside sweat, skin and circulation, the deepest 'layer of the onion' available to examination.

Contraction patterns

What is seen varies from person to person according to their state of mind and well-being. Apparent is a record or psychophysical pattern of the patient's responses, actions, transactions and interactions with his environment. The patterns of contraction which are found bear a direct relationship with the patient's unconscious, and provide a reliable avenue for discovery and treatment. They are providing sensory input to the patient and this is of considerable importance.

One of Latey's concepts involves a mechanism which leads to muscular contraction as a means of disguising a sensory barrage resulting from an emotional state. Thus he describes:

- A sensation which might arise from the pit of the stomach being hidden by contraction of the muscles attached to the lower ribs, upper abdomen and the junction between the chest and lower spine.
- Genital and anal sensations which might be drowned out by contraction of hip, leg and low back musculature.
- Throat sensations which might be concealed with contraction of the shoulder girdle, neck, arms and hands.

Emotional contractions

A restrained expression of emotion itself results in suppression of activity and, ultimately, chronic contraction of the muscles which would be used were these emotions expressed, be they rage, fear, anger, joy, frustration, sorrow or anything else.

Latey points out that all areas of the body producing sensations which arouse emotional excitement may have their blood supply reduced by muscular contraction. Also, sphincters and hollow organs can be held tight until numb. He gives as examples the muscles which surround the genitals and anus as well as the mouth, nose, throat, lungs, stomach and bowel.

Three fists

In assessing these and other patterns of muscular tension in relation to emotional states, Latey divides the body into three regions which he describes as:

- 'Lower fist' – (metaphor for a clenched fist) which centres entirely on pelvic function.
- 'Upper fist' – which includes head, neck, shoulders, arms, upper chest, throat and jaw.
- 'Middle fist' – which focuses mainly on the lower chest and upper abdomen.

Why are Latey's concepts so important?

Because he comes close to an explanation of the mechanisms at work in the body–mind problems which are familiar to all who work on the human body with their hands. He avoids more conjectural explanations involving electromagnetic energy, chakras, auras or energy fields or flows; not that such explanations are necessarily any less valid than Latey's, but he provides another way of seeing the problem.

Lower fist

'The lower fist describes the muscular function of the pelvis, low back, lower abdomen, hips, legs and feet, with their mechanical, medical and psychosomatic significance.'

He identifies the central component of this region as the pelvic diaphragm, stretching as it does across the pelvic outlet, forming the floor of the abdominal cavity. The perineum allows egress for the bowel, vagina and urinary tract as well as the blood vessels and nerve supply for the genitalia. Each opening being controlled by powerful muscular sphincters which can be compressed by contraction of the muscular sheet.

When our emotions or feelings demand that we need to contract the pelvic outlet, a further group of muscular units come into play which increases the pressure on the area from the outside. These are the muscles which adduct the thighs and which tilt the pelvis forwards and rotate the legs inwards, dramatically increasing compressive forces on the perineum, especially if the legs are crossed.

The impression this creates is one of 'closing in around the genitals' and is observed easily in babies and young children when anxious or in danger of wetting themselves. You can reproduce these contractions experimentally as follows:

EXERCISE 11.1

Time suggested 2 MINUTES

Stand upright, legs apart a little and exert maximum pressure and weight through the arches of the feet trying to flatten them to the floor. Sustain this effort for at least 2 minutes and sense the changes in your overall posture; feel the details of what is happening in the feet, knees, legs, hips, pelvis and spine. Feel the tensions begin to build around the pelvis and upper body parts.

Note where discomfort begins.

COMMENT

If this sort of contraction is short-lived no damage occurs. If it is prolonged and repetitive, however, compensatory (adaptation stage) changes appear involving those muscles which abduct the legs, rotate them outwards and which pull the pelvis upright.

If the correction is incomplete the pelvis remains tilted forwards, requiring additional contraction of low back muscles in order to maintain an erect posture.

Buttock muscle tension

Another pattern which is sometimes observed is of tension in the muscles of the buttocks which act to reinforce the perineal tension from behind. This tends to compress the anus more than the genitals and produces a different postural picture.

EXERCISE 11.2

Time suggested 2–3 MINUTES

Demonstrate this on yourself by standing and squeezing your anus tight, contracting the buttocks really hard and holding this for 2 or 3 minutes.

Feel the changes of posture and feelings of tension, strength and weakness in different parts of your body.

Lower fist problems

Problems of a mechanical nature which stem from the lower fist contraction include: internally rotated legs and 'knock-knees'; unstable knee joints; pigeon-toed stance resulting in flat arches. Here then is the onset of symptoms in 'knock-kneed, flat-footed children', and here also lies the answer.

The main mechanical damage is to the hip joints, due to compression and overcontraction of mutually opposed muscles. The hip is forced into its socket, muscles shorten and as there is loss of rotation and the ability to separate the legs, backward movement becomes limited. Uneven wear commences with obvious long-term end results. If this starts in childhood, damage may include deformity of the ball and socket joint of the hip.

Low back muscles are also involved and this may represent the beginning of chronic backache, pelvic dysfunction, coccygeal problems and disc damage. The abdominal muscles are also affected since they are connected to changes in breathing function which result from the inability of the lower diaphragm to relax and allow proper motion to take place.

Medical complications which can result from these muscular changes involve mainly circulatory function, since the circulation to the pelvis is vulnerable to stasis. Haemorrhoids, varicose veins, urethral constriction become more likely, as do chances of urethritis and prostatic problems. All forms of gynaecological problems are more common and childbirth becomes more difficult as well.

