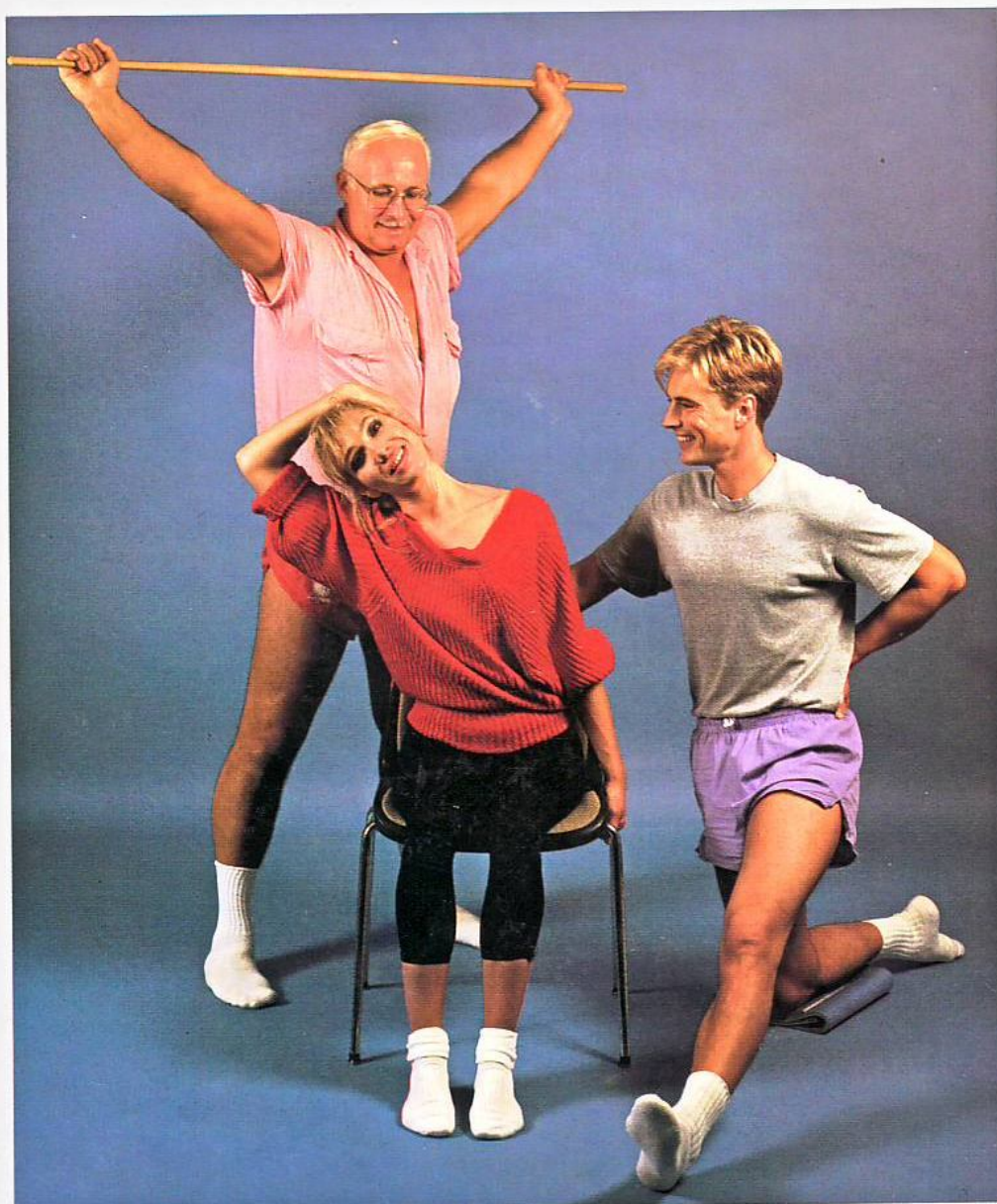


AUTO STRETCHING

The Complete Manual of Specific Stretching
by Olaf Evjenth and Jern Hamberg



ALFTA REHAB FÖRLAG

AUTOSTRETCHING

The Complete Manual of Specific Stretching

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FOREWORD

Did you ever feel stiff? Or suffer muscle pains? Then this is the book for you. It teaches you how to get rid of your discomforts and avoid injuries.

Do you exercise regularly? Or rarely, or not at all?

Is your work heavy, monotonous or onesided? Or is it light?

If your answer to any one of these questions is yes, then you should give yourself a test and start stretching your muscles. You'll feel much better. This book was written for you, no matter what shape you're in. Your muscles are very important for your general well-being. To work well, they have to be tough, strong, and supple.

We've studied muscle stretching for many years, and we've found that muscles can be stretched – and are stretched – in lots of different ways. When we compared different methods, we discovered that the result depends a lot on *how* you do it. It's all too easy to get it wrong and do yourself an injury.

To stretch a muscle or muscle group correctly you must know what you're doing and do it with care. This is why we demand certain basics from any muscle exercise. It must:

- start and end in a safe position
- give maximum stretching effect without being risky
- be totally safe for the tissues involved
- require a minimum of equipment
- be possible to do anywhere, at any time.

This is quite demanding, and our stretching exercises may seem more difficult than others in current use. But experience shows that it's better to learn something safe and effective, even if it is a little harder, than use a simple method that doesn't give results – and may even be dangerous.

Take it as a challenge! This book describes *Auto-stretching*, a specific, safe and effective way of stretching your own contracted muscles. Look up an exercise and test yourself:

- Are the movements described difficult for you? Then you need stretching to be able to move better – that is, **stretching as treatment**.
- Can you do it without difficulty? You should still stretch from time to time for **preventive reasons** – to stay supple.

Correct muscle stretching should be part of your daily routine, just like brushing your teeth, washing your hands, and so on. With this book we want to help you to test and stretch muscles right – smoothly and safely.

Oslo, Norway and Alfta, Sweden, September 1990

Olaf Evjenth

Jern Hamberg

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INTRODUCTION

Moving is a natural part of life. We use at least 430 muscles to move our bodies. To work well, these muscles have to be supple and strong. They also need staying power. But these days, many people spend most of their daily life sitting down; they don't move much. This can harm muscles and connective tissue and make them tight and/or weak.

Everybody knows that it's important to exercise for strength and stamina, but lots of people forget about suppleness – that is, muscle stretching. The result can be unnecessary stiffness, sometimes even injuries to joints, cartilages, tendons and muscles.

Many people lack strength and stamina and need exercise to improve these. But many more have problems with tight muscles; sooner or later, the symptoms show. Tightened muscles need to be stretched to 'normal' length. And even if you are healthy and uninjured, you should stretch your muscles. As we get older, our muscles tend to work less efficiently; stretching can counteract this to some extent and let the body keep its vitality longer.

The message of this book is that *stretching the right way helps health*. Anybody can use it. The stretching technique described is called *Autostretching* and is a safe way to keep or regain normal mobility and suppleness.

For those who are receiving treatment for problems with movement, this book is an excellent way to support and prolong the effect of treatment.

Physical therapists, doctors, physical education instructors and coaches may use this book as a complement to *Muscle Stretching in Manual Therapy, Vol I and II* (Alfta Rehab Förlag, 2nd Edition, 1988).

The last chapter gives a short description of how muscles and joints work, and also a deeper insight into the benefits of stretching.

Why do muscles tighten up?

There are many reasons why muscles contract and get shorter, stiff and tight:

- heavy work or hard physical training
- poorly coordinated movements
- poor posture
- lack of activity
- monotonous and/or one-sided movement
- injury and pain

When a muscle is made to work intensively, it responds fairly quickly by contracting – getting

short. If the muscle isn't stretched after this work, it stays short, gets tight and prevents the muscle on the opposite side of the joint from working properly. This other muscle then moves less and may even be weakened.

If a shortened muscle is left untreated, you change the way you move. This means that the joint has to work in ways it wasn't made for and can't take. Also, blood vessels are squeezed – circulation is impaired. Sooner or later you'll notice various symptoms.

How do you know a tightened muscle?

If you sit still for too long, you get stiff and want to get up and move around. This is instinct. One of the first symptoms of shortening, tightening muscles is that you *feel stiff*. Others are *fumbling* and *feeling tired*. It may *hurt* when you move, or you get *aches*, even when you are at rest. You might even get *cramps*. Usually, however, *you don't notice that you're getting stiffer and stiffer – but people around you do!* Maybe you're just a little below par.

Effects of lasting muscle shortening:

Shortened muscles in neck or shoulder may give you vague discomfort where those muscles are, but also aches and pains in your head and/or neck, radiating down your arms, hands, chest and back.

Stiff arm muscles can cause pain and numbness in your arms, hands and fingers, and make you fumble and feel clumsy.

Tight hand muscles can make the hand hurt and feel weak – 'writer's cramp' – or send aches radiating up your shoulder and neck. You can't use your hand with the precision and control you're used to; it may get generally shaky. In extreme cases, the hand simply won't do its work any more, which can be a catastrophe for people like musicians.

If *muscles around the rib cage get too tight*, they can give you pains that resemble heart pains, and also pain radiating down your arms.

Stiff muscles in your lower back may cause back pain and make it very difficult to move.

Shortened muscles around the hips are very common. This can give you pain in the hip area, but also vague pain in your groin, stomach and back, radiating down the front or back of your legs and all the way into the feet.

Tight muscles in thighs, calves and feet can give you local pains, but above all they ruin the way you walk. They can affect your pelvis, back and neck as well. Cramps in legs and feet are often symptoms of shortened muscles.

Until recently it hasn't been widely known that these kinds of trouble can be prevented by sensible stretching – and that it helps alleviate them once they're there.

General rules for treating tight muscles

Before you can start stretching, your joints must always be able to move normally. The stretching should be felt only in the muscles, not in the joints – so always check the joints involved, by moving them as far as they should go, before you attempt an exercise.

If you've got a recent muscle or tendon injury of any kind, you must consult a specialist before you start stretching.

There are times when a shortened tissue can help stabilize a joint, e. g. if you don't quite have the control of a joint after an accident, a paralysation or other injury. In such cases, too, a specialist should be consulted before any exercises are started.

Various types of mobility exercise

Many people have got injured by the wrong kind of physical training. Most of us don't realise how important it is to finish a workout session with mobility exercises – stretching. The harder the workout, the stiffer and more injured the muscles are likely to be, and the more they need stretching.

There are two basic types of stretching:

- Ballistic stretching.
- 'Controlled, gradual stretching'.

Ballistic stretching is an active, hard and rapid stretching which aims to make the body able to move well. But this type of exercise carries a considerable risk of overstretching, since the lengthening of muscles is relatively uncontrolled, with great force and long lever arms. Such violent stretches provoke a protective reflex: the muscle contracts 'to save itself'. Thus the effect may well be the opposite of the one intended. Because movements are often uncontrolled, they can cause muscle tears and injuries to tendons, ligaments, joints and even spinal discs.

The most common ballistic stretching exercise is trying to put your palms on the floor while standing with knees straight. When this is done quickly and powerfully, it is very dangerous for the lower spine.

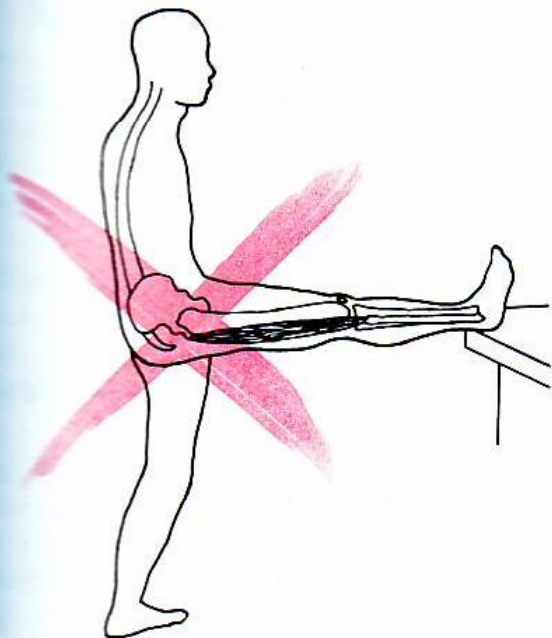
Gymnasts often use quick forward and backward bends, to 'tie themselves in knots'. In time, the lower spinal structures give in to this great strain, and the joints start moving too much. This can cause a lot of trouble: first, a tired feeling, then persistent aches that gradually get worse. The object of a stretching exercise must be to improve a function, not to impair it – so never do ballistic exercises.

Examples of ballistic exercises:

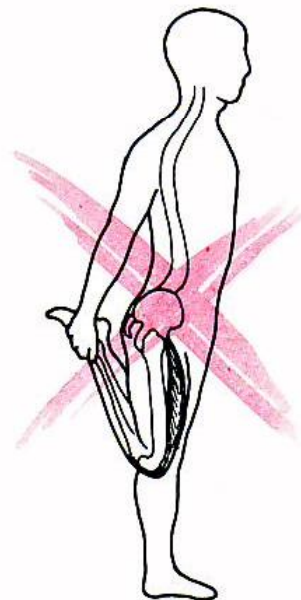


'Controlled, gradual stretching' or gradual, passive stretching means that the muscle is first tensed, then relaxed, and finally stretched gradually. Scientific studies have shown that this type of exercise is better than ballistic stretching*.

Examples of 'controlled, gradual stretching':



'Controlled, gradual stretching'
of the hamstrings.



'Controlled, gradual stretching'
of rectus femoris.

These are just two examples of commonly used exercises that we believe should be improved. As in the examples above, these exercises usually lack a safe, stable starting position.

This is why we have made special studies of applied anatomy and biomechanics to develop a *refined technique*, focussed on each separate muscle or muscle group, which we call *Autostretching*.

Autostretching

The principles of *Autostretching* are:

- Starting positions must be safe and stable.
- The real function of muscles/muscle groups must always be taken into account.
- The whole exercise must be fully controlled and have the intended effect.
- Muscles/muscle groups must be stretched in such a way that they are lengthened as near as possible to the normal range of mobility.

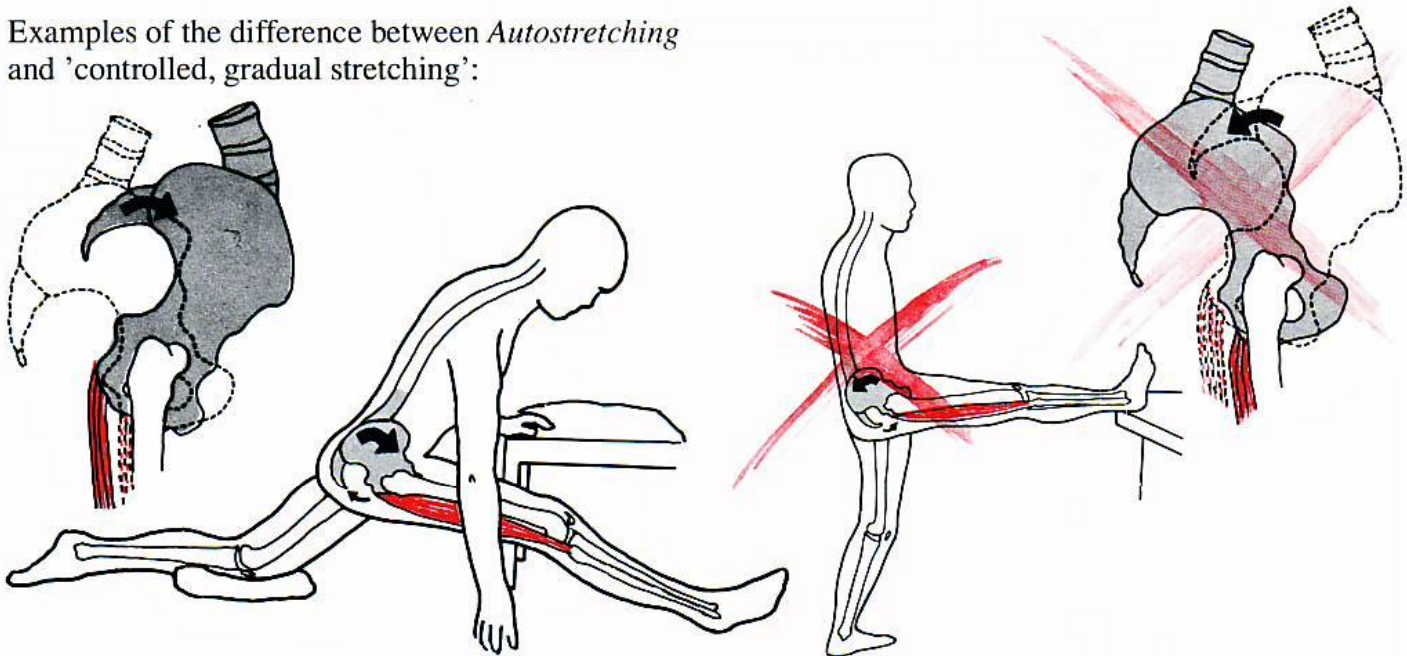
These vital principles are what makes *Autostretching* effective and safe. *Autostretching* helps you move easier and better. No protective reactions are provoked. And you don't risk overstrained or torn muscles, since stretching is slow and gentle.

So this is what *Autostretching* means:

- Stretching your own muscles and sinews the right way, to prevent and/or relieve stiffness and other discomforts due to tight muscles
- Really effective stretching, because it affects all muscles that restrict movement.

*See reference 31, page 246.

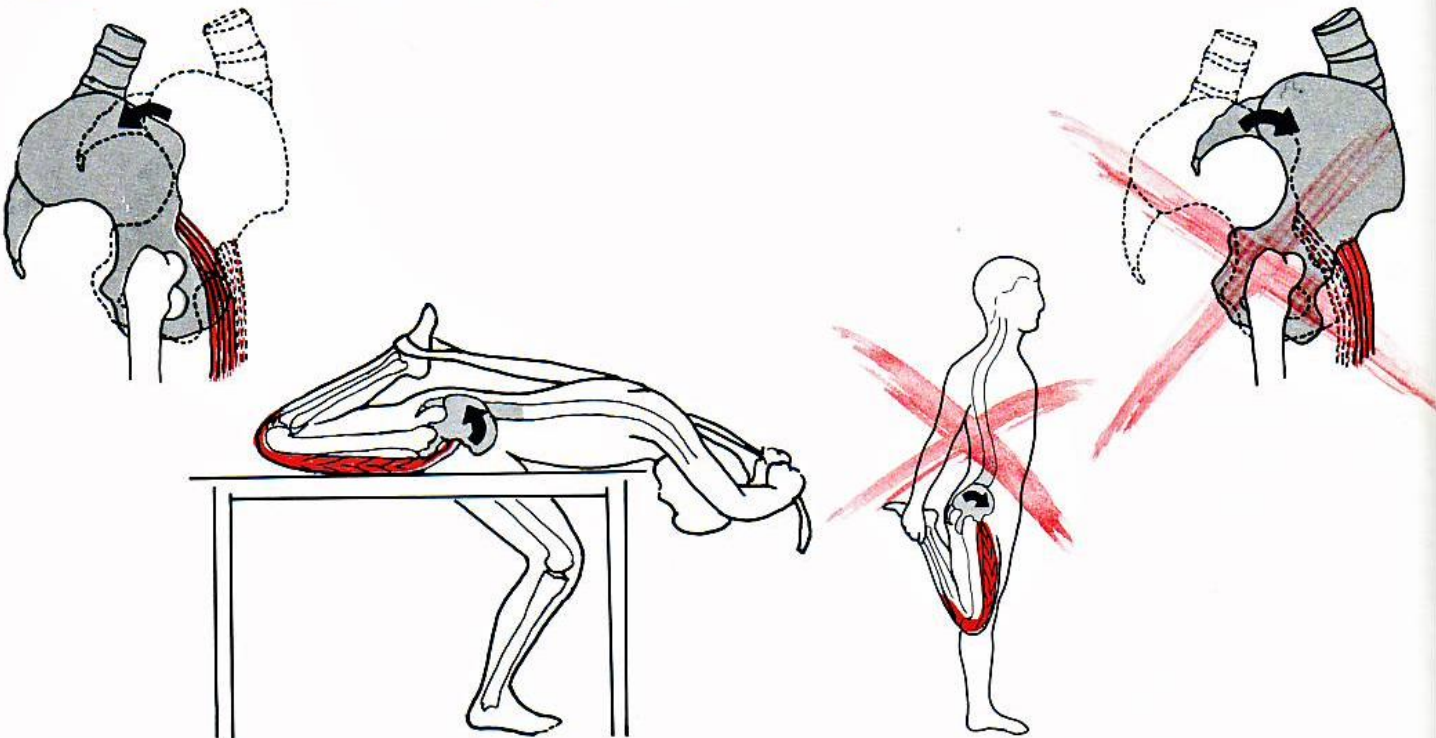
Examples of the difference between *Autostretching* and 'controlled, gradual stretching':



Autostretching of the hamstrings.
Note the stable position.
Leg extended backward keeps pelvis tilted forward.

'Controlled, gradual stretching' of the hamstrings.
Pelvis tilted backward.

The forward tilt of the pelvis during *Autostretching* allows the hamstrings to stretch at least an inch further than in the 'controlled, gradual stretching' exercise.



Autostretching of rectus femoris.
Note the stable position.
Leg down with foot on floor keeps pelvis tilted backward.

'Controlled, gradual stretching' of rectus femoris.
Pelvis tilted forward.

The backward tilt of the pelvis during *Autostretching* allows the thigh muscle rectus femoris to stretch at least an inch further than in the 'controlled, gradual stretching' exercise. The same difference goes for all exercises.

When, how much, and how often should you stretch?

The object of all stretching is to limber up. So you should stretch *before an activity*, to check how your muscles are feeling; you'll notice if they are tight or tender. Pain is a bad sign; be careful. Tight or tender muscles are prone to injury if they are worked hard, especially if the work requires speed – like running to catch a bus. Athletes test their muscles during warmups. Maybe they notice a little tightness or faint twinges of pain, but sometimes they go ahead and compete anyway, in spite of these warning signals. That's when injuries happen – and then they can neither train nor compete for a long time.

But most important is stretching as treatment after an activity, a workout session or a competition. Then your muscles are sure to be shortened and need a good stretching to get back to normal.

If you have been inactive for a long time, you may need to stretch every day for several months. For naturally supple people a few times may be enough. But you should always go on stretching until you see real improvement.

GUIDE

How to use this book

You don't have to read this book from beginning to end before you start. Look up what you need for your own individual stretching program. There are pictures, explanations and instructions on each pair of pages.

In the table of contents on page 4 you'll find sections headed AUTOSTRETCHING FOR... and then the various parts of the body. Turn to each section's register to find the movements you have problems with.

Example 1.

You are plagued by a stiff shoulder. Look at page 4 and find 'The Shoulder'; see which pages describe stretching exercises for shoulder muscles. The section register, in this case on page 12, lists them according to problem. Look up the pages describing problem and exercise, read them carefully, and test yourself.

Example 2.

Your neck is stiff. Look for 'The Neck' and you'll find all the exercises for the neck. Try out which ones suit you – maybe Neck 1 or 8, and why not Shoulder 12.

Example 3.

If you have trouble with forearms and hands – maybe after a spell of gardening work – choose Elbow 3 and 4, Wrist 1, Fingers 4.

Example 4.

You've been jogging hard, or maybe shopping all day in uncomfortable shoes; and now your feet are killing you. Try Hip 3, 8 and 9; Knee 1, Ankle 3, 4, 5 and 6; Toes 2.

Example 5.

If you wear fashionable winkle-picker shoes with pointed toes, you're probably painfully aware of the base joint of your big toes. For this problem try the Toes 2 exercise.

Some of the exercises are suited to *daily use*, like Shoulder 12, 13, Elbow 4, Wrist 1, 2, 3, Hip 1, 5, 9A and Ankle 8.

Body type, fitness and mobility vary from person to person. Stretching exercises are often done in groups, but this doesn't suit everybody. Find out yourself if an exercise is good for you. To find the

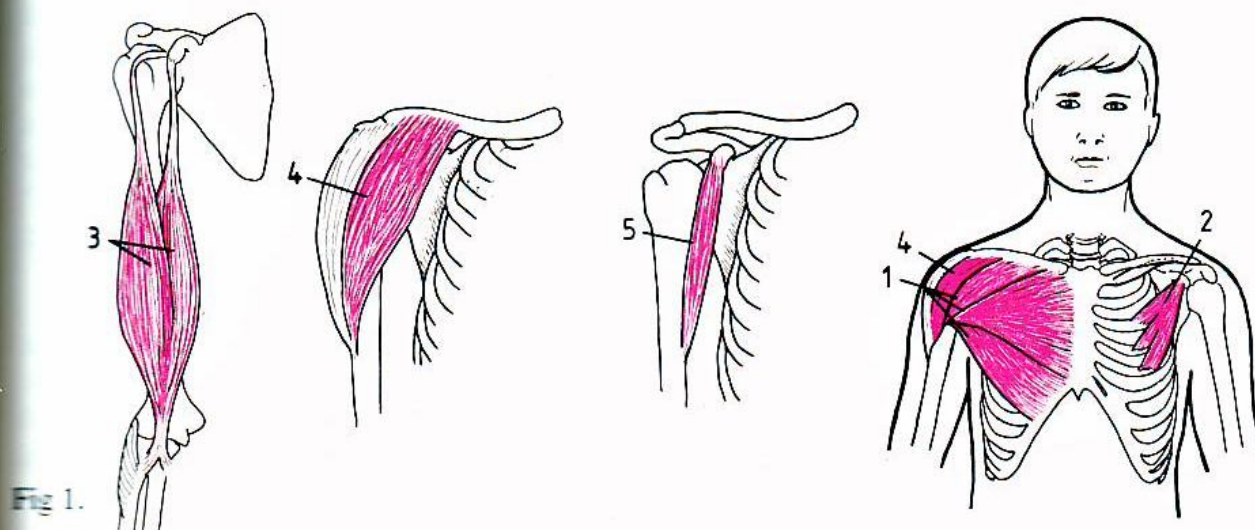


Fig 1.

right stretching program for your individual needs, the rule is: *Select, stretch, and see.*

This book may also be used by doctors and physical therapists in teaching patients to stretch their muscles.

How to use the pictures

The illustrations make it easier for you to understand explanations and instructions. Drawings show the troublesome muscles, where they are, and *where you should feel the strain while exercising.* (Fig 1).

In most drawings, each muscle has a number,

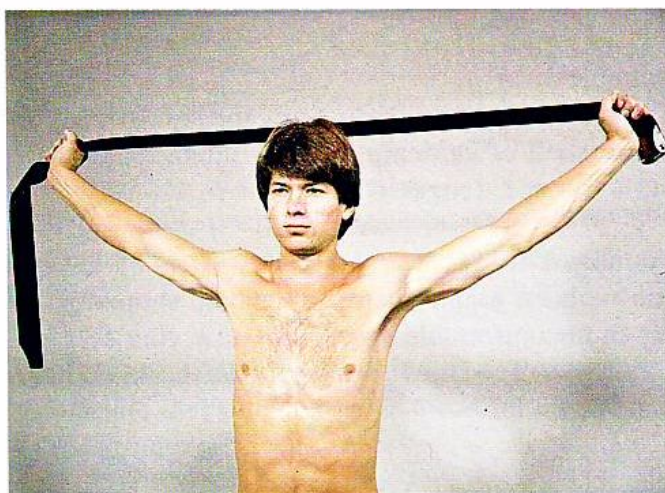


Fig 2. Starting Position

which is also found in the explanations together with its name. Drawings also show where muscles begin (this is called their origin) and where they end (their insertion).

In some cases – notably when it comes to the hip and the various parts of the spine – muscle names are not mentioned. This is because there are so many of them involved that there's no point in listing them all. But you'll find all the movements you may have problems with, and the pictures show what the muscles look like and where to find them.

Color photos show starting positions and stretching movements. The 'starting position' photo (Fig 2) shows you how to begin the exercise. First, see if you can assume this position – you'll notice at once if the muscles are too tight. If you feel any stiffness at this stage, you should do this exercise daily until you can move easier.

The 'stretching' photo (Fig 3) shows you the correct way to do the exercise, and also how far 'normally' lengthened muscles should stretch.

In the photos we have drawn arrows and sometimes crosses. Arrows show the direction of a movement, *but not how far it should go.* Crosses indicate which body parts should be held stable or fixed

during an exercise. In most cases, the starting position is so stable that no cross needs to be shown.

If you can get into the position shown in the 'stretching' photo without feeling any strain, you probably don't need to do that particular exercise. But try it now and then anyway, just to check if you've stiffened up!

How to use explanations and instructions

Each exercise is described in detail and according to the same order. It's easy to find out why and how you

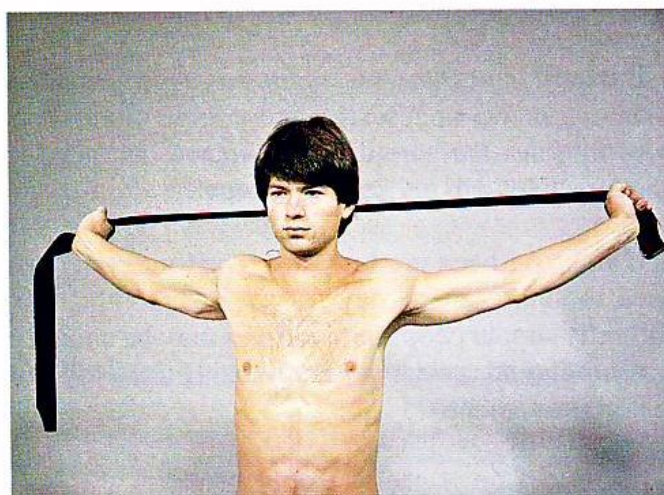


Fig 3. Stretching

need to stretch. Here are the headings you'll find for every exercise:

1. Your difficulty is...

Here you find a description of the movement that causes trouble.

You've noticed that a certain movement bothers you. In Example 1 above, your shoulder feels stiff. You've turned to one of the pages that describe the muscles of the shoulder. Now read the heading, 'Your difficulty is...' Does it seem like your own problem? Then do the recommended exercise and compare. If you're not sure what 'normal' movement should be, look at the bottom of the page. Try to do what is listed as 'Normal Mobility'. If that makes you feel tightness, go on to the drawings. Is your tight area where the muscles are shown in the pictures? Then you'll find your answer under the next heading:

2. Tight Muscles

Here you get the names of the tightened muscles that restrict your movements. You can feel the whole muscle with your fingers – tendons, attachments and all. Is it tender? You can massage it gently, both along and across the muscle fibers shown in the drawing.

This is a good way to relieve muscular pain, and it prepares you for stretching.

3. Equipment

These exercises are for doing anywhere, any time. This is why the equipment is so simple. There are two kinds: for support and for protection. Whenever you stretch, you need good support to make the starting position stable. Body parts that take pressure must be protected by comfortable padding. Especially the knees – don't ever put weight on them without protection. Remember that exercises shouldn't hurt.

4. Starting Position

Effective and safe stretching depends on getting the starting position right. It is always described in detail, both in words and in pictures, so that you can support, control and relieve your muscles throughout the exercise. Note crosses and arrows in the photos and follow the instructions exactly. Work long and hard at getting this position right! Especially important are neck and pelvis. They must always be held correctly.

5. Stretching

The description of each stretch is divided into four parts, each with a specific purpose and always in the same order:

I. Finding the particular muscle you want to stretch. (This muscle or muscle group is called the agonist.) Check if the muscle feels tight. Look at the muscle drawing to make sure the tightness is in the right place.

II. Activating the muscle. When you've found the agonist, tense it up and let it work without movement (isometrically) for about 5 seconds. This warms the muscle and prepares it for stretching. No great force is needed.

III. The actual stretching movement. Let your muscle relax for a few seconds; then, do the stretch that lengthens it. Now the beginning (origin) of the muscle moves away from the end (insertion). This is the opposite of what the muscle does in its normal work.

In some cases you use eye focus and breathing to make the exercise easier and more effective.

IV. Stretching to the limit, slowly and gradually. This is parts II and III repeated. You should certainly feel the stretch – it may even hurt, but *only* in a 'good' way and *only* in the muscle you're stretching at the moment (check muscle drawing). If you feel 'nasty' pain, or pain in the wrong place, stop the exercise immediately and read under 7

and 8 below. If the stretch feels good, stay with it – no waving or jerking! – for at least 15 seconds, and up to 1 minute or more if needed. *Keep stretching until you notice real improvement* (but not necessarily all the way to 'normal' extreme position). *Doing it slowly and gently is better than using more force in a hurry.*

6. Stimulation

The muscle you've been stretching – the agonist* – has an opposite on the other side of the joint. This one is called the antagonist*. If some of your muscles stay tightened for a long time, their antagonists or opposites can't work properly. They are hindered and may even get weak from lack of work. So it's very important to stimulate these muscles back to normal function.

Do it by continuing your stretch movement as before, while at the same time tensing the antagonists. Now you're making them work 'against' the movement. If antagonists show weakness when you try to stimulate them, start exercising them for strength.

7. Common Errors

Here we point out details that often go unnoticed. Read this part carefully and check that you're really doing the exercise right.

8. Notes

Remarks, hints and maybe warnings concerning the exercise. The rule about pain under Stretching, point IV, above, is always valid!

9. Normal Mobility

Nobody knows what 'normal mobility' means. A slight, slender woman may move very differently from a big, heavy man. But in general, we can agree that a movement should be painless and smooth throughout its course; it should stop naturally and not too early. Under this heading we describe movements that more or less every healthy person should be able to perform. If you've got that far, the exercise has done its work. You've achieved 'normal mobility'.

With the help of this book you can check the suppleness of muscles all over your body. If your joints work normally and you still can't move as described under this heading, then you should start stretching. If the movements are no problem to you, stretch now and then, anyway, to stay supple.

* More about these on page 244.

AUTOSTRETCHING FOR MUSCLES OF THE ARMS AND LEGS

Note: Exercises that can be done on left or right side of the body are always shown on the right. When you want to do them on the left side, swap 'left' and 'right' in all descriptions and pictures.

Body part	Exercise No.	Your difficulty is...	Page
The Shoulder	1	Bringing your arms up and backward above your head, behind it and on down behind your back.	14 – 15
	2	Bringing straight arms up and backward with palms turned forward.	16 – 17
	3	Bringing your arms up and backward with palms turned backward.	18 – 19
	4	Bringing your arm up and in toward your head while turning arm inward.	20 – 21
	5	Bringing your upper arm backward and inward across your back while turning upper arm inward.	22 – 23
	6	Pushing straight arms forward – moving your shoulder blades apart.	24 – 25
	7	Bending your elbow with upper arm touching your ear.	26 – 27
	8	Pulling your shoulders up toward ears.	28 – 29
	9	Bringing your upper arm backward and up.	30 – 31
	10	Bringing your upper arm backward at shoulder level with your elbow kept straight.	32 – 33
	11	Turning your forearm outward with the upper arm close to your side and your elbow bent.	34 – 35
	12	Touching your ear to your shoulder without raising the opposite shoulder.	36 – 37
	13	Touching your chin to your chest and your ear to your shoulder, without raising the opposite shoulder.	38 – 39
The Elbow	1	Bending your elbow.	40 – 41
	2	Straightening your elbow with your forearm turned inward.	42 – 43
	3	Bending your wrist, palm first, while keeping your elbow straight and your forearm turned inward.	44 – 45
	4	Bending your wrist, palm first, with clenched fist, elbow straight and forearm turned inward.	46 – 47
	5	Bending your wrist backward with your elbow straight and your forearm turned outward.	48 – 49
	6	Bending your wrist backward with your elbow and fingers straight and forearm turned outward.	50 – 51
	7	Turning your forearm outward with your elbow bent or straightening your elbow with your forearm turned outward.	52 – 53
	8	Turning your forearm outward with your elbow bent.	54 – 55
The Wrist	1	Curling your thumb with your forearm turned inward and your wrist bent, palm first.	56 – 57
	2	Straightening your thumb with your forearm turned outward, your elbow kept straight and your wrist bent backward.	58 – 59
	3	Bringing straight thumb over toward your little finger while your forearm is turned inward.	60 – 61
The Fingers	1	Bringing curled fingers up toward the back of your hand and closer to the other fingers, with your wrist straight.	62 – 63
	2	Bringing curled fingers up toward the back of your hand and away from the other fingers.	64 – 65
	3	Bending your wrist backward while keeping fingers curled.	66 – 67
	4	Bringing your thumb toward your forearm.	68 – 69

The Fingers

- 5 Bringing curled little finger up and closer to your third finger while your wrist is bent backward. 70 – 71
- 6 Bringing the little-finger bone in your hand up toward the back of your hand, with curled fingers, elbow straight and forearm turned outward. 72 – 73

The Hip

- 1 Bending your hip while your knee is straight. 74 – 75
- 2 Bending your hip while your knee is bent. 76 – 77
- 3 Bending your hip while both bringing and turning your leg inward. 78 – 79
- 4 Bending your hip while bringing your leg inward and turning it outward. 80 – 81
- 5 Moving your legs apart while turning them inward, hips bent. 82 – 83
- 6 Moving your legs apart while turning them outward, hips bent. 84 – 85
- 7 Bending or straightening your hips sufficiently. 86 – 87
- 8 Bringing your leg backward and turning it inward while bending your back to opposite side. 88 – 89
- 9 Bending your knee when your hip is straight.
 - A: Lying face down. 90 – 91
 - B: Kneeling. 92 – 93
 - C: Standing up. 94 – 95
- 10 Moving your legs apart with hips straight and legs turned inward. 96 – 97
- 11 Moving your legs apart with hips and knees straight and legs turned outward. 98 – 99
- 12 Crossing your thighs with hip kept straight. 100 – 101
- 13 Crossing your thighs with hip kept straight while turning your thigh outward and your lower leg inward.
 - A: Knee bent. 102 – 103
 - B: Knee bent all the way. 104 – 105
- 14 Turning your legs inward at hip. 106 – 107
- 15 Turning your legs outward at hip. 108 – 109

The Knee

- 1 Bending your knee. 110 – 111
- 2 Bending your knee while turning your lower leg inward. 112 – 113
- 3 Bending your knee while turning your lower leg outward. 114 – 115
- 4 Straightening your knee with your lower leg turned inward. 116 – 117
- 5 Straightening your knee with your lower leg turned outward. 118 – 119

The Ankle

- 1 Straightening your ankle (for pulling on a sock or getting up on tiptoe). 120 – 121
- 2 Curling your toes while your ankle is straightened.
 - A: Kneeling. 122 – 123
 - B: Sitting. 124 – 125
- 3 Bending your ankle upward. 126 – 127
- 4 Bending your ankle upward while keeping your knee straight and raising the inner side of your foot. 128 – 129
- 5 Bending your ankle upward while keeping your knee straight and raising the outer side of your foot. 130 – 131
- 6 Bending your ankle upward with your knee bent. 132 – 133
- 7 Bending your ankle upward with your knee bent and raising the inner side of your foot. 134 – 135
- 8 Bending your ankle upward with your knee bent and raising the outer side of your foot. 136 – 137

The Toes

- 1 Bending your toes upward. 138 – 139
- 2 Moving your big toe away from the other toes. 140 – 141

THE SHOULDER 1.

Your difficulty is:

Bringing your arms up and backward above your head, behind it and on down behind your back.

Tight Muscles:

Primarily

1 *pectoralis major*

2 *pectoralis minor*.

Stretch also affects

3 *biceps brachii*

4 *deltoideus, clavicular part*

5 *coracobrachialis*.

Equipment:

Chair.

Belt, strap, towel, rod or the like.

Starting Position:

Sit on chair, upper body inclined forward to keep lower back straight, chin drawn back, head held naturally. With palms forward and arms up, grasp belt with hands far enough apart to permit arms to move up above head and down behind back, with elbows straight.

Stretching:

1. Move hands closer so that stretch is felt in the chest and shoulder as arms move in upward-backward circle.
2. With arms straight, pull outward but don't move hands; hold for 5 seconds.
3. Relax and then move arms further upward and backward to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain grip but don't pull outward. Press arms backward and downward behind body, to limit.
2. Hold position a few seconds.

Common Errors:

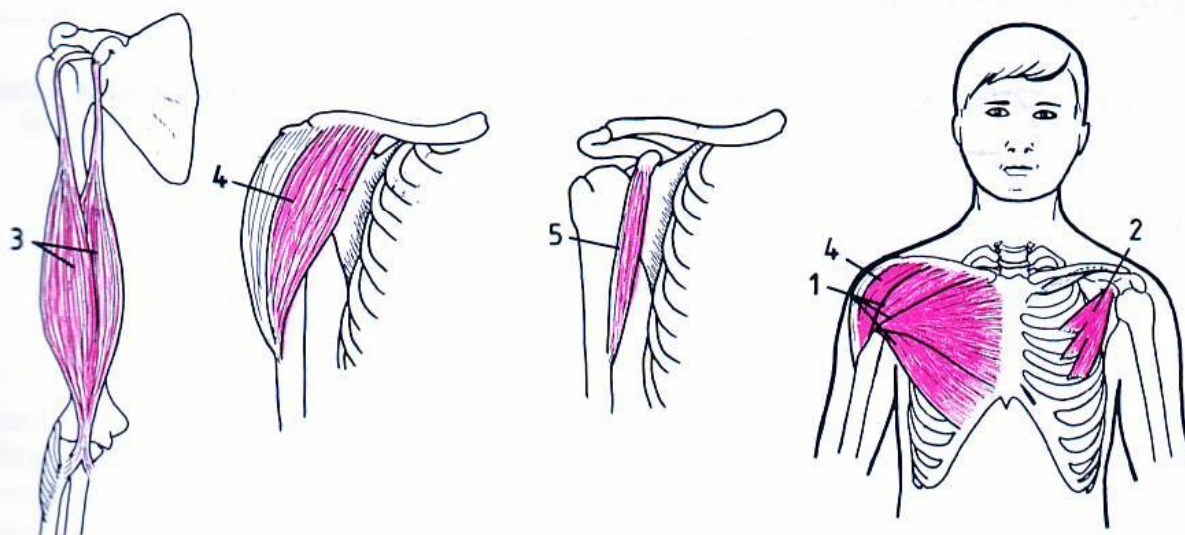
- * Chin juts forward.
- * Back arched.
- * Elbows not straight.

Note:

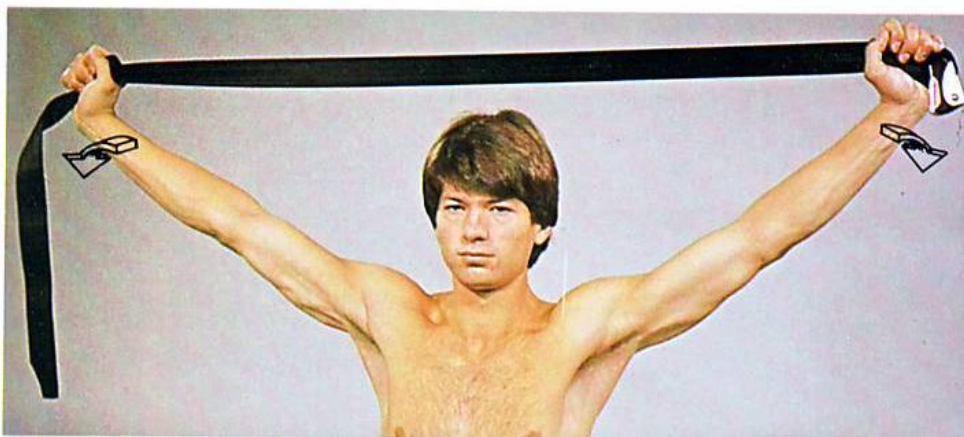
Note distance between hands on belt; move hands closer after each stretch; the closer they are, the more you can move.