EXERCISE 11.3

Time suggested 5–7 MINUTES

Assessing pelvic motion while patient is breathing

Method a. Have the patient seated and feel for a gentle motion of the sacrum (pelvis) tipping forwards on inhalation and backwards on exhalation.

Method b. Patient side-lying, knees bent together, a hand over the sacrum allows pelvic breathing motion to be assessed. In good function there should be a slight lengthening of the lower body on inhalation and a shortening on exhalation.

Method c. Patient lies on back, knees and head supported about 5–10 cm from the surface. You sit at the side and rest your arm across the front of the pelvic bones, your hand resting on far hip, and feel for a rocking motion during respiration, as above.

In addition, try resting the other hand just above the sacrum, under the patient at the same time. This helps the patient to become aware of the subtle respiratory motion of the sacrum/pelvis.

EXERCISE 11.4

Time suggested 3–5 MINUTES

Self treatment

If no such rhythmic motion is palpable (often the case) have the patient lie face down (or do this yourself), taking one arm back and down to cup their (your) own perineum. Practise feeling for the difference between normal relaxed motion of the phases of breathing when relaxed and the restricted pattern when they (you) clench the buttocks.

By breathing deeply in this position the abdomen is compressed against the floor or table and perineal motion is forced to occur. They (you) can learn to increase the excursion by relaxing the muscles of the region. This improves further if the tense muscles of the region are released by treatment. A profound weakness of the legs is often felt as relaxation of these muscles begins, and this may last for hours. As tension goes, so vulnerability increases and reassurance is required. This is only a part of the restoration of normal function, but it is a beginning.

Middle fist

When considering the middle fist Latey concentrates his attention on respiratory and diaphragm function and the many emotional inputs which affect this region. He discounts the popular misconception which states that breathing is produced by contraction of the diaphragm and the muscles which raise the rib cage, with exhalation being but a relaxation of these muscles.

He states:

> This is quite untrue. Breathing is produced by an active balance between the muscles mentioned above and the expiratory muscles that draw the rib-cage downwards and pull the ribs together. The even flow of easy breathing should be produced by dynamic interaction of these two sets of muscles.

The active exhalation phase of breathing is the result he suggests of:

1. Transversus thoracis which lies inside the front of the chest, attaching to the back of the sternum and fanning out inside the ribcage, and then continuing to the lower ribs where they separate. This is the inverted 'V' below the chest (it is known as transversus abdominis in this region). He calls this 'probably the most remarkable muscle in the body'. It has, he says, direct intrinsic abilities to generate all manner of uniquely powerful sensations, with even light contact sometimes producing reflex contractions of the whole body, or of the abdomen or chest and feelings of nausea and choking, all types of anxiety, fear, anger, laughter, sadness, weeping and so on.

The commonest sensations described by patients relating to its being touched include 'nausea, weakness, vulnerability and emptiness'. He discounts the idea that its sensitivity is related to the 'solar plexus', maintaining that its closeness to the internal thoracic artery is probably more significant, since when it is contracted it can exert direct pressure on it.

He believes that physiological breathing has as its central event a rhythmical relaxation and contraction of this muscle. Rigidity is often seen in the patient with 'middle fist' problems, where 'control' dampens the emotions which relate to it.

2. The other main exhalation muscle is serratus posterior inferior which runs from the upper lumbar spine, fanning upwards and outwards over the lower ribs which it grasps from behind, pulling them down and inwards on exhalation. These two muscles mirror each other, working together.

Latey comments on the remarkable changes in tone in serratus relating to speech:

> The tone of this muscle varies with the emotional content of the patient's speech, especially when the emotions are highly labile and thinly veiled near the surface. With the patients lying on their front the whole dorsolumbar region may be seen to ripple in ridge-shaped patterns as they talk. As their words become progressively more 'loaded' the patterns become more emphatic. However, it is more usual to find a static overcontracture of this muscle, with the underlying back muscles in a state of fibrous shortening and degeneration, reflecting the fixity of the transversus, and the extent of the emotional blockage.

Middle fist functions

Laughing, weeping and vomiting are three 'safety valve' functions of middle fist function which Latey is interested in. These are used by the body to help resolve internal imbalance. Anything stored internally which cannot be contained, emerges explosively via this route. In all three functions transversus alternates between full contraction and relaxation. In laughing and weeping there is a definite rhythm of contraction/relaxation of transversus, whereas in vomiting it remains in total contraction throughout each eliminative wave. Between waves of vomiting the breathing remains in the inspiratory phase, with upper chest panting. Transversus is slack in this phase.

Latey suggests that often it is only muscle fatigue which breaks cycles of laughter/weeping/vomiting, and he reminds us of phrases such as:

- 'I wept/laughed until my sides ached.'
  Nausea and vomiting are often associated with feelings such as
- 'I swallowed my pride' and 'stomaching an insult'.

He suggests seeking early feelings of hunger, need, fullness, emptiness, overfulness, nausea, rejection, expulsion and so on when working in this area, if we wish to uncover basic emotional links.

Latey delves into areas which are clearly within the realm of psychotherapy, and bodywork can be seen to have great importance in this field.

EXERCISE 11.5

Time suggested 5–7 MINUTES

In terms of assessing the function of the 'middle fist' he suggests that:

> With the patient balanced, sitting upright or lying sideways with knees up – the practitioner can easily learn the movements he is trying to encourage. The feelings of the middle fist disturbance surface most readily with the patient lying on their back. With one hand resting below the sternum (assessing transversus movement)

the practitioner's other hand can feel the upper or lower fist movement. Nausea is often felt strongly in this position.