Normal Mobility:

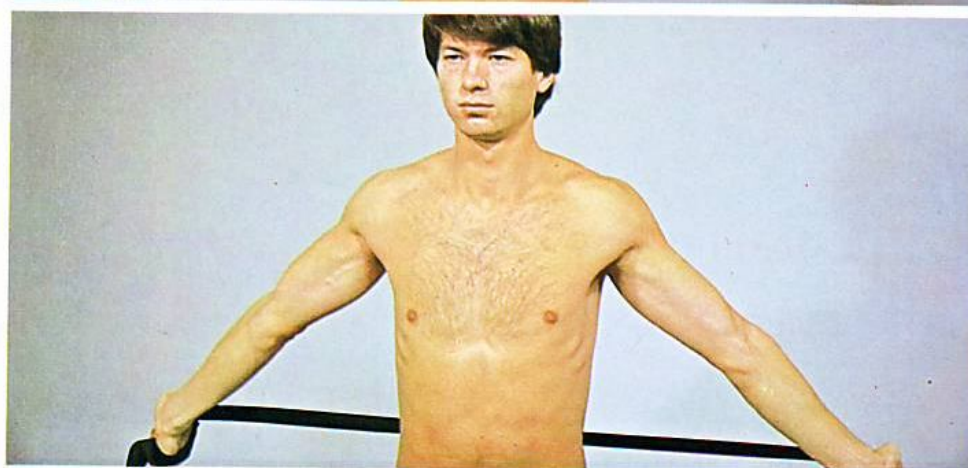
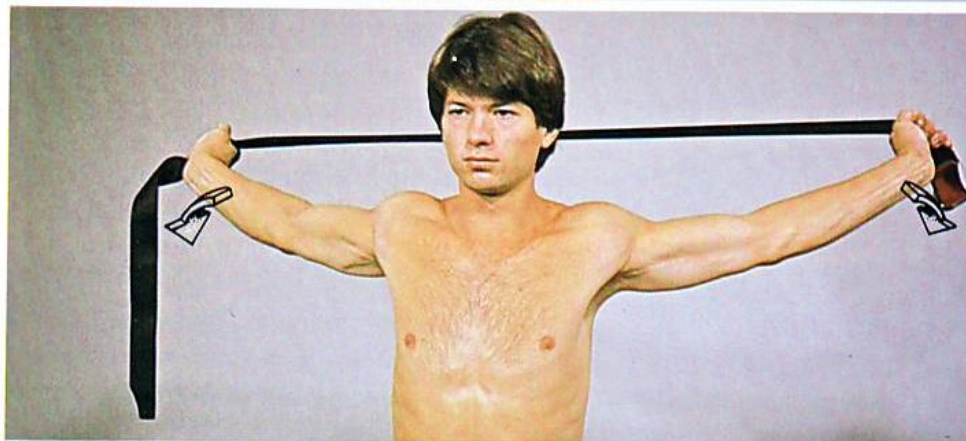
You should be able to do this exercise with your hands about double shoulder width apart. This stretch counteracts rounded upper back (thoracic kyphosis).



Starting Position:

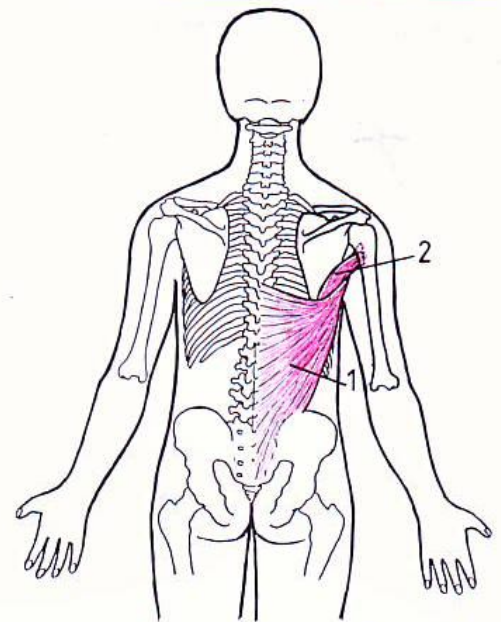
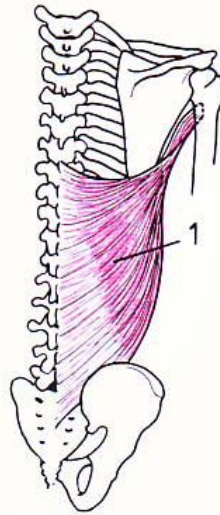
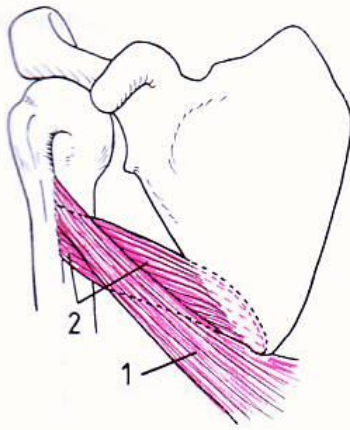


Stretching:

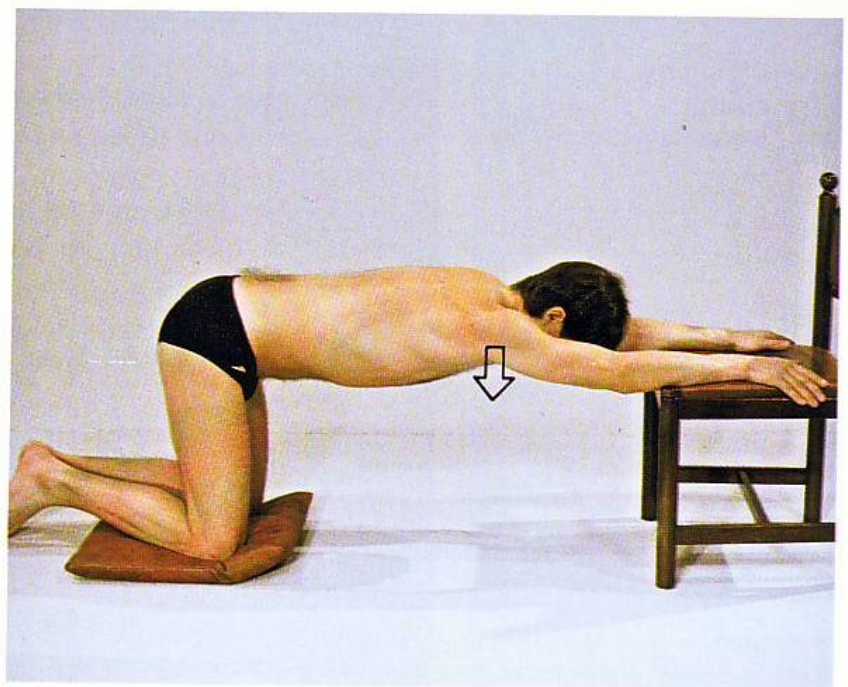
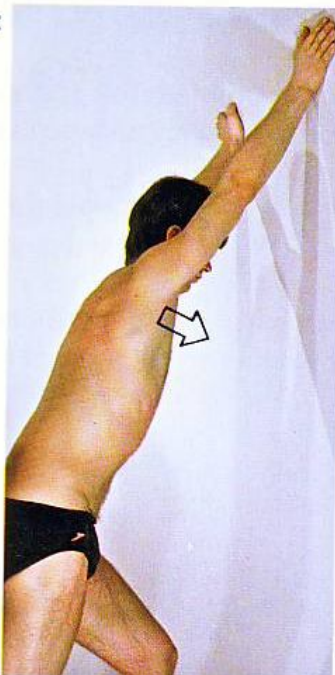


THE SHOULDER 2.

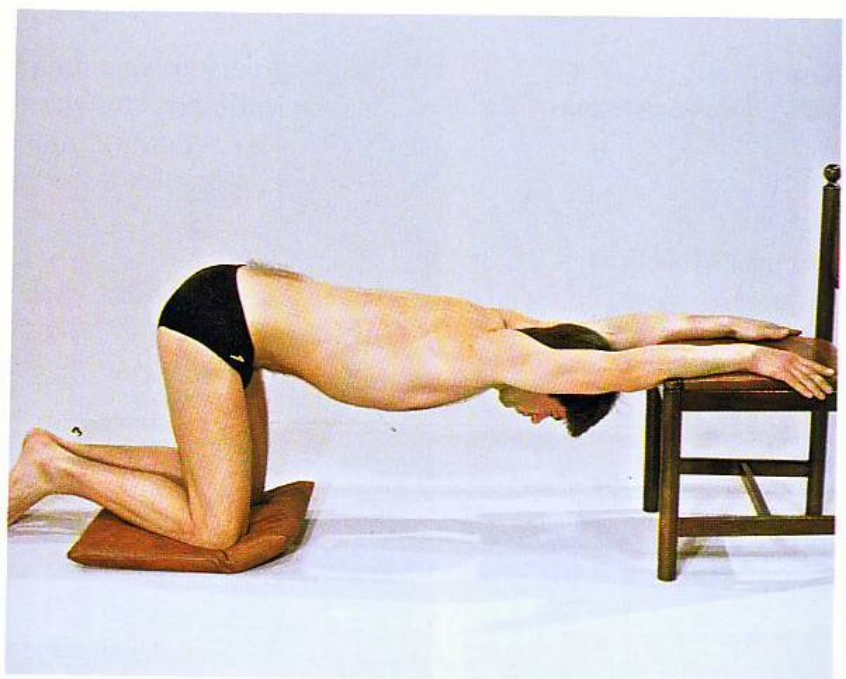
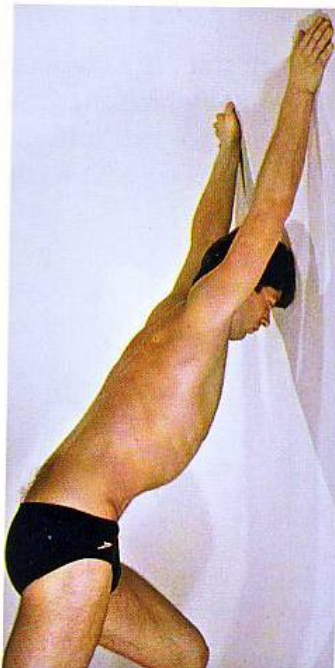
Your difficulty is:	Bringing straight arms up and backward with palms turned forward.
Tight Muscles:	Back muscles: 1 <i>latissimus dorsi</i> 2 <i>teres major</i> .
Equipment:	Wall, chair or other suitable support.
Starting Position:	Stand facing wall, one foot ahead of the other, neck inclined forward, chin drawn back. Place palms against wall at shoulder width apart, fingers pointing upward and outward, arms straight. Lean upper body forward and push lower back out, pulling lower abdomen up toward navel ('tail between legs').
Stretching:	1. Move chest and shoulders toward wall, so that stretch is felt in outer shoulder. 2. Press hands toward wall and downward; hold for 5 seconds. 3. Relax and move chest and shoulders as close as possible to wall. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Lift turned-out arms up and backward to limit, palms forward. 2. Hold position a few seconds.
Common Errors:	* Chin juts forward. * Back arched. * Forearms not turned outward. * Elbows bent.
Notes:	1. Hips may be bent, but balance should be maintained throughout. 2. As shown to the right, stretch may also be done kneeling, palms against a chair seat or the floor.
Normal Mobility:	Lying on your back on floor with hips and knees bent to limit. Arms, held straight at shoulder width, should be free to move above head and down to rest completely on floor, palms up.



Starting Position:



Stretching:



THE SHOULDER 3.

Your difficulty is:

Bringing your arms up and backward with palms turned backward.

Tight Muscles:

Muscles of upper back and chest:

- 1 *subclavius*
- 2 *pectoralis major*
- 3 *pectoralis minor*
- 4 *latissimus dorsi*
- 5 *teres major*.

Equipment:

Firm object that can be gripped above head, such as a bar, beam, step of open staircase, tree branch, or hanging belts or ropes.

Starting Position:

With arms above head, head held naturally, chin drawn back, grip object at shoulder width, palms facing backward. Keep feet resting on floor, legs leaning forward or knees bent to prevent arching of back.

Stretching:

1. Bend knees to lower body so that arms stretch and shoulders pull up toward ears and tightening is felt in muscles under collarbone and across the chest.
2. Tense chest/back muscles as if to lift body up; hold for 5 seconds.
3. Relax and lower body to limit – maybe a little bit more – with back straight.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Release grip; stand up straight.
2. Stretch arms up and backward as far as they will go, palms backward.
3. Hold position a few seconds.

Common Errors:

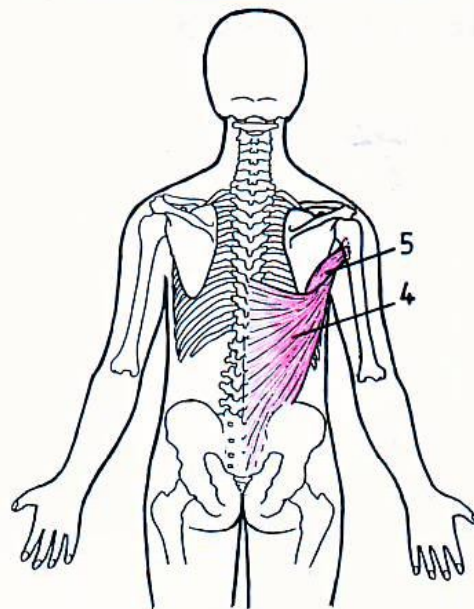
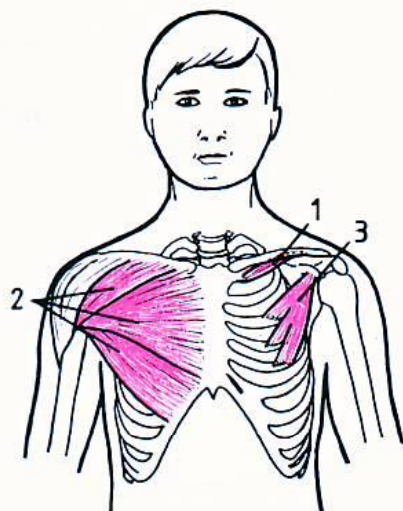
- * Chin juts forward.
- * Palms not turned backward.
- * Elbows bent.
- * Back arched.

Note:

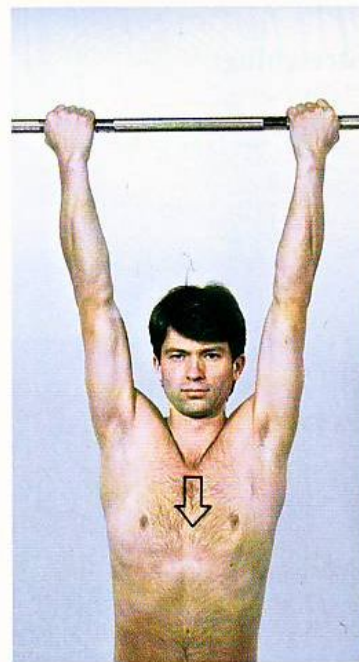
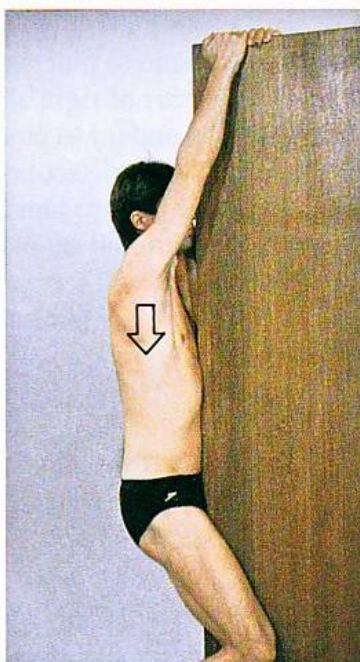
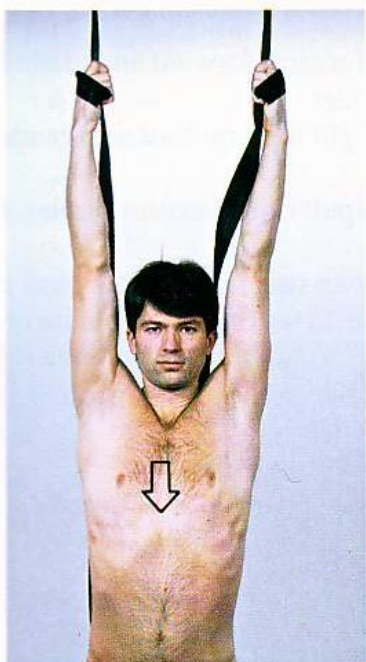
Stronger persons can stretch hanging free. If suitable overhead supports are not available, stretch may be done by hanging from upper edge of a sturdy door. Warning: most doors are not made to carry weight, so be careful and support lower edge against floor with wedge.

Normal Mobility:

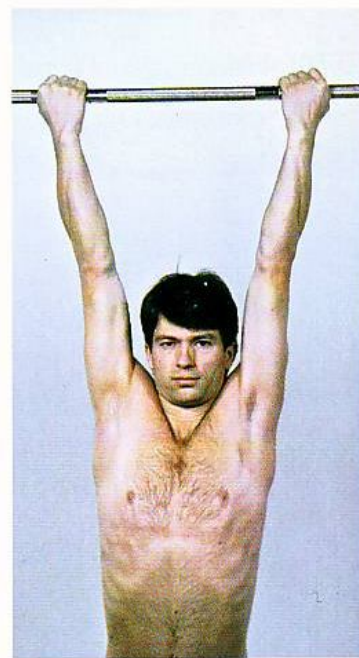
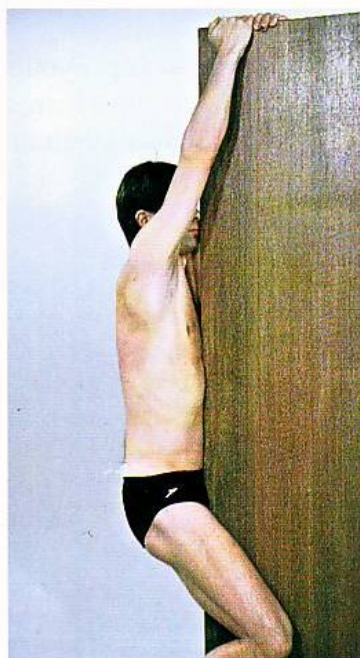
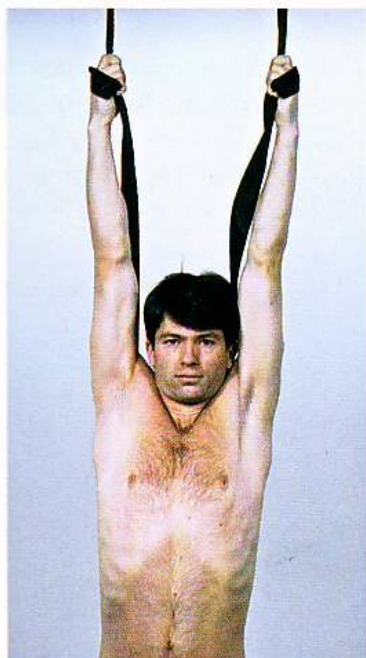
Lying down on your back on floor with hips and knees bent to limit. Arms, held straight at shoulder width, should be free to move above head and down to rest completely on floor, palms up.



Starting Position:

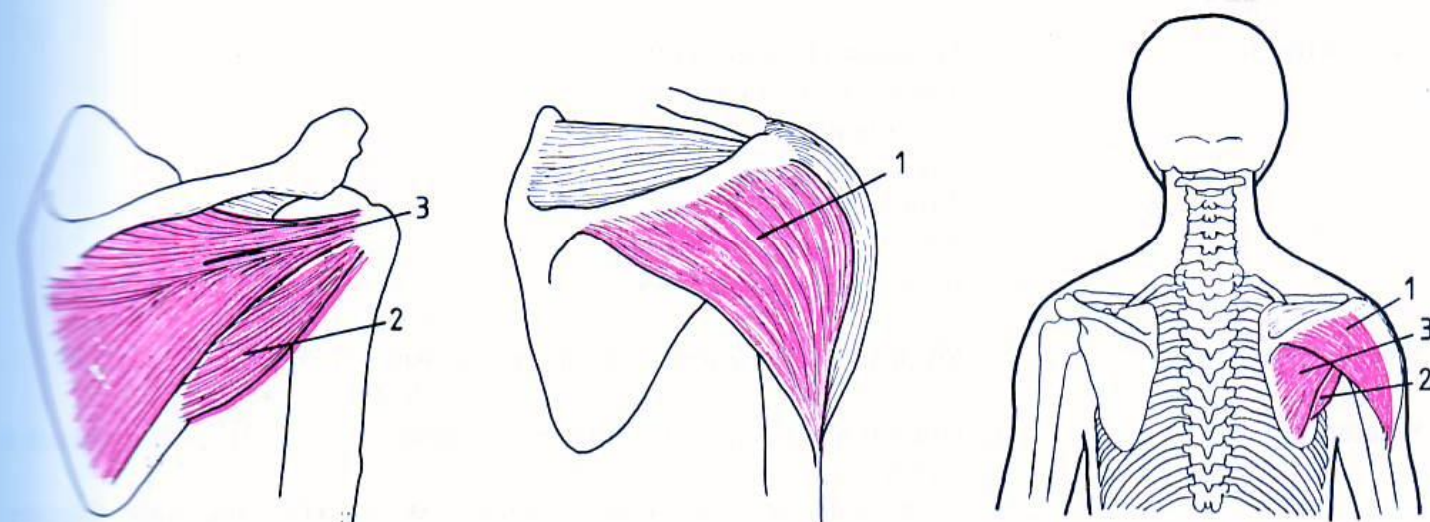


Stretching:

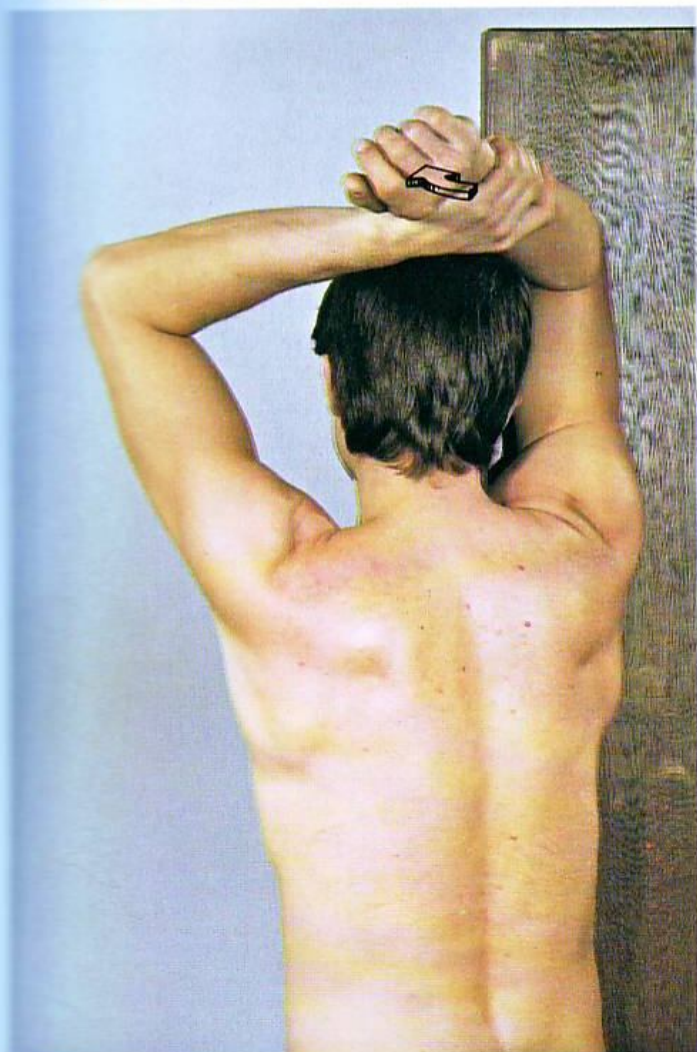


THE SHOULDER 4.

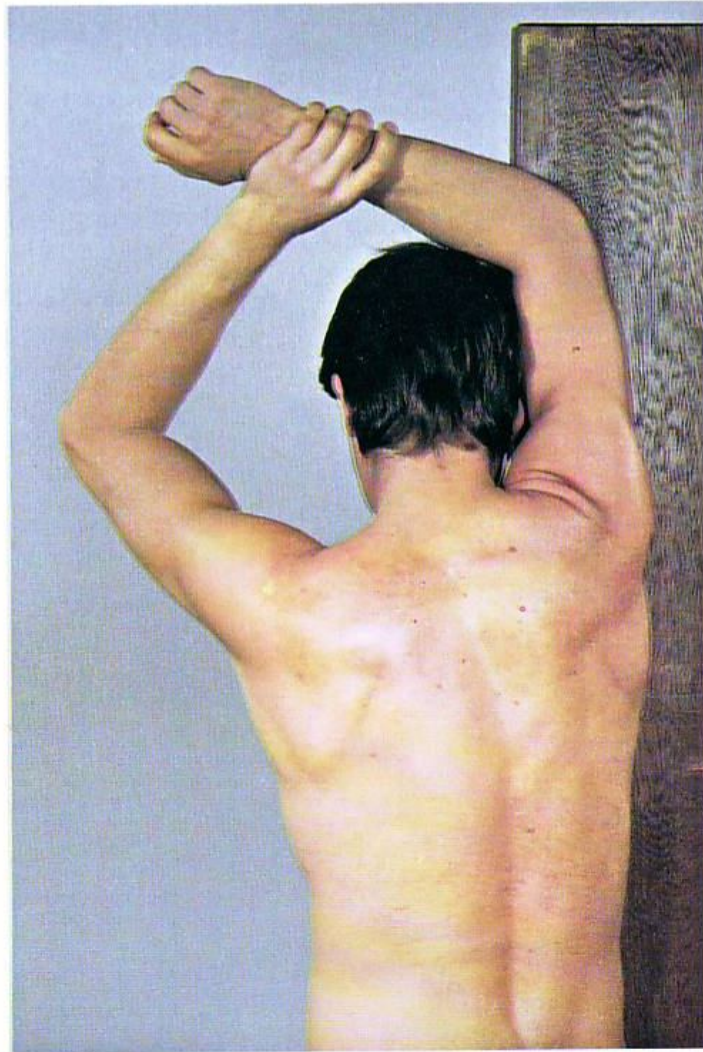
Your difficulty is:	Bringing your arm up and in toward your head while turning arm inward.
Tight Muscles:	Muscles around shoulder: 1 <i>deltoideus, spinal part</i> 2 <i>teres minor</i> 3 <i>infraspinatus</i> .
Equipment:	Door-frame or similar support.
Starting Position:	Grasp right wrist with left hand. Raise both arms as high above and as far behind head as possible, right upper arm touching right ear. Support right upper arm and right side against door-frame. Keep right elbow back, right forearm pointing backward and to the left.
Stretching:	1. Use left hand to pull right forearm forward and to the left, so that stretch is felt in rear of right shoulder. 2. Hold grip and try to push right forearm backward with upper arm against head; hold for 5 seconds. 3. Relax and use left hand to pull right forearm further forward to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip. Move right arm to the left; turn forearm forward and press elbow back to limit. 2. Resist with left hand. 3. Hold position a few seconds.
Common Errors:	* Body bends sideways. * Right elbow pulled forward.
Note:	This stretch may also be done standing free or sitting on floor.
Normal Mobility:	With elbow bent, you should be able to move your right arm slightly in behind your head; in this position, your wrist should be able to come further forward than the elbow.



Starting Position:



Stretching:



THE SHOULDER 5.

Your difficulty is:

Bringing your upper arm backward and inward across your back while turning upper arm inward.

Tight Muscles:

Shoulder/chest muscles:

1 *deltoideus, clavicular part*

2 *deltoideus, acromial part*

3 *teres minor*

4 *infraspinatus*

5 *pectoralis major*

6 *supraspinatus.*

Starting Position:

Sit or stand, both arms behind back; grasp right wrist with left hand.

Stretching:

1. Use left hand to pull right arm backward and to the left, so that stretch is felt in right shoulder.
2. Hold steady grip and pull right upper arm to body and right forearm backward; hold for 5 seconds.
3. Relax; use left hand to pull right arm further to the left and backward to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

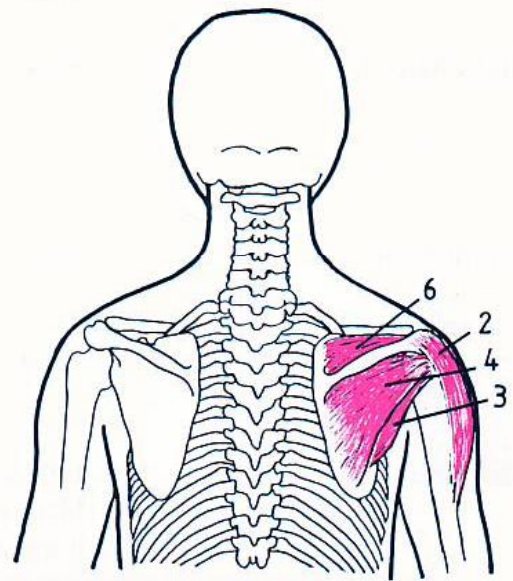
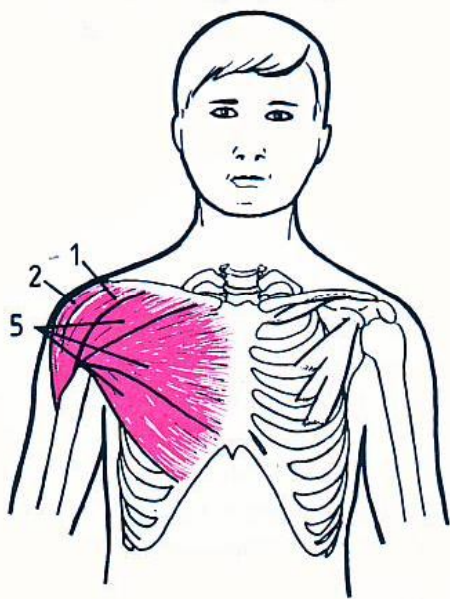
1. Retain grip but don't pull with left hand. Move right hand to the left and as far back as possible.
2. Resist with left hand.
3. Hold position a few seconds.

Common Errors:

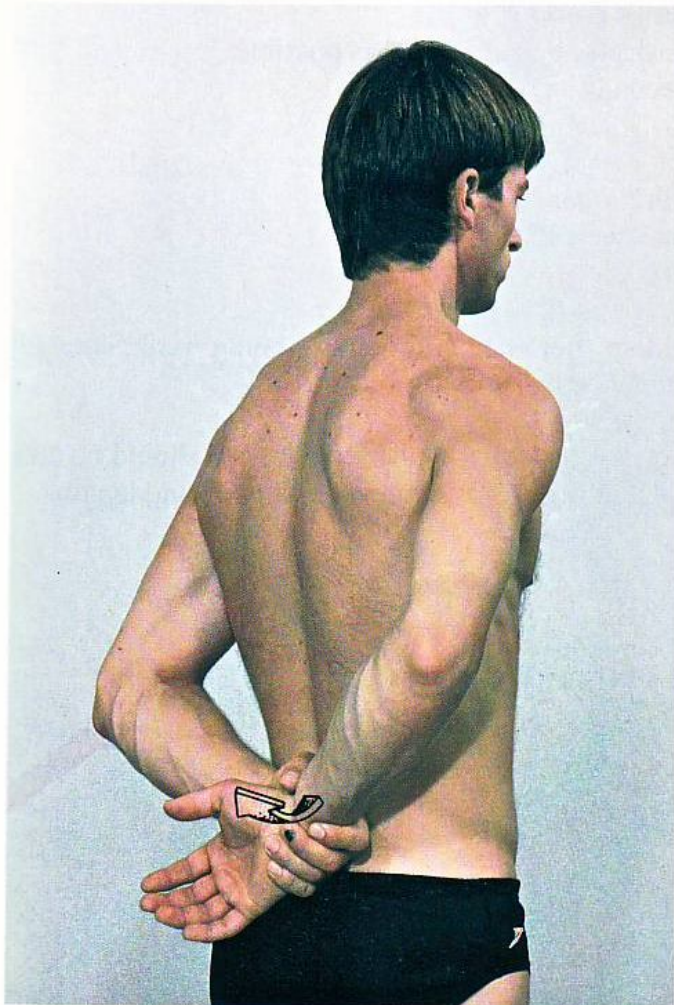
- * Body bends sideways.
- * Elbow straight.

Normal Mobility:

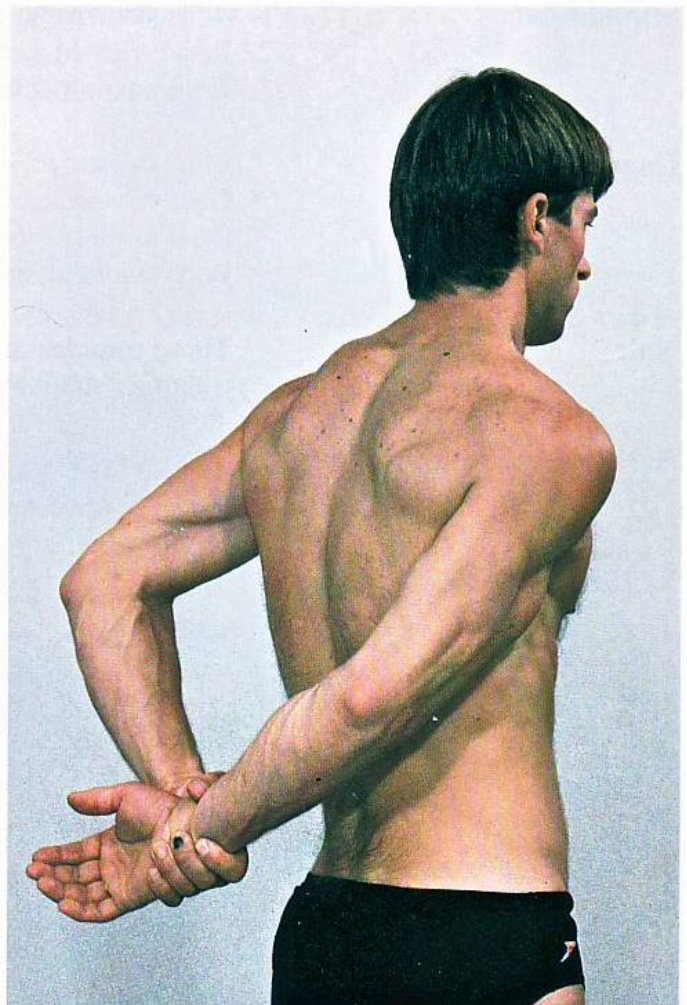
With back straight and right upper arm against body, you should be able to move your right forearm in behind your back; your wrist should be able to move further back than the elbow.



Starting Position:

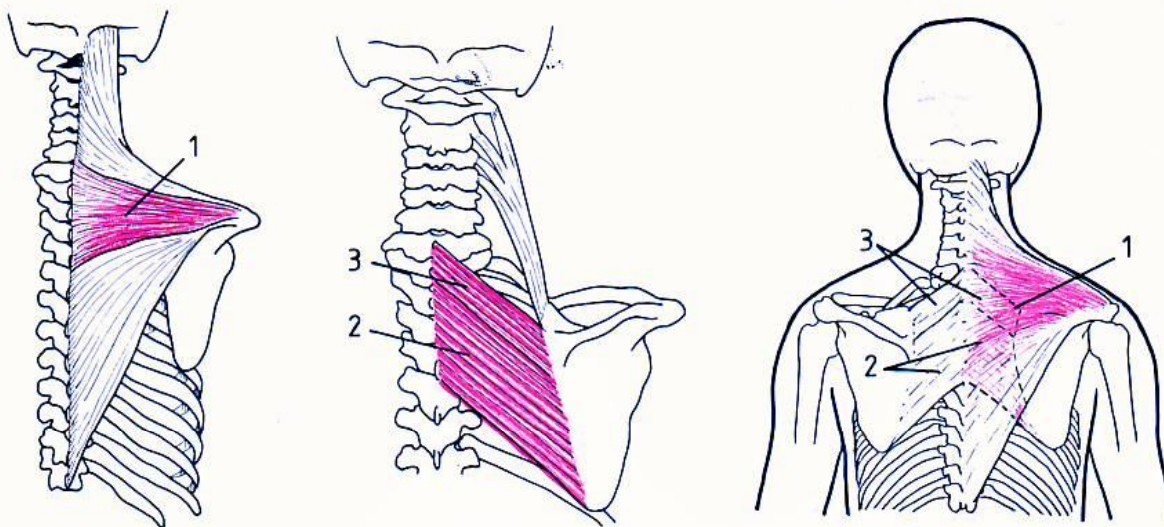


Stretching:

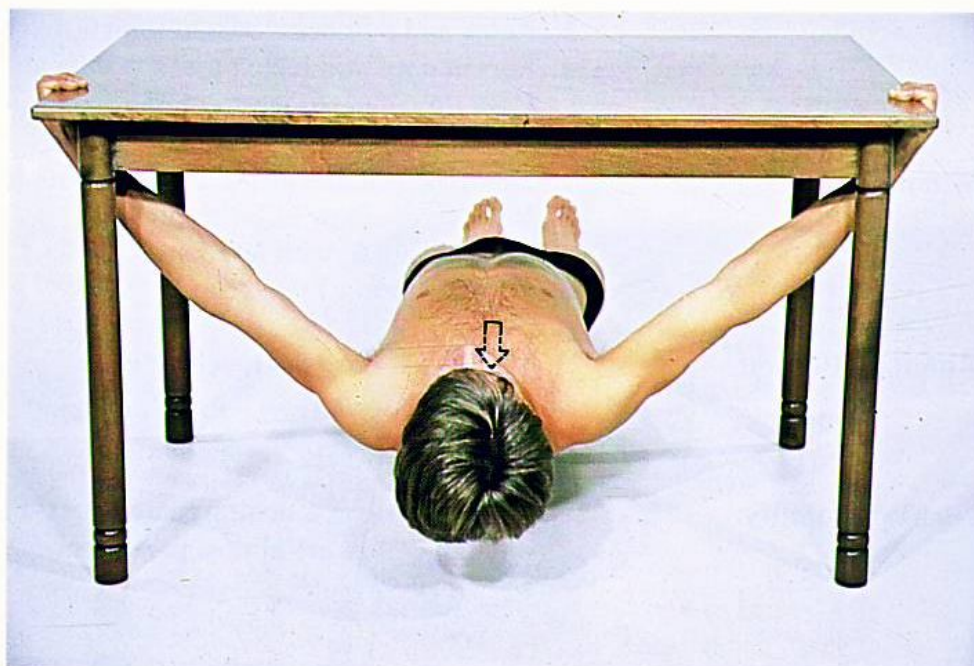


THE SHOULDER 6.

Your difficulty is:	Pushing straight arms forward – moving your shoulder blades apart.
Tight Muscles:	Shoulder muscles: 1 <i>trapezius, transverse part</i> 2 <i>rhomboideus major</i> 3 <i>rhomboideus minor</i> .
Equipment:	Table or other object large enough to lie under and hang from.
Starting Position:	Lie on your back under table. Grasp edges of table, arms straight and hands so far apart that upper back is about one hand width above floor when arms and body are straight; heels on floor.
Stretching:	1. Lower straight body toward floor, so that stretch is felt between shoulder blades. 2. Tense as if to raise body upward with arms still straight; hold for 5 seconds. 3. Relax and allow straight body to sink lower, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release grip and lie down on floor. 2. Raise straight arms vertically upward as far as possible. 3. Hold position a few seconds.
Common Errors:	* Elbows bent. * Head too far forward or too far back. * Parts of body other than heels touch floor. * Body not held straight.
Note:	These muscles are seldom shortened without also being weak; strength training usually recommended.
Normal Mobility:	With back straight and chin tucked in, outstretched arms should be able to move so far forward that finger tips move at least one hand length.



Starting Position:

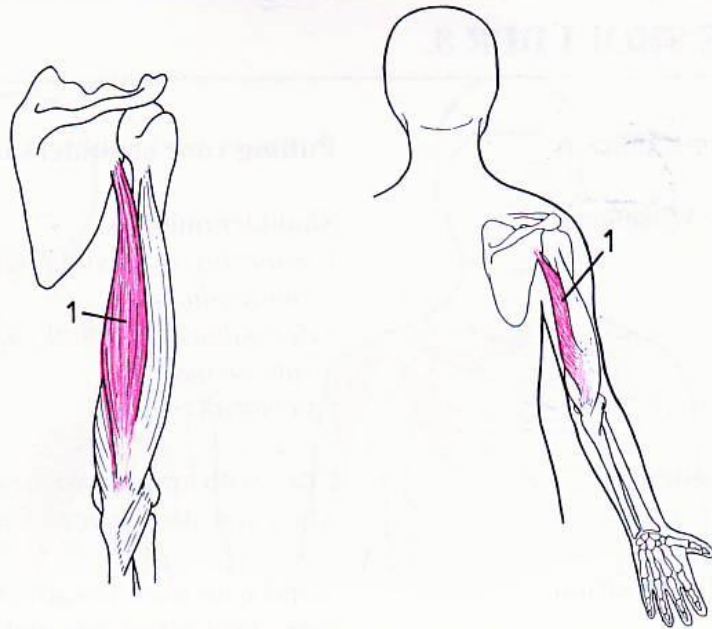


Stretching:

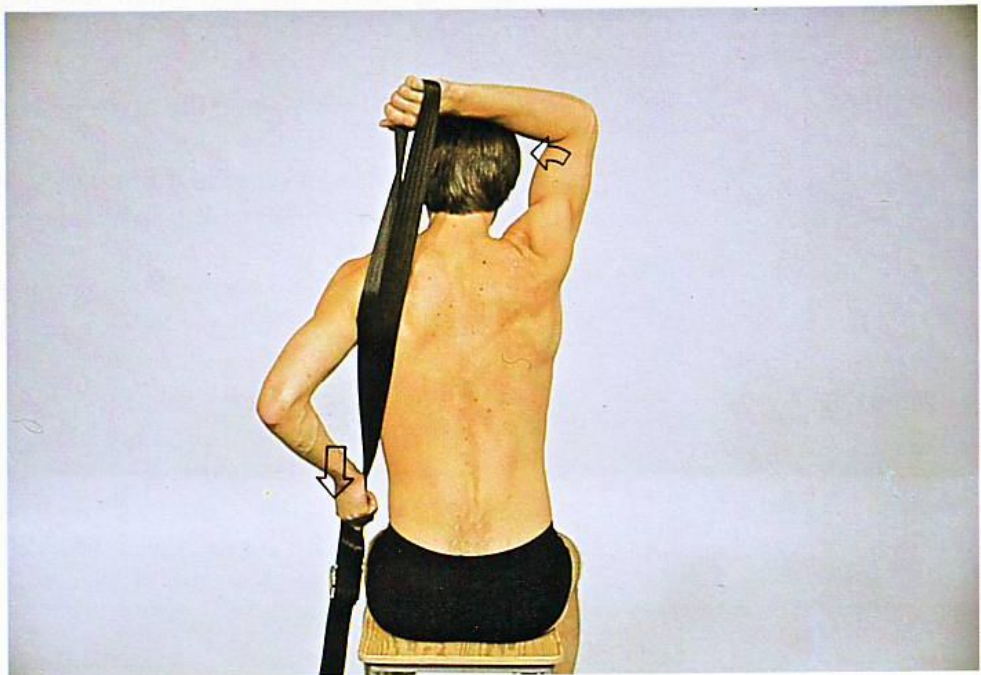


THE SHOULDER 7.