What might you notice in the patient as you hold this muscle?

If they are feeling nauseous you might see a sudden pallor, sweat and protrusion of the chin followed by retching and gagging. A receptacle should be on hand and you should ask 'do you want to be sick?'

After that you could ask 'what was stopping you?', for insights into underlying emotions.

If laughter is going to emerge this may be preceded by a squirming movement, a sideways look of 'naughtiness', superficial guilt, shame or embarrassment. A slight snort, snigger or grunt can lead to the main explosive laughter release.

A comment such as 'It's ridiculous isn't it?' can help.

Before weeping starts the eyes become moist, the mouth quivers, a catch is heard in the voice. There is an expectation of encouragement and of comfort being offered. These emotions are interchangeable and one may lead into another since these safety valves may be releasing feelings from quite different sources at the same time.

If panic starts it is characterised by a fluttering of the transversus, and is unmistakable. This can build into a shaking of the whole body, with breathing and chest movements becoming jerky and tremulous. Limbs twitch and eyes open wide. This sort of emotional explosion can have roots in very early experiences.

Latey pays great attention to the transversus muscle. He says:

> A feeling of tightness behind or below the breastbone marks the beginning of a cycle of emotion linked to this muscle (recrimination, pity, disgust, etc.). Is heartache an overtightness of the transversus muscle!

As outlined above, he encourages movement of the middle fist components (breathing and body work) and while doing so registers feelings of unease in the patient:

> Panic starts as a very definite fluttering of the transversus muscle itself and is quite unmistakable. Given full play it rapidly builds into a shaking of the whole body. The chest movements and breathing are jerky and tremulous: the limbs are twitchy: the eyes wide and staring in alarm. I have to look elsewhere for the meaning of panic: the chains of investigation are tortuous and difficult – invariably when fully exposed they lead back to earliest feelings.

Middle fist problems

The clinical problems associated with middle fist dysfunction relate to resulting distortions of blood vessels, internal organs, autonomic nervous system involvement and alteration in the neuroendocrine balance. Diarrhoea, constipation, colitis may be involved but more direct results relate to lung and stomach problems. Thus bronchial asthma is an obvious example of middle fist fixation.

There is a typical associated posture, with the shoulder girdle raised and expanded as if any letting go would precipitate a crisis. Compensatory changes usually include very taut deep neck and shoulder muscles. In treating such a problem Latey starts by encouraging function of the middle fist itself then extending into the neck and shoulder muscles, encouraging them to relax and drop, he then goes back to the middle fist.

Dramatic expressions of alarm, unease and panic may be seen. The patient, on discussing what they feel, might report sensations of being smothered, drowned, choked, engulfed, crushed, obliterated. They relate to early life panic sensations and may go to the person's very core.

> Asthma is not easy to treat. Some merely require to mourn the loss (or lack) of motherly tenderness, soothing and comfort. Most have a great deal more work to do.

When middle fist dysfunction involves digestive function this can involve postural alterations and emotional conflicts common in adolescents, says Latey:

> The lower end of the oesophagus passes through the muscular part of the diaphragm before joining the stomach. There is an intriguing mechanism which allows for the passage of food, or regurgitation of vomit, between the chest and the abdomen. When the diaphragm is contracted the muscular opening is constricted. In order to allow free flow it must be relaxed (full expiration) with the lower ribs pulled slightly together (transversus contraction).
>
> This device frequently fails when there is a chronic disturbance of the middle fist – the 'lower end of swallowing' is not happening properly. This may merely lead to wind, burping or fullness. However, when the neuroendocrine/smooth muscle activity is also disturbed the consequences may be more severe. Peptic ulcers, heartburn, reflux oesophagitis, hiatus hernia and so on are all medical conditions associated with middle fist problems. Here the filling and emptying of the stomach and duodenum, with their internal secretions, have become chronically disordered.

We discussed briefly (Exercise 11.5) Latey's methods for the holding and releasing of the middle fist and he suggests that this can lead to total or partial resolution of such dysfunction:

> However, most patients only achieve partial resolution: when the middle fist disturbance begins to resolve the conflict is transferred to the mouth, neck and throat. Even though severe gastro-intestinal symptoms may have dissipated, we may still be left with a more complex problem involving the upper fist (the first part of swallowing).

If patients begin to weep, stopping and starting this process of release, Latey suggests the safety valve is only slightly open. He sees the pelvic and middle fist rhythms as coordinated but the head, neck and shoulders may seem rigid, fighting the movement. In such cases he has found that the situation can change dramatically by laying one's hands across the front of the patient's throat, a very light but firm touch which seems to effect sensitivity in the sternocleidomastoid muscles.

In such cases weeping may become full-bodied, giving a total expression of grief with an orgasmic rhythm. Wailing and high-pitched crying may follow with expressions of complete misery and dejection, even leading to screams of terror. Unfettered rage, snapping and even biting is possible as the upper fist releases its pent-up tensions and expresses itself for the first time in years. Patently this is an area where many may not wish to venture. It is powerful and involves the need for nerves of steel on the part of the operator; however, it is in such catharsis that healing may occur of pains and hurts buried for decades.

Upper fist

The metaphor of the clenched fist, which is used to describe regions of the body associated with chronic, often emotionally based, contractions, is a powerful image. We have looked at the middle fist (diaphragm, respiratory muscles, abdomen) and also the lower fist which, not unnaturally, focused on the pelvic region (as well as low back and lower abdomen, hips, legs and feet).