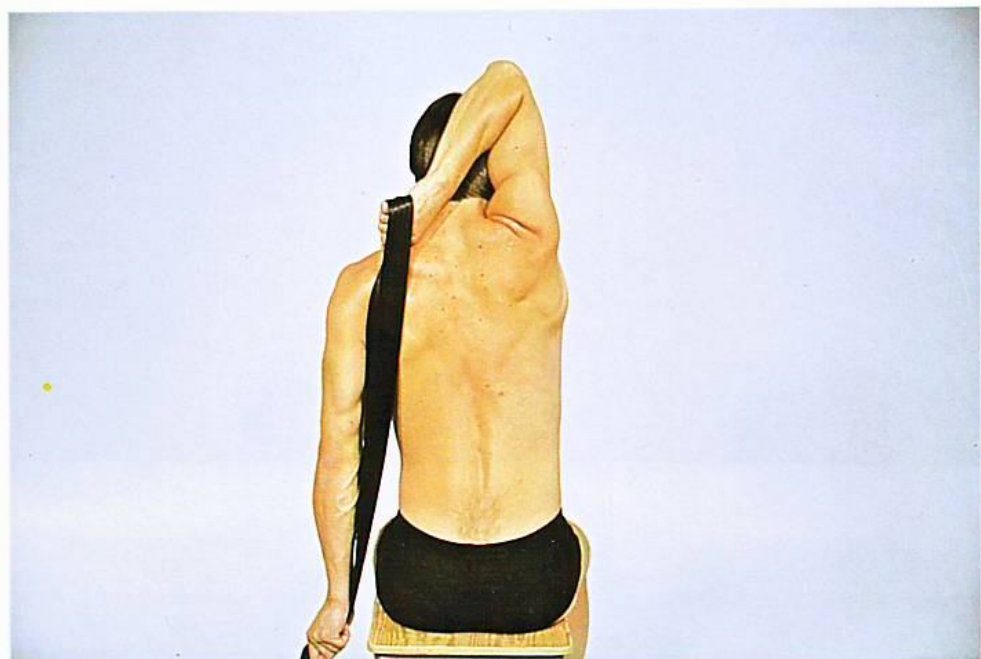
Your difficulty is:	Bending your elbow with upper arm touching your ear.
Tight Muscle:	Muscle along back of upper arm: <i>1 triceps brachii, long head.</i>
Equipment:	Belt, rope, towel or the like, and maybe a chair or stool to sit on.
Starting Position:	Stand erect or sit on a chair/stool. Grasp belt with right hand. With elbow bent, raise right arm until upper arm points straight up. Belt now hangs down behind back; grasp it with left hand.
Stretching:	1. Pull belt down with left hand so that stretch is felt along back of right arm. 2. Resist by trying to straighten right elbow; hold for 5 seconds. 3. Relax and pull belt down to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Let go of belt and grip right wrist with left hand. 2. Bend right elbow as far as possible. 3. Resist bending with left hand. 4. Hold position a few seconds.
Common Errors:	* Right upper arm not touching ear. * Body bent back or to the side. * Head bent forward.
Normal Mobility:	With upper arm touching ear, elbow should be able to bend until forearm and upper arm are almost parallel or the forearm is stopped by touching flesh.



Starting Position:



Stretching:



THE SHOULDER 8.

Your difficulty is:

Pulling your shoulders up toward ears.

Tight Muscles:

Shoulder muscles:

- 1 *trapezius, ascending part*
- 2 *supraspinatus*
- 3 *deltoideus, acromial part*
- 4 *subclavius*
- 5 *pectoralis minor.*

Equipment:

Chair with arms, table, or other support somewhat lower than hand height when you stand erect with arms hanging straight down.

Starting Position:

Stand with back toward chair/table, neck stretched long and chin drawn back. Feet about one and a half foot-lengths from the table. Grip chair arms/table with hands placed shoulder width apart; keep arms straight.

Stretching:

1. Weight arms by lowering the body so that stretch is felt in shoulders and above shoulder blades; let lower back move toward support.
2. Tense shoulder muscles as if to raise body; hold for 5 seconds.
3. Relax and lower body further between shoulders, to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

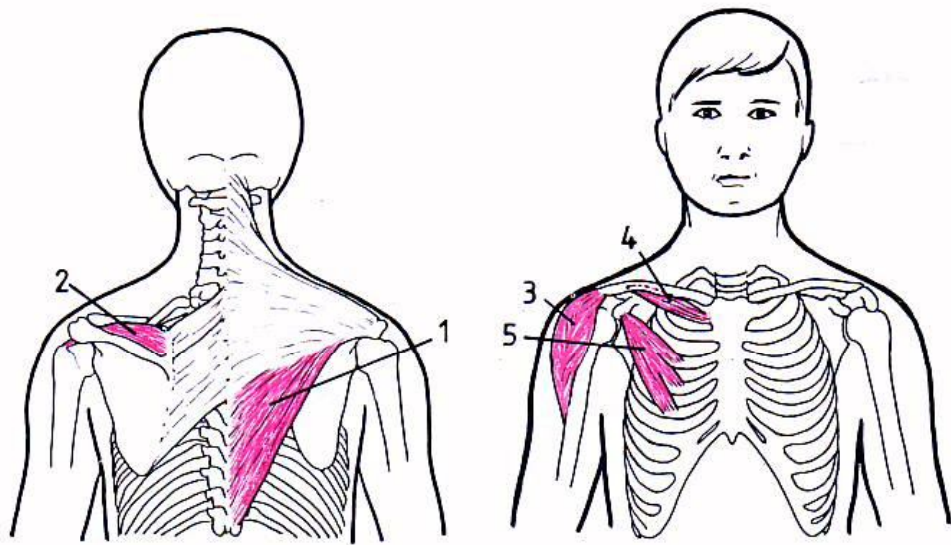
1. Stand free, neck long and chin tucked in.
2. Raise shoulders as far as possible toward ears.
3. Hold position a few seconds.

Common Errors:

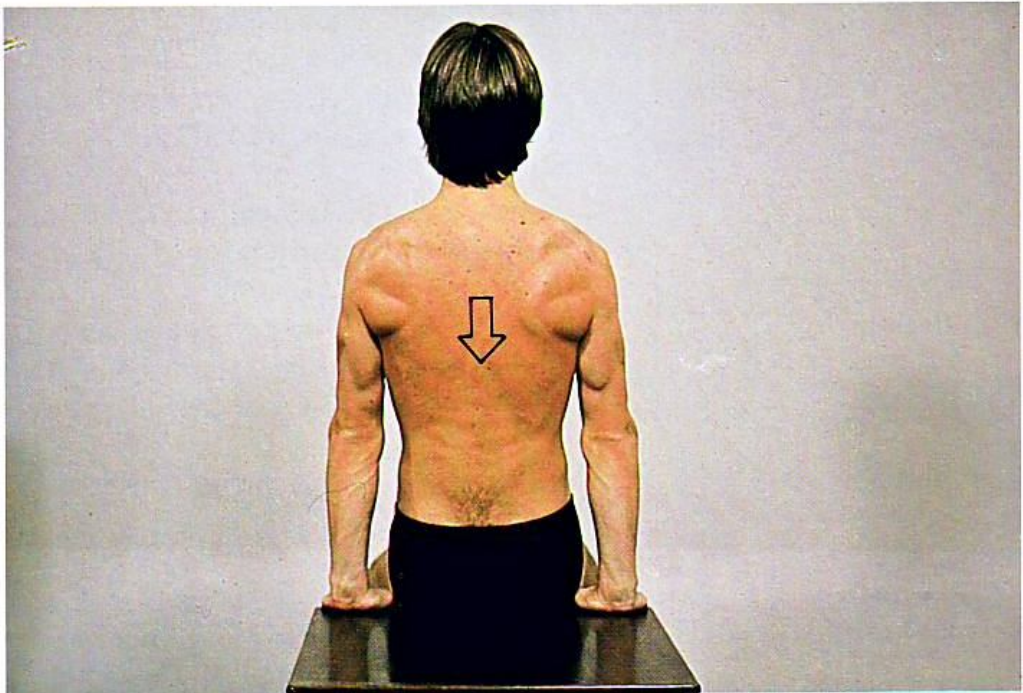
- * Elbows bent.
- * Back not straight.
- * Head craned forward.
- * Chin juts forward.

Normal Mobility:

You should be able to pull your shoulders up to your ear lobes or higher.



Starting Position:



Stretching:



THE SHOULDER 9.

Your difficulty is:

Bringing your upper arm backward and up.

Tight Muscles:

Arm, shoulder, chest muscles:

1 *serratus anterior*

2 *deltoideus, clavicular part*

3 *pectoralis major*.

Equipment:

Table or other support, height about level with hands when you stand erect with arms straight down.

Starting Position:

Stand with back toward table, neck stretched long and chin drawn back, feet about one and a half foot-lengths from the table. Grip edge of table with hands placed shoulder width apart, arms straight.

Stretching:

1. Lower body - without bending forward - by bending knees and elbows so that stretch is felt under shoulder blades and in chest.
2. Tense these muscles as if to raise body; hold for 5 seconds.
3. Relax and bend elbows and knees to lower body to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

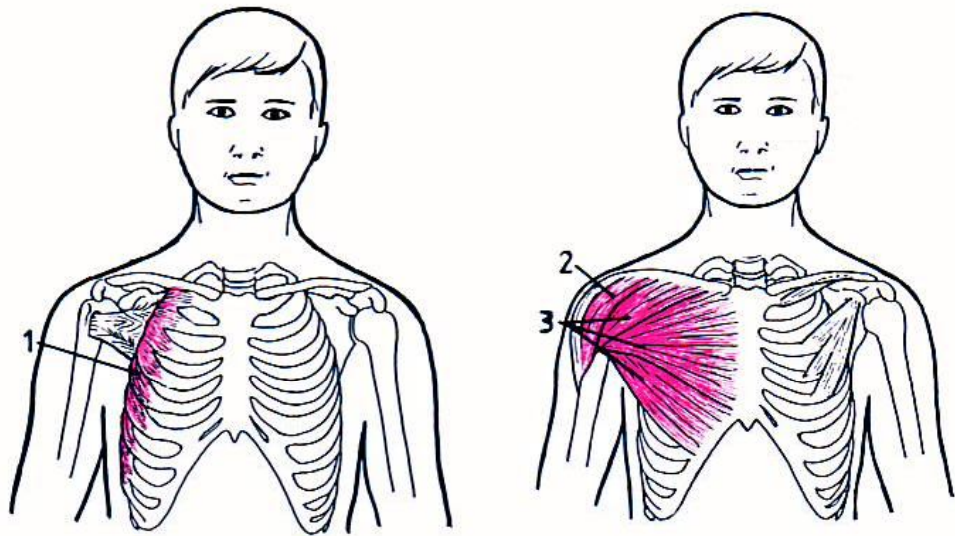
1. Stand erect, neck long and chin tucked in.
2. Move bent elbows backward and up to limit.
3. Hold position a few seconds.

Common Errors:

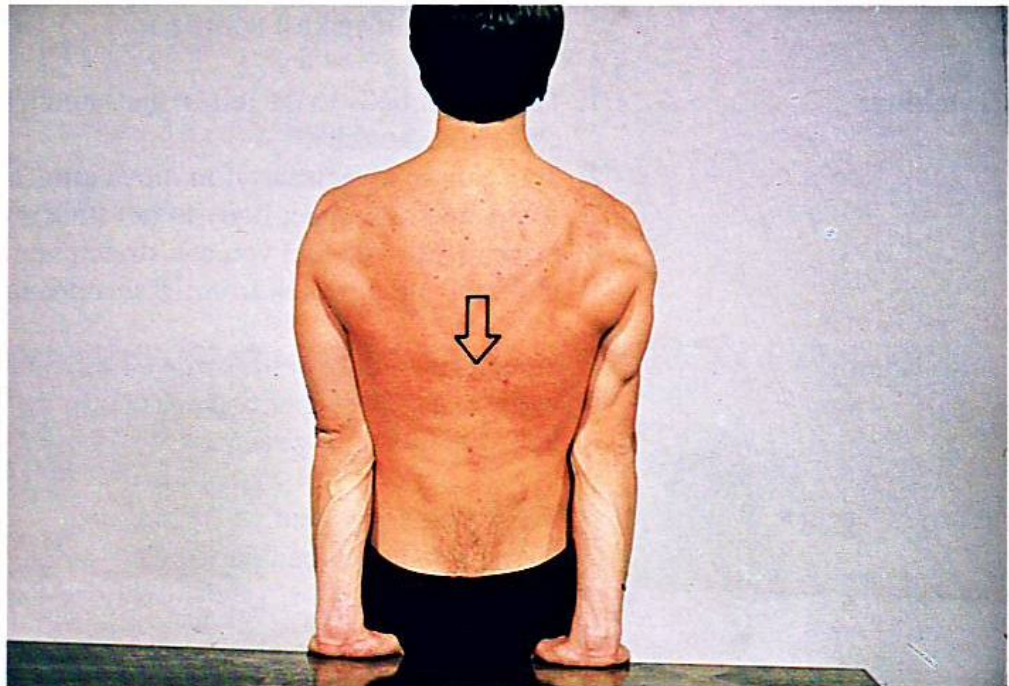
- * Elbows held straight and/or not shoulder width apart.
- * Body bent forward.
- * Chin juts forward.

Normal Mobility:

You should be able to move your upper arm backward and up almost to the horizontal, without leaning trunk forward.



Starting Position:

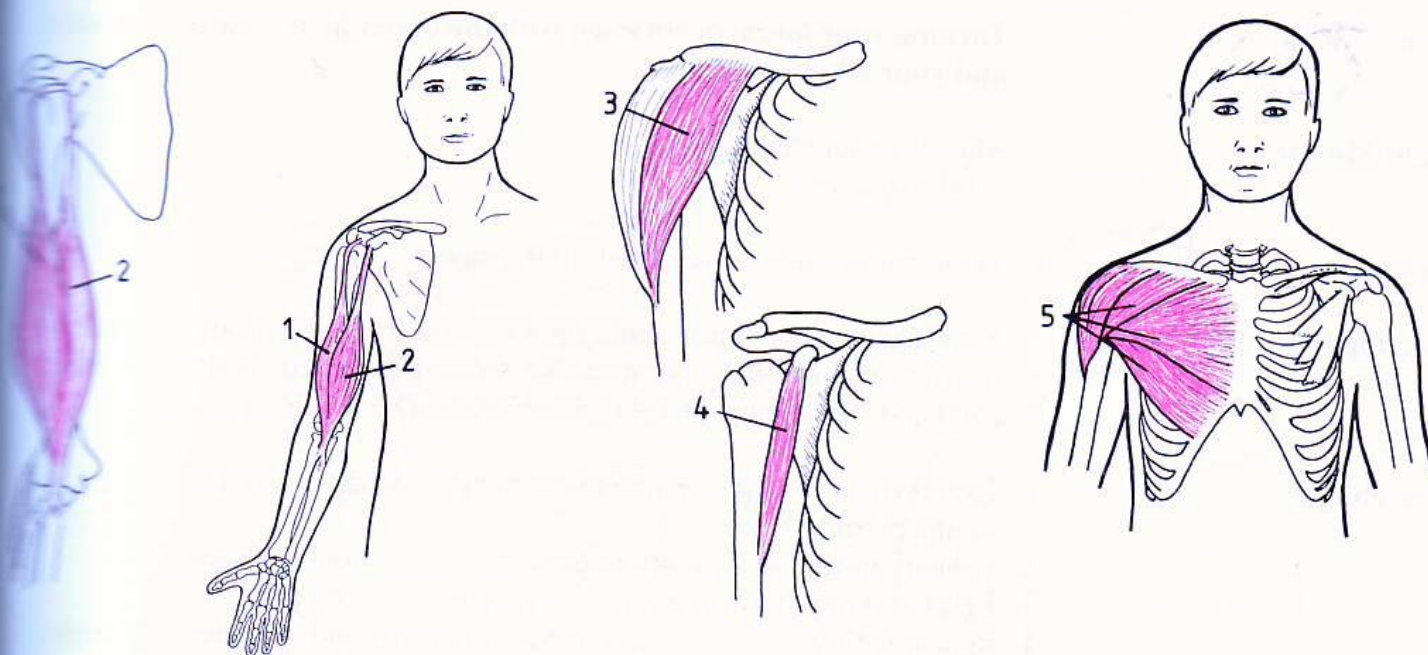


Stretching:

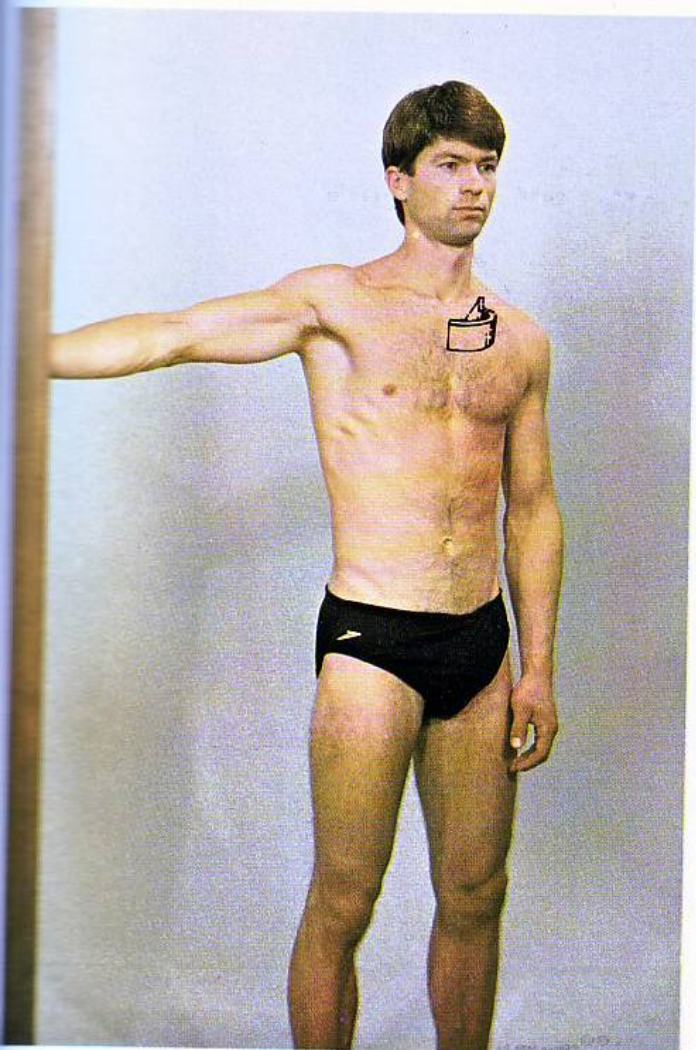


THE SHOULDER 10.

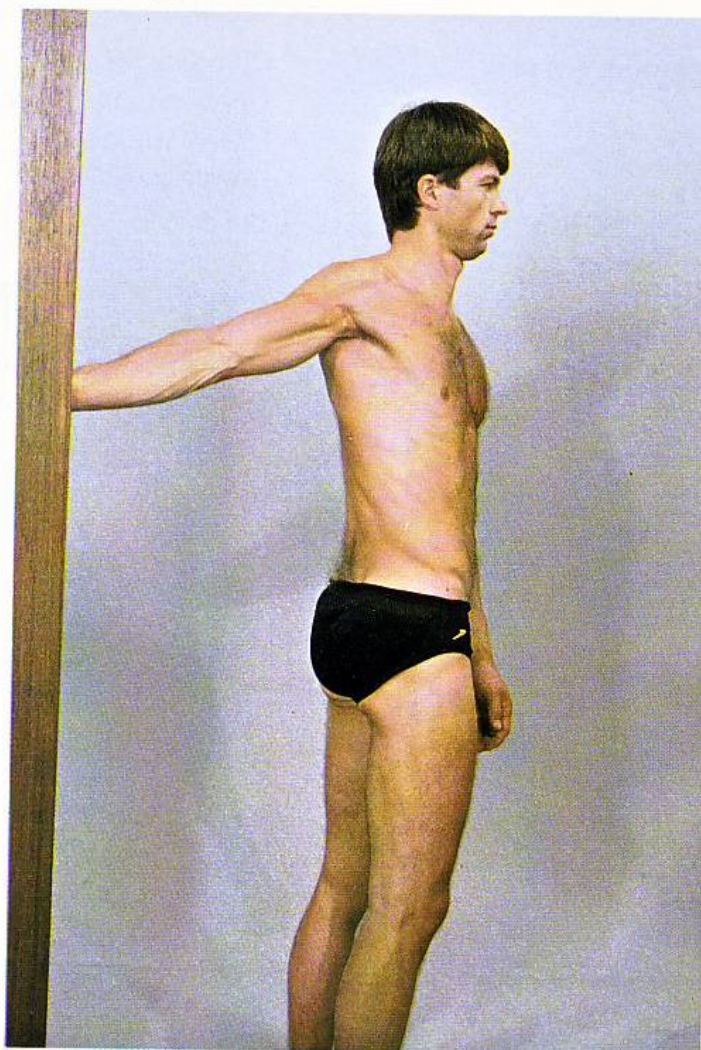
Your difficulty is:	Bringing your upper arm backward at shoulder level with your elbow kept straight.
Tight Muscles:	Arm, shoulder, chest muscles: 1 <i>biceps brachii, long head</i> 2 <i>biceps brachii, short head</i> 3 <i>deltoideus, clavicular part</i> 4 <i>coracobrachialis</i> 5 <i>pectoralis major.</i>
Equipment:	Door-frame or similar vertical support.
Starting Position:	Stand erect, right side toward door-frame. Extend right arm straight out to side, palm down. Turn forearm inward. Place back of hand and wrist/forearm against door-frame.
Stretching:	1. Turn upper body to the left so that stretch is felt in front side of upper arm, chest and shoulder. 2. Tense these muscles as if to move arm forward; hold for 5 seconds. 3. Relax and turn upper body to left limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Stand free of door-frame; move horizontal, straight right arm backward without turning upper body to the right. 2. Hold position a few seconds.
Common Errors:	* Wrist and elbow bent. * Upper arm not turned outward. * Neck and body bent. * Back arched.
Normal Mobility:	You should be able to move straight arms slightly backward at shoulder level, without leaning forward.



Starting Position:

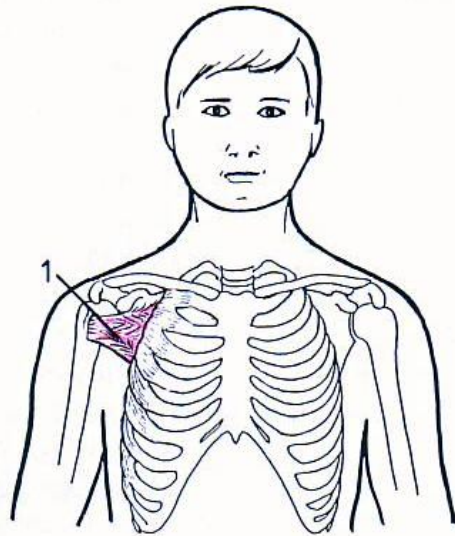
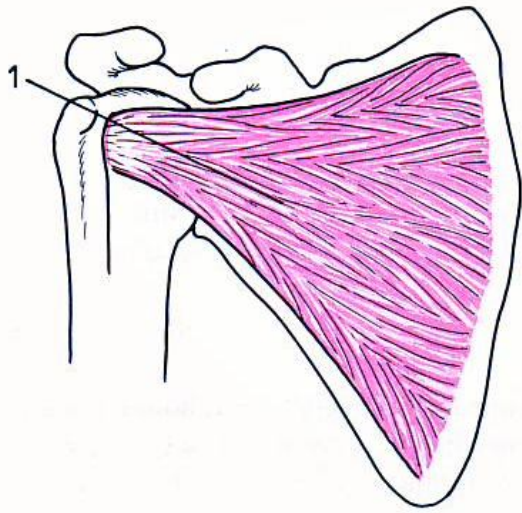


Stretching:

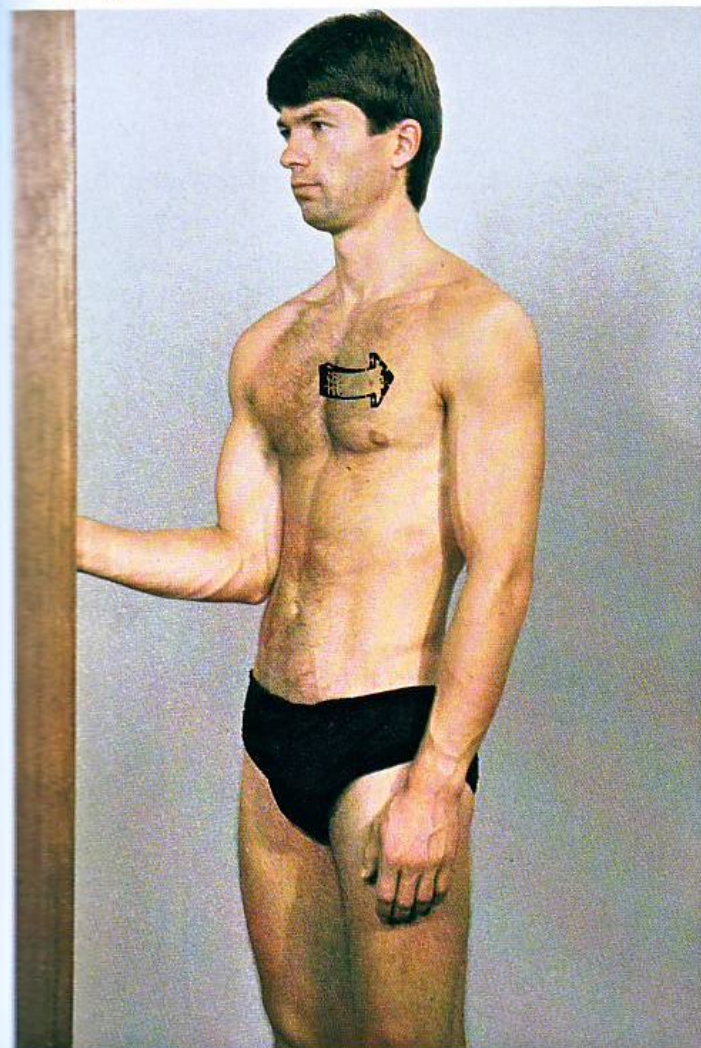


THE SHOULDER 11.

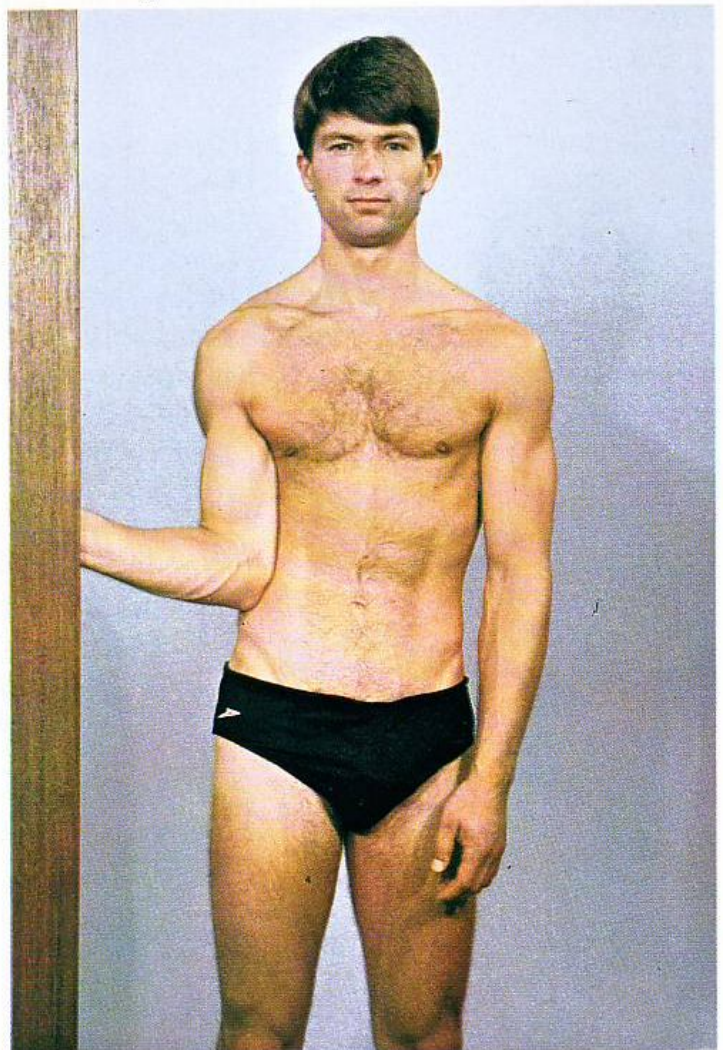
Your difficulty is:	Turning your forearm outward with the upper arm close to your side and your elbow bent.
Tight Muscle:	Muscle under shoulder blade: <i>1 subscapularis.</i>
Equipment:	Door-frame, table corner, or similar support.
Starting Position:	Stand facing door-frame. Hold right upper arm close to body with elbow in front of hip; bend elbow so that forearm is almost horizontal. Hold hand and wrist against edge of door-frame. Draw chin back.
Stretching:	1. Turn body to the left (relative to door-frame) so that stretch is felt under shoulder blade. 2. Tighten muscle as if to turn upper arm inward; hold for 5 seconds. 3. Relax and turn body to left limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. With elbow at your side and forearm still horizontal, turn forearm outward to limit. 2. Resist with left hand. 3. Hold position a few seconds.
Common Errors:	* Chin juts forward. * Upper arm not close to body. * Elbow straightens. * Lower back arched. * Body bent.
Note:	This exercise may be done sitting, with arm against corner of a table.
Normal Mobility:	With upper arm held close to body and elbow bent, you should be able to turn your forearm to point to the side or slightly backward.



Starting Position:

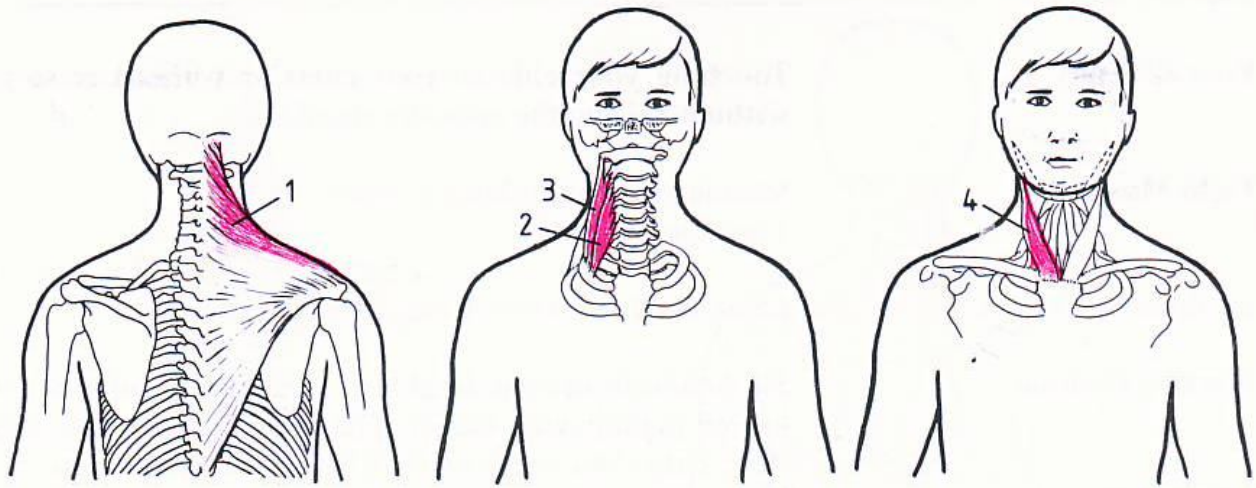


Stretching:

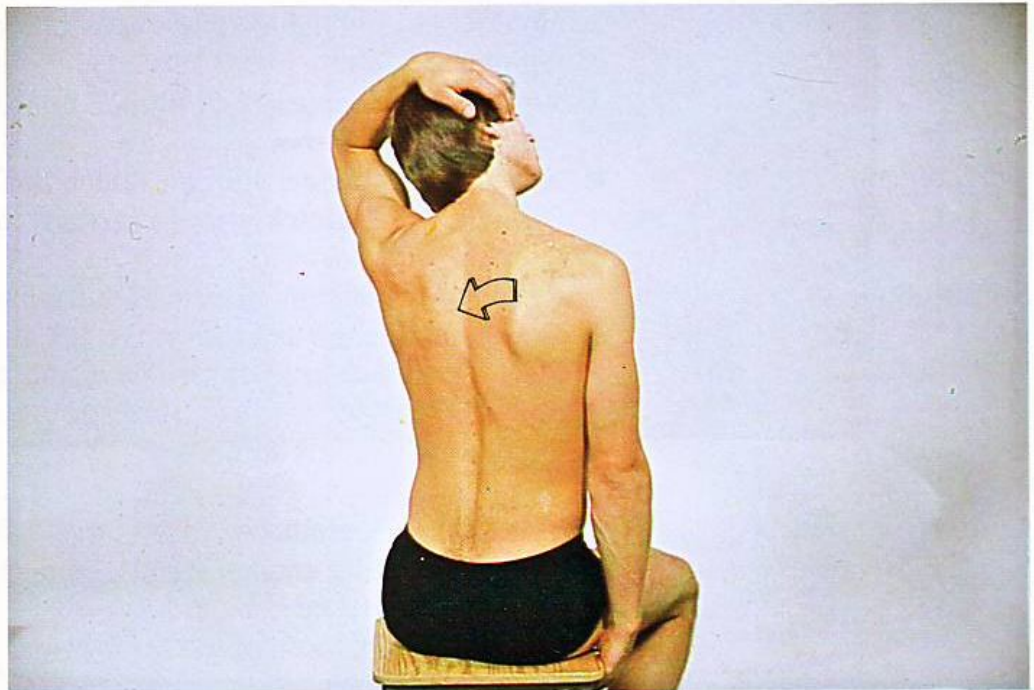


THE SHOULDER 12.

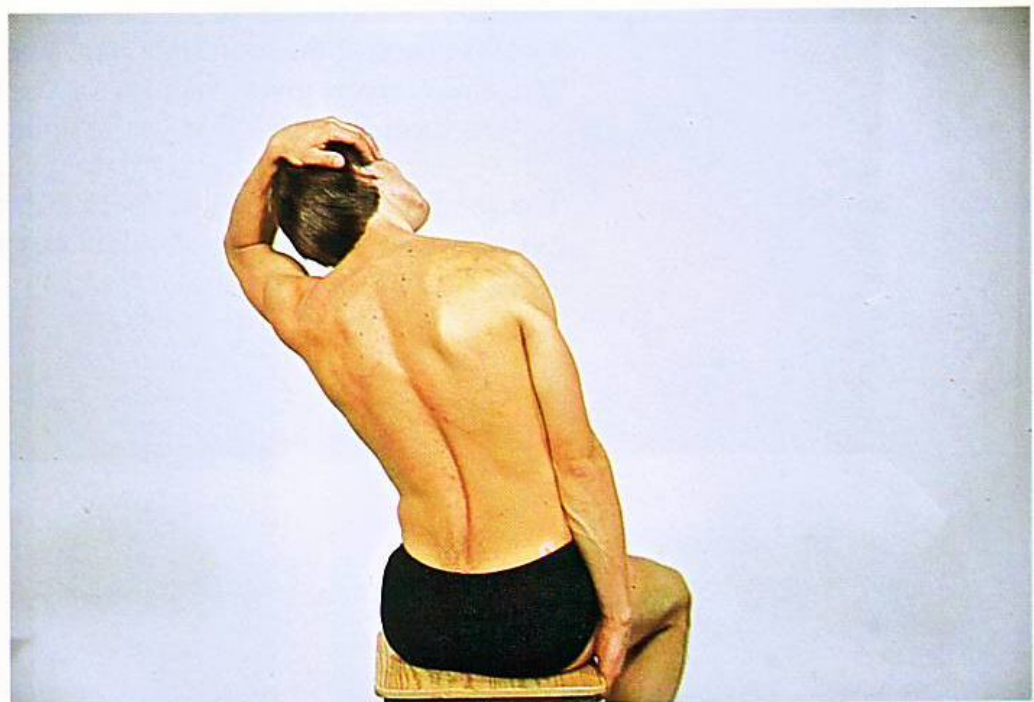
Your difficulty is:	Touching your ear to your shoulder without raising the opposite shoulder.
Tight Muscles:	Shoulder/neck muscle: 1 <i>trapezius, descending part.</i> If stretch is done with neck bent slightly backward, other tight muscles are affected: 2 <i>scalenus anterior</i> 3 <i>scalenus medius</i> 4 <i>sternocleidomastoideus.</i>
Equipment:	Chair/stool, where hand can grasp under seat.
Starting Position:	Sit with back straight; hold head high. Turn head slightly to the right and bow forward, while leaning head/neck to left limit. Place left hand on right side of head down to the ear, to stabilize head and neck. Grip under seat with right hand, at right hip.
Stretching:	1. Keep upper body straight and lean to the left, so that right shoulder is pulled down and stretch is felt in right side of neck. 2. Retain steady grip and tighten muscles as if to raise right shoulder; hold for 5 seconds. 3. Relax and lean to left limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Hold head position but release grip on chair seat. 2. Bend head/neck to the left; resist with left hand against left temple. 3. Move right shoulder and arm downward as far as possible, without bending body to the right. 4. Hold position a few seconds.
Common Errors:	* Incorrect turning and sideways bending. * Right hand grip loosens. * Upper body doesn't lean far enough to the left.
Notes:	1. This is one of the most important exercises, and it should be done at varying degrees of bending – where you feel it the most. 2. If you bend head/neck slightly backward during this exercise, more muscles are affected (see Tight Muscles, above). 3. If this exercise gives you pain, or you feel numb afterwards, then let your therapist check that you're doing it right.
Normal Mobility:	You should nearly be able to touch your ear to your shoulder without raising either shoulder.



Starting Position:

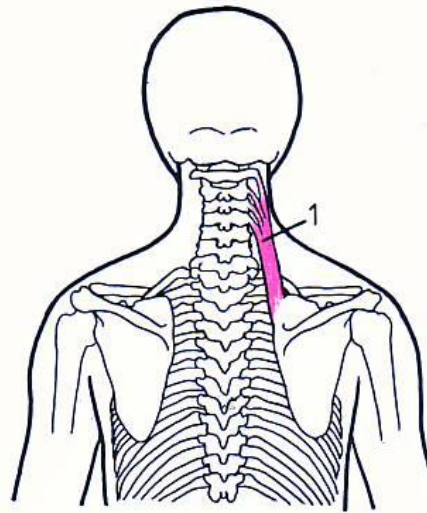
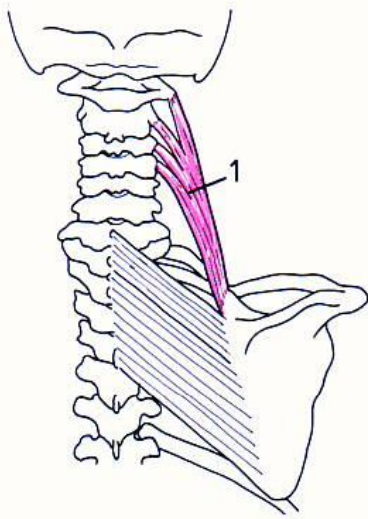


Stretching:

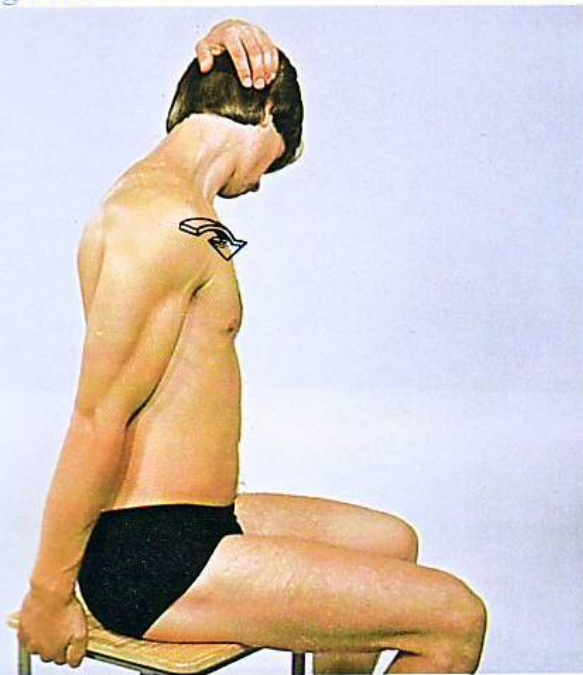


THE SHOULDER 13.

Your difficulty is:	Touching your chin to your chest and your ear to your shoulder, without raising the opposite shoulder.
Tight Muscle:	Muscle that moves shoulder blade: <i>1 levator scapulae.</i>
Equipment:	Chair, stool etc. where hand can grip under seat.
Starting Position:	Sit with back straight, head held high. Bow head forward and turn it to the left to limit. Grip crown of head with left hand, to stabilize head and neck. Grip chair seat with right hand, behind right hip.
Stretching:	1. Lean upper body to the left and slightly forward so that muscle from right side of neck down to shoulder blade is tensed. 2. Hold steady and tighten muscles as if to raise right shoulder; hold for 5 seconds. 3. Relax and lean upper body further to the left and forward, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain head position; release right hand grip. 2. Bow head forward and turn to the left; resist with left hand on temple. 3. Push right shoulder and arm down and back to limit without bending body to the right. 4. Hold position a few seconds.
Common Errors:	* Head and neck cramped. * Head not bent far enough to side. * Head not bowed far enough forward. * Right hand grip loose or too far forward. * Back not straight.
Notes:	1. This is one of the most important stretches! 2. If this exercise gives you pain, or you feel numb afterwards, then let your therapist check that you're doing it right.
Normal Mobility:	You should nearly be able to touch your ear to your shoulder with chin touching chest and neither shoulder raised.



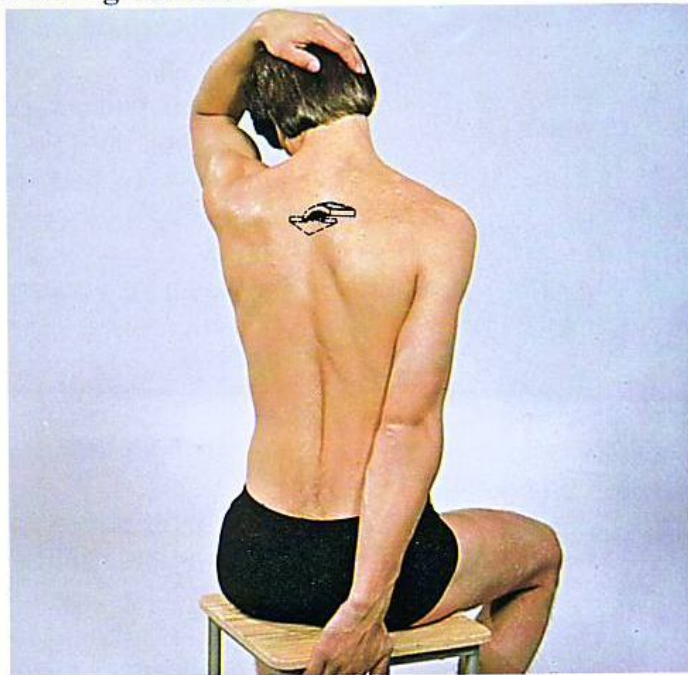
Starting Position:



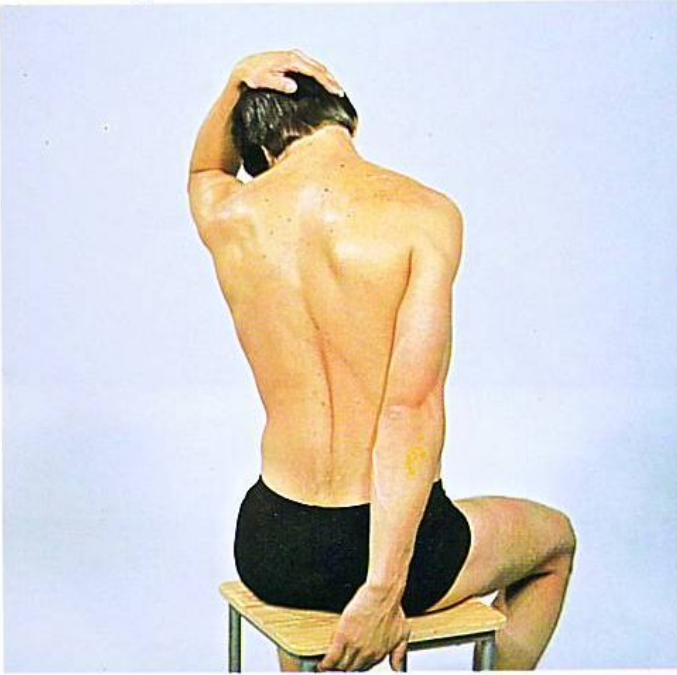
Stretching:



Starting Position:



Stretching:



THE ELBOW 1.

Your difficulty is:

Bending your elbow.

Tight Muscles:

Muscles that straighten elbow:
1 *triceps brachii, medial head*
2 *triceps brachii, lateral head*
3 *anconeus.*

Equipment:

Table or similar support.

Starting Position:

Stand up straight, facing table, chin drawn back. Lean upper body forward and place parallel forearms on table, shoulder width apart.

Stretching:

1. Bend trunk further forward over table so that stretch is felt along backs of upper arms.
2. Tense these muscles by pressing forearms down against table; hold for 5 seconds.
3. Relax and bend over table to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Stand up.
2. Bend elbows.
3. Hold position a few seconds.

Common Errors:

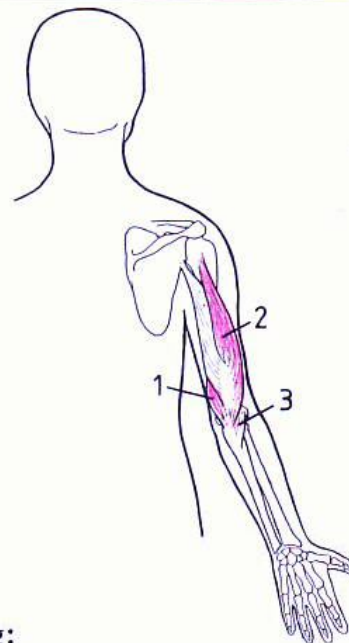
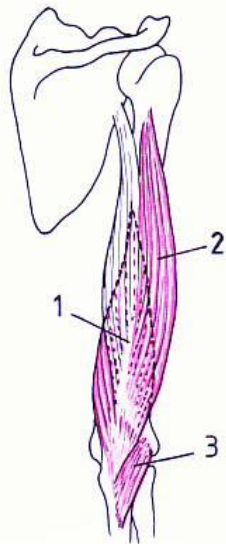
- * Chin juts forward.
- * Back arched.

Note:

This stretch may be done with both arms against a wall or with one arm at a time against a door, as shown at the bottom of next page.

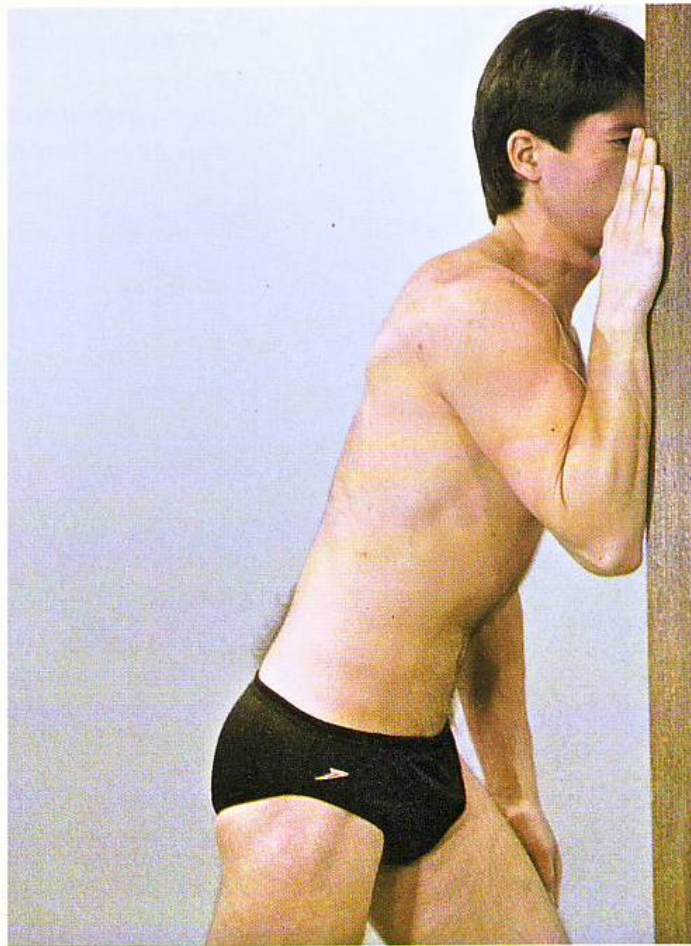
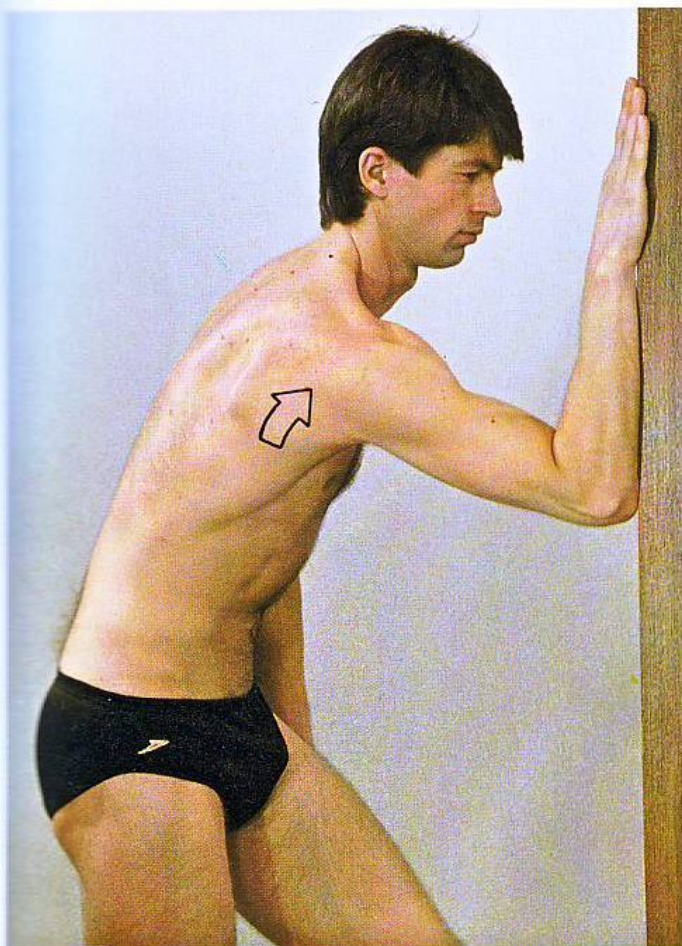
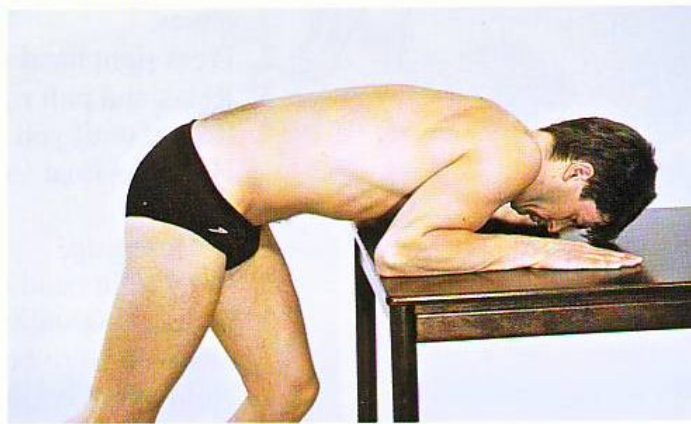
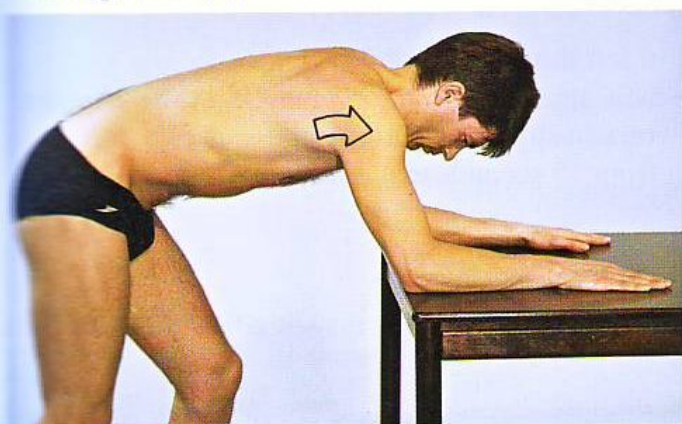
Normal Mobility:

Elbow should be able to bend until forearm and upper arm are almost parallel, or forearm stops against flesh of upper arm.



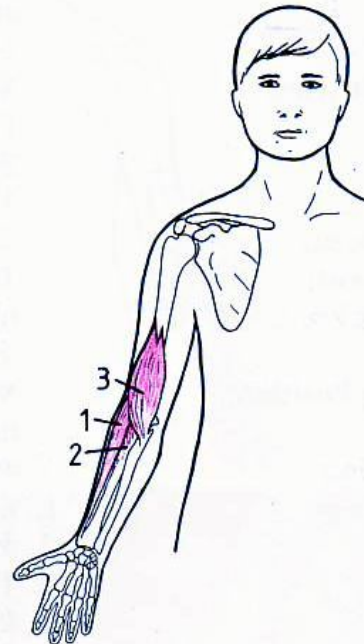
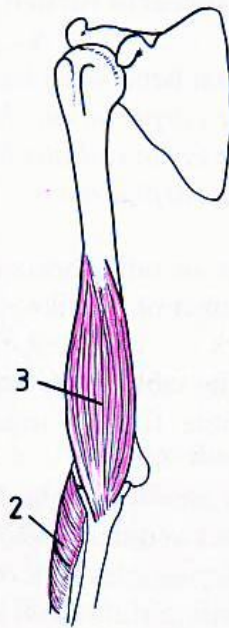
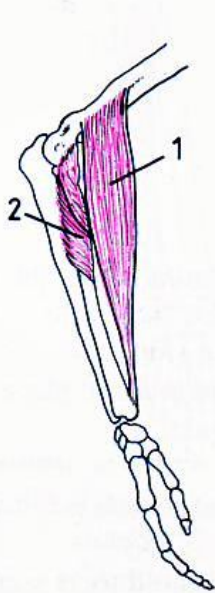
Starting Position:

Stretching:

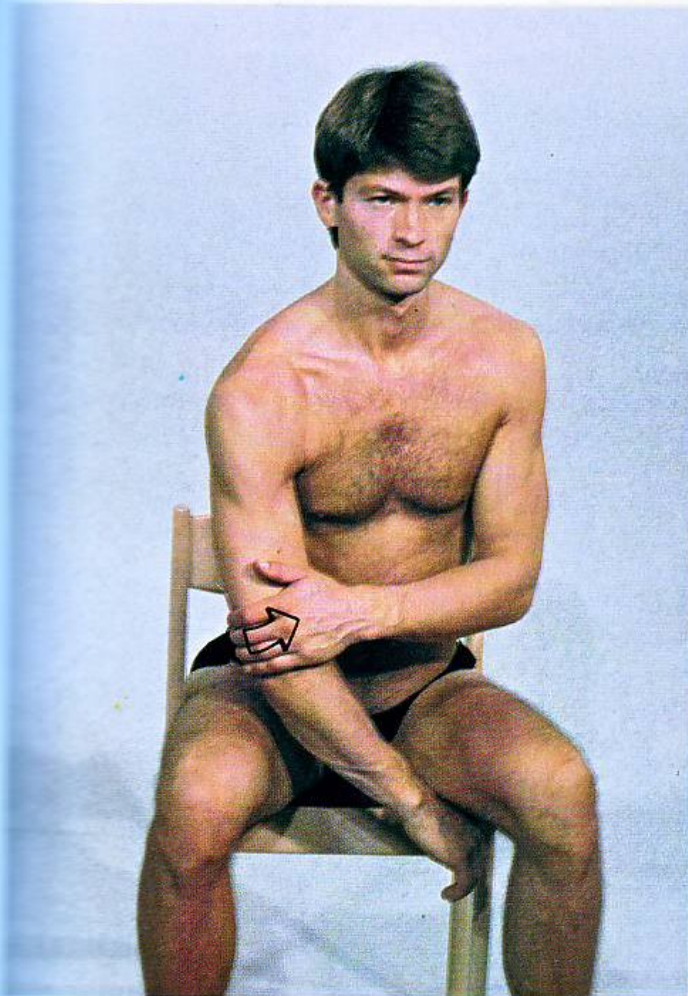


THE ELBOW 2.

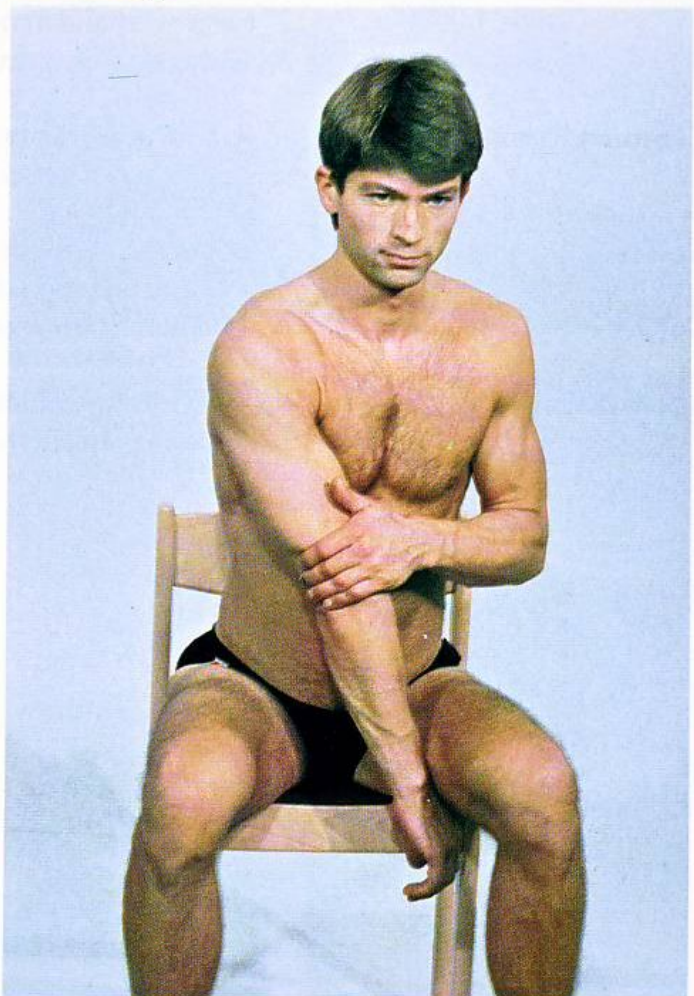
Your difficulty is:	Straightening your elbow with your forearm turned inward.
Tight Muscles:	Muscles that bend elbow: 1 <i>brachioradialis</i> 2 <i>supinator</i> 3 <i>brachialis</i> .
Equipment:	Chair or stool.
Starting Position:	Sit leaning forward, legs apart. Turn whole right arm inward to limit. Place back of right hand and wrist against inside of left thigh. Grip back of right elbow with left hand.
Stretching:	1. Pull with left hand so that stretch is felt in right forearm and inside of elbow. 2. Press right hand against left thigh; hold for 5 seconds. 3. Relax and pull right elbow straighter, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release grip. 2. Press right hand against inside of right thigh. 3. In that position, straighten right elbow while resisting with left hand on elbow (as if to bend it). 4. Hold position a few seconds.
Common Error:	* Forearm not turned far enough inward.
Normal Mobility:	Even with forearm turned inward to limit, you should be able to straighten your elbow until forearm and upper arm are in a straight line.



Starting Position:

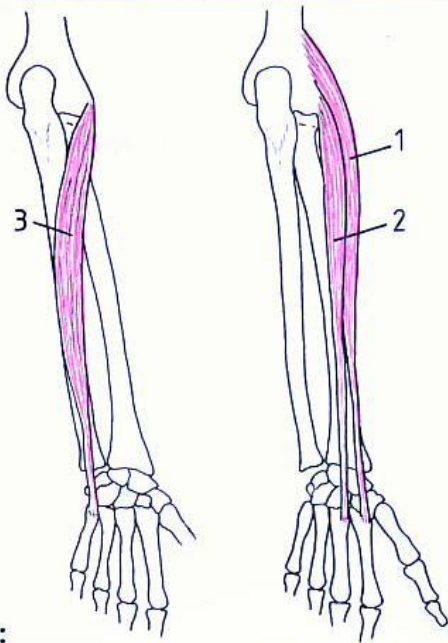


Stretching:

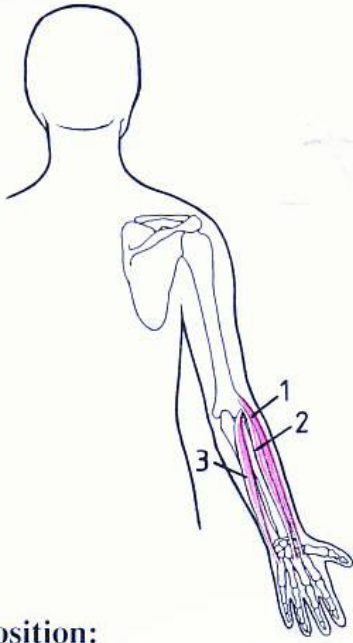


THE ELBOW 3.

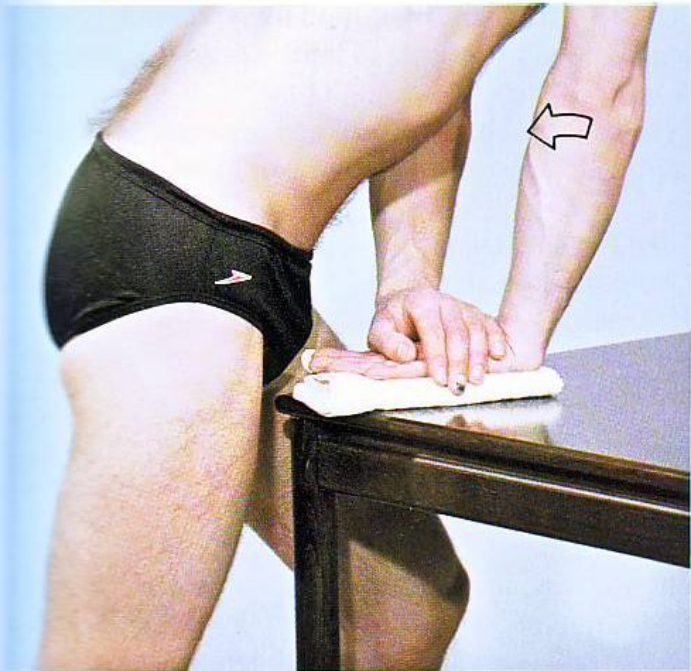
Your difficulty is:	Bending your wrist, palm first, while keeping your elbow straight and your forearm turned inward.
Tight Muscles:	Muscles that bend wrist backward: 1 <i>extens or carpi radialis longus</i> 2 <i>extens or carpi radialis brevis</i> 3 <i>extens or carpi ulnaris.</i>
Equipment:	Table edge or other horizontal support of suitable height, padded with towel, blanket or the like.
Starting Position:	Stand facing table. Turn right forearm inward to limit; place back of right hand on table, fixing it to table with left hand.
Stretching:	1. Keep right elbow straight. Move body so that stretch is felt along back of forearm and in outer side of elbow. 2. Tense these muscles as if to straighten wrist; hold for 5 seconds. 3. Relax; keeping right hand firmly fixed to table, move body further away from table. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Bend wrist, palm first, as far as you can with elbow straight. 2. Place left hand in right palm and resist wrist-bending; elbow still straight. 3. Hold position a few seconds.
Common Errors:	* Elbow not straight. * Forearm not turned far enough inward.
Note:	1. As shown to the right, stretch may also be performed by pressing back of hand gradually down against a table, with elbow straight. 2. This stretch counteracts aches or cramps in forearm, hand and fingers.
Normal Mobility:	With elbow straight and forearm turned inward, your wrist should be able to bend palm-first until your hand is at a right angle to your forearm.



Starting Position:



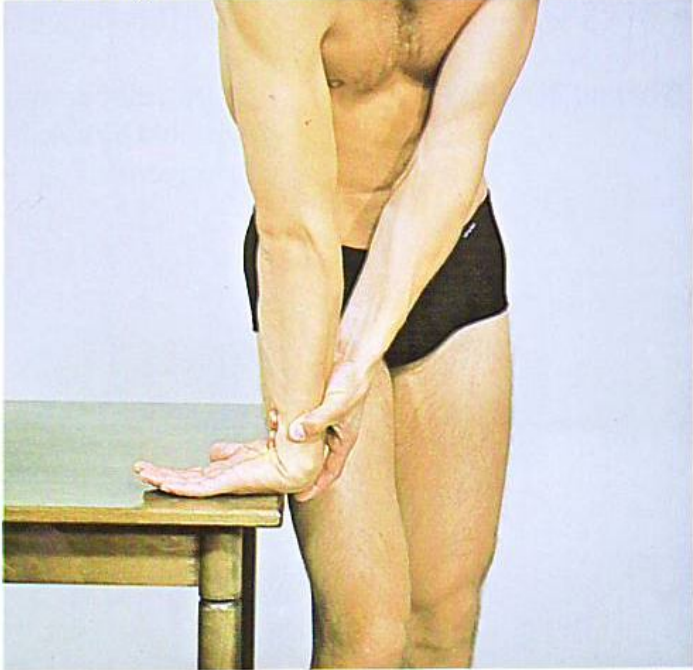
Starting Position:



Stretching:

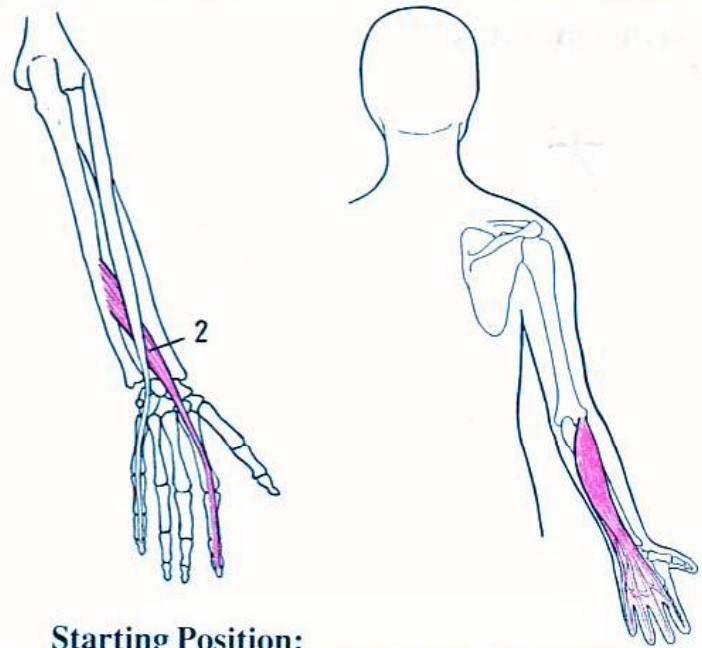
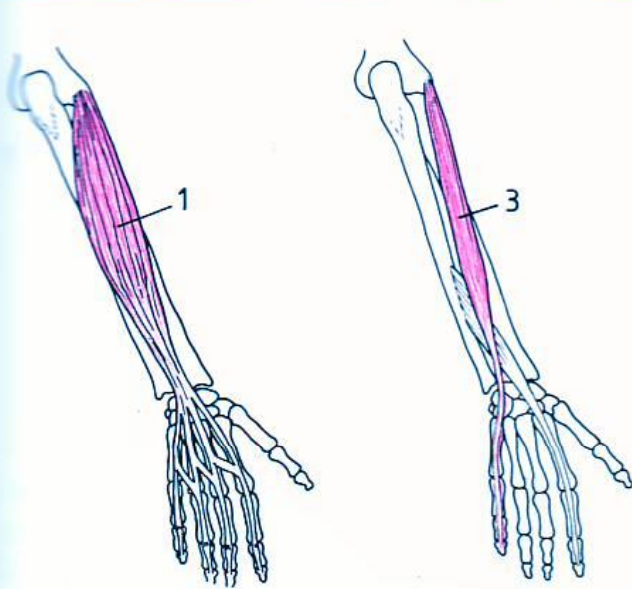


Stretching:



THE ELBOW 4.

Your difficulty is:	Bending your wrist, palm first, with clenched fist, elbow straight and forearm turned inward.
Tight Muscles:	Muscles that straighten fingers: 1 <i>extens or digitorum</i> 2 <i>extens or indicis</i> 3 <i>extens or digiti minimi</i> .
Starting Position:	Stand or sit. Turn right arm inward to limit and clench right fingers as tight as you can. With left hand, reach in front of right hand and grasp around clenched fingers. Straighten elbow.
Stretching:	1. Bend right wrist, palm first, so that stretch is felt along back of forearm and in outer side of elbow. 2. Tense these muscles as if to straighten wrist; hold for 5 seconds. 3. Relax, and use left hand to bend right wrist to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip, but don't pull with left hand. 2. Keep elbow straight; bend right wrist to limit. 3. Resist bending with left hand. 4. Hold position a few seconds.
Common Errors:	* Right elbow bent. * Fingers not clenched. * Forearm not turned completely inward.
Notes:	1. If you have difficulty in crossing arms for grip, do this exercise with arms almost straight in front of body, palms facing inward as if to clap at arm's length. Clench right fist and grasp it with left hand, and pull with left hand to stretch. See illustrations to the right. 2. This stretch counteracts aches or cramps in forearm, hand and fingers.
Normal Mobility:	With elbow straight, forearm turned inward and fist clenched, your wrist should be able to bend palm-first until your hand is at a right angle to your forearm.



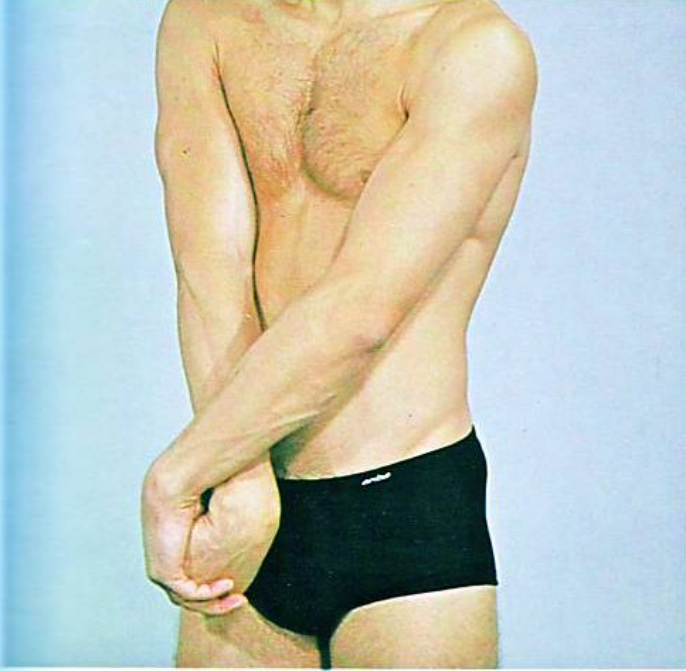
Starting Position:

Starting Position:



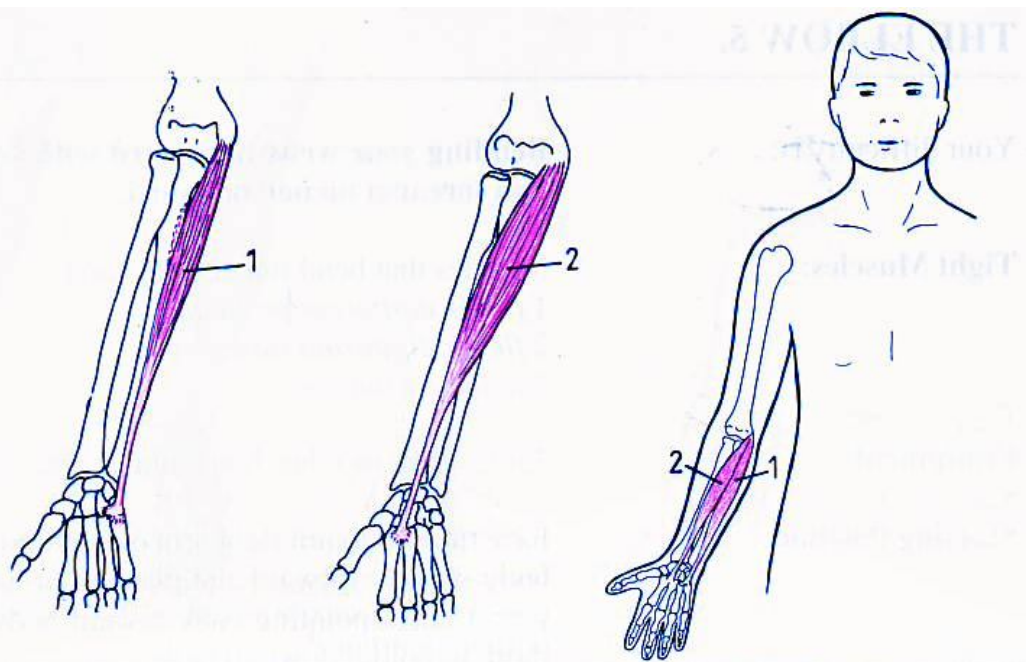
Stretching:

Stretching:

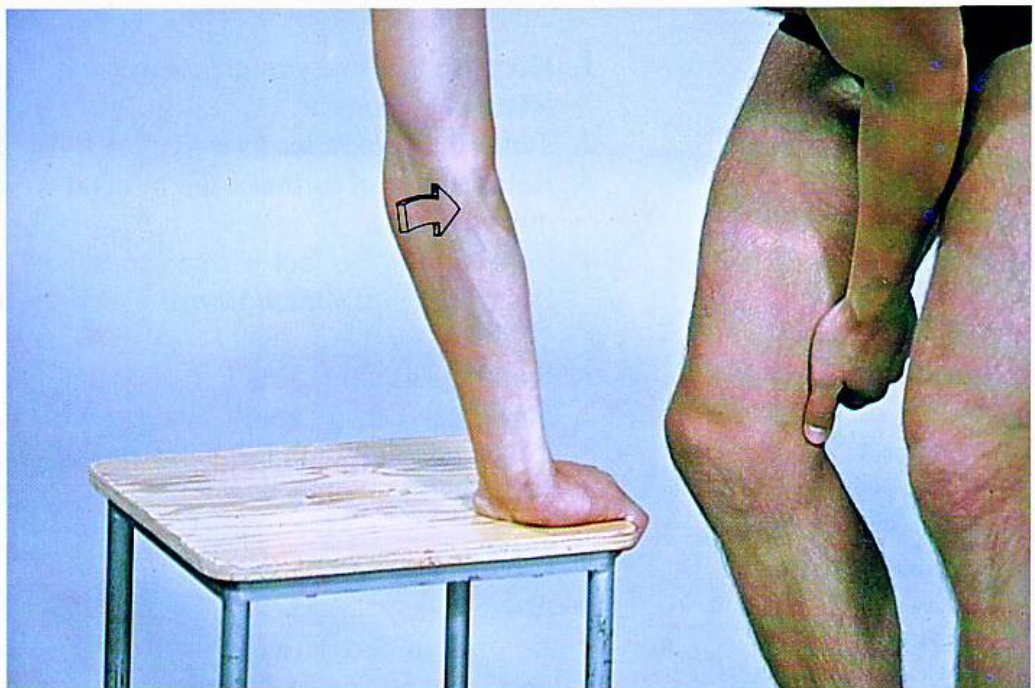


THE ELBOW 5.

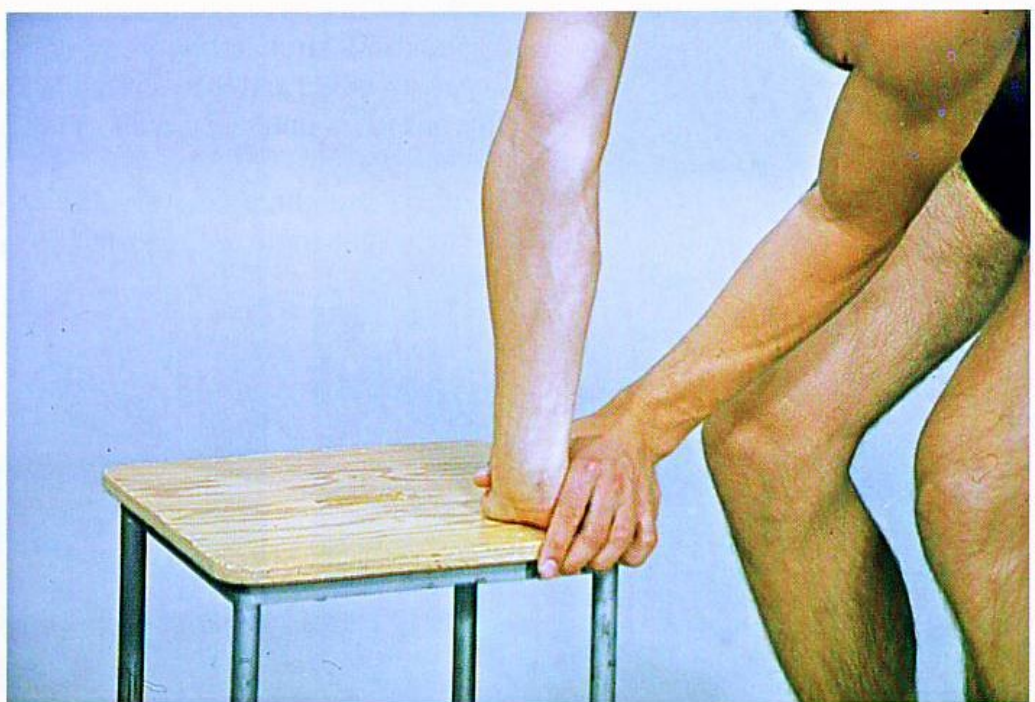
Your difficulty is:	Bending your wrist backward with your elbow straight and your forearm turned outward.
Tight Muscles:	Muscles that bend wrist: 1 <i>flexor carpi ulnaris</i> 2 <i>flexor carpi radialis</i> .
Equipment:	Table, chair or other horizontal surface of suitable height.
Starting Position:	Face table and turn right arm outward to limit, with elbow straight and forearm turned outward. Lean slightly forward and place right palm on table, with fingers over edge of table, pointing back toward body. Grip right wrist and back of hand with left hand to stabilize right hand against table.
Stretching:	1. Keep right elbow straight; lean back to bend wrist backward so that stretch is felt along inside of forearm and elbow. 2. Tense these muscles as if to straighten wrist; hold for 5 seconds. 3. Relax and lean further back to bend wrist to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Stand up straight. 2. Bend right wrist backward to limit. Keep elbow straight. 3. Resist this bending with left hand against back of right hand. 4. Hold position a few seconds.
Common Errors:	* Elbow bent. * Arm turned inward. * Left hand lets go of right hand.
Normal Mobility:	With elbow straight, thumb out and fingers clenched, wrist should be able to bend backward to a position almost at a right angle to the forearm.



Starting Position:



Stretching:



THE ELBOW 6.

Your difficulty is:

Bending your wrist backward with your elbow and fingers straight and forearm turned outward.

Tight Muscles:

Muscles that bend fingers and hand:

- 1 *flexor digitorum profundus*
- 2 *flexor digitorum superficialis*
- 3 *palmaris longus*.

Equipment:

Table, chair or other horizontal surface of suitable height.

Starting Position:

Face table and turn right arm outward to limit, with elbow straight. Lean body slightly forward and place right hand (palm and fingers) on table, with fingers pointing back toward body. Place left hand on top of the right, to hold it down to table.

Stretching:

1. Keep right elbow straight; lean back so that stretch is felt along inside of forearm and elbow.
2. Tense these muscles as if to clench fingers; hold for 5 seconds.
3. Relax and lean further back to bend wrist to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Stand up straight.
2. Straighten fingers and bend right wrist backward to limit.
3. Resist bending with left hand against back of right hand and fingers.
4. Hold position a few seconds.

Common Errors:

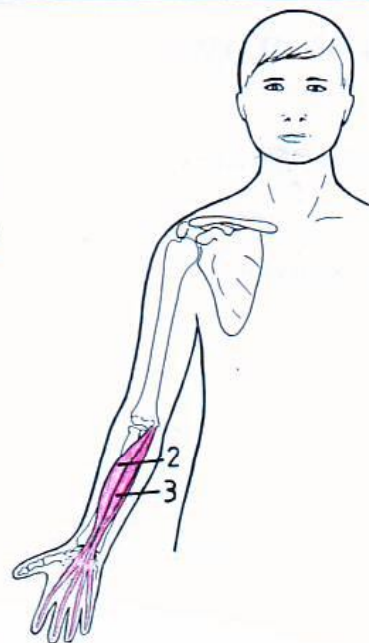
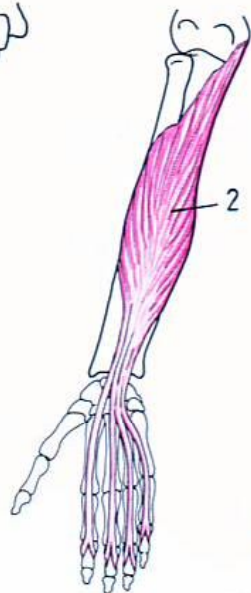
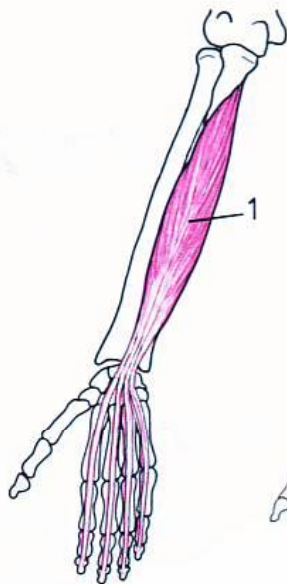
- * Body not turned far enough back.
- * Elbow bent.
- * Arm not turned outward.
- * Left hand lets go of right hand.

Notes:

1. If you can't stretch finger muscles fully, use left hand to flatten fingers to table, and then stretch further. See illustrations to the right.
2. This stretch counteracts aches or cramps in forearm, hand and fingers.

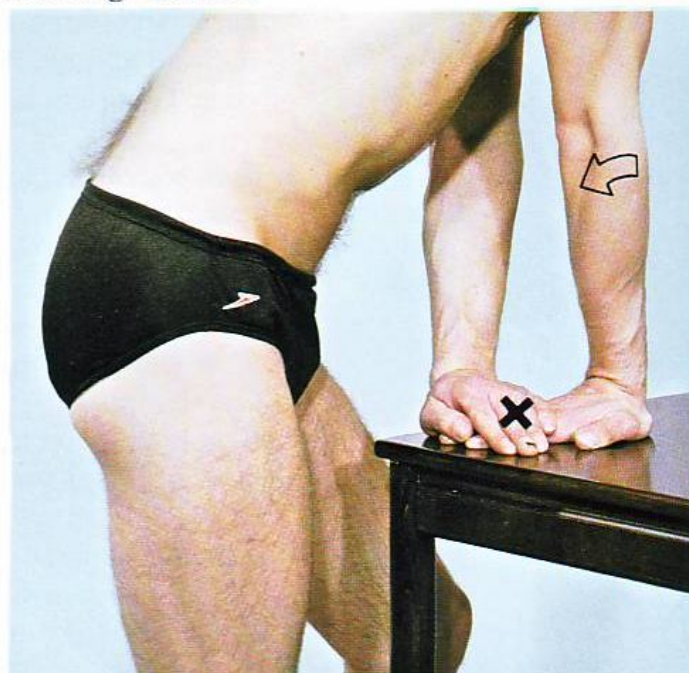
Normal Mobility:

With fingers straight, wrist should be able to bend backward to a position almost at a right angle to forearm.



Starting Position:

Starting Position:



Stretching:

Stretching:



THE ELBOW 7.

Your difficulty is:

Turning your forearm outward with your elbow bent *or* straightening your elbow with your forearm turned outward.

Tight Muscles:

Primarily, muscles that turn forearm inward and bend elbow:

1 *pronator teres, humeral head*

2 *pronator teres, ulnar head*

3 *pronator quadratus*

4 *brachialis.*

Stretch also affects muscles that bend hand:

5 *flexor carpi radialis*

6 *flexor carpi ulnaris.*

Equipment:

Table, chair or other horizontal surface of suitable height.

Starting Position:

Face table; lean forward, with right elbow bent and forearm turned outward to limit. Place right hand on table, with fingers gripping around edge. Grip right arm just below elbow with left hand, thumb forward.

Stretching:

1. Turn body to the left so that stretch is felt inside elbow and down forearm to the palm.
2. Tense these muscles as if to turn forearm inward. Bend elbow; hold for 5 seconds.
3. Relax and turn body to the left; turn forearm outward and straighten elbow to limit – maybe a little bit more. Aid straightening by pushing with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

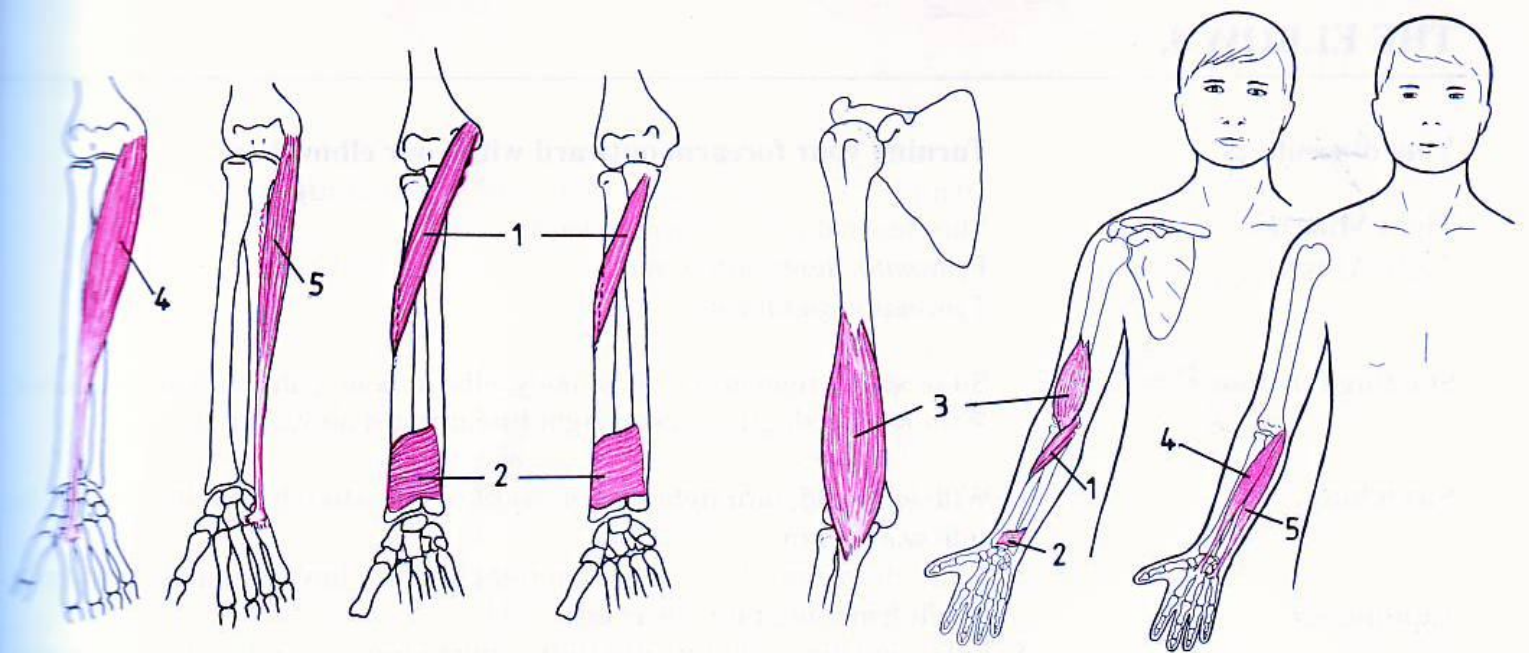
1. Stand up straight.
2. Turn forearm and hand outward and straighten elbow to limit.
3. Resist turning with left hand on right wrist.
4. Hold position a few seconds.