The upper fist involves muscles which extend from the thorax to the back of the head, where the skull and spine join, extending sideways to include the muscles of the shoulder girdle. These muscles therefore set the relative positions of the head, neck, jaw, shoulders and upper chest, and to a large extent the rest of the body follows this lead (it was F. M. Alexander (1931) who showed that the head–neck relationship is the primary postural control mechanism).

This region, says Latey, almost with relish, is 'the centre, *par excellence*, of anxieties, tensions and other amorphous expressions of unease'.

In chronic states of disturbed upper fist function, he asserts, the main physical impression is one of restrained, over-controlled, damped-down expression. The feeling of the muscles is that they are controlling an 'explosion of affect'.

In contrast to the lower fist which impresses us with its grip on sensual functions, the upper fist has contracted in response to, or to restrain response to, the outer world.

Just what it is that is being restrained is never obvious from the muscles themselves, but interpreting facial muscles may give a clue. Far more important though than the expressions on the face are those which have been withheld. Those experiences which are *not allowed* free play on the face are expressed in the muscles of the skull and the base of the skull. This is, he believes, of central importance in problems of headache, especially migraine.

Says Latey, 'I have never seen a migraine sufferer who has not lost complete ranges of facial expression, at least temporarily.'

Effects of upper fist patterns

The mechanical consequences of upper fist fixations are many and varied, ranging from stiff neck to compression factors leading to disc degeneration and facet wear. Swallowing and speech difficulties are common, as are shoulder dysfunctions including brachial neuritis, Reynaud's syndrome and carpel tunnel problems.

Latey states:

> The medical significance of upper fist contracture is mainly circulatory. Just as lower fist contraction contributes to circulatory stasis in the legs, pelvis, perineum and lower abdomen; so may upper fist contracture have an even more profound effect. The blood supply to the head, face, special sense, the mucosa of the nose, mouth, upper respiratory tract, the heart itself and the main blood vessels are controlled by the sympathetic nervous system and its main 'junction boxes' (ganglia) lie just to the front of the vertebrae at the base of the neck.

Thus headaches, eye pain, ear problems, nose and throat as well as many cardiovascular troubles may contain strong mechanical elements relating to upper fist muscle contractions.

He reminds us that it is not uncommon for cardiovascular problems to manifest at the same time as chronic muscular shoulder pain (avascular necrosis of the rotator cuff tendons) and that the longus colli muscles are often centrally involved in such states.

He looks to the nose, mouth, lips, tongue, teeth, jaws and throat for evidence of functional change related to upper fist dysfunction, with relatively simple psychosomatic disturbances underlying these. Sniffing, sucking, biting, chewing, tearing, swallowing, gulping, spitting, dribbling, burping, vomiting, sound-making and so on are all significant functions which might be disturbed acutely or chronically.

And as with middle and lower fist dysfunction these can all be approached via breathing function:

> When all the components of the upper fist are relaxed, the act of expiration produces a noticeable rhythmical movement. The neck lengthens, the jaw rises slightly (rocking the whole head), the face fills out, the upper chest drops.

> When the patient is in difficulty I may try to encourage these movements by manual work on the muscles and gentle direction to assist relaxed expiration. Again, by asking the patient to let go and let feelings happen, I encourage resolution. Specific elements often emerge quite readily, especially those mentioned with the middle fist, the need to vomit, cry, scream, etc.

In relation to headache Latey observes:

> We can often see the headache to be a more general avoidance mechanism. The way in which the generalised focus of pain occupies attention is significant. It clouds and limits concept formation and observation. There is always a deadening and coarsening of sensation and expressiveness. It seems *as though* the patient uses the headache to hold some perturbation at bay until it can be coped with more responsively, or disappears.
>
> With more severe migraines, with disturbances of vision and nausea, it is often necessary to work through feelings of disgust in considerable detail. Fear of poisoning may be a strong component of nausea, and usually dates back to earliest disturbances of feeling.

He also spends time analysing shock and withdrawal experienced in early months of life as life's realities are recoiled from. This leads, he believes, to our failing to learn from experience as we flinch from emotionally unpleasant episodes.

Withdrawal characteristics determine many of his clinical perspectives. Superficially, at any rate, they are easy to recognise:

> The dull lifeless tone of the flesh; lifeless flaccidity of larger surface muscle (or spastic rigidity); lifeless hard fibrous state of deep residual postural muscles (with the possible exception of the head and neck muscles); the over-investment of the person in his eyes and ears – hearing and seeing.

More profound pointers to withdrawal are more subtle:

> The ritualised expression of any 'emotion' in a depersonalised and unspontaneous fashion; the use of language that denies the central presence of unity of self, wards off threats (from outside or inside temptation perhaps) and grasps hold of common insanities of our civilisation. These insanities are greatly worsened by social/family mystification (studied by R. D. Laing et al).

EXERCISE 11.6 — *Time suggested* 10–15 MINUTES

Examine someone with known emotional stress symptoms and see whether you can identify patterns of muscular change as outlined above; dull lifeless, lifeless flaccidity, spastic rigidity, lifeless hard fibrous and so on; or breathing dysfunction as described earlier in Chapter 9.

Look also for 'ritualised expression of emotion' or 'use of language that denies central presence and unity of self, wards off threats', lack of facial expression – which ones are missing? – and also statements about bodily feelings that seem unusual.

Variations on the same theme

Latey suggests that we consider these three 'fists', or regions, of abnormal tension, contraction and restriction as we try to look and feel for the physical manifestations of emotional turmoil. A variation on precisely this same theme is found in the methods grouped together as 'somatosynthesis'. This is described quite beautifully by Ford (1989).