Common Errors:

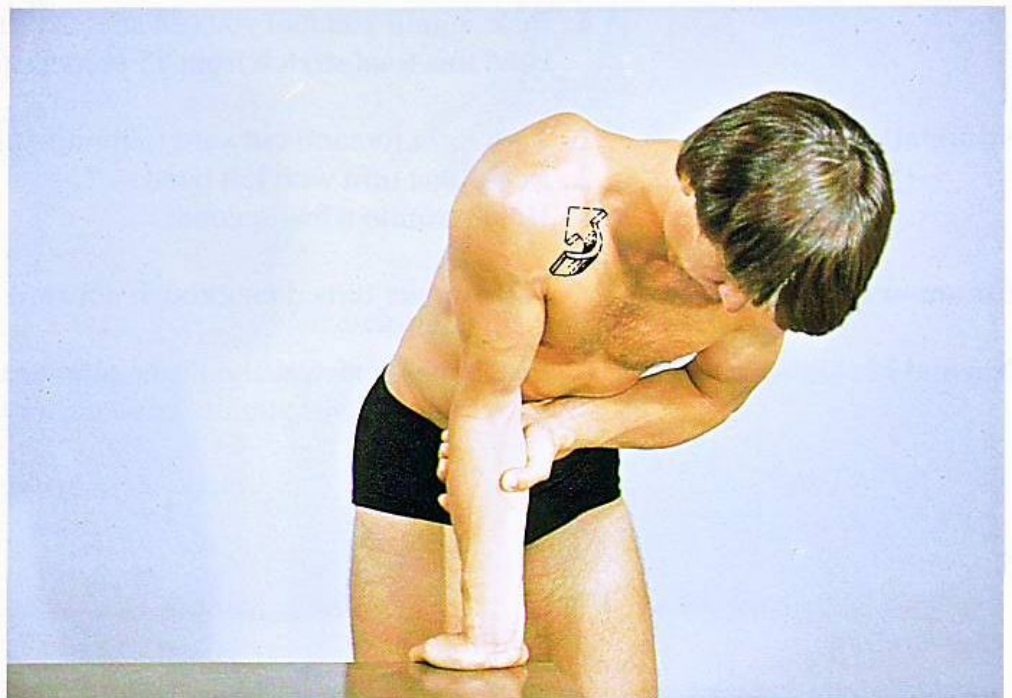
- * Body not turned enough to the left.
- * Forearm not turned enough outward.
- * Elbow not straight enough.

Normal Mobility:

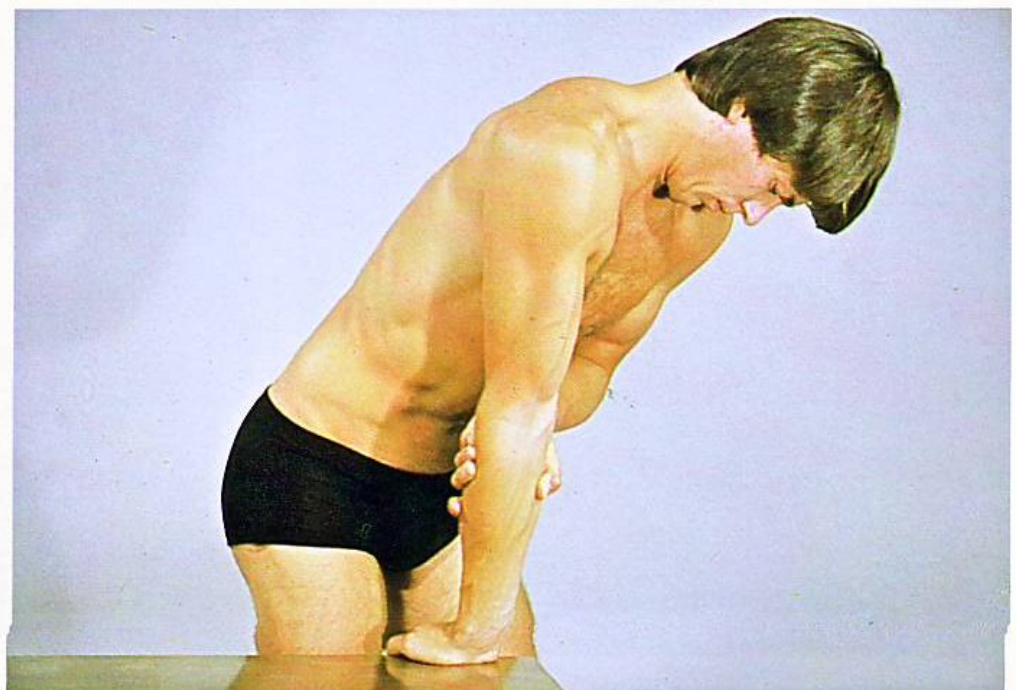
With upper arm close to body, forearm should be able to turn so far outward that the thumb points downward when the elbow is bent, and backward when the elbow is straight.



Starting Position:



Stretching:



THE ELBOW 8.

Your difficulty is:

Turning your forearm outward with your elbow bent.

Tight Muscles:

Muscles that turn forearm inward:

1 *pronator teres, ulnar head*

2 *pronator quadratus.*

Starting Position:

Sit or stand, right arm against body, elbow bent, palm turned up to limit.
With left hand, grip back of right forearm just above wrist.

Stretching:

1. With left hand, turn right arm outward so that stretch is felt along palm side of forearm.
2. Tense these muscles as if to turn right forearm inward against resistance of left hand; hold for 5 seconds.
3. Relax and turn right forearm further out to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

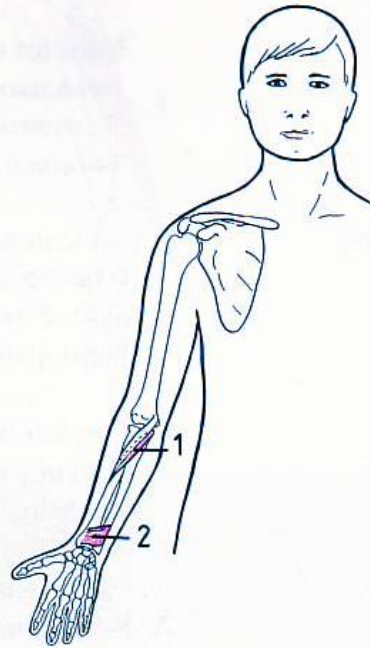
1. Turn right forearm outward to limit with elbow bent.
2. Resist that turn with left hand.
3. Hold position a few seconds.

Common Error:

* Forearm not turned far enough outward.

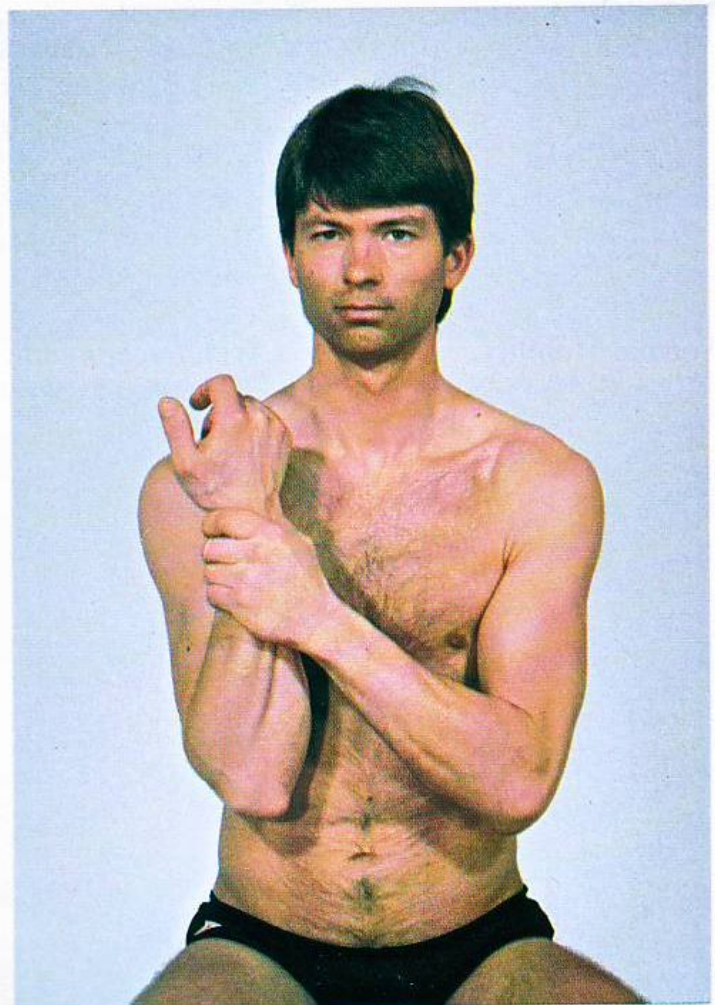
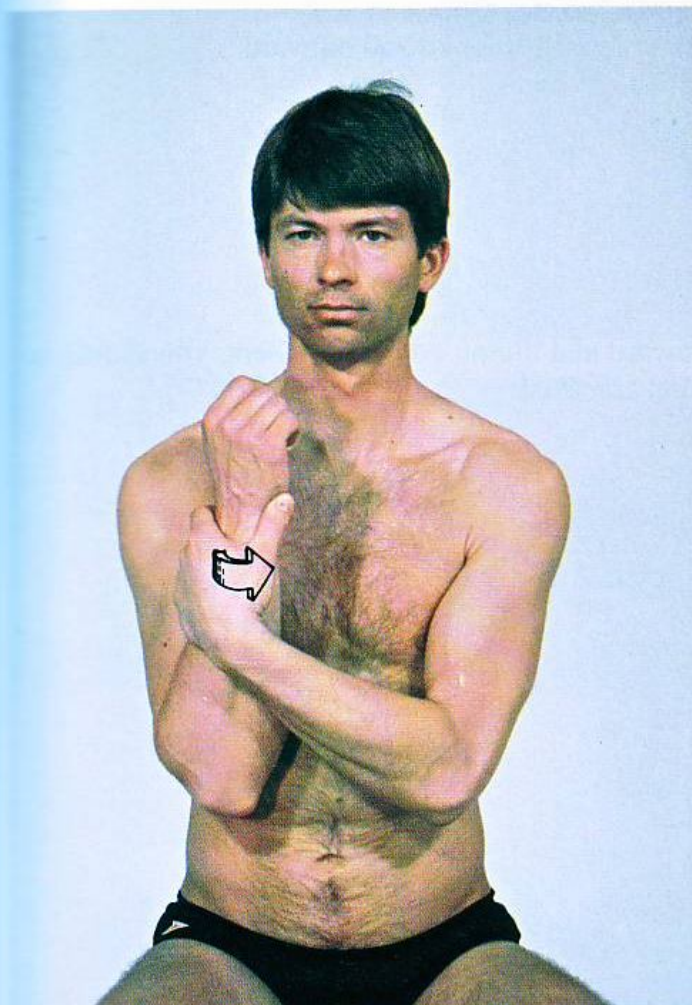
Normal Mobility:

In this position you should be able to turn your forearm outward until your thumb points slightly outward/forward.



Starting Position:

Stretching:



THE WRIST 1.

Your difficulty is:

Curling your thumb with your forearm turned inward and your wrist bent, palm first.

Tight Muscles:

Muscles that control thumb:

1 *extensor pollicis longus*

2 *extensor pollicis brevis*

3 *abductor pollicis longus*.

Starting Position:

Sit leaning slightly forward, right elbow resting on right thigh. Turn right forearm inward to limit with wrist straight, and bend all joints of thumb as if to touch base of little finger. Fix right thumb in position with left hand, palm-to-palm, thumb around back of hand.

Stretching:

1. Use left hand to bend right wrist toward palm and outward (little finger direction) so that stretch is felt in right thumb, wrist, and up into the forearm.
2. Tense these muscles as if to straighten thumb; resist with left hand; hold for 5 seconds.
3. Relax and use left hand to bend right wrist to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

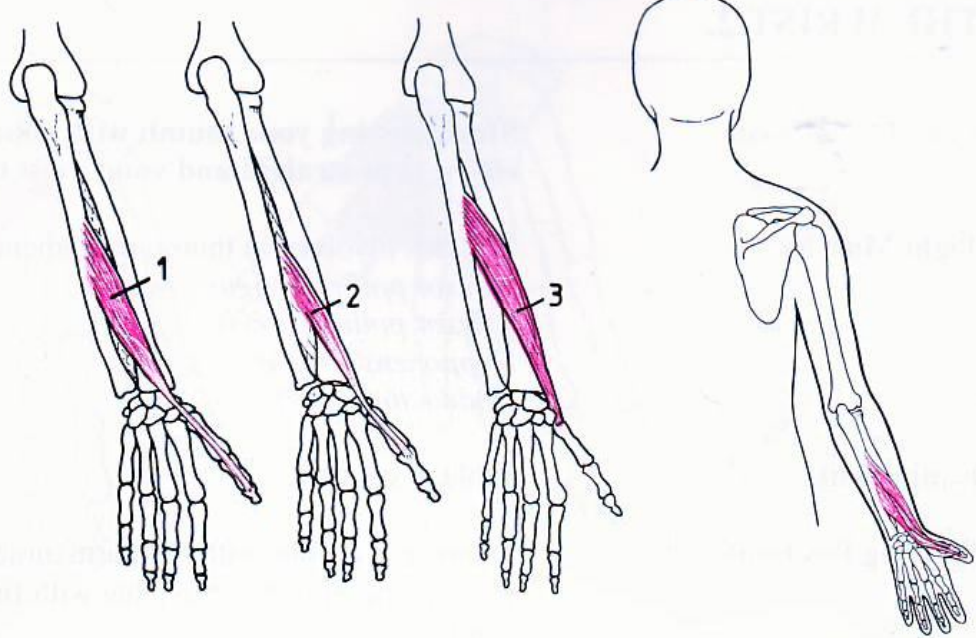
1. Retain grip.
2. Try to bend right thumb and wrist forward and outward.
3. Resist that movement with left hand.
4. Hold position a few seconds.

Common Errors:

- * Forearm not turned inward.
- * Thumb not bent at all joints.
- * Wrist not bent far enough.

Normal Mobility:

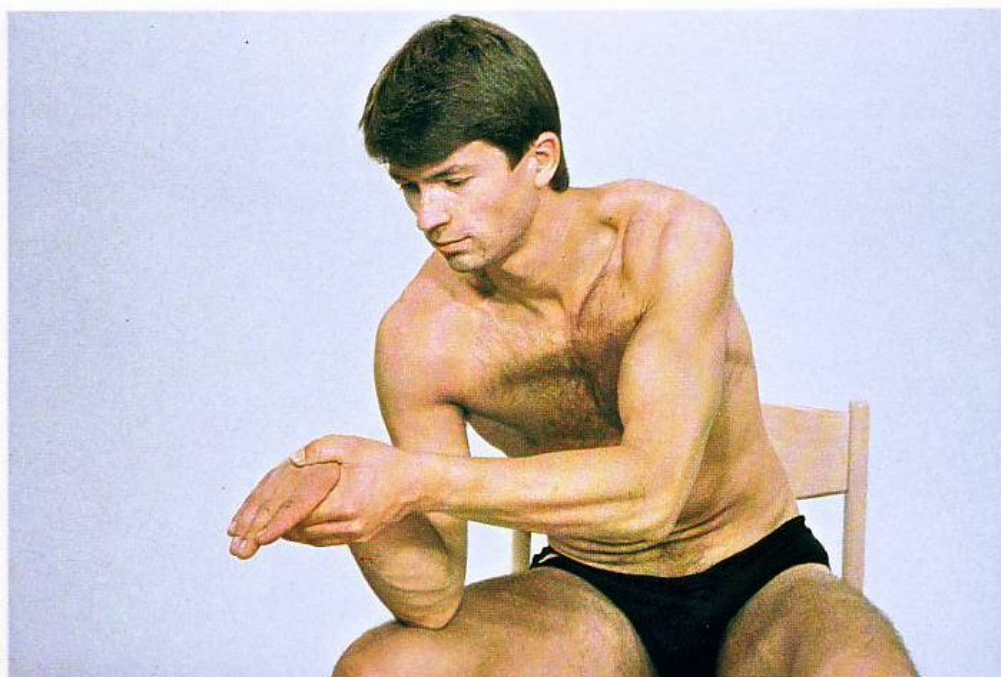
With forearm turned inward and thumb completely bent, you should be able to bend your wrist nearly 90 degrees.



Starting Position:



Stretching:



THE WRIST 2.

Your difficulty is:

Straightening your thumb with your forearm turned outward, your elbow kept straight and your wrist bent backward.

Tight Muscles:

Muscles involved in thumb movements:

- 1 *flexor pollicis longus*
- 2 *flexor pollicis brevis*
- 3 *opponens pollicis*
- 4 *adductor pollicis*.

Equipment:

Table or counter.

Starting Position:

Stand facing table, with right arm turned outward to limit, elbow straight. Place palm on table; grip edge with fingers. Grasp right thumb with left hand.

Stretching:

1. Pull right thumb upward with left hand, so that stretch is felt along inside of thumb, wrist, and up into the forearm.
2. Tense these muscles as if to bend thumb; resist with left hand for 5 seconds.
3. Relax and pull right thumb up to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Release grip.
2. Turn forearm outward and straighten elbow.
3. Point right thumb up to limit.
4. Resist that movement with left thumb.
5. Hold position a few seconds.

Common Errors:

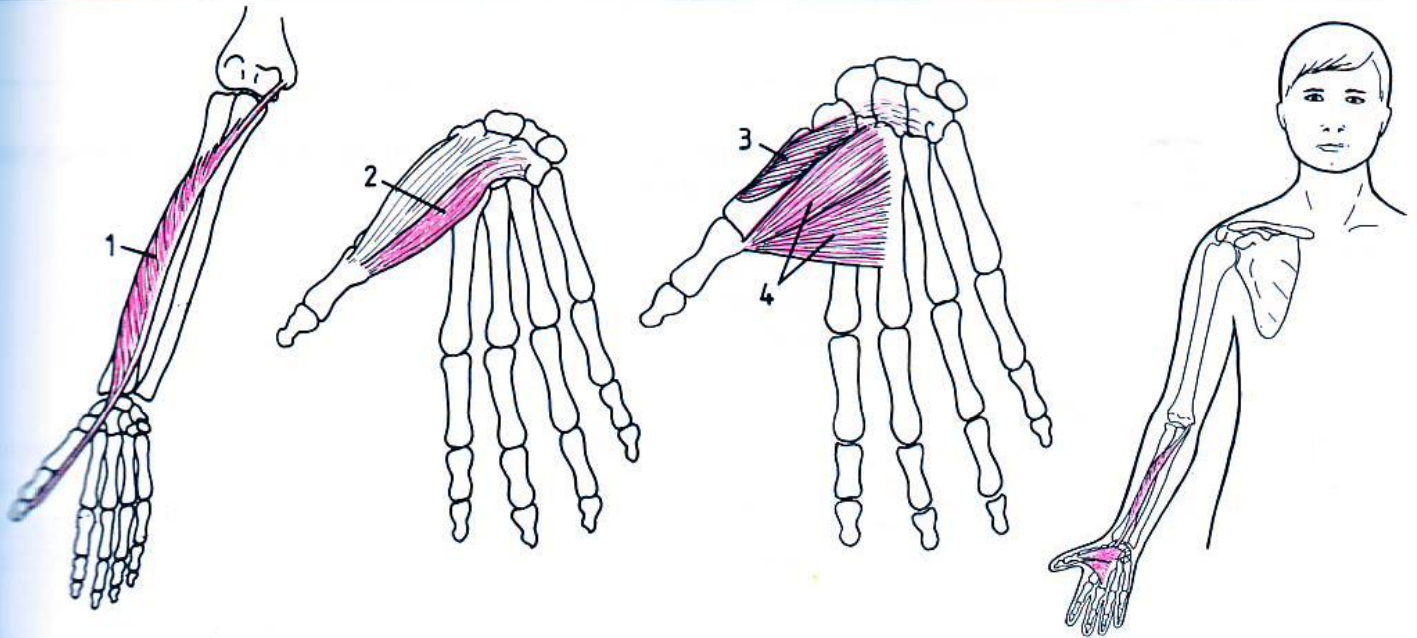
- * Elbow bent.
- * Forearm not turned outward.
- * Right hand lets go of table edge.

Note:

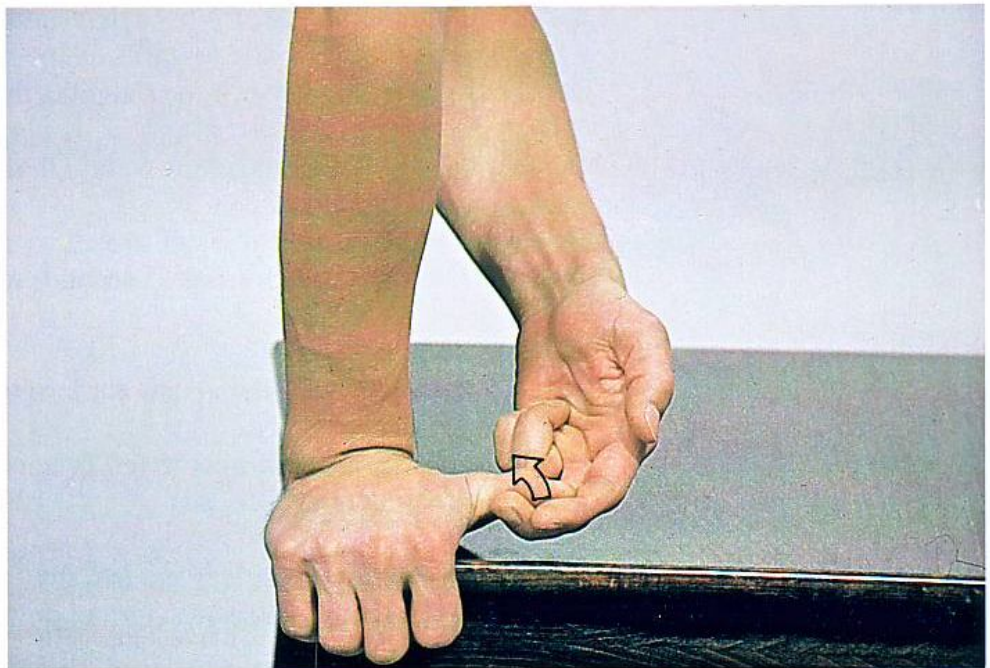
This stretch counteracts aches or cramps in forearm, hand and fingers.

Normal Mobility:

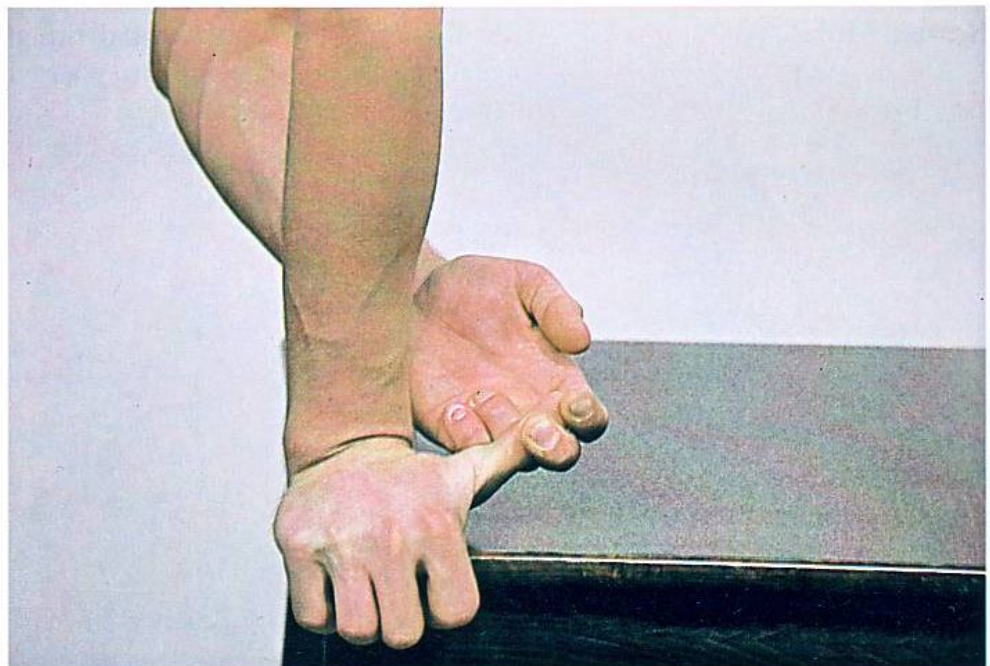
With forearm turned outward and elbow straight, you should be able to point your straight thumb more or less at a right angle to the forearm.



Starting Position:



Stretching:



THE WRIST 3.

Your difficulty is:

Bringing straight thumb over toward your little finger while your forearm is turned inward.

Tight Muscles:

Muscles that move thumb away from fingers:

- 1 *abductor pollicis longus*
- 2 *extensor pollicis brevis*
- 3 *abductor pollicis brevis.*

Starting Position:

Sit with elbow bent and forearm resting on right thigh. With right wrist straight, turn right arm inward to limit. Straighten all joints of right thumb and move thumb toward little finger. Place ball of left thumb on first joint of right thumb, and left fingers around little finger side of right hand.

Stretching:

1. Close left hand, pressing right thumb toward little finger, and right wrist turned in the same direction, so that stretch is felt on outer side of thumb in wrist, and up into the forearm.
2. Tense these muscles as if to straighten thumb; resist with left hand for 15 seconds.
3. Relax and use left hand to press right thumb toward little finger to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

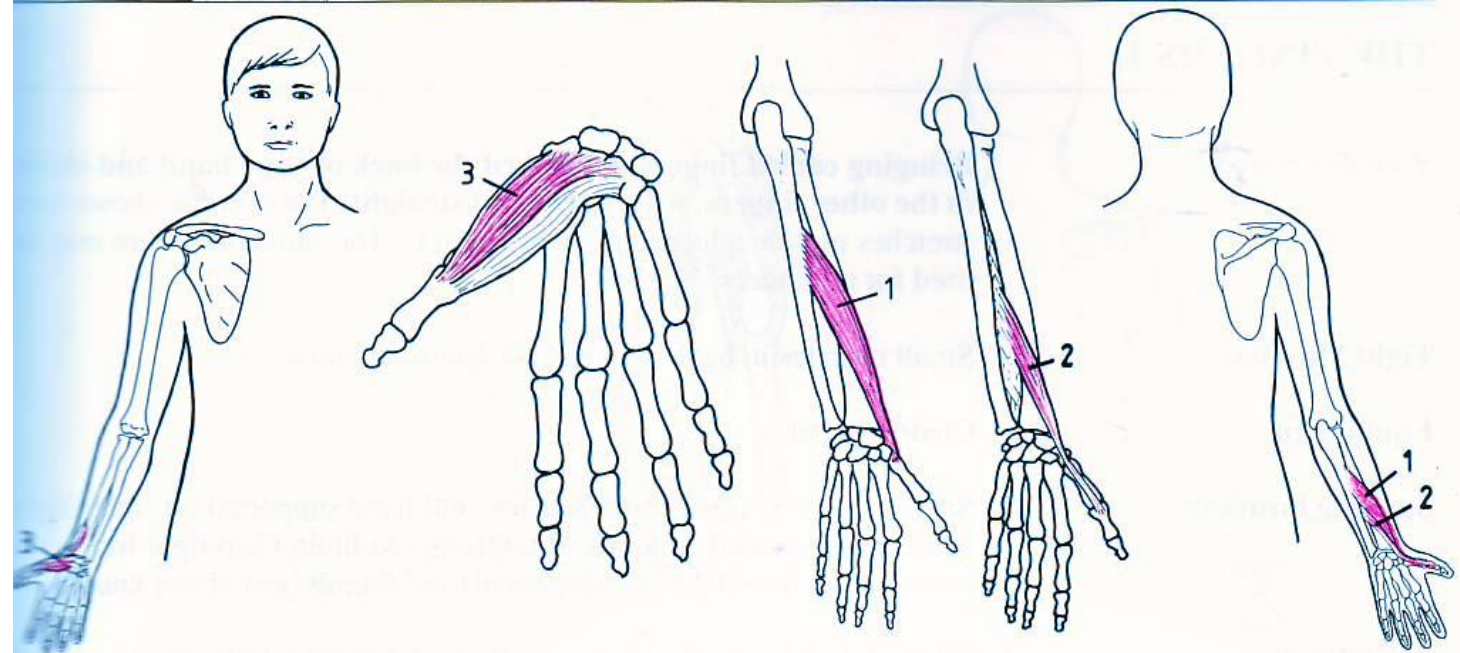
1. Release grip.
2. Move straight right thumb and turn right wrist toward little finger to limit.
3. Resist thumb movement with left fingers placed on inside of thumb.
4. Hold position a few seconds.

Common Errors:

- * Forearm not turned far enough inward.
- * Ball of left thumb placed too far out on right thumb.
- * Wrist bent.

Normal Mobility:

With forearm turned inward and straight thumb pointing toward little finger, you should be able to turn your wrist about 30 degrees in the same direction.



Starting Position:

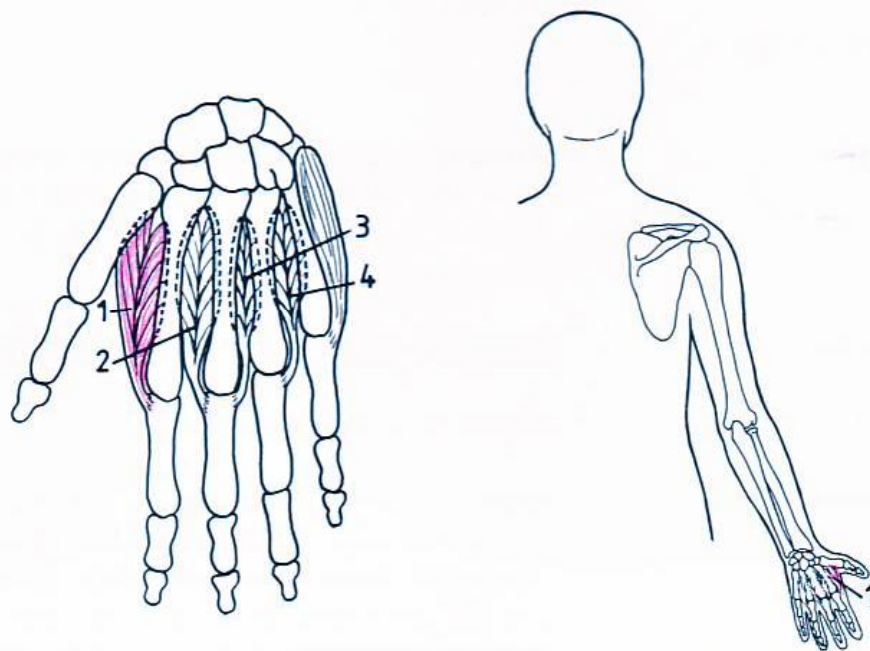


Stretching:



THE FINGERS 1.

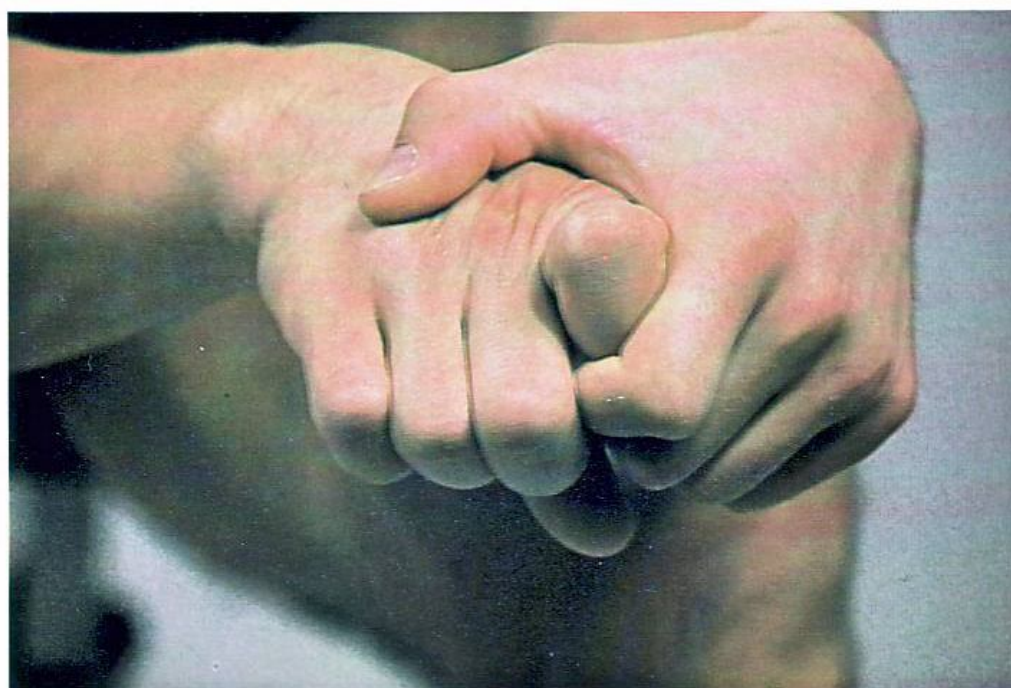
Your difficulty is:	Bringing curled fingers up toward the back of your hand and closer to the other fingers, with your wrist straight. The exercise shown here stretches muscle attached to forefinger (1.) The same procedure may be used for all fingers.
Tight Muscles:	Small muscles in back of hand: 1-4 <i>interossei dorsales</i> .
Equipment:	Chair or stool.
Starting Position:	Sit with wrist straight, right forearm and hand supported on right thigh; bend outer and middle joints of forefinger to limit. Grip right forefinger between left forefinger (on fingernail) and thumb (just above knuckle).
Stretching:	1. With left hand press forefinger up, back and toward little finger so that stretch is felt in forefinger muscles in hand. 2. Tense these muscles as if to bend knuckle joint; resist with left hand for 5 seconds. 3. Relax and push forefinger up, back and more toward little finger, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Move forefinger up, back and toward little finger, to limit. 2. Resist that movement with left thumb. 3. Hold position a few seconds.
Common Error:	* Wrist bent backward.
Notes:	1. You can stretch fingers one by one or all together, in both directions. 2. Muscles stretched in back of hand are numbered 2, 3 and 4. 3. This stretch can counteract ache or cramp in hand.
Normal Mobility:	Bent forefinger should be able to move up and back 45 to 90 degrees, and slightly toward little finger.



Starting Position:

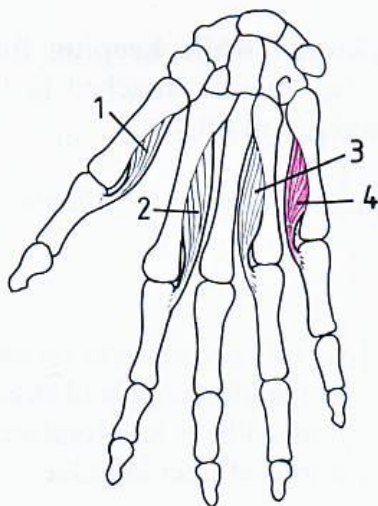


Stretching:



THE FINGERS 2.

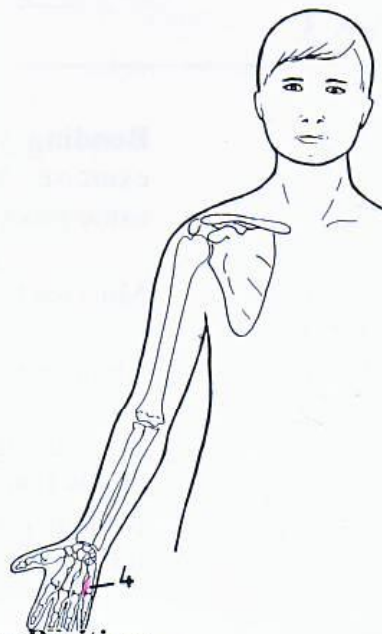
Your difficulty is:	Bringing curled fingers up toward the back of your hand and away from the other fingers. The exercise shown here stretches muscle attached to little finger (4.) The same procedure may be used for all fingers.
Tight Muscles:	Muscles in palm: 1- 4 <i>interossei palmares</i> .
Equipment:	Corner of table, counter or the like.
Starting Position:	Stand with table corner at right; turn right arm inward to limit. Rest palm on forward edge of table, knuckles at edge, fingers hanging down free over edge. Bend outer and middle joints of little finger to limit; keep knuckle joint straight. Grip right little finger between left thumb (on fingernail and outer joint) and left forefinger (down on knuckle).
Stretching:	1. With left forefinger, pull right little finger up, back and out from third finger, so that stretch is felt in little-finger muscle in palm. 2. Tense muscle as if to clench little finger to palm; resist with left forefinger for 5 seconds. 3. Relax and pull little finger further up, back and out from third finger, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release grip. 2. Move little finger up, back and out from third finger, to limit. 3. Resist that movement with left thumb. 4. Hold position a few seconds.
Common Errors:	* Forearm not turned inward. * Edge of palm not held to table.
Notes:	1. As shown to the right, grip may be reversed: left thumb at knuckle, left forefinger and middle finger on right little fingernail. 2. You can stretch fingers one by one or all together, in both directions. 3. Other muscles stretched in palm are numbered 1, 2 and 3. 4. This stretch can counteract ache or cramp in hand.
Normal Mobility:	Bent little finger should be able to move back, up and out about 45 degrees from your third finger.



Starting Position:



Stretching:



Starting Position:



Stretching:



THE FINGERS 3.

Your difficulty is:

Bending your wrist backward while keeping fingers curled. The exercise shown here stretches muscle attached to forefinger (1). The same procedure may be used for all fingers.

Tight Muscles:

Muscles that bend and straighten fingers: 1- 4 *lumbricales*.

Equipment:

Chair or stool.

Starting Position:

Sit with right upper arm close to side, forearm turned outward to limit, elbow bent at more than a right angle, wrist held straight, and forefinger bent at middle and outer joints. Place left forefinger over bent right forefinger, with thumb on right forefinger knuckle.

Stretching:

1. Use left hand to move right forefinger back to limit. Bend right wrist back so that stretch is felt below forefinger in palm.
2. Tense this muscle as if to bend at knuckle; resist with left hand for 5 seconds.
3. Relax. Use left hand to bend right wrist back to limit – maybe a little bit more – keeping forefinger bent backward as much as you can.
4. Repeat until you feel you can stretch no more and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position and grip, but release pressure from left hand.
2. Move right forefinger toward back of hand and bend wrist backward to limit.
3. Resist that movement with left thumb.
4. Hold position a few seconds.

Common Errors:

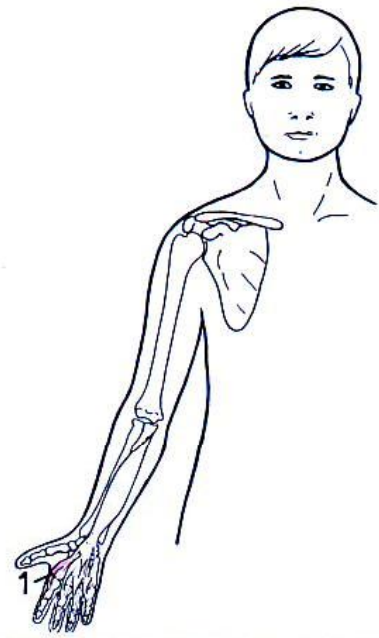
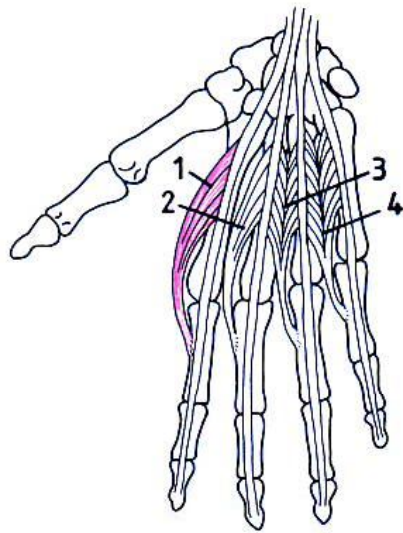
- * Wrist not bent far enough backward.
- * Elbow is straightened.
- * Middle and outer joint of forefinger too slack.

Notes:

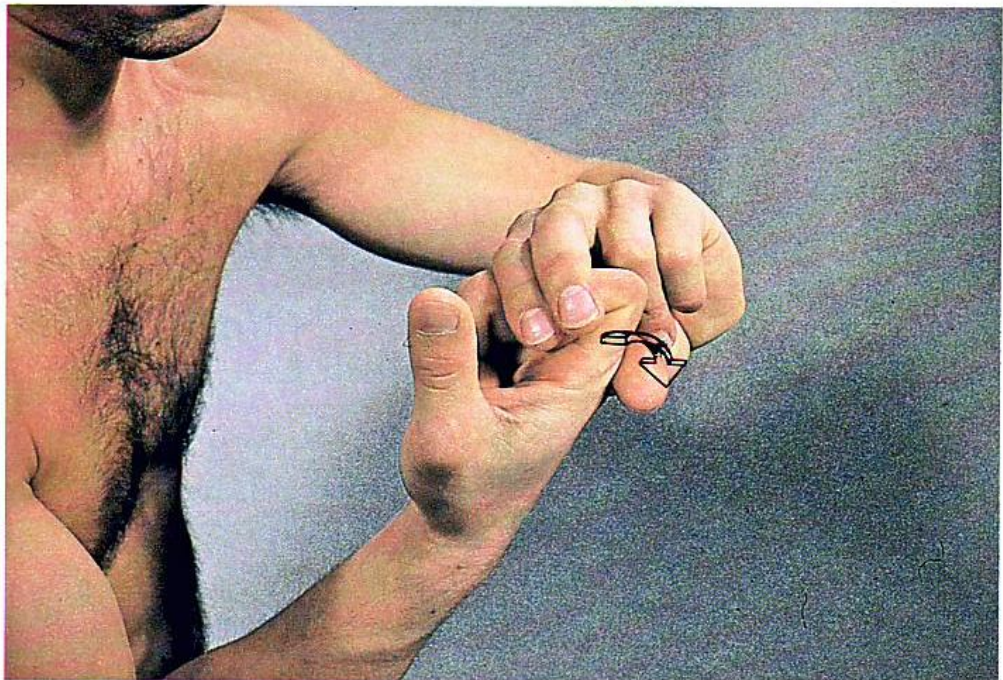
1. Stretch may be used for all four fingers, individually or together.
2. Other muscles stretched are numbered 2, 3 and 4.
3. This stretch can counteract ache or cramp in hand.

Normal Mobility:

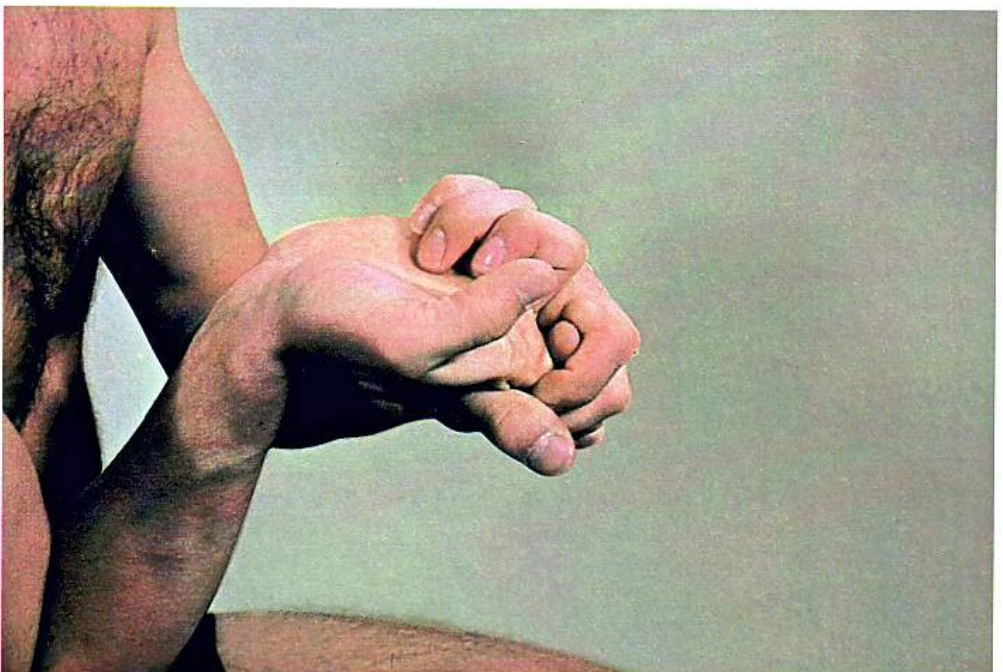
With fingers bent fully at middle and outer joints and bent backward at knuckles, wrist should be able to bend backward almost to a right angle to the forearm.



Starting Position:



Stretching:



THE FINGERS 4.

Your difficulty is:

Bringing your thumb toward your forearm.

Tight Muscles:

Muscles that move thumb toward fingers:

- 1 *adductor pollicis, oblique head*
- 2 *adductor pollicis, transverse head*
- 3 *interosseus dorsalis I*
- 4 *opponens pollicis.*

Equipment:

Chair or stool.

Starting Position:

Sit with right palm on outer side of right thigh, thumb on front of thigh. Grip right thumb with left hand.

Stretching:

1. Using left hand, pull right thumb up from thigh toward right wrist, so that stretch is felt in palm between thumb and forefinger.
2. Tense these muscles as if to touch thumb to forefinger; resist with left hand for 5 seconds.
3. Relax, and use left hand to pull right thumb further up and back to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain grip.
2. Raise thumb up and back from thigh toward wrist, to limit.
3. Resist that movement with left hand.
4. Hold position a few seconds.

Common Errors:

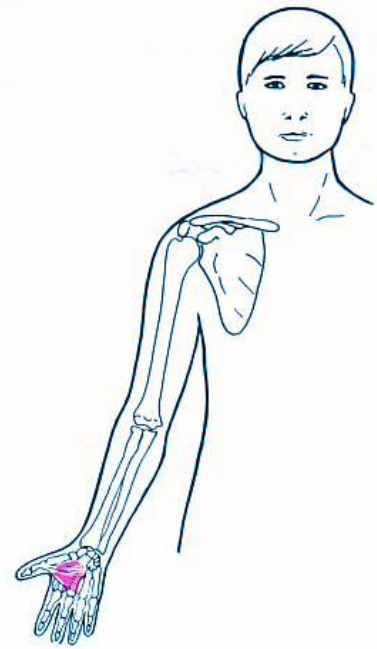
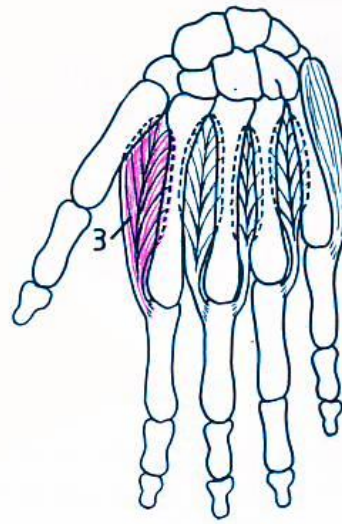
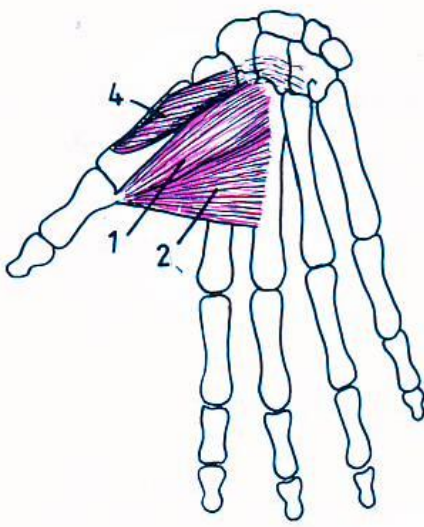
- * Right palm not on thigh.
- * Right wrist bends.
- * Left hand grip too far out on right thumb.
- * Thumb knuckle joint compressed and painful if thumb isn't pulled hard enough.

Notes:

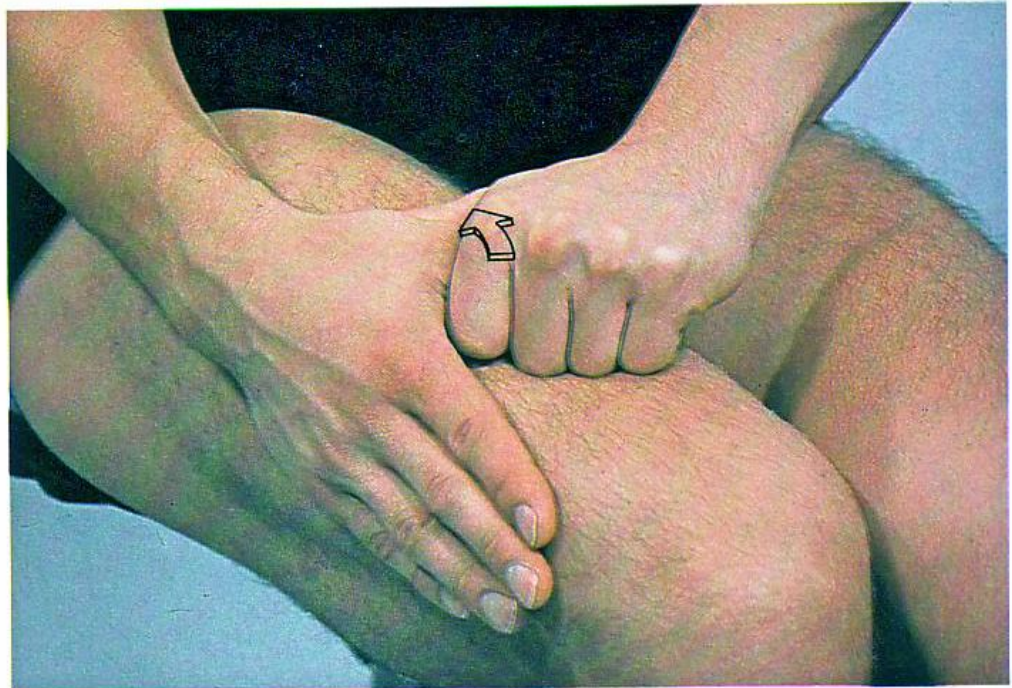
1. This stretch may also be done with palm and four fingers on a table, thumb over edge.
2. Stretch can counteract ache or cramp in hand.

Normal Mobility:

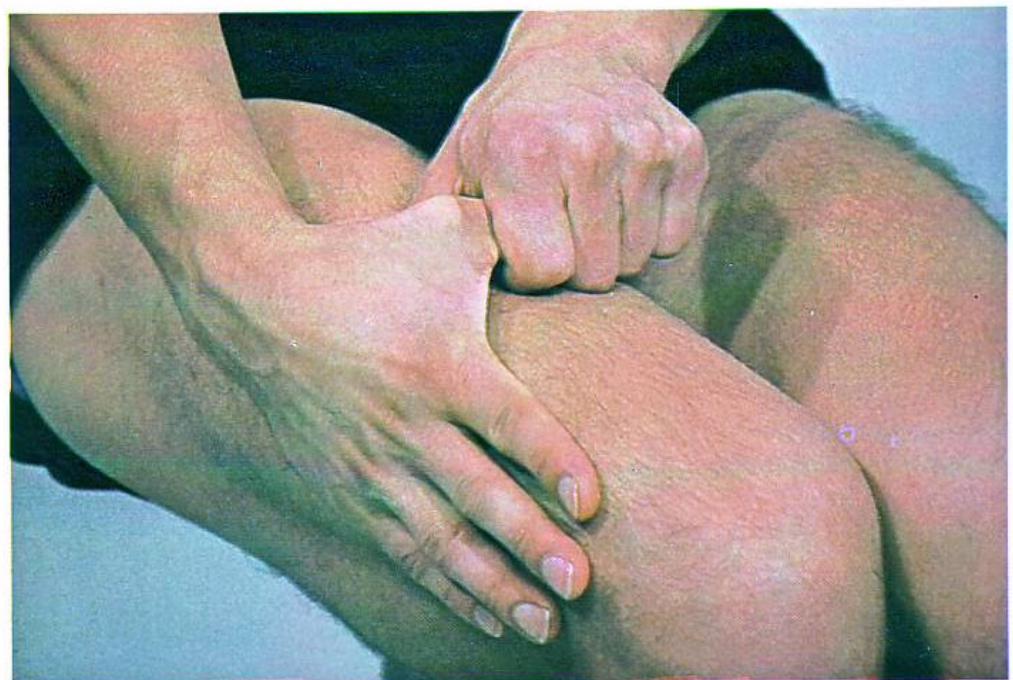
You should be able to pull your thumb at least to a right angle to forefinger.



Starting Position:



Stretching:



THE FINGERS 5.

Your difficulty is:

Bringing curled little finger up and closer to your third finger while your wrist is bent backward.

Tight Muscles:

Muscles that move little finger outward:

- 1 *abductor digiti minimi*
- 2 *interosseus palmaris IV*
- 3 *lumbricalis IV*.

Equipment:

Table, chair or the like.

Starting Position:

Stand facing table, with right arm turned outward to limit, wrist bent backward to limit, and palm on table, fingers over edge, little finger bent at middle and outer joints. Grip bent little finger between left thumb (just below knuckle) and forefinger (on little fingernail).

Stretching:

1. Using left hand, pull little finger up and over third finger, so that stretch is felt in muscles in hand at base of little finger.
2. Tense these muscles as if to clench little finger to palm; resist with left hand for 5 seconds.
3. Relax and pull little finger further up and over third finger to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

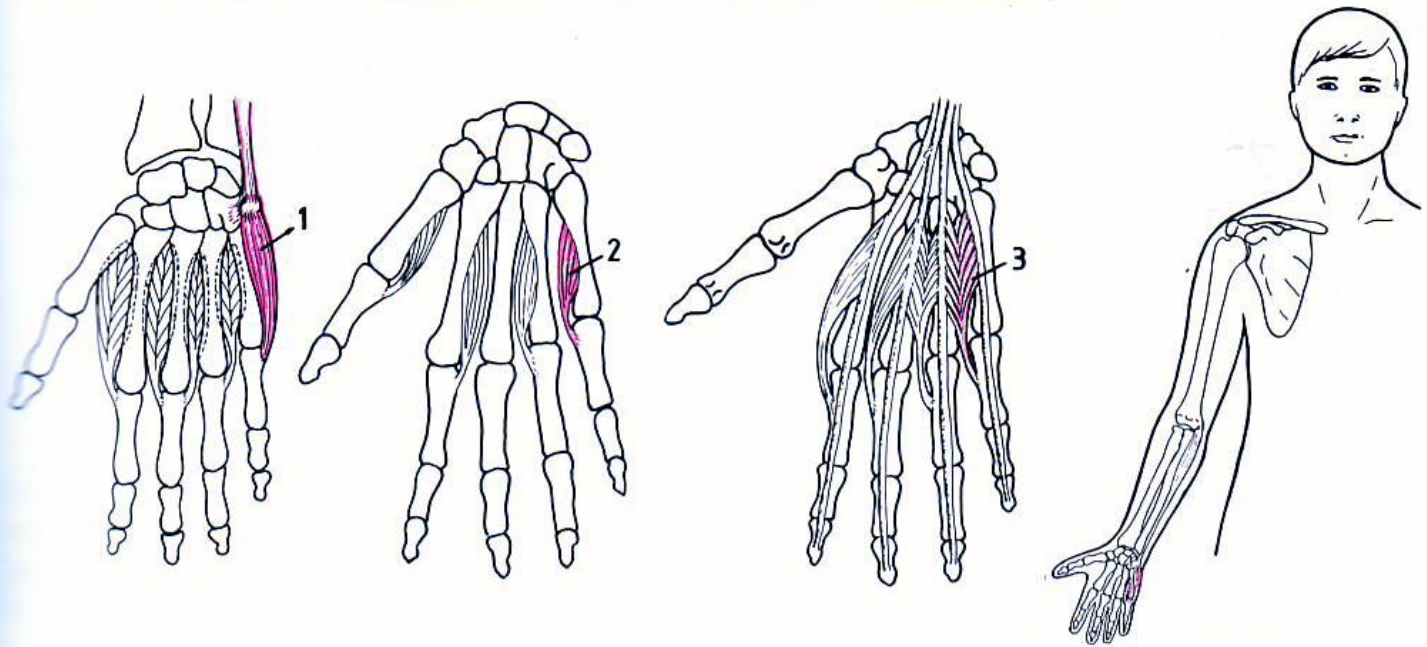
1. Retain grip.
2. Move bent little finger up and back over third finger, bending backward in knuckle.
3. Resist that movement with left hand.
4. Hold position a few seconds.

Common Errors:

- * Arm not turned outward.
- * Wrist not bent backward.
- * Little finger not bent.

Normal Mobility:

In this position, your little finger should be able to move slightly over third finger.



Starting Position:



Stretching:



THE FINGERS 6.

Your difficulty is:

Bringing the little finger bone in your hand up towards the back of your hand, with curled fingers, elbow straight and forearm turned outward.

Tight Muscle:

Muscle that moves little finger:
1 opponens digiti minimi.

Equipment:

Chair, stool or the like.

Starting Position:

Stand facing table, with right arm turned outward to limit, wrist bent backward to limit, and palm on table, fingers over edge, little finger bent at middle and outer joints. Place left hand just below forefinger and middle finger on palm of little finger, and place left thumb on back of third finger, at knuckle.

Stretching:

1. Pull with left forefinger and middle finger to move outer edge of palm up and over toward third finger, so that stretch is felt on outside of little finger.
2. Tense this muscle to cup palm; resist with left hand for 5 seconds.
3. Relax and press little finger further back and toward third finger to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

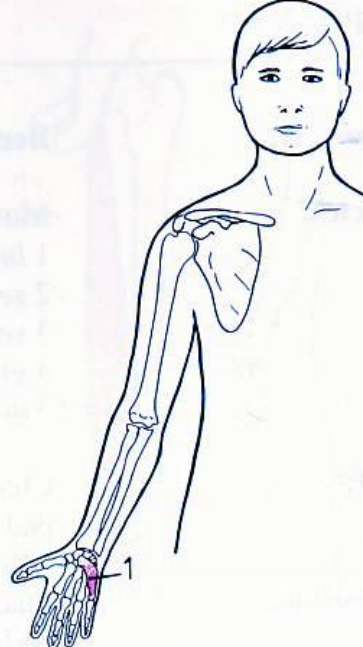
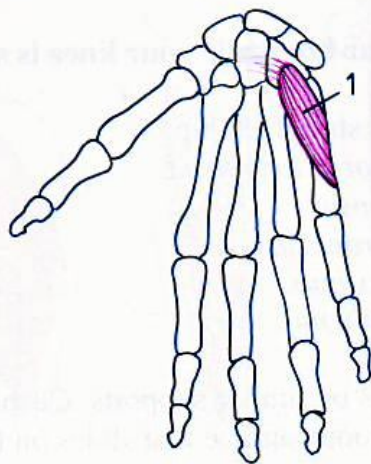
1. Release left hand grip.
2. Raise bent little finger up toward back of hand.
3. Resist that movement with left fingers.
4. Hold position a few seconds.

Common Errors:

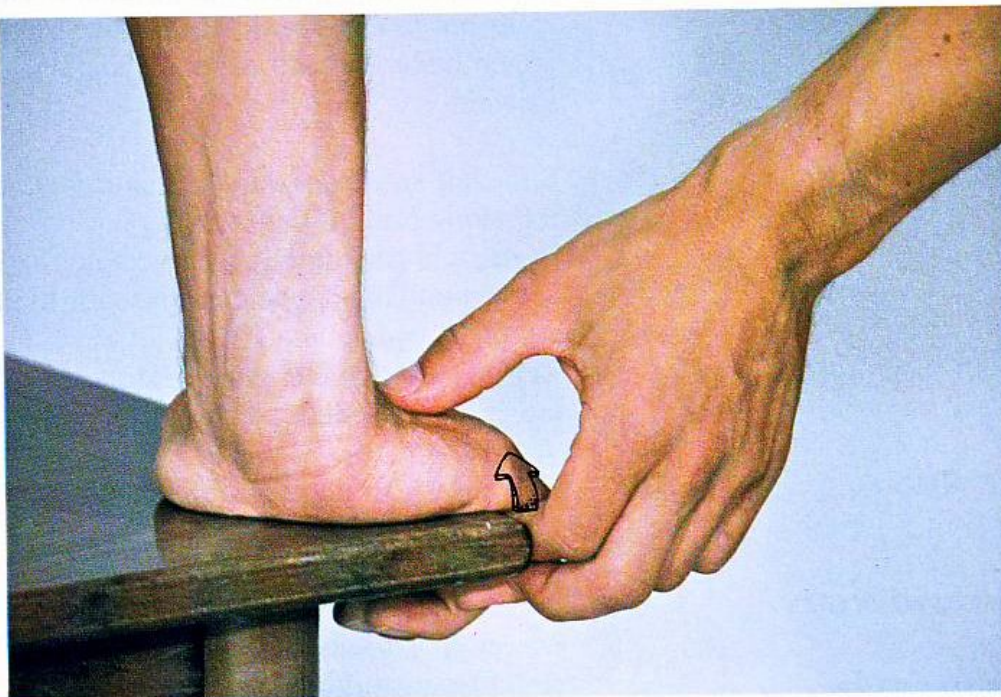
- * Wrist not bent backward.
- * Forearm not turned outward.
- * Left thumb not placed on knuckle of right third finger.

Normal Mobility:

With straight elbow, forearm turned outward and fingers bent, you should be able to move edge of palm slightly, both forward and backward.



Starting Position:



Stretching:



THE HIP 1.

Your difficulty is:

Bending your hip while your knee is straight.

Tight Muscles:

Muscles that straighten hip:

- 1 *biceps femoris, long head*
- 2 *semitendinosus*
- 3 *semimembranosus*
- 4 *gluteus maximus*
- 5 *adductor magnus*.

Equipment:

Chairs, stools or similar supports. Cushion or other soft object for knee pad, with smooth surface that slides on floor.

Starting Position:

Place left knee on cushion; right leg forward with knee bent. Support body well with arms, hands on chairs. (Only one chair is shown in photos, so as not to obscure details of the stretch.) Straighten left hip, and lean upper body forward without a stoop, keeping pelvis facing straight forward.

Stretching:

1. Slide left knee backward so that right knee straightens out and stretch is felt along back of right thigh.
2. Press right heel down on floor; hold for 5 seconds.
3. Relax; straighten right knee and slide left knee backward to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain final stretch position; try to raise right leg with knee straight.
2. Hold position a few seconds.

Common Errors:

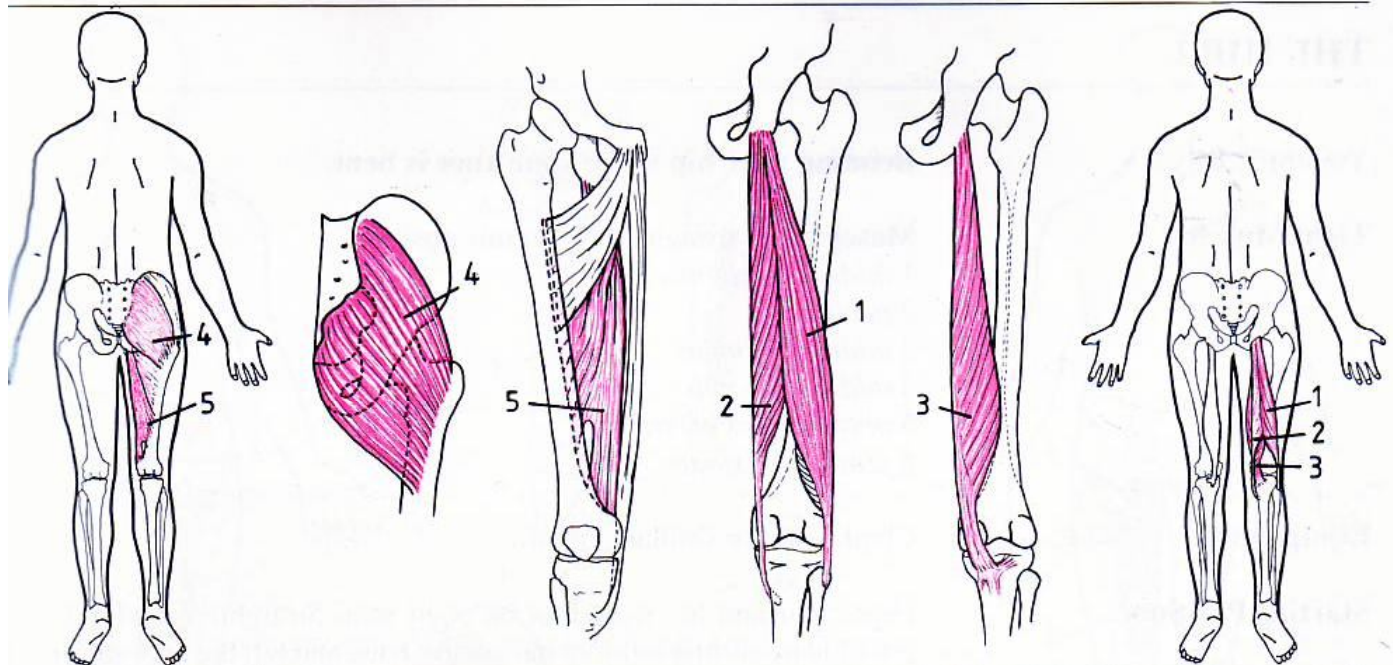
- * Pelvis tilted backward or turned.
- * Lower back turned or bent forward.
- * Right leg turned in or out.
- * Weak support by hands and arms.
- * Too much pressure on left knee.

Note:

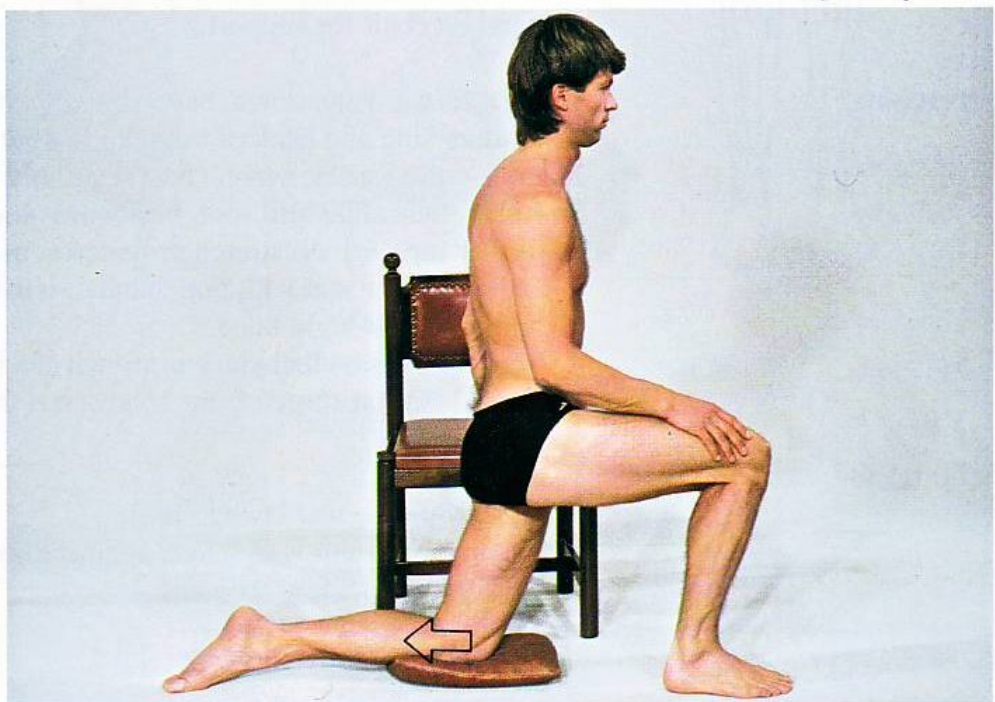
This is one of the more commonly needed stretches.

Normal Mobility:

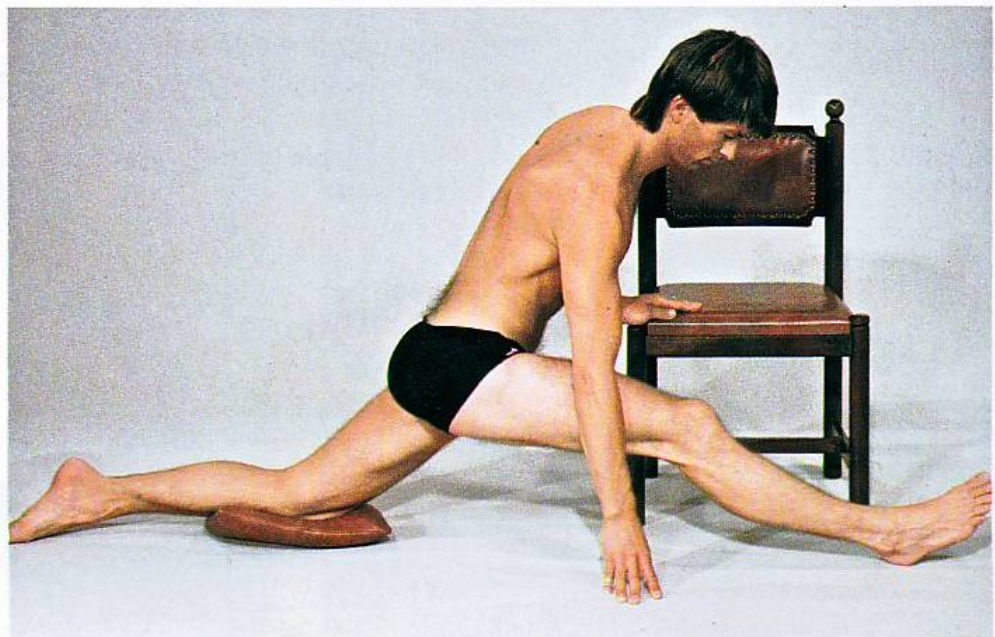
Standing up with straight knees, you should be able to bring your upper body forward all the way to horizontal, with hips as hinges and lower back kept quite straight.



Starting Position:



Stretching:



THE HIP 2.

Your difficulty is:

Bending your hip while your knee is bent.

Tight Muscles:

Muscles that straighten hip in this position:

- 1 *adductor magnus*
- 2 *pectineus*
- 3 *adductor longus*
- 4 *adductor brevis*
- 5 *obturatorius externus*
- 6 *gluteus maximus*.

Equipment:

Chair, stool or similar support.

Starting Position:

Face chair and put right foot on chair seat. Straighten left hip as far as possible by sliding left foot backward; back and left leg kept straight. Left hand on chair for support.

Stretching:

1. Lean forward and down, bending right knee and hip, so that stretch is felt in inner side and back of thigh and in buttock.
2. Press right foot down on chair seat; hold for 5 seconds.
3. Relax, then slide left foot backward and press upper body and hip further forward. As stretch progresses, move right arm inside right thigh and grip chair seat with both hands, so that right shoulder can come level with or below right knee.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Stand on left leg.
2. Bend right hip and knee to limit.
3. Resist movement with hands against knee.
4. Hold position a few seconds.

Common Errors:

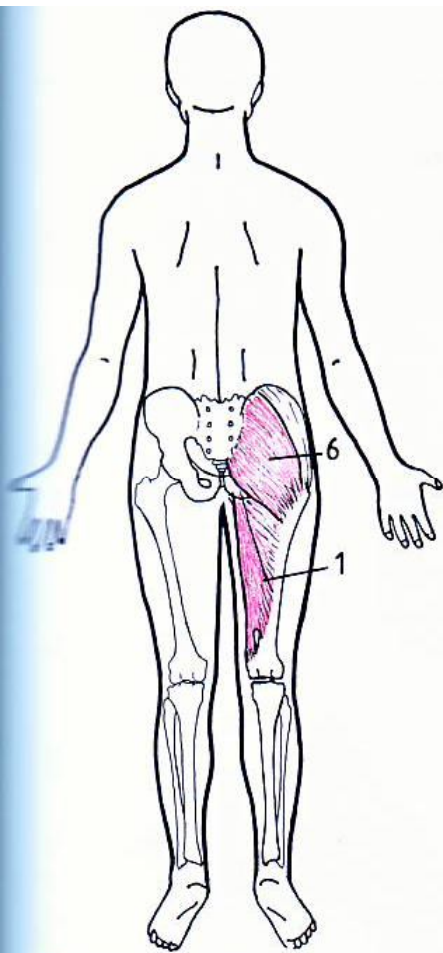
- * Left knee and hip bent.
- * Lower back not kept straight.

Note:

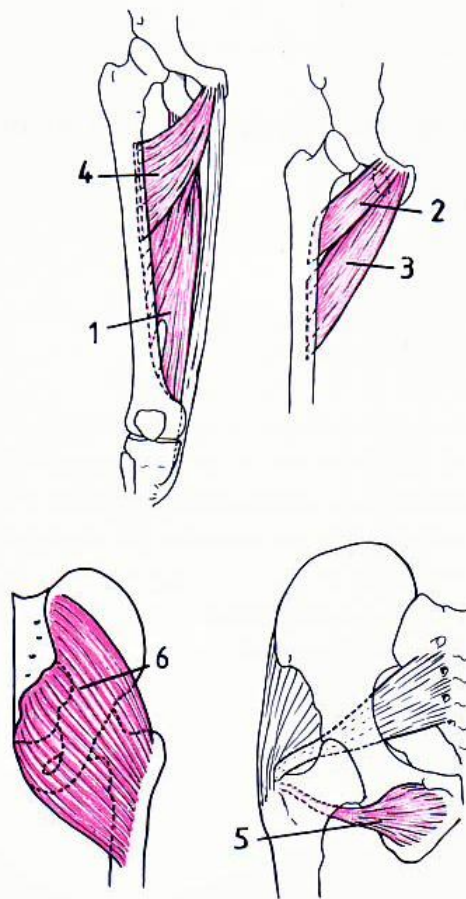
Arms may pull down to increase effect of final phase of stretch; don't push lower back out.

Normal Mobility:

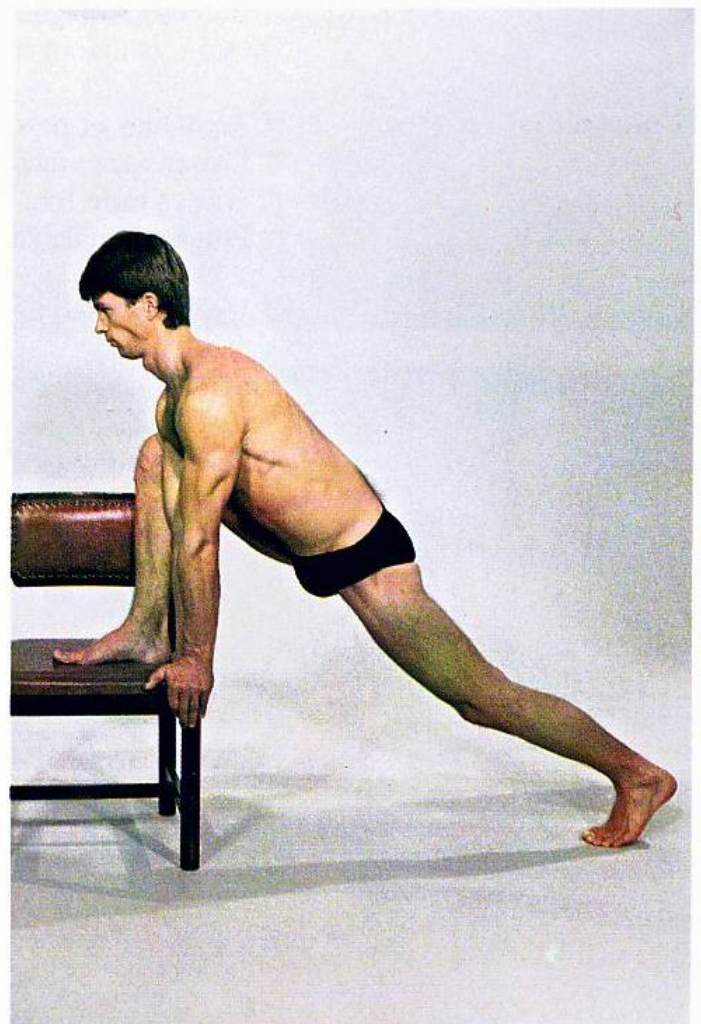
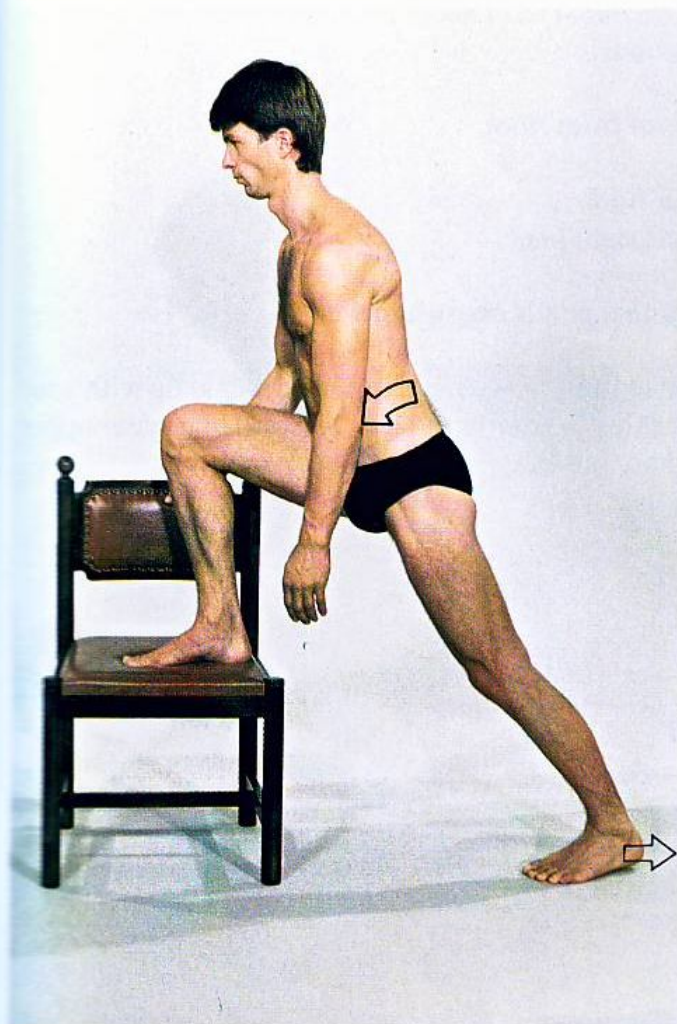
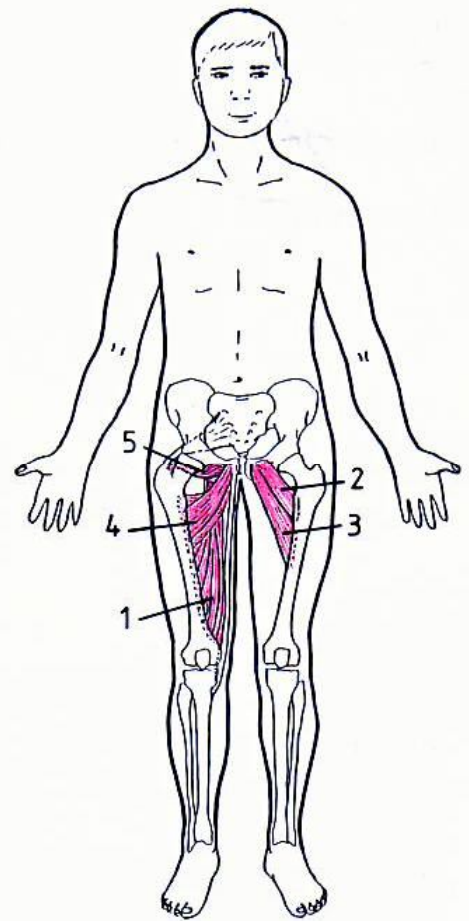
You should be able to bring your bent knee almost up to shoulder level.



Starting Position:



Stretching:



THE HIP 3.

Your difficulty is:

Bending your hip while both bringing and turning your leg inward.

Tight Muscles:

Muscles that straighten hip, move legs apart and turn them outward at hip:

1 *piriformis*

2 *gluteus maximus, medius and minimus*

3 *quadratus femoris.*

Starting Position:

Lie on your back on floor with right knee and hip bent about 60 degrees, sole of right foot on floor. Hold right hipbone still with right hand; extend left arm to side, palm down on floor. Cross left foot over, with outer side of heel/ankle against outer side of right knee/thigh.

Stretching:

1. Move right thigh inward, keeping right foot on floor, so that stretch is felt in back of thigh and buttock.
2. Press right thigh against left heel/ankle; hold for 5 seconds.
3. Relax, and press with left heel/ankle to push right thigh inward (toward the left) to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Put left thigh against right knee.
2. Press right thigh inward against left knee.
3. Hold position a few seconds.

Common Errors:

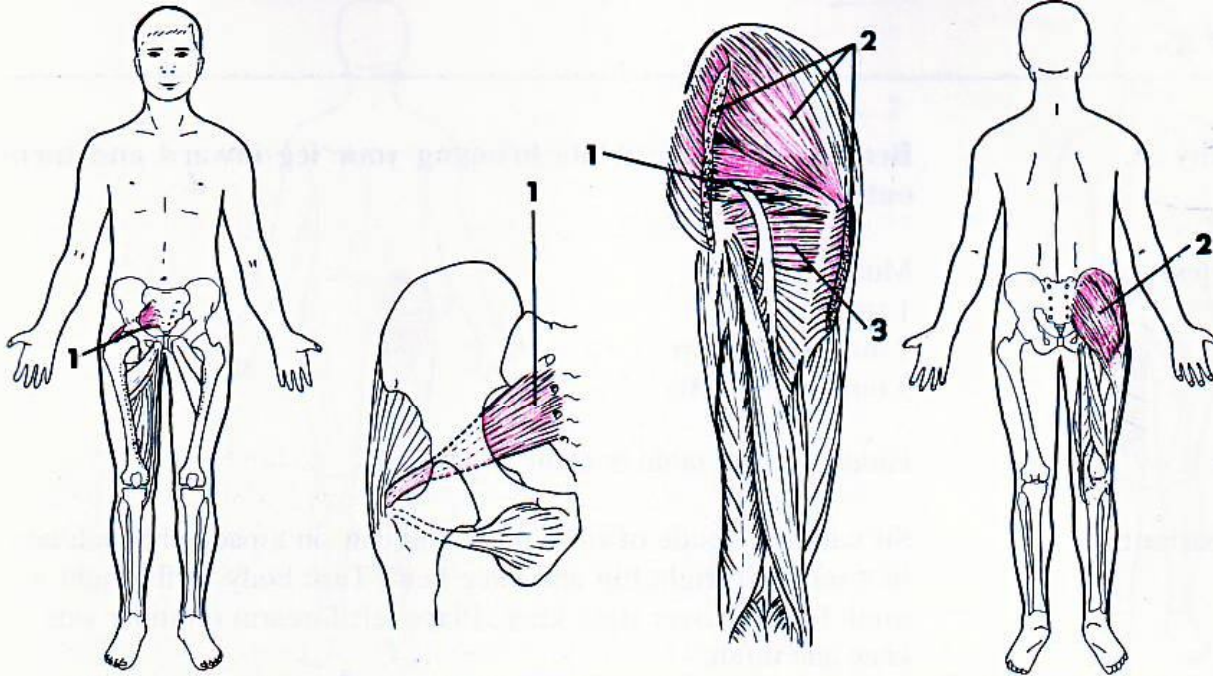
- * Right side of pelvis raised from floor.
- * Lower back arched.
- * Sole of right foot not on floor.
- * Left heel/ankle slides off right knee.

Note:

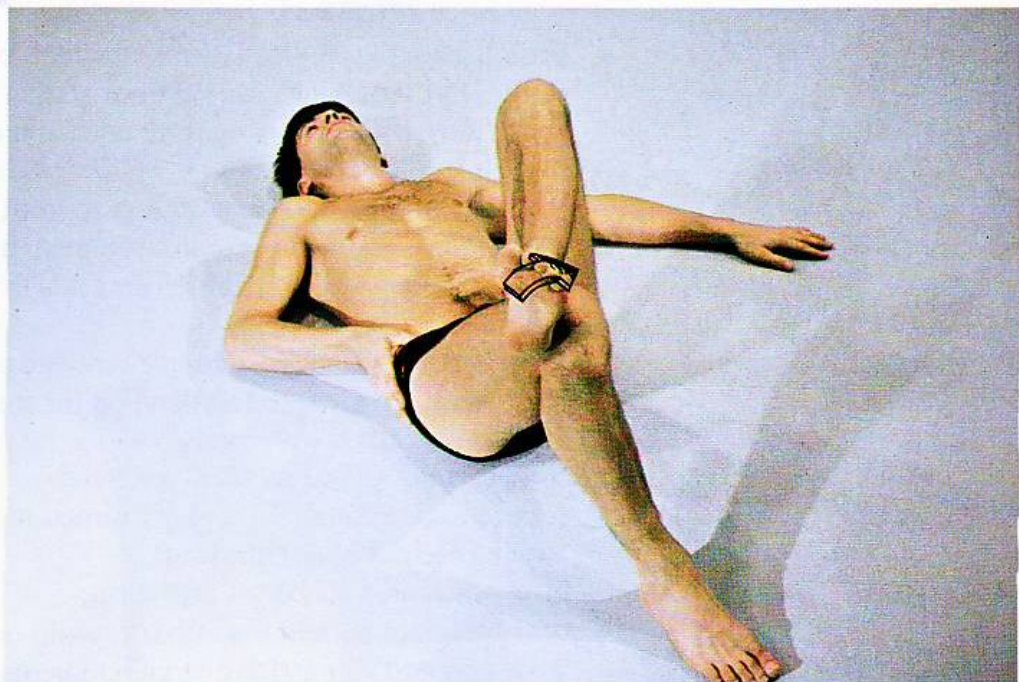
Use right hand to check that pelvis doesn't move.

Normal Mobility:

With legs turned inward to limit, you should be able to stand up with your legs crossed – with either leg in front – and lean forward until your upper body is horizontal, without pushing your lower back out.



Starting Position:



Stretching:



THE HIP 4.

Your difficulty is:

Bending your hip while bringing your leg inward and turning it outward.

Tight Muscles:

Muscles that:
1 straighten hip
2 move legs apart
3 turn leg inward.

Equipment:

Padded bench, table or chair.

Starting Position:

Sit with outer side of right thigh and calf on a padded bench/table, left foot on floor, right hip and knee bent. Turn body to the right and lean trunk forward over right knee. Place left forearm on inner side of right knee and thigh.

Stretching:

1. With back straight, lean trunk further forward over right hip, while sliding left foot backward on floor so that stretch is felt in right buttock.
2. Tense muscles by pressing right knee and calf down to bench/table; hold for 5 seconds.
3. Relax; lean torso further over leg, to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; move right knee inward and upward to limit.
2. Resist movement with left hand on inner side of right knee.
3. Hold position a few seconds.

Common Errors:

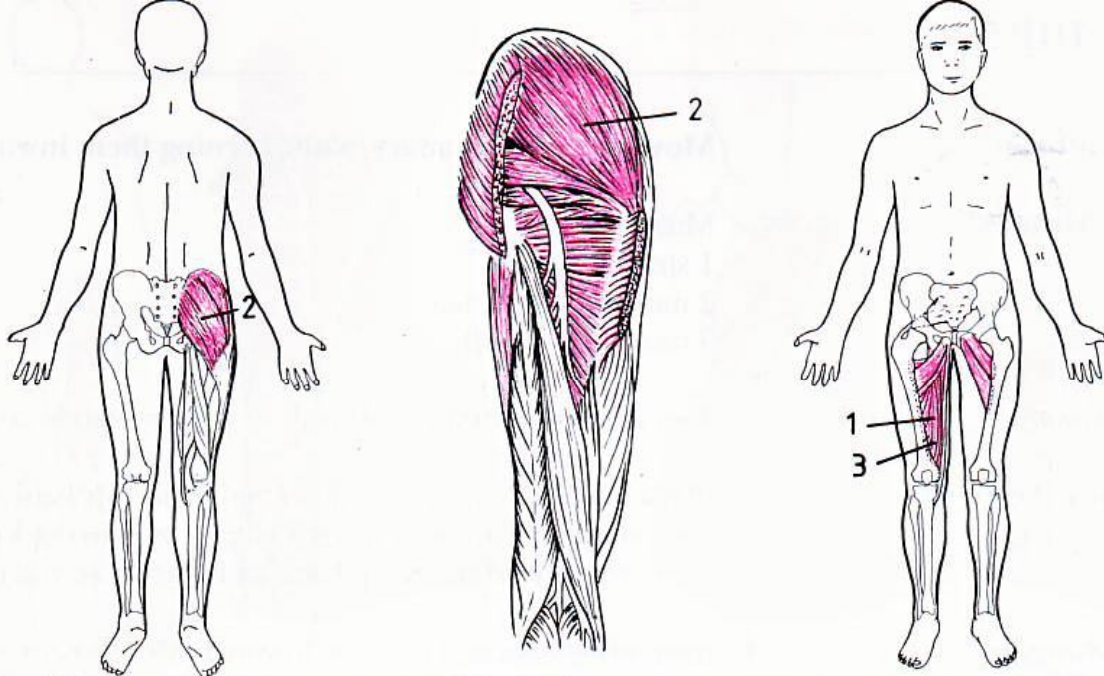
- * Lower back pushed out and not turned to the right.
- * Right knee not pressed inward.