Ford believes that:

> There is a close relationship between the diagnostic and therapeutic uses of touch. When touch is involved (palpation), it is not uncommon to hear of the diagnosis turning

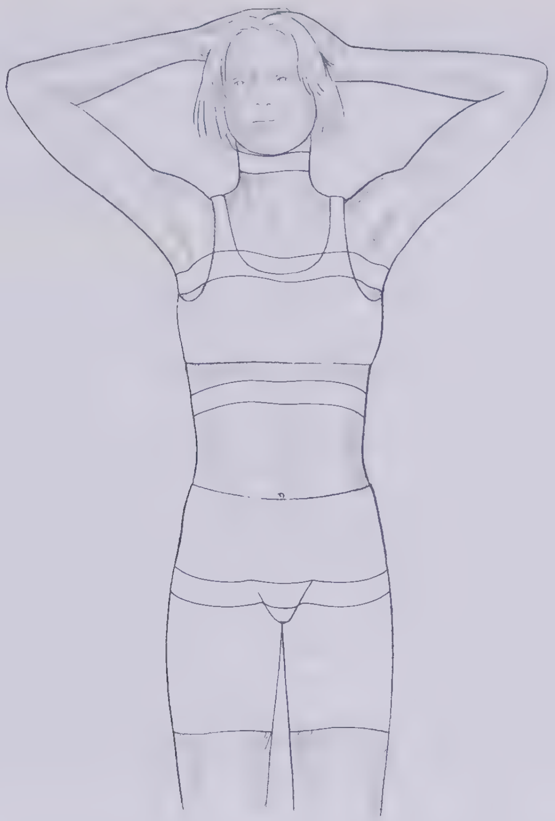

Fig. 11.1 Illustration of Ford's cross restriction areas.

into therapy without the awareness of the therapist or the patient. He continues: My approach to therapeutic touch has always been to keep it simple, getting maximal results from minimal number of techniques and procedures.

Which areas does he work on in dealing with emotional problems?

I might begin by working with the four major areas of cross-restriction in the body; the base of the pelvis [Latey's lower fist], the base of the rib cage [Latey's middle fist], the base of the neck and the base of the skull [together these are Latey's upper fist]. (Fig. 11.1)

It is in these regions, he asserts, that the usual orientation of soft tissues in a vertical direction are different, they are horizontally directed:

Usually the horizontal tissue cross-restricts the vertical tissue of the body, thereby hampering normal muscle movement, fluid flow and nerve transmission. *The practical result is that these areas turn out to be the places that most of us experience and retain stress, tension and pain in our bodies. And they are also the areas often related to the deeper psychological issues beneath our physical signs and symptoms. A simple straightforward approach to working with these cross-restrictions is to gently compress them from front to back.* [My italics.]

How does he palpate and treat these (and other) dysfunctions?

Seasoned palpators have long known that the best hand is a light hand. The lighter the touch, the more information can be obtained.

It is by lightly palpating, projecting the sense of touch, and being receptive to whatever information radiates into the hand that he identifies areas of maximal tension and dysfunction:

Once I have palpated to determine where to touch (therapeutically), there are three things I take into account: depth, direction and duration. How deep does my touch need

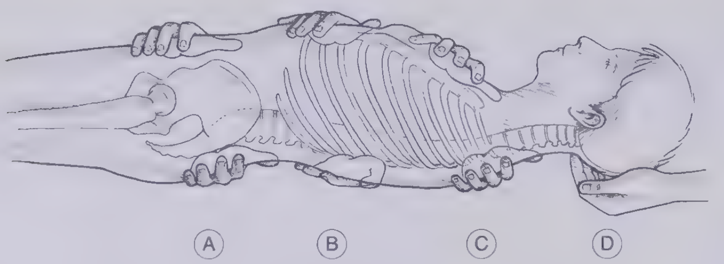

Fig. 11.2 The hand positions which would be used in Ford's treatment of horizontal 'cross-restrictions' – (A) pelvic, (B) diaphragmatic, (C) thoracic outlet and (D) base of skull. By 'projecting' his sense of touch he palpates for 'depth, direction and duration' in order to treat these dysfunctions.

> to be? Should it be at the level of the energy field where no physical contact is involved, at the skin surface . . . or pressing firmly into the (patient's) body.

He then decides in which direction this contact should move, straight down, right, left, pulling, pushing, steady or continuous movement or a combination of these? And finally he allows the tissues themselves to determine how long the force should be held. (Fig. 11.2)

Wolff's final thought, that we 'remember that palpation and therapy are happening simultaneously', should be one of our key considerations throughout our work. We can now see that Latey and Wolff approach these problems with slightly different methods, as does Marion Rosen whose work is considered next.

The Rosen method

Marion Rosen, a brilliant physical therapist, has evolved a method (Mayland 1988) which addresses the same physical manifestations of emotional turmoil as do the approaches of Latey and Ford.

> Rosen Method is not a mechanical process. It is a journey taken together by client and practitioner towards self-discovery.

The practitioner *observes* the patient's back, as in the following exercises.

EXERCISE 11.7

Time suggested
10–12 MINUTES

Examine someone (if possible the person used in Exercise 11.6) with known emotional stress symptoms and see whether you can identify the following:

Are the muscles tense?

Where does breath move freely?

Where is it withheld?

What statement is the patient making with his body?

What has to happen so that he can relinquish that contracted space?

What is the direction in which the muscles are holding?

Does this holding bear down, hold him together, puff him up or separate the top from the bottom of the body by tightening in the middle? (equivalent to Latey's middle fist).

Compare these observations with the findings you made in Exercise 11.6.