Notes:

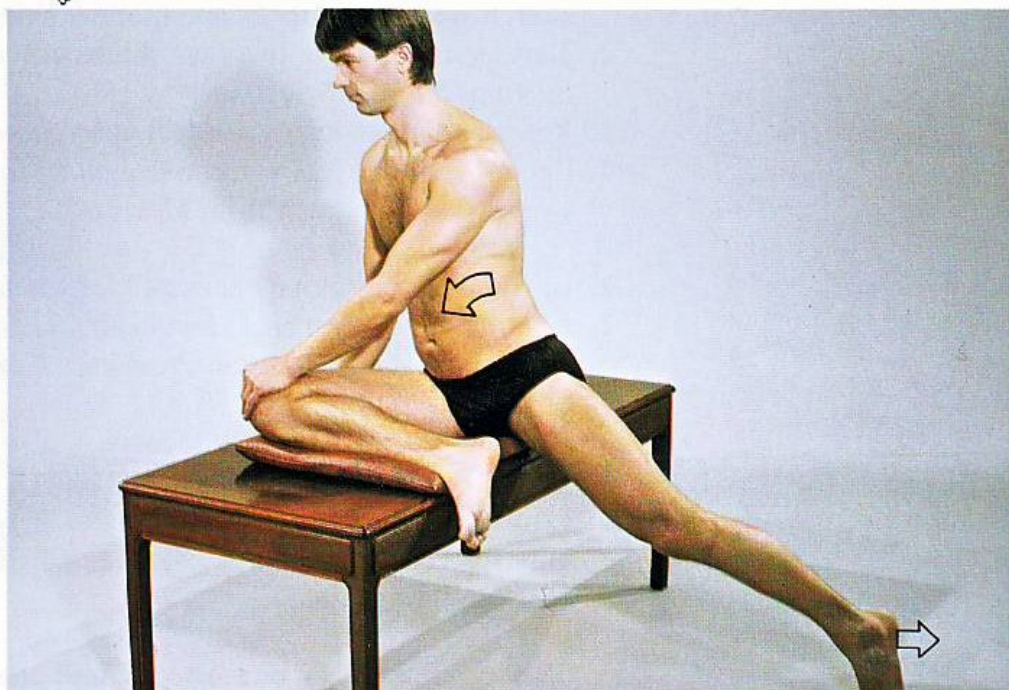
1. If you feel pain in lower back, groin or knee, stop stretching.
2. If you feel pain in hips, stretch more carefully – that is, with less force and longer time.
3. This exercise may also be done on floor.

Normal Mobility:

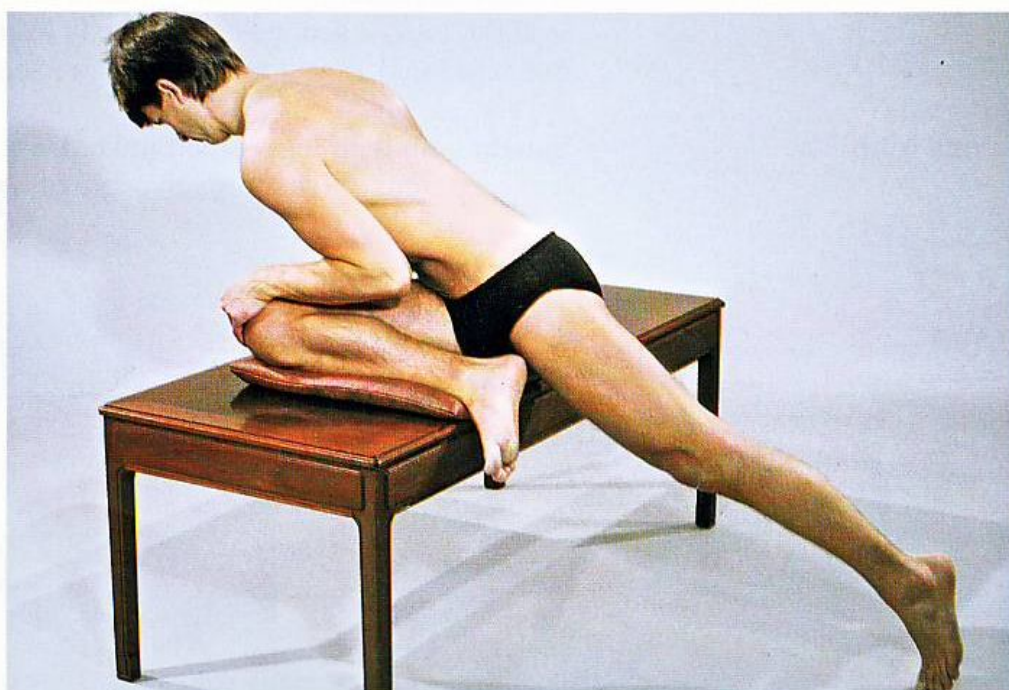
With legs turned outward to limit, you should be able to lift your right thigh, knee bent, and move it over to the left in front of your body.



Starting Position:



Stretching:



THE HIP 5.

Your difficulty is:

Moving your legs apart while turning them inward, hips bent.

Tight Muscles:

Muscles that:

- 1 straighten hip
- 2 move legs together
- 3 turn leg outward.

Equipment:

Two cushions or other soft pads to let knees slide comfortably on floor.

Starting Position:

Place one knee on each cushion and hands forward on floor; keep lower back straight. Turn legs inward at hips by moving lower legs and feet as far apart as possible. Keep heels as far apart as you can.

Stretching:

1. Bend elbows so that body is lowered. Move knees and feet apart so that stretch is felt in buttocks and in inner sides and backs of thighs.
2. Tense muscles as if to press thighs toward each other without knees moving; hold for 5 seconds.
3. Relax and move knees and feet apart to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; move knees and legs as far apart as possible.
2. Alternatively, lie on back, feet in air, knees and hips at right angles, and legs turned inward to limit. Press knees out to limit, and resist with hands on outsides of knees.
3. Hold either position a few seconds.

Common Errors:

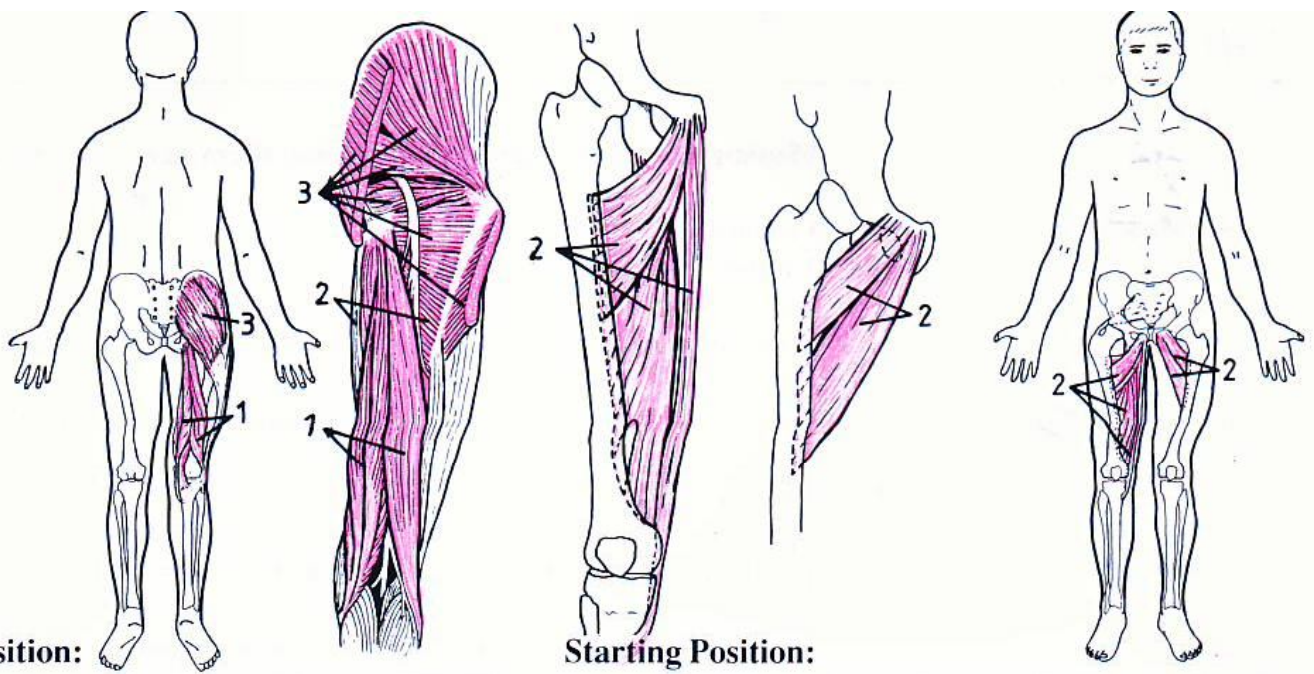
- * Lower back arched.
- * Hips not turned inward (heels come closer together).
- * Hips straightened.

Note:

This exercise should be done with hips gradually bending more and more. If you find kneeling uncomfortable or difficult, try standing up with knees straight, legs turned inward and body leaning forward (straight back!) so that hips bend almost at a right angle. See illustrations on right.

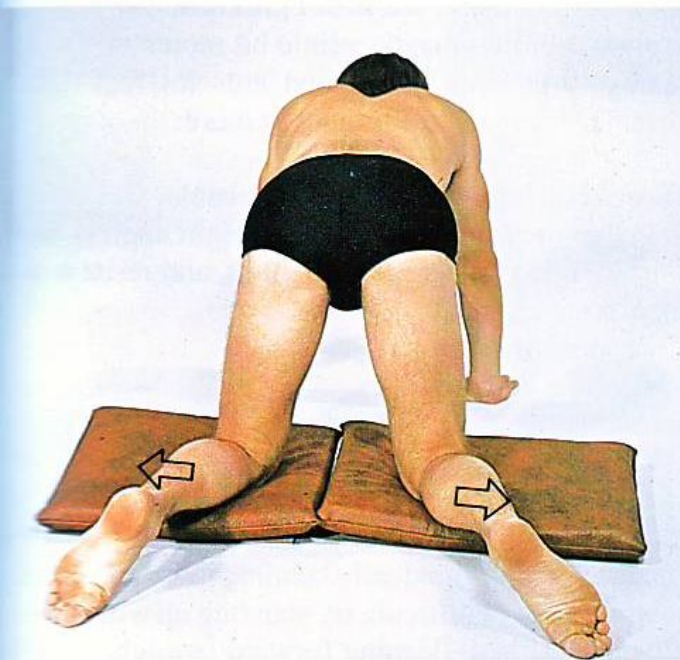
Normal Mobility:

Standing up with legs turned inward, you should be able to move your legs apart until thighs form an angle of more than 90 degrees.

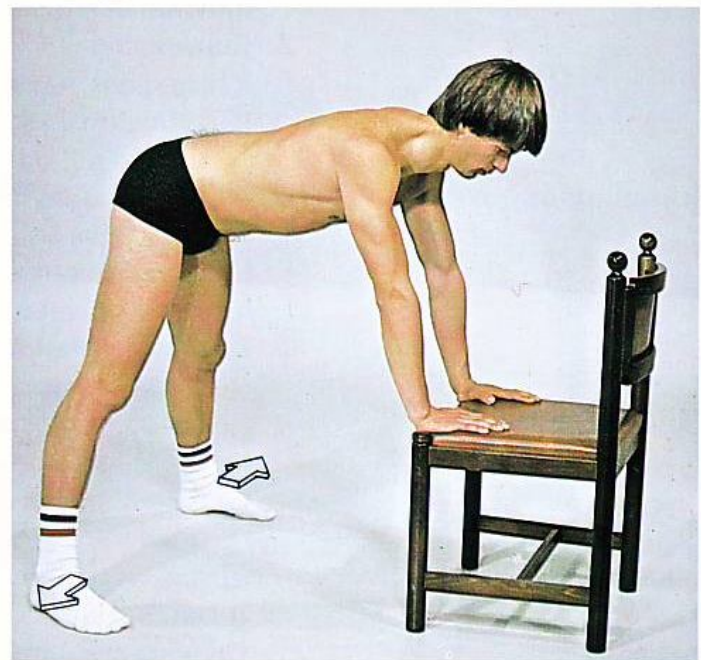


Starting Position:

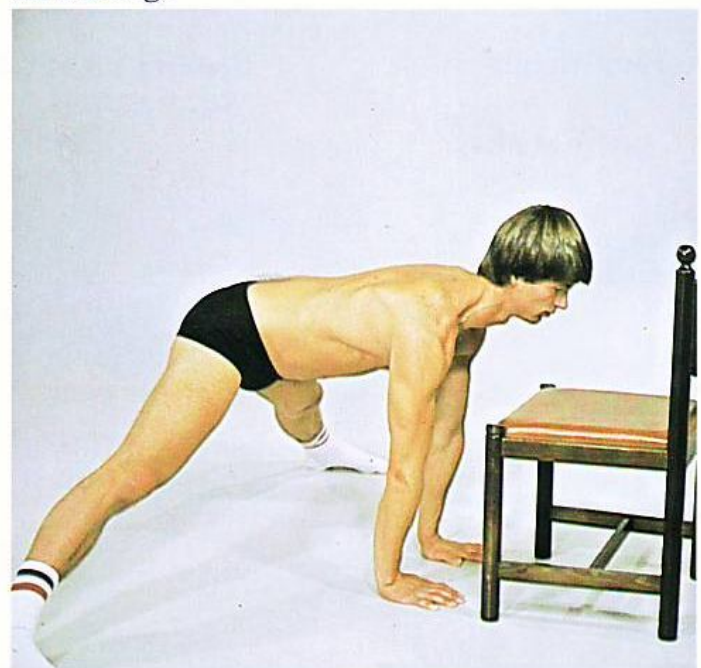
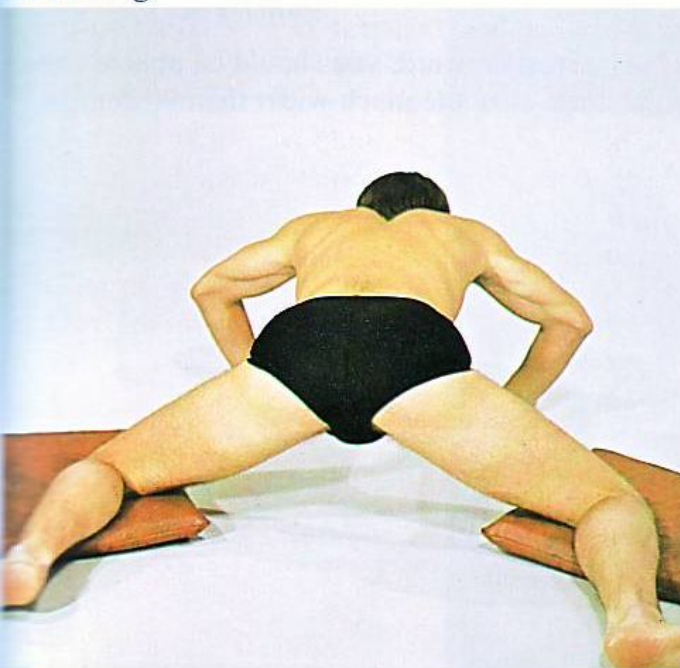
Starting Position:



Stretching:

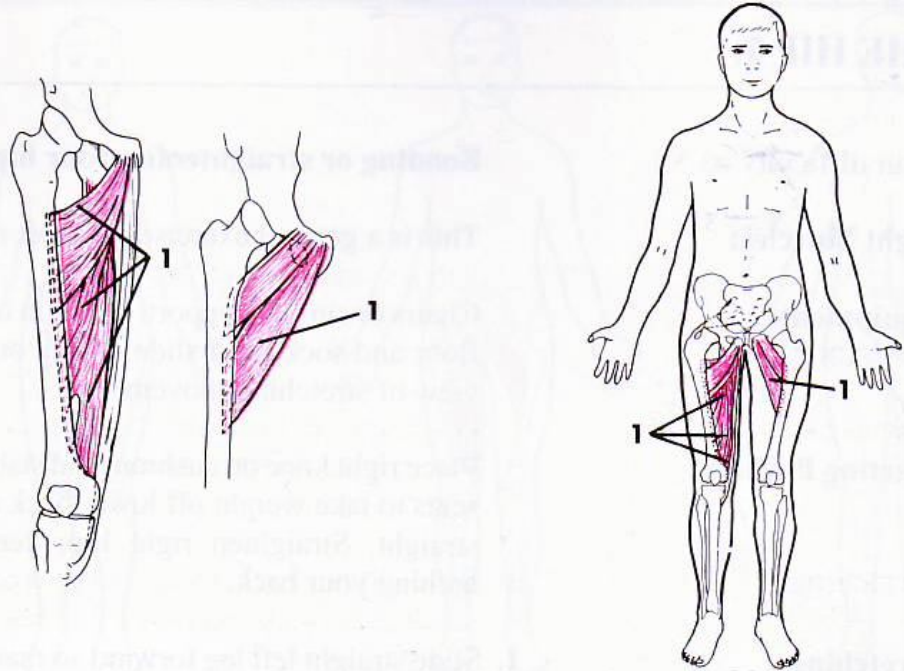


Stretching:

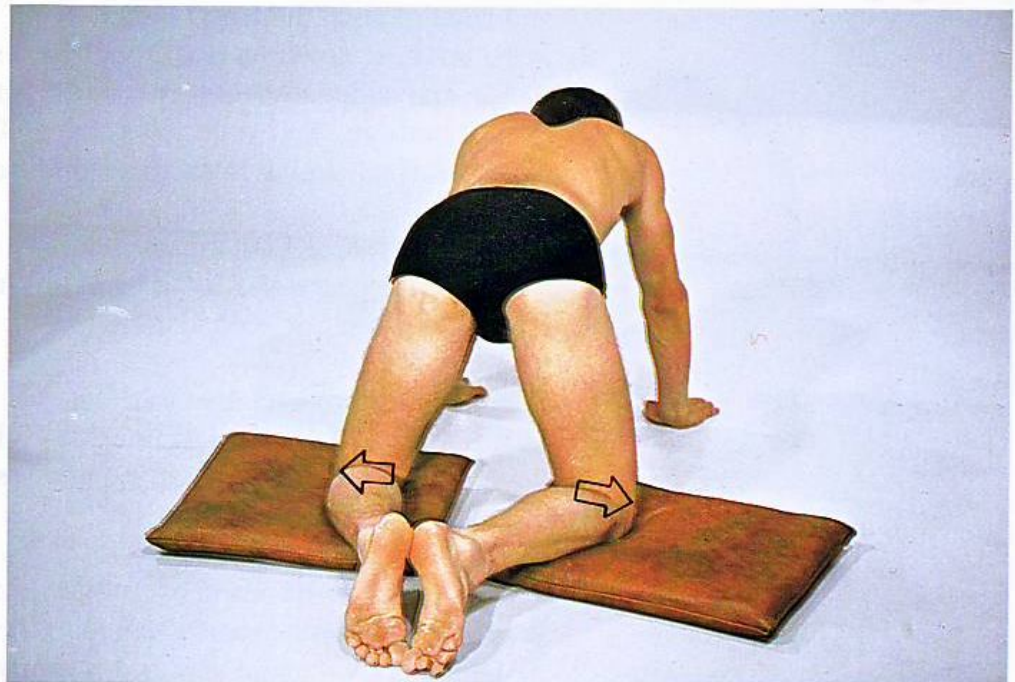


THE HIP 6.

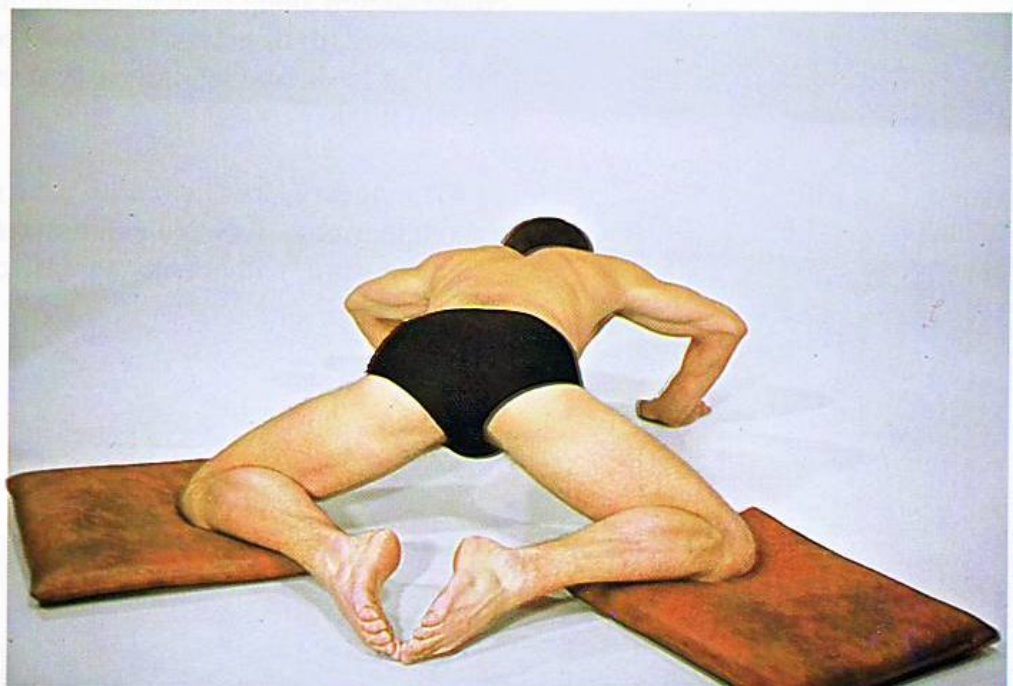
Your difficulty is:	Moving your legs apart while turning them outward, hips bent.
Tight Muscles:	Primarily muscles that: 1 move legs together at hips.
Equipment:	Two cushions or other soft pads that let knees slide comfortably on floor.
Starting Position:	Place one knee on each cushion and hands forward on floor; keep lower back straight. Push knees apart to limit, keeping heels together to turn legs outward.
Stretching:	1. Bend elbows so that body is lowered and move knees apart so that stretch is felt in buttocks and even more in inner sides and backs of thighs. 2. Tense muscles as if to press thighs toward each other without knees moving; hold for 5 seconds. 3. Relax and move knees apart to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position; move knees and legs as far apart as possible. 2. Alternatively, lie on back, feet in air, knees and hips at right angles, and legs turned outward to limit. Press knees out to limit, and resist with hands on outsides of knees. 3. Hold either position a few seconds.
Common Errors:	* Lower back arched. * Legs not turned outward at hips (heels not held together). * Hips straightened.
Note:	This exercise should be done with hips gradually bending more and more. If you find kneeling uncomfortable or difficult, try standing up with knees straight, legs turned outward and body leaning forward (straight back!) so that hips bend almost at a right angle. See illustrations on right.
Normal Mobility:	Standing up with your legs turned outward, you should be able to move your legs apart until thighs form an angle much wider than 90 degrees.



Starting Position:



Stretching:



THE HIP 7.

Your difficulty is:

Bending or straightening your hips sufficiently.

Tight Muscles:

This is a general exercise for most muscles around the hips.

Equipment:

Chairs or similar support. Cushion or other soft support for knee. Smooth floor and socks that slide. (Only one chair shown, so as not to obstruct view of stretching movement).

Starting Position:

Place right knee on cushion, and stabilize body firmly with hands on chair seats to take weight off lower back and knee. Slide left heel forward, leg straight. Straighten right hip, keeping upper body vertical, without arching your back.

Stretching:

1. Slide straight left leg forward so that stretch is felt along back of left thigh and front of right thigh and hip.
2. Press left heel down on floor; hold for 5 seconds.
3. Relax, and slide left heel forward to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; tighten muscles of right buttock.
2. Keep left knee straight; try to bend left hip.
3. Hold position a few seconds.

Common Errors:

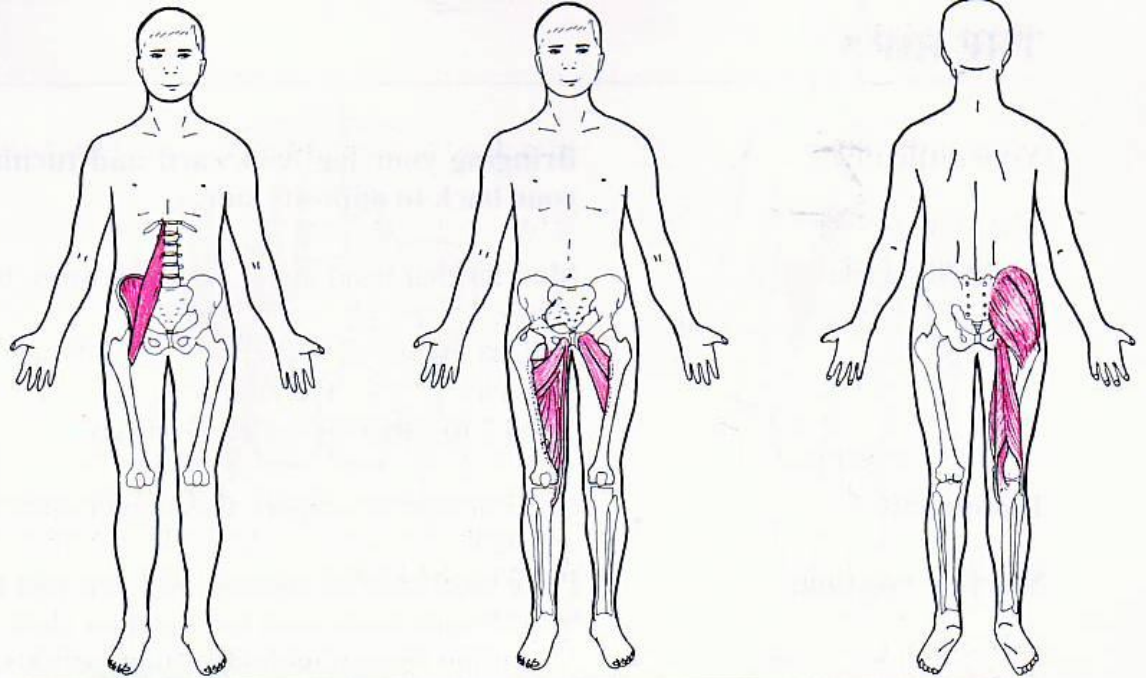
- * Pelvis tilts or turns relative to trunk.
- * Hands and arms don't take enough weight.
- * Right foot pressed down, putting too much body weight on knee.
- * Left leg turned inward or outward.

Notes:

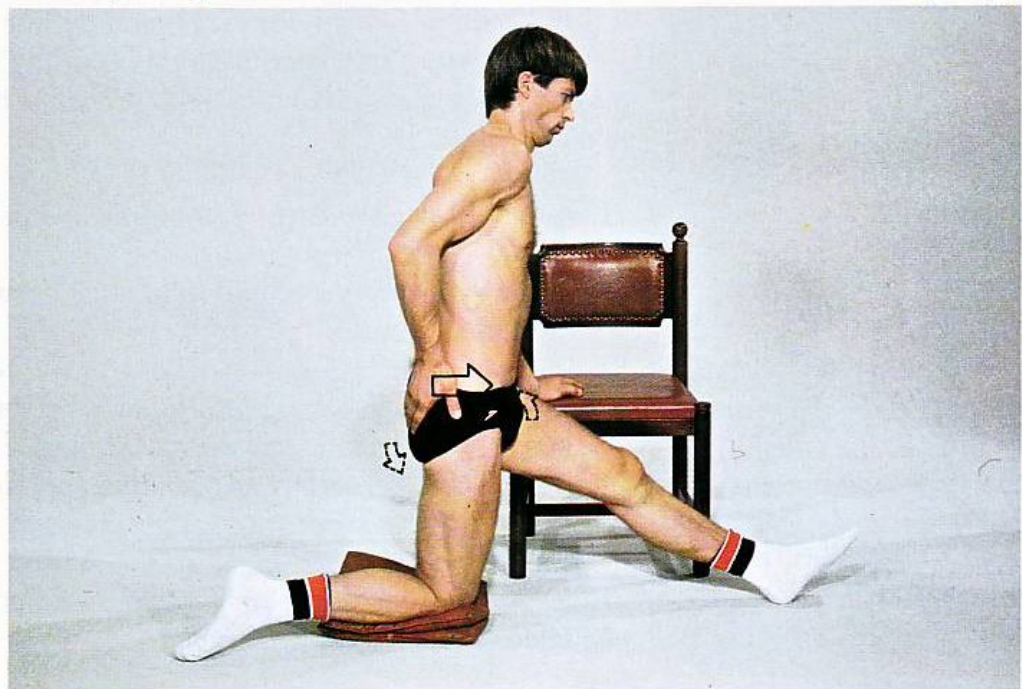
1. Switch leg positions to exercise muscles on opposite side.
2. This is one of the more commonly needed stretches.
3. Upper body may be inclined slightly forward, back straight, to increase stretch along back of left thigh.
4. A backward tilt of pelvis ('tail between the legs'), with lower belly pulled up toward navel, increases stretch on front and inside of right hip and thigh.

Normal Mobility:

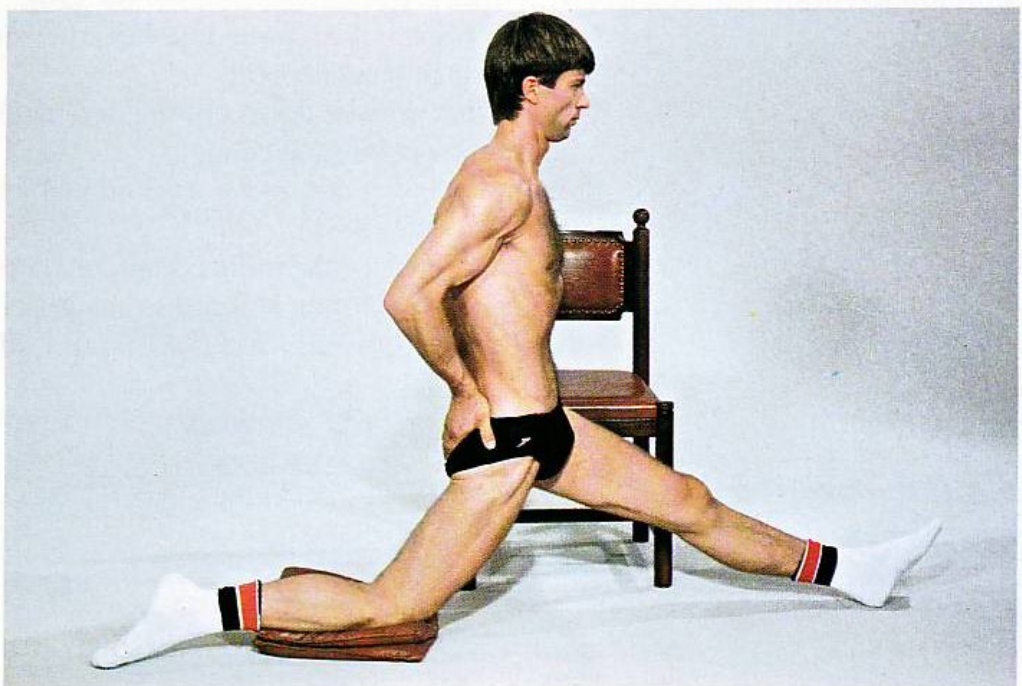
From a standing position and with back straight, it should be possible to lean the upper body forward to a horizontal position or move either leg slightly backward, without any arching of lower back.



Starting Position:



Stretching:



THE HIP 8.

Your difficulty is:

Bringing your leg backward and turning it inward while bending your back to opposite side.

Tight Muscles:

Muscles that bend lower back sideways, bend hip and turn leg outward at hip:

1 *psoas major*

2 *iliacus*.

1 and 2 together are called *iliopsoas*.

Equipment:

Chair or similar support. Cushion or other soft knee pad.

Starting Position:

Place right knee on cushion, with left foot forward on floor, hip and knee bent. Steady body with left hand on chair seat. Straighten right hip and hold trunk vertical without turning pelvis sideways. Tilt pelvis backward by 'pulling tail between legs' and pulling lower belly up toward navel; check with right hand that you're doing it right. Swing right foot and lower leg outward to turn thigh inward at hip; bend upper body sideways to the left.

Stretching:

1. Bend left knee further to pull trunk and pelvis forward, so that stretch is felt on inside of right groin.
2. Tense muscles as if to pull right knee forward and left foot backward; hold for 5 seconds.
3. Relax; keep pelvis tilted back and draw it forward to limit – maybe a little bit more – by tensing muscles in right buttock and left thigh and by bending left knee more, without sliding left foot on floor.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; tense muscles in right buttock to move pelvis forward.
2. Hold position a few seconds.

Common Errors:

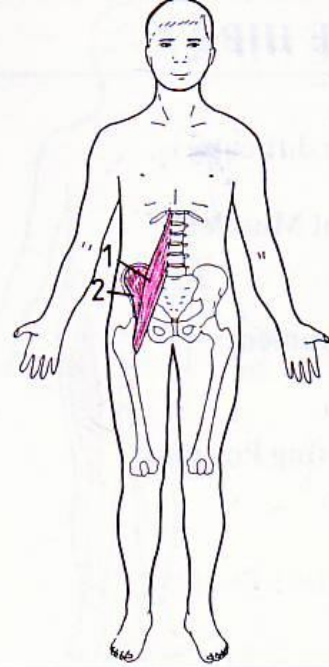
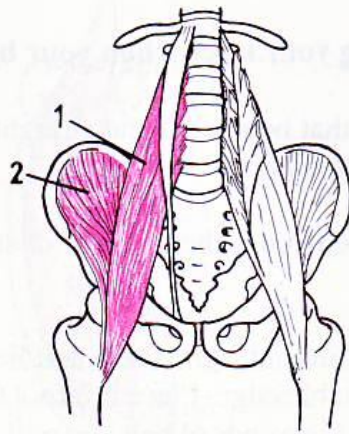
- * Pelvis turned sideways or tilted forward.
- * Lower back arched, turned, or bent the wrong way.
- * Not enough hand support.
- * Right foot pressed down, putting too much body weight on knee.
- * Right hip not straight enough.
- * Right lower leg and foot not far enough out.

Notes:

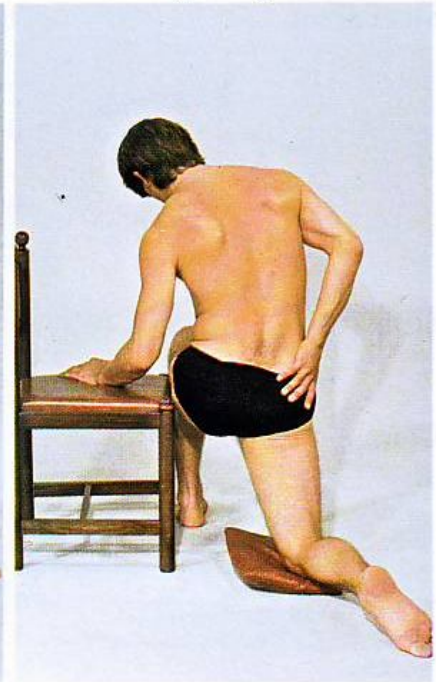
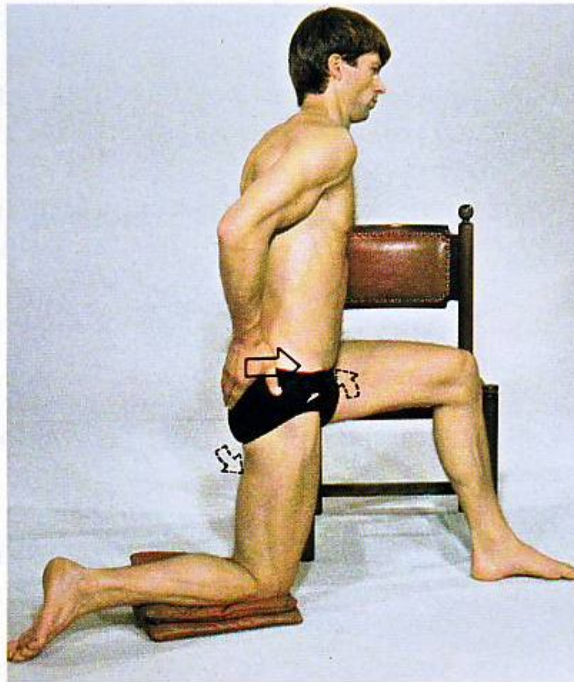
1. This is one of the more commonly needed stretches.
2. This stretch often helps alleviate lower back pain.
3. This exercise stretches *iliopsoas* muscles maximally.

Normal Mobility:

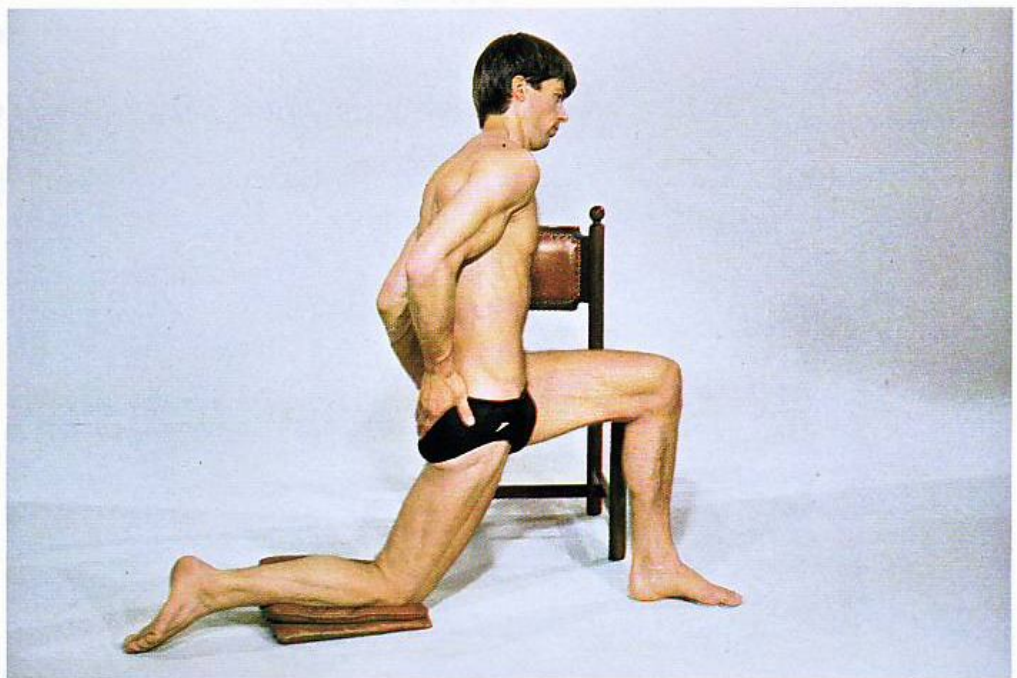
Standing up, you should be able to move your leg backward a little without arching your back.



Starting Position:

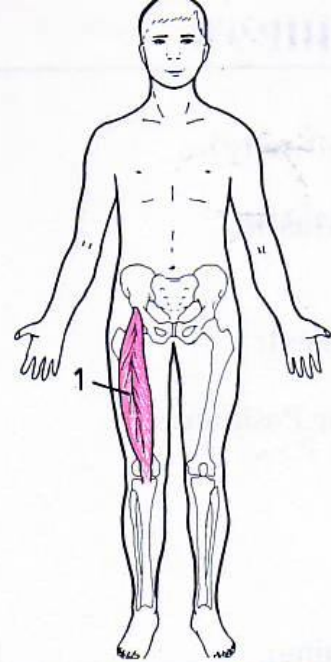
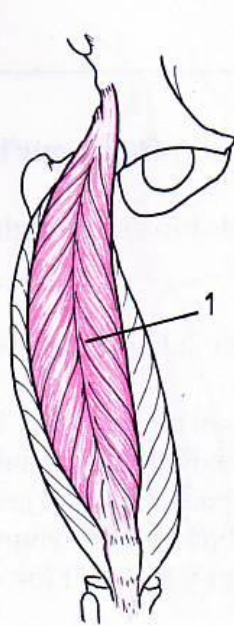


Stretching:

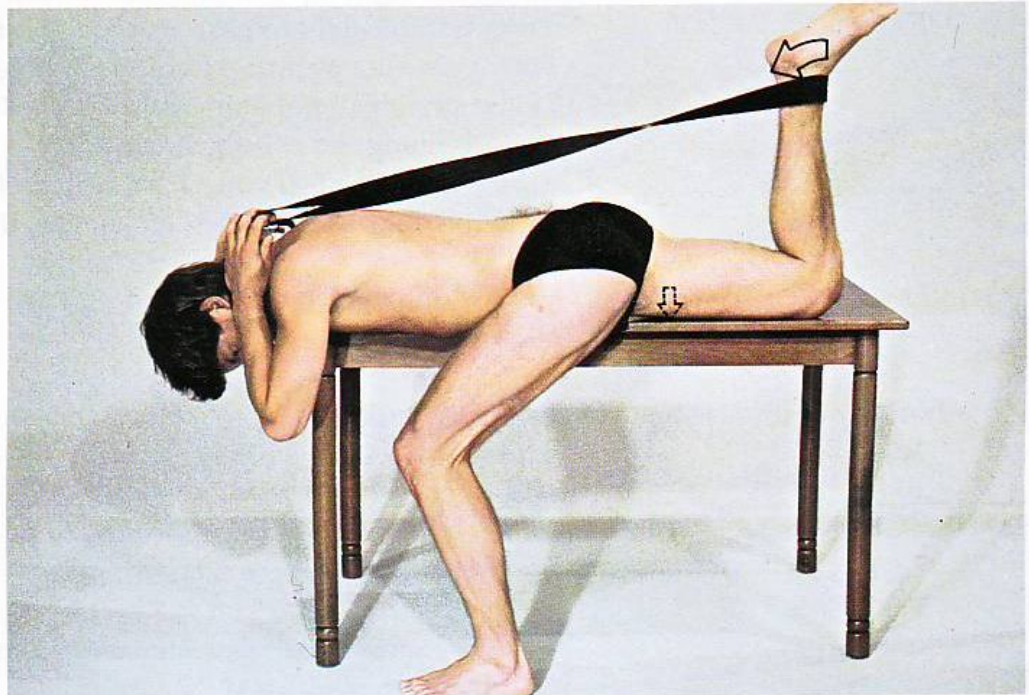


THE HIP 9 A.

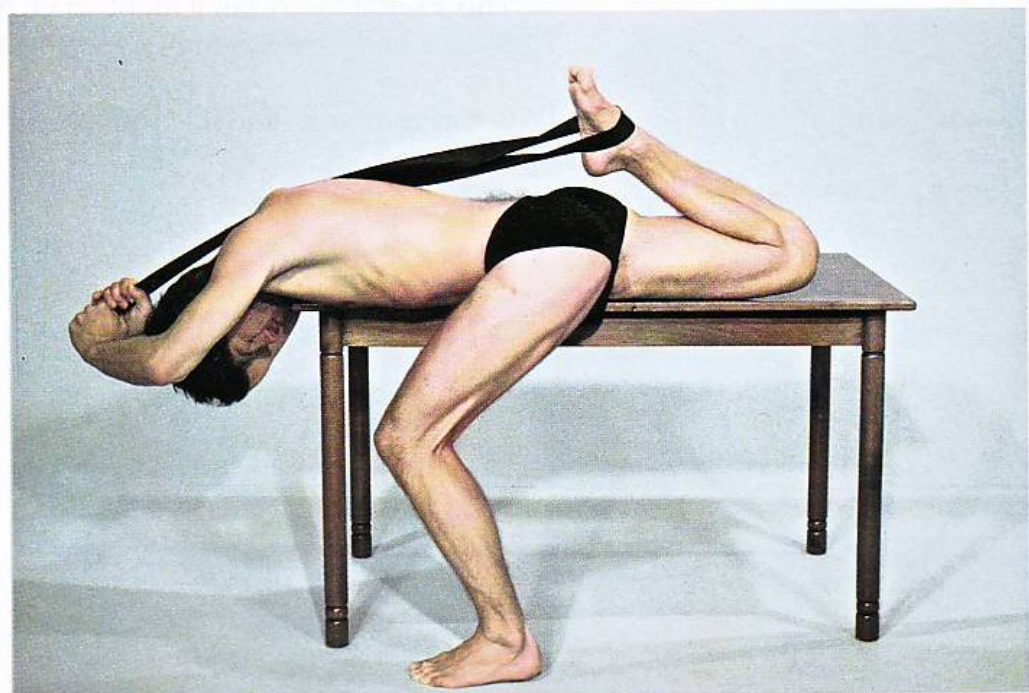
Your difficulty is:	Bending your knee when your hip is straight. Lying face down.
Tight Muscle:	Muscle that bends hip and straightens knee: <i>1 rectus femoris.</i>
Equipment:	Table, bench or other surface of suitable height. Belt, rope, towel, or the like.
Starting Position:	Put belt around right ankle and lie face down on table; head and left leg outside table edge. Place left foot far enough forward to take any arch out of back. Grip ends of belt and pull it over right shoulder. Bend upper body slightly sideways to the left, and bend right knee without turning lower leg either way. Press right hip against table. Draw chin back.
Stretching:	1. Bend knee further by pulling belt, so that stretch is felt along front of right thigh. 2. Press right foot against pull of belt; hold for 5 seconds. 3. Relax and pull belt to draw right foot as close as possible to buttock, while keeping lower back straight. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	None! Stimulating antagonists at back of thigh may cause cramps, and should be avoided.
Common Errors:	* Left foot too far back or up off floor so that lower back is arched. * Upper body bent to the right. * Right hip bent. * Right lower leg turned inward or outward. * Chin jutting out or head bent backward.
Notes:	1. This stretch may be used when muscles are extremely tight and kneeling is painful. 2. Right hand and arm may be used instead of belt when muscles are only slightly tight. 3. If lower leg is turned, knee may be overstrained.
Normal Mobility:	With hip and back straight, you should be able to pull your heel up to touch the buttock.



Starting Position:

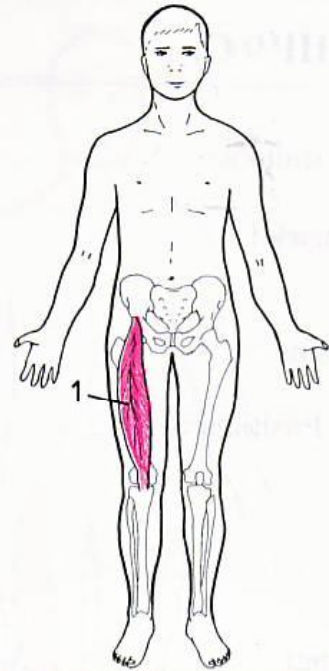
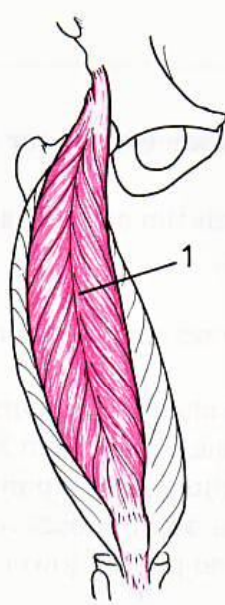


Stretching:

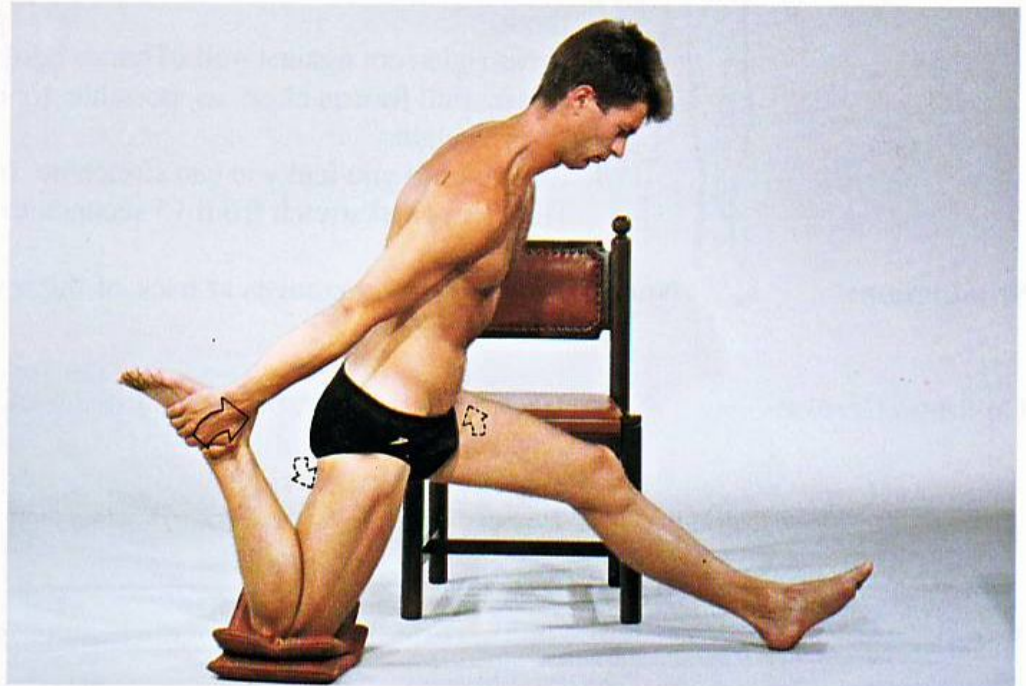


THE HIP 9 B.

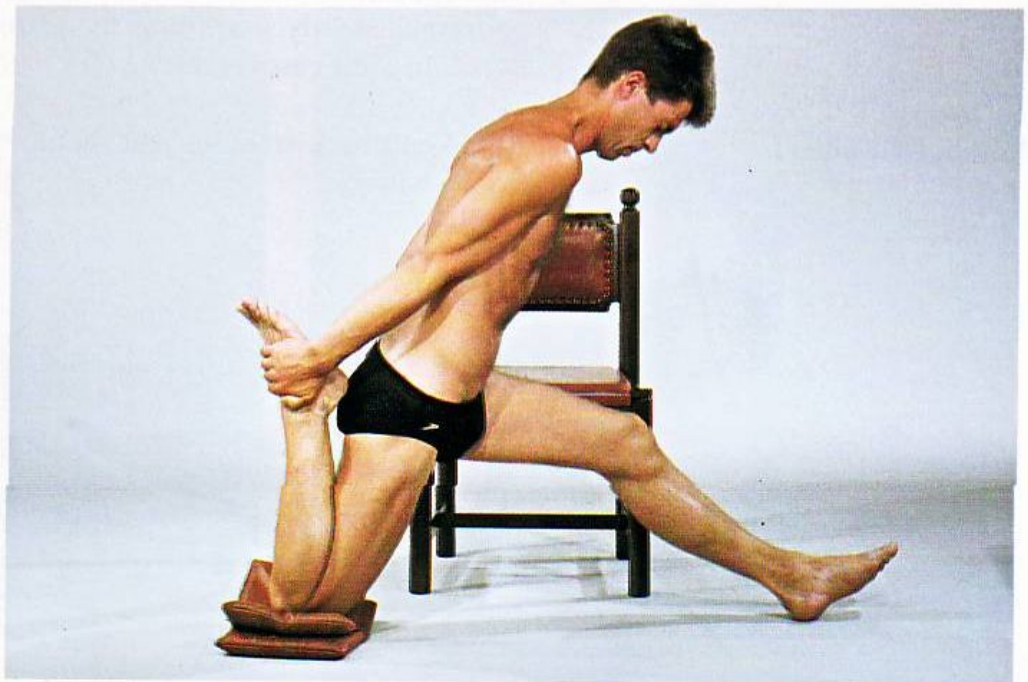
Your difficulty is:	Bending your knee when your hip is straight. Kneeling.
Tight Muscle:	Muscle that bends hip and straightens knee: <i>1 rectus femoris.</i>
Equipment:	Chair, stool, other suitable support. Cushion or other soft knee pad.
Starting Position:	Place right knee on cushion. Put left foot on floor in front; straighten left knee. Use left hand on chair to take weight off lower back and knee, and to aid balance. Reach back and grip right ankle with right hand; don't turn pelvis right, and don't arch your back. Tilt pelvis backward ('pull tail between your legs') and pull lower belly up toward navel.
Stretching:	1. Straighten right hip and pull foot toward buttock so that stretch is felt along front of right thigh. 2. Press right foot against pull of hand; hold for 5 seconds. 3. Relax; straighten right hip and pull foot as close as possible to buttock, while keeping lower back straight. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	None! Stimulating antagonists at back of thigh may cause cramps, and should be avoided.
Common Errors:	* Lower back arched. * Right hip not straightened. * Pelvis turned to the right. * Lower back bent sideways. * Too much body weight on right knee.
Notes:	1. This exercise stretches muscle maximally. Use when muscle is only slightly tightened. 2. This exercise may put a lot of strain on knee. 3. If knee hurts, exercise 9A is recommended instead.
Normal Mobility:	With hip and back straight, you should be able to pull your heel up to touch the buttock.



Starting Position:

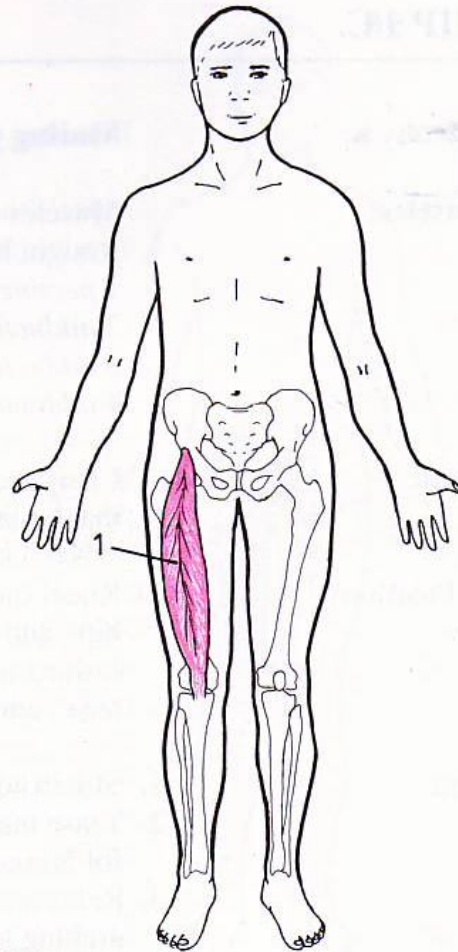
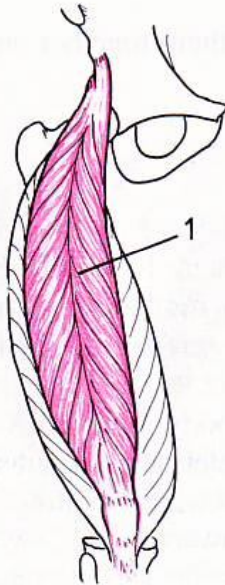


Stretching:

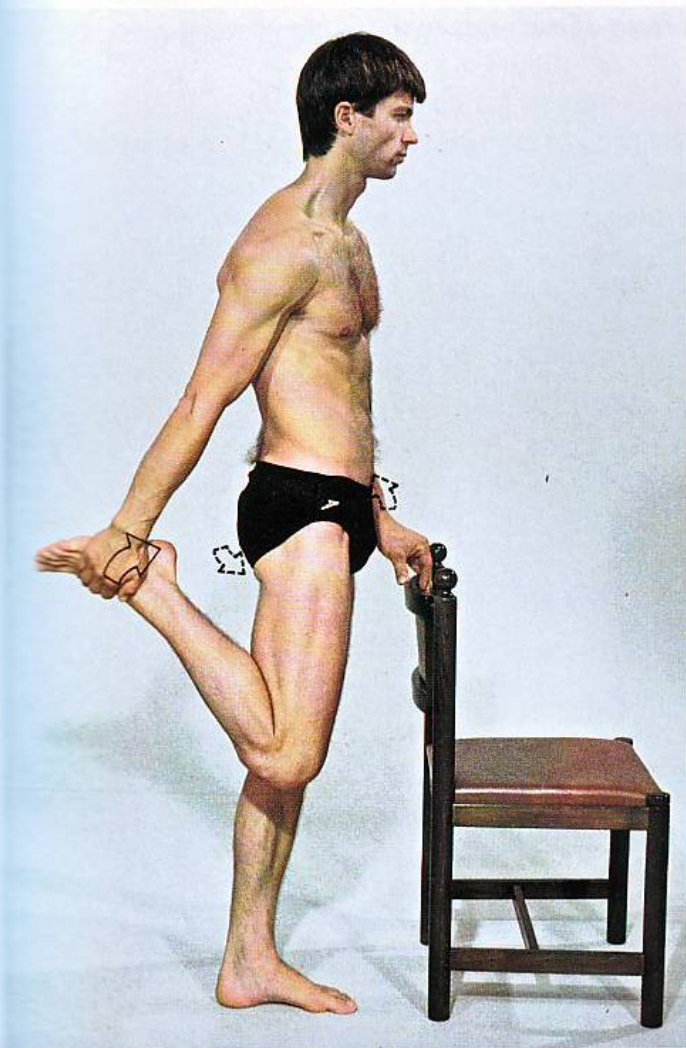


THE HIP 9 C.

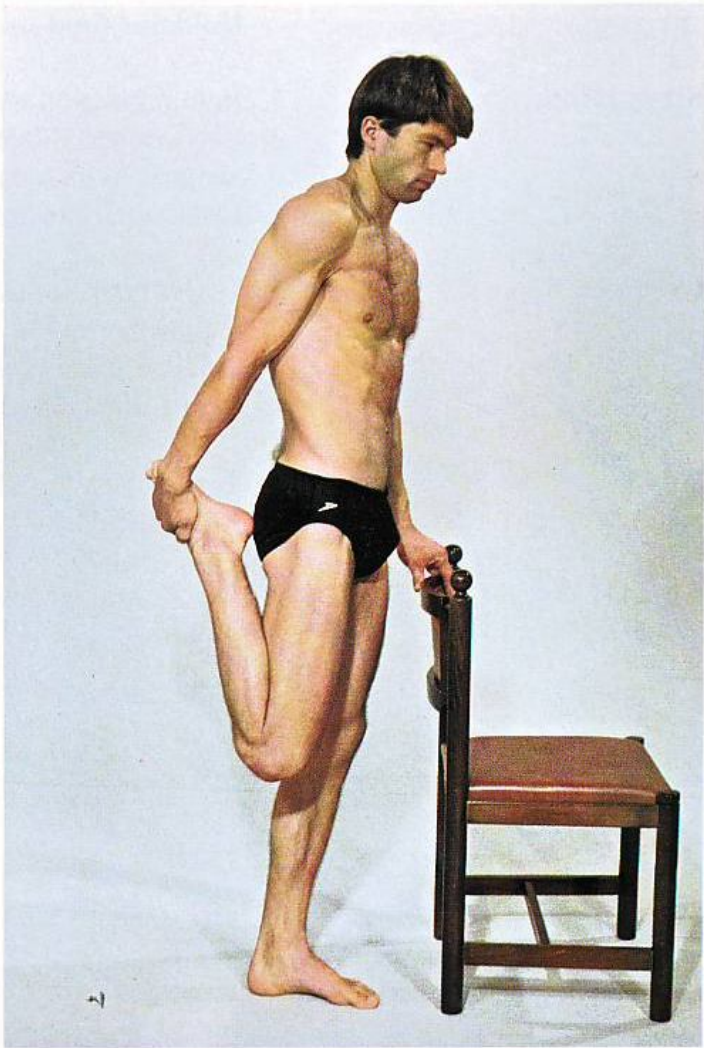
Your difficulty is:	Bending your knee when your hip is straight. Standing up.
Tight Muscle:	Muscle that bends hip and straightens knee: <i>1 rectus femoris.</i>
Equipment:	Chair back or other support at hand height.
Starting Position:	Put left hand on chair for support. Bend upper body sideways to the right and grip right ankle with right hand. Straighten back, left knee and left hip. Then straighten right hip by moving right thigh as far backward as possible without arching back – that is, tilt pelvis back by 'pulling tail between legs' and pulling lower belly up toward navel.
Stretching:	1. Pull right foot toward buttock so that stretch is felt along front of right thigh. 2. Press right foot against pull of hand; hold for 5 seconds. 3. Relax; pull foot as close as possible to buttock, while keeping lower back straight. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	None! Stimulating antagonists at back of thigh may cause cramps, and should be avoided.
Common Errors:	* Lower back arched; pelvis not tilted backward. * Right hip not straight. * Pelvis turned to the right. * Lower back bent sideways. * Not enough hand support.
Notes:	1. This exercise may be used when muscle is moderately or extremely tight. 2. This exercise is almost never done right. To be effective, it must be performed strictly according to instructions, down to the smallest detail. In most cases, exercises 9A or 9B are recommended instead.
Normal Mobility:	With hip and back straight, you should be able to pull your heel up to touch the buttock.



Starting Position:



Stretching:



THE HIP 10.

Your difficulty is:

Moving your legs apart with hips straight and legs turned inward.

Tight Muscles:

Muscles that bend legs, move them together and turn them outward at straight hip:

- 1 *pectineus*
- 2 *adductor brevis*
- 3 *adductor longus*
- 4 *adductor magnus*.

Equipment:

Chair back or other suitable support. Smooth cushions or other soft pads that let knees slide comfortably on floor.

Starting Position:

Kneel on cushions and steady body with hands on chair back. Keeping hips and back straight, move feet as far apart as possible to turn legs inward at hips. Tilt pelvis backward, 'pulling your tail between your legs', and pull lower belly up toward navel.

Stretching:

1. Slide knees apart so that stretch is felt in groin and inner sides of thighs.
2. Tense muscles as if to pull knees together (without moving them); hold for 5 seconds.
3. Relax and slide knees apart to limit – maybe a little bit more – without arching lower back.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position and slide knees as far apart as possible.
2. You may also lie on your back or face down, and move legs apart to limit, resisting with hands on outer sides of thighs.
3. Hold either position a few seconds.

Common Errors:

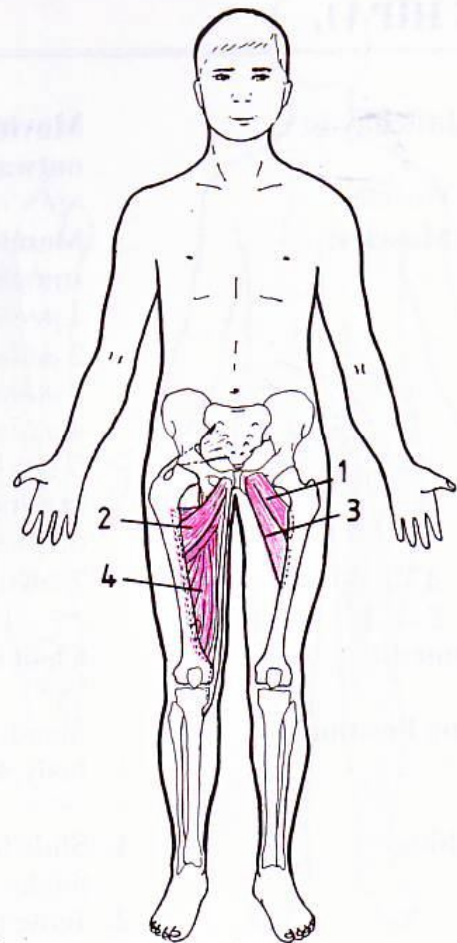
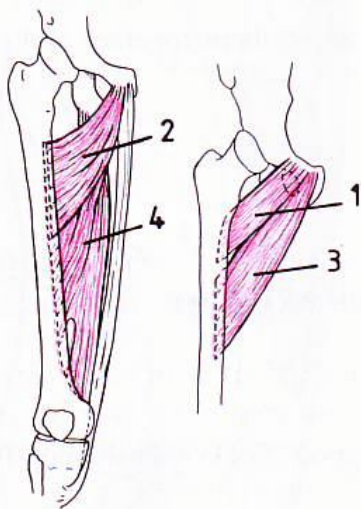
- * Lower back arched.
- * Hips not straight.
- * Pelvis tilted forward.
- * Legs turned outward at hips.

Note:

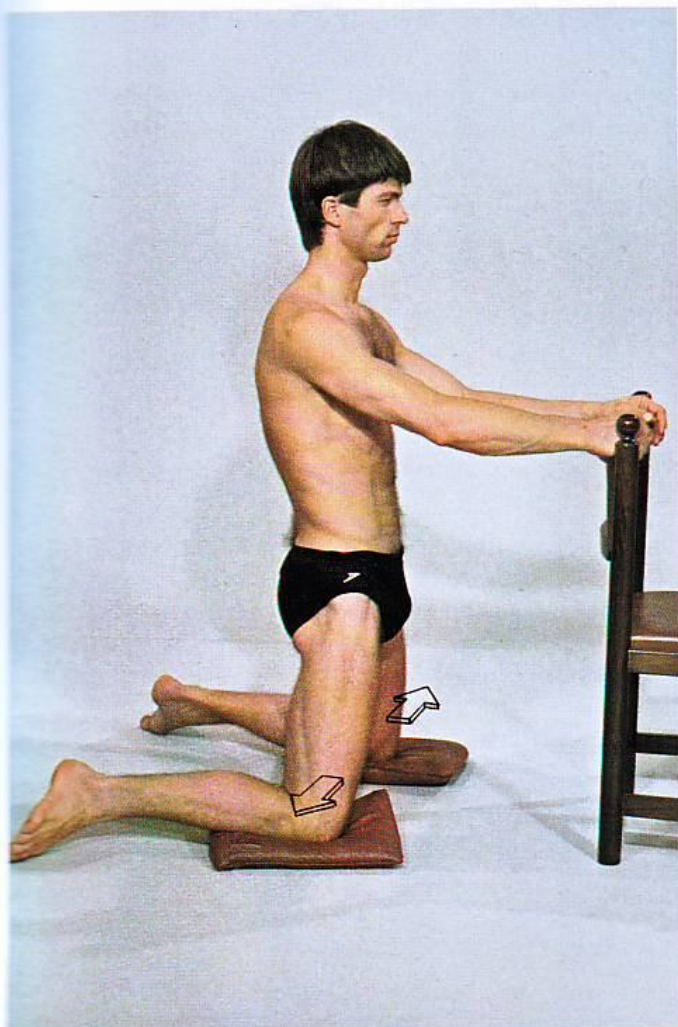
Tensed muscles of belly and buttocks make it easier to keep pelvis tilted backward.

Normal Mobility:

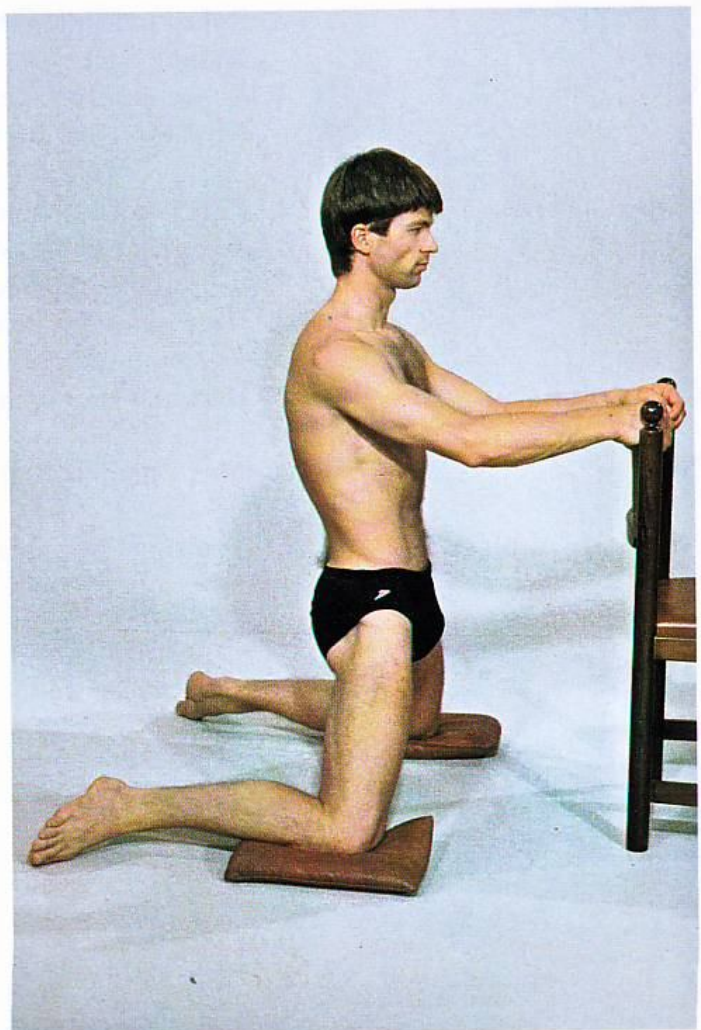
You should be able to get your legs at a right angle to each other.



Starting Position:



Stretching:



THE HIP 11.

Your difficulty is:

Moving your legs apart with hips and knees straight and legs turned outward.

Tight Muscles:

Muscles that bend legs, move them together and turn them inward at straight hip:

- 1 *pectineus*
- 2 *adductor brevis*
- 3 *adductor longus*
- 4 *adductor magnus*
- 5 *gracilis*.

In extreme position, stretch also affects:

- 6 *semitendinosus*
- 7 *semimembranosus*.

Equipment:

Chair or other suitable support. Socks that slide on floor.

Starting Position:

Stand with back straight and legs apart, hands on chair back to steady body, legs turned outward to limit.

Stretching:

1. Slide feet further apart so that stretch is felt in groin and inner sides of thighs.
2. Tense muscles as if to bring legs together, but don't move feet; hold for 5 seconds.
3. Relax and slide feet outward to limit – maybe a little bit more – without arching back.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position and slide knees as far apart as possible.
2. You may also lie on your back and move legs apart to limit, resisting with hands on outer sides of thighs.
3. Hold either position a few seconds.

Common Error:

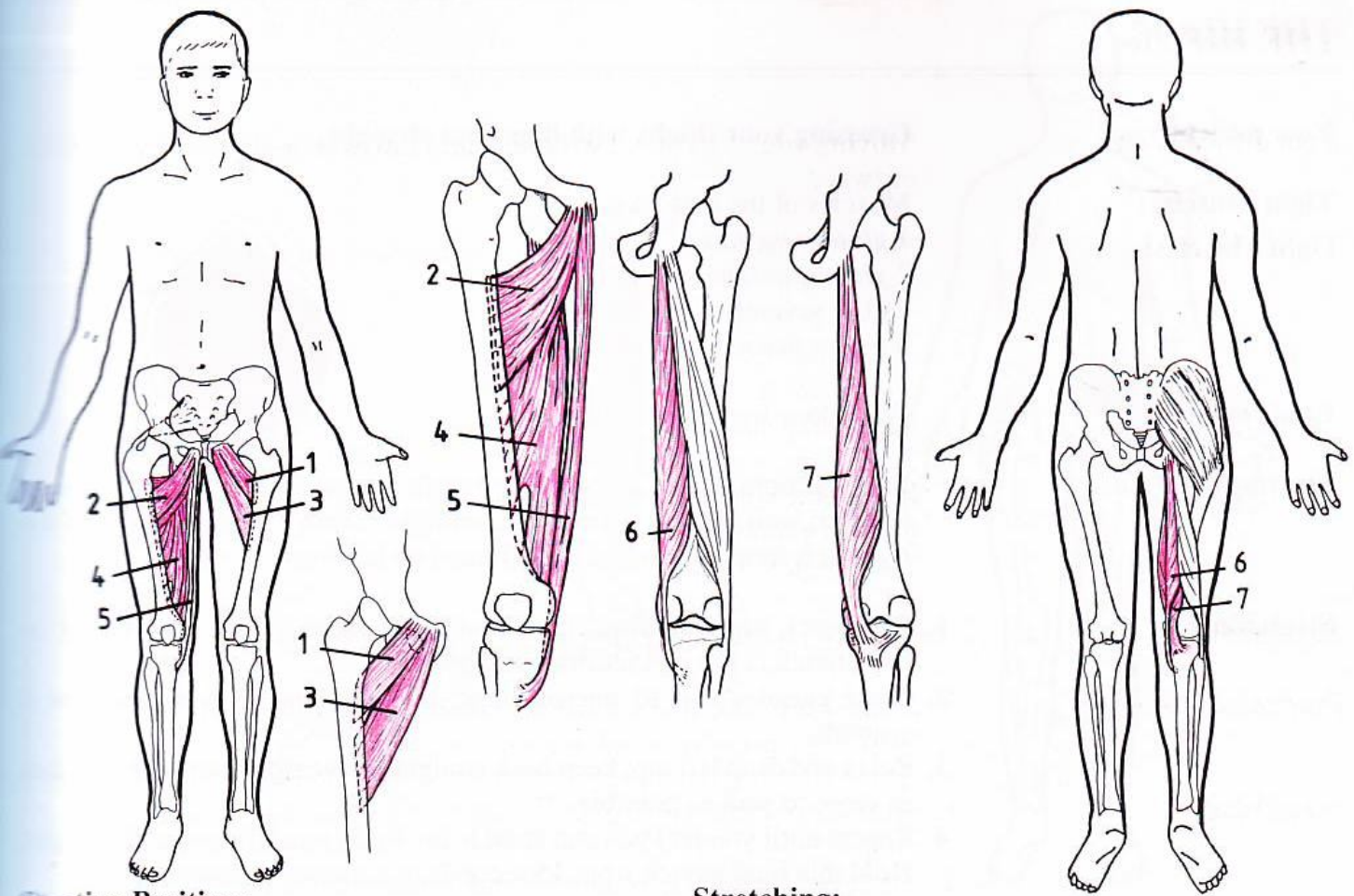
- * Back not held straight.

Note:

This stretch is useful when you want to avoid a kneeling position.

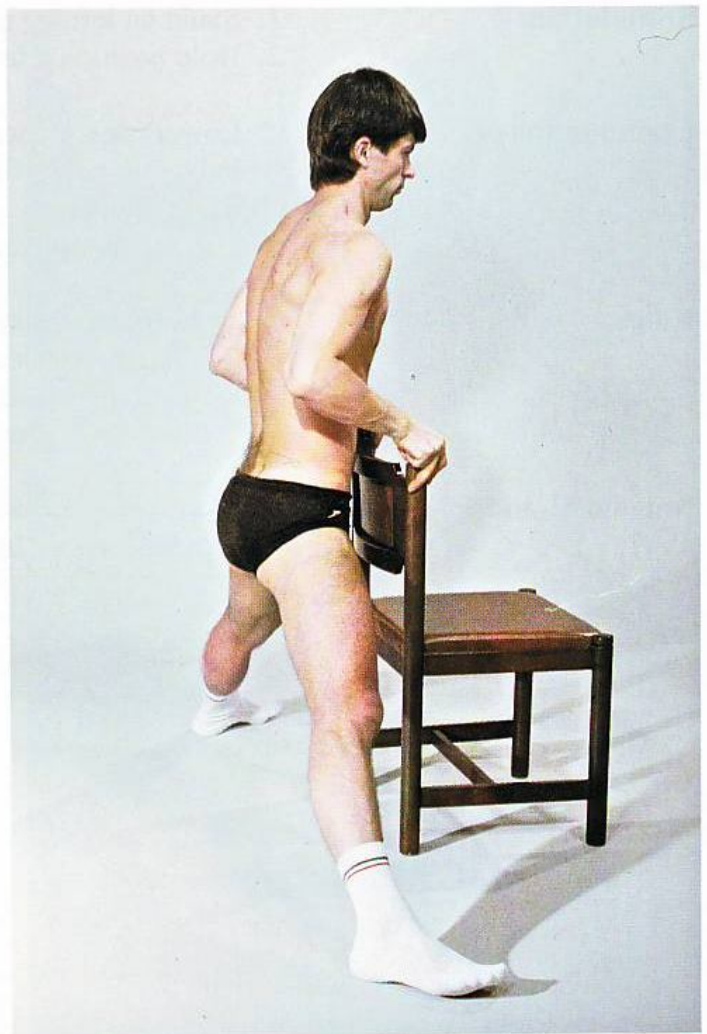
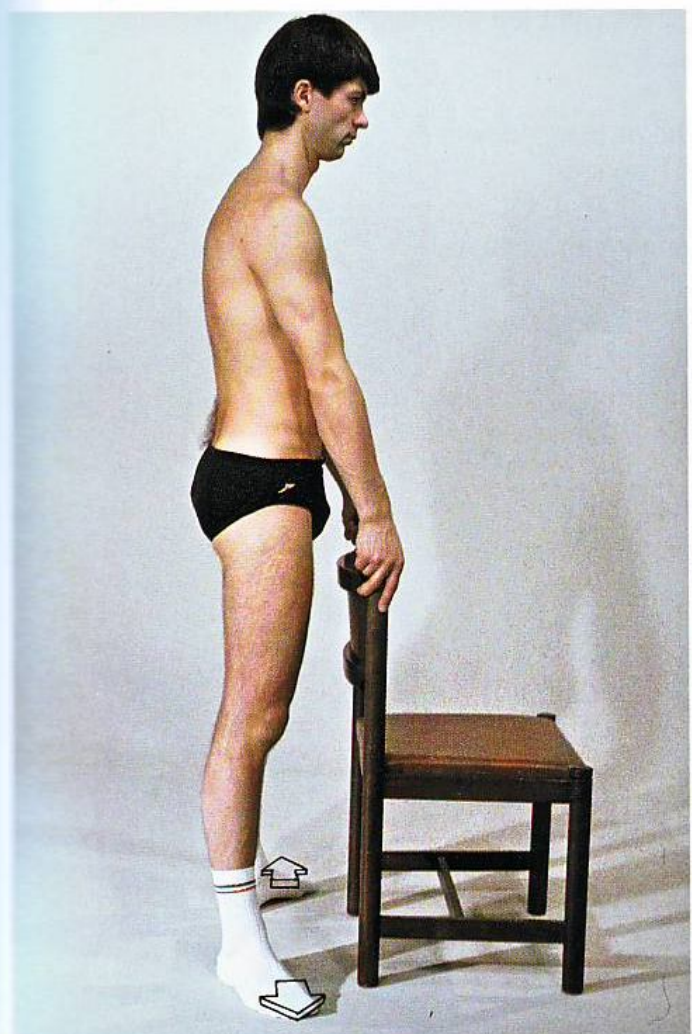
Normal Mobility:

You should be able to stand with your legs at a right angle to each other.



Starting Position:

Stretching:



THE HIP 12.

Your difficulty is:

Crossing your thighs with hips kept straight.

Tight Muscles:

Muscles of the buttocks:

1 *gluteus medius*

2 *gluteus minimus*

and, if severely shortened

3 *tensor fasciae latae*.

Equipment:

Wall, door-frame or the like.

Starting Position:

Stand straight at arm's length from wall, with weight on right foot; right hand on wall, arm horizontal and straight. Cross left leg in front of the right, left foot on floor; place left hand on left hip.

Stretching:

1. Keep back straight; drop left hip and move right hip closer to wall so that stretch is felt on outer side of right hip.
2. Tense muscles as if to uncross legs, but don't move feet; hold for 5 seconds.
3. Relax and drop left hip; keep back straight; move right hip and left foot as close to wall as possible.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Stand on left leg and cross right leg over as far as possible.
2. Hold position a few seconds.

Common Errors:

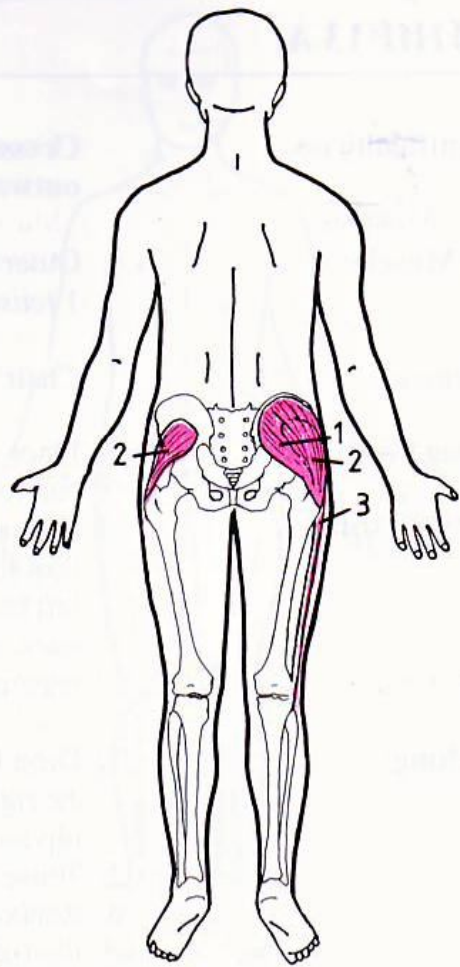
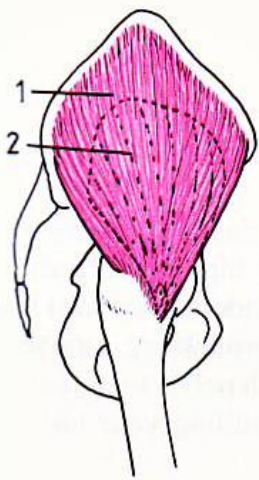
- * Lower back arched and/or bent sideways.
- * Pelvis turned or tilted forward.
- * Right hip bent.
- * Left leg not moved far enough to the right.

Notes:

1. Pelvis and trunk should be a stable unit; move in hips only.
2. Find most effective position by trying various slight forward/backward hip bends and slight inward/outward leg turns, and use a position where stretch is felt the most.

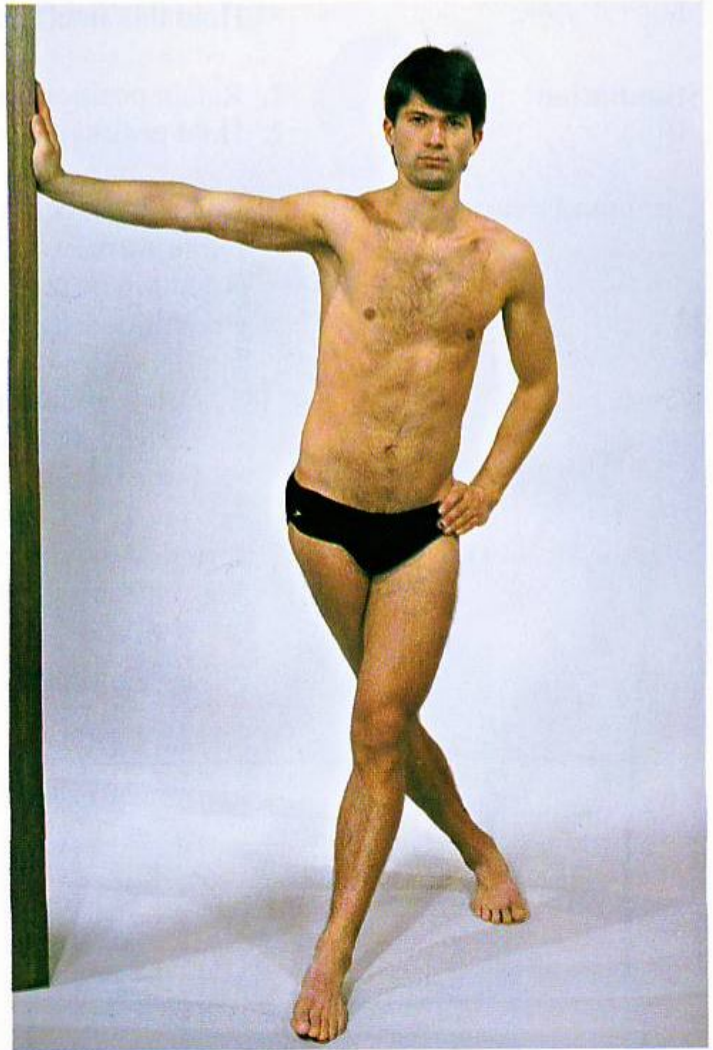
Normal Mobility:

Lying on your back with hips straight, you should be able to cross your legs until upper leg rests on opposite thigh just above the knee.



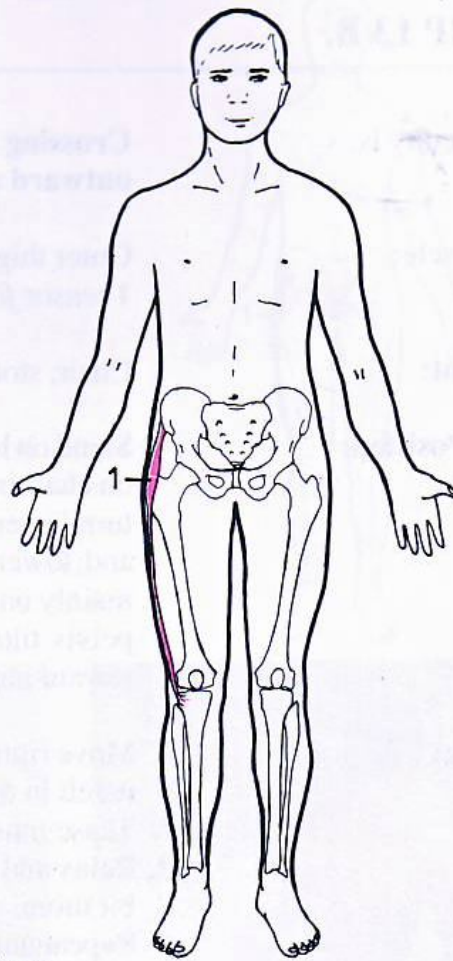
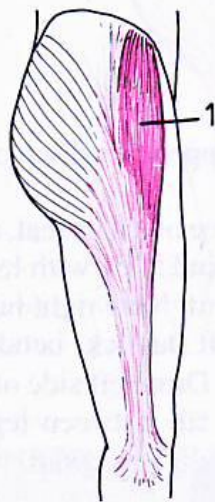
Starting Position:

Stretching:



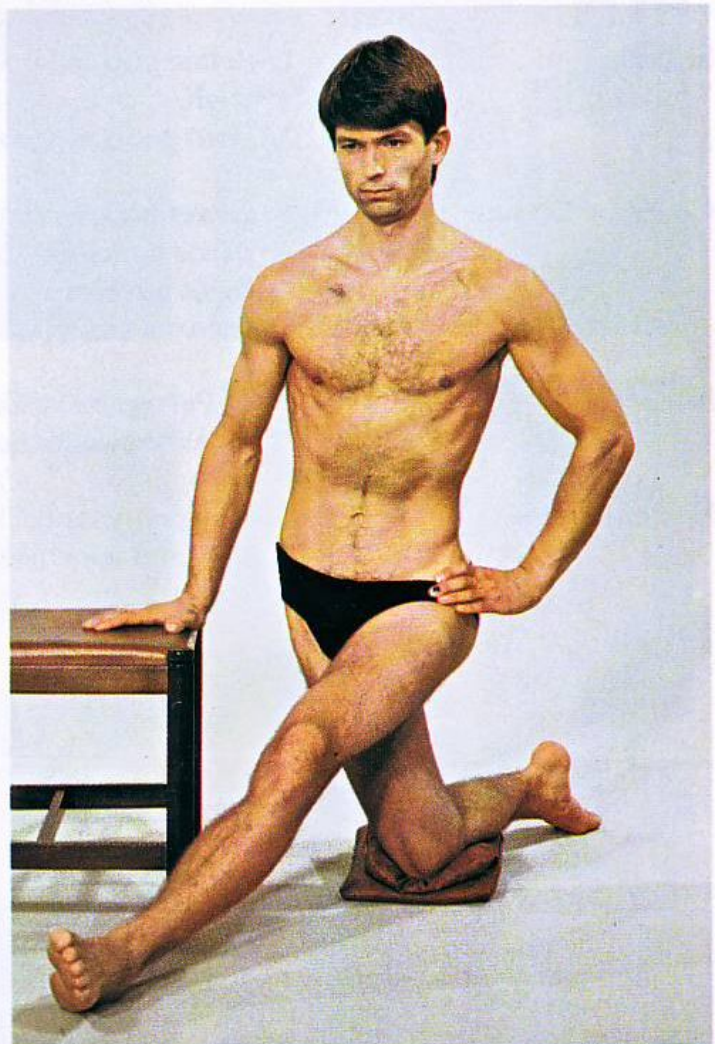