EXERCISE 11.8 — *Time suggested* 12–20 MINUTES

Palpate and observe the back muscles of a prone patient with known emotional problems (the same person as in the previous exercise if possible).

Take your time to locate the most restricted muscular area of the back and hold a palpating hand against it, meeting its tension, just taking out the slack. Observe:

- What happens to these tissues over a period of some minutes, and
- What changes, if any, take place in the breathing pattern.

The hands are then run gently over the back muscles, seeking information, comparing what was observed with what is palpated (see Exercise 11.6).

Your task is to increase patient awareness of areas of 'holding' in a non-judgmental manner. As areas are palpated and held so alterations slowly manifest as the patient becomes aware, breathes into those restricted regions as you, 'Watch and feel for the place on the back that is most unmoving, held, or not included in his expression of himself. He is unaware that he is holding back.'

Your are required to follow such tissues as they release and relax, continuing until all the back is released and breathing function is freely observed in all the tissues.

Then attention turns to the diaphragm and anterior surface. This major breathing muscle reveals tensions being held and changes in its function are readily palpated, at the same time as facial expression alterations are seen.

DESCRIPTION OF WHAT HAPPENS

Compare the description given below, of what might be observed when the Rosen method is used, with the description given by Latey following Exercise 11.5:

> Sometimes as the practitioner works with the muscles that move the diaphragm, a flutter of the diaphragm itself can be seen. Movements in the abdomen might begin as they do when a person is sobbing or crying, although the expression on the face has not changed, leading her [the practitioner] to believe that the sadness that is being expressed in the body is not reaching the face and the consciousness of the client.

WHAT NEXT?

Other tensions, in the neck or chest perhaps, are then sought which are specifically palpated and worked on in the same manner, until emotional release occurs. The work is accompanied by careful observation and skilled questioning.

As should be clear, the process of palpation is in fact the start of the treatment process (something which can also be said for Lief's neuromuscular technique).

The essence of this approach is the identification, via observation and palpation, of restricted areas in which the breathing function fails to manifest itself. Until this is achieved subsequent release is not easily achieved.

As Mayland says:

> All we want is for a person to get connected with what they are holding back. The degree to which they repress, that they will not allow themselves to experience, that they carry around with them . . . form a barrier to our living. They are like loads, like rocks in our being.

HOW MUCH PRESSURE DURING ROSEN WORK

It is perhaps helpful to note that the amount of pressure used on tense 'held' areas, when Rosen method is applied, is very similar to that described by Fritz Smith and Stanley Lief in earlier chapters (Chs 4, 5).

It 'meets' the muscle, not attempting to overwhelm it or make it do anything. Awareness is the key, *with release occurring from the patient's side not as a forced event.*

HIERARCHY OF EMOTIONS

In Rosen method, as in Latey's work, there is a hierarchy of emotions, linked to specific areas:

- Deep fear and deep love are associated with the region of the pelvis (or deep in the belly) and where the legs meet the pelvis.
- Repressed anger and sadness are often found in the upper torso or neck.
- Feelings towards others relate to the middle trunk and heart area.
- Fear and anxiety are repressed around the diaphragm.
- Anger, sadness and fear are, according to Marion Rosen, easier to release than love.

THE GOAL

Rosen method is characterised by the gentleness of the approach.

Emotions are re-experienced, not forced, as the client learns that feelings are just feelings and not the events which precipitated their being locked away. The method leads to self-acceptance and release from long-held tensions, identified by palpation and observation.

UPLEDGER'S CONTRIBUTION TO EMOTIONAL RELEASE

Upledger's somatoemotional release (Upledger 1987) described in earlier chapters (Chs 2, 5), is worthy of further mention at this point; using gentle compressive or traction forces, such as:

- Slight inferiorly directed compressive force upon the parietals of the seated patient
- Compression of the cervical and thoracic vertebrae caudally
- Gentle medial compression of the anterior ilia with the patient standing
- Grasping of the ankles of the supine patient and introduction of slight compressive or traction force, etc.

OVERLAP

You will probably by now have noted the resemblance that these descriptions have with Smith's work (Ch. 5).

Indeed, the overlap between the work of Latey, Rosen, Ford, Upledger and Smith (and indeed that of Lief and the Beckers) should not be surprising, since they are all looking at the physical somatic manifestations of emotional distress and are all attempting to both palpate, locate and initiate or assist in self-generated change in these altered soft tissues.

PALPATION SKILLS ESSENTIAL

Upledger requires the therapist to follow the 'unwinding' process which the body initiates when these (compressive, etc.) forces are applied.

Palpatory and proprioceptive skills of a high order are required to achieve this, since not only are the hands required to follow the slow unwinding process but also to register and prevent any tendency for the unwinding to follow a repetitive pathway.

While this method is used largely to release locked-in trauma-induced forces, 'repressed emotional components of the somatic injury are frequently and concurrently released'.

Panic or hysteria related to the trauma are relived and adaptational energy released.

Upledger warns: 'Be alert. Do not inhibit your patient by dragging on their body movements. Try to follow where the patient's body leads you.' The patient may finally adopt the position in which the trauma occurred.

While somatoemotional release (as in Rosen method) seems to describe therapy rather than palpation/diagnosis, the distinction is essentially blurred when these approaches are used as described by their developers.

Palpation skills determine the practitioner's ability to perform these therapeutic methods.

Cautions and questions

There is justifiably intense debate regarding the question of the induction by body work therapists of 'emotional release'.

- If the most appropriate response an individual can make to the turmoil of their life is the 'locking away' of these in their musculoskeletal system, we need to ask if it is advisable to unlock the emotions that the tensions and contractions hold.
- If there exists no current ability to mentally process the pain that these somatic areas hold, are they not best left where they are until counselling or psychotherapy or self-awareness leads to the individual's ability to reflect, handle, deal with, and eventually work through the issues and memories?
- What is the advantage of triggering a release of emotions, manifested by crying, laughing, vomiting or whatever – as described by Latey and others – if neither the individual nor the therapist can then take the process further?

Answers?

The answers to these questions are not available. However, it is suggested that each patient and each therapist/practitioner should reflect on these issues before removing (however gently and however temporarily) the defensive armouring that life may have obliged vulnerable individuals (all of us) to erect and maintain.

At the very least we should all learn skills which allow the safe handling of 'emotional releases', which may occur with or without deliberate efforts to induce them. Or we should have a referral process in place which leads to the patient having the ability to talk through whatever is emerging from these processes with suitably qualified personnel.

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Appendix

Location of Chapman's neurolymphatic reflexes

No.	Symptoms/area	Anterior	Fig.	Posterior	Fig.
1.	Conjunctivitis and retinitis	Upper humerus	4.12	Occipital area	4.14
2.	Nasal problems	Anterior aspect of first rib close to sternum	4.12	Posterior the angle of the jaw on the tip of the transverse process of the first cervical vertebra	4.14
3.	Arms (circulation)	Muscular attachments pectoralis minor to third, fourth and fifth ribs	4.12	Superior angle of scapula and superior third of the medial margin of the scapula	4.14
4.	Tonsillitis	Between first and second ribs close to sternum	4.12	Midway between spinous process and tip of transverse process of first cervical vertebra	4.16
5.	Thyroid	Second intercostal space close to sternum	4.12	Midway between spinous process and tip of transverse process of second thoracic vertebra	4.14
6.	Bronchitis	Second intercostal space close to sternum	4.12	Midway between spinous process and tip of transverse process of second thoracic vertebra	4.16
7.	Oesophagus	As No. 6	4.12	As No. 6	4.16
8.	Myocarditis	As No. 6	4.12	Between the second and third thoracic transverse processes. Midway between the spinous process and the tip of the transverse process	4.15
9.	Upper Lung	Third intercostal space close to the sternum	4.12	As No. 8	4.15
10.	Neuritis of upper limb	As No. 9	4.12	Between the third and fourth transverse processes, midway between the spinous process and the tip of the transverse process	4.15
11.	Lower Lung	Fourth intercostal space, close to sternum	4.12	Between fourth and fifth transverse processes. Midway between the spinous process and the tip of the transverse process	4.15
12.	Small intestines	Eighth, ninth and tenth intercostal spaces close to cartilage	4.12	Eighth, ninth and tenth thoracic intertransverse spaces	4.14
13.	Gastric hypercongestion	Sixth intercostal space to the left of the sternum	4.12	Sixth thoracic intertransverse space, left side	4.14
14.	Gastric hyperacidity	Fifth intercostal space to the left of the sternum	4.12	Fifth thoracic intertransverse space, left side	4.17
15.	Cystitis	Around the umbilicus and on the pubic symphysis close to the midline	4.12	Upper edge of the transverse processes of the second lumbar vertebra	4.17
16.	Kidneys	Slightly superior to and lateral to the umbilicus	4.12	In the intertransverse space between the twelfth thoracic and the first lumbar vertebrae	4.17
17.	Atonic constipation	Between the anterior superior spine of the ilium and the trochanter	4.12	Eleventh costal vertebral junction	4.14
18.	Abdominal tension	Superior border of the tension pubic bone	4.12	Tip of the transverse process of the second lumbar vertebra	4.15
19.	Urethra	Inner edge of pubic ramus near superior aspect of symphysis	4.12	Superior aspect of transverse process of second lumbar vertebra	4.17

No.	Symptoms/area	Anterior	Fig.	Posterior	Fig.
20.	Dupuytren's contracture, and arm and shoulder pain	None		Anterior aspect of lateral margin of scapulae, inferior to the head of humerus	4.17
21.	Cerebral congestion (related to paralysis or paresis)	(On the posterior aspect of the body) Lateral from the spines of the third, fourth and fifth cervical vertebrae	4.12	Between the transverse processes of the first and second cervical vertebrae	4.16
22.	Clitoral irritation and vaginismus	Upper medial aspect of the thigh	4.12	Lateral to the junction of the sacrum and the coccyx	4.15
23.	Prostate	Lateral aspect of the thigh from the trochanter to just above the knee. Also lateral to symphysis pubis as in uterine conditions (see No. 43)	4.12	Between the posterior superior spine of the ilium and the spinous process of the fifth lumbar vertebra	4.15
24.	Spastic constipation or colitis	Within an area of an inch or two wide extending from the trochanter to within an inch of the patella	4.12	From the transverse processes of the second, third and fourth lumbar vertebrae to the crest of the ilium	4.14
25.	Leucorrhoea	Lower medial aspect of thigh, slightly posteriorly (on the posterior aspect of the body)	4.12 & 4.14	Between the posterior/superior spine of the ilium and the spinous process of the fifth lumbar vertebra	4.15
26.	Sciatic neuritis	Anterior and posterior to the tibiofibular junction	4.12	1. On the sacroiliac synchondrosis 2. Between the ischial tuberosity and the acetabulum 3. Lateral and posterior aspects of the thigh	4.14
27.	Torpid liver (nausea, fullness malaise)	Fifth intercostal space, from the mid-mammillary line to the sternum	4.13	Fifth thoracic intertransverse space on the right side	4.14
28.	Cerebellar congestion (memory and concentration lapses)	Tip of coracoid process of scapula	4.13	Just inferior to the base of the skull on the first cervical vertebra	4.16
29.	Otitis media	Upper edge of clavicle where it crosses the first rib	4.13	Superior aspect of first cervical transverse process (tip)	4.14
30.	Pharyngitis	Anterior aspect of the first rib close to the sternum	4.13	Midway between the spinous process and the tip of the transverse process of the second cervical vertebra	4.16
31.	Laryngitis	Upper surface of the second rib, 2 or 3 inches (5–8 cm) from the sternum	4.13	Midway between the spinous process and the tip of the second cervical vertebra	4.16
32.	Sinusitis	Lateral to the sternum on the superior edge of the second rib in the first intercostal space	4.13	As No. 31	4.16
33.	Pyloric stenosis	On the sternum	4.13	Tenth costovertebral junction on the right side	4.17
34.	Neurasthenia (chronic fatigue)	All the muscular attachments of pectoralis major on the humerus, clavicle, sternum, ribs (especially fourth rib)	4.13	Below the superior medial edge of the scapula on the face of the fourth rib	4.15
35.	Wry neck (torticollis)	Medial aspect of upper edge of the humerus	4.13	Transverse processes of the third, fourth, sixth and seventh cervical vertebrae	4.16
36.	Splenitis	Seventh intercostal space close to the cartilaginous junction, on the left	4.13	Seventh intertransverse space on the left	4.14
37.	Adrenals (allergies, exhaustion)	Superior and lateral to umbilicus	4.13	In the intertransverse space between the eleventh and twelfth thoracic vertebrae	4.17
38.	Mesoappendix	Superior aspect of the twelfth rib, close to the tip, on right	4.13	Lateral aspect of the eleventh intercostal space on the right	4.14
39.	Pancreas	Seventh intercostal space on the right, close to the cartilage	4.13	Seventh thoracic intertransverse space on the right	4.17
40.	Liver and gall bladder congestion	Sixth intercostal space, from the mid-mammillary line to the sternum (right side)	4.12	Sixth thoracic intertransverse space, right side	4.17

No.	Symptoms/area	Anterior	Fig.	Posterior	Fig.
41.	Salpingitis or vesiculitis	Midway between the acetabulum and the sciatic notch (this is on the posterior aspect of the body)	4.17	Between the posterior, superior spine of the ilium and the spinous process of the fifth lumbar vertebra	4.15
42.	Ovaries	The round ligaments from the superior border of the pubic bone, inferiorly	4.13	Between the ninth and tenth intertransverse space and the tenth and eleventh intertransverse space	4.15
43.	Uterus	Anterior aspect of the junction of the ramus of the pubis and the ischium	4.13	Between the posterior, superior spine of the ilium and the fifth lumbar spinous process	4.15
44.	Uterine fibroma	Lateral to the symphysis, extending diagonally inferiorly	4.13	Between the tip of the transverse process of the fifth lumbar vertebra and the crest of the ilium	4.14
45.	Rectum	Just inferior to the lesser trochanter	4.13	On the sacrum close to the ilium at the lower end of the iliosacral synchondrosis	4.17
46.	Broad ligament (uterine involvement usual)	Lateral aspect of the thigh from the trochanter to just above the knee	4.13	Between the posterior, superior spine of the ilium and the fifth lumbar spinous process	4.15
47.	Groin glands (circulation and drainage of legs and pelvic organs)	Lower quarter of the sartorius muscle and its attachment to the tibia	4.13	On the sacrum close to the ilium at the lower end of iliosacral synchondrosis	4.17
48.	Haemorrhoids	Just superior to the ischial tuberosity. (These areas are on the posterior surface of the body)	4.15	On the sacrum close to the ilium, at the lower end of the iliosacral synchondrosis	4.15
49.	Tongue	Anterior aspect of second rib at the cartilaginous junction with the sternum	4.12	Midway between the spinous process and the tip of the transverse process of the second cervical vertebra	4.16

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Page numbers in bold type refer to illustrations and tables.

S

T

Palpation Skills

Good palpation or touch skills lie at the core of all manual therapies. Subtlety and sensitivity of touch, and the accurate interpretation of palpatory tests, are required from the start of training, and continue to develop throughout practice.

Palpation Skills is a workbook which helps both practitioner and student towards increasingly sophisticated assessment and practice through palpatory skills.

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Leon Chaitow is an internationally known and respected lecturer, author and osteopathic practitioner. He is the author of the three books in the series Advanced Soft Tissue Techniques – *Muscle Energy Techniques, Modern Neuromuscular Techniques* and *Positional Release Techniques.* A video *Muscle Energy Techniques for Muscle Dysfunction* has been produced to accompany the *Muscle Energy Techniques* text. Leon Chaitow is also the Editor of Churchill Livingstone's *Journal of Bodywork and Movement Therapies.*

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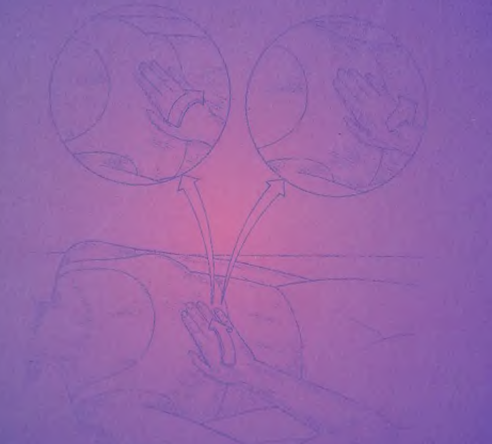

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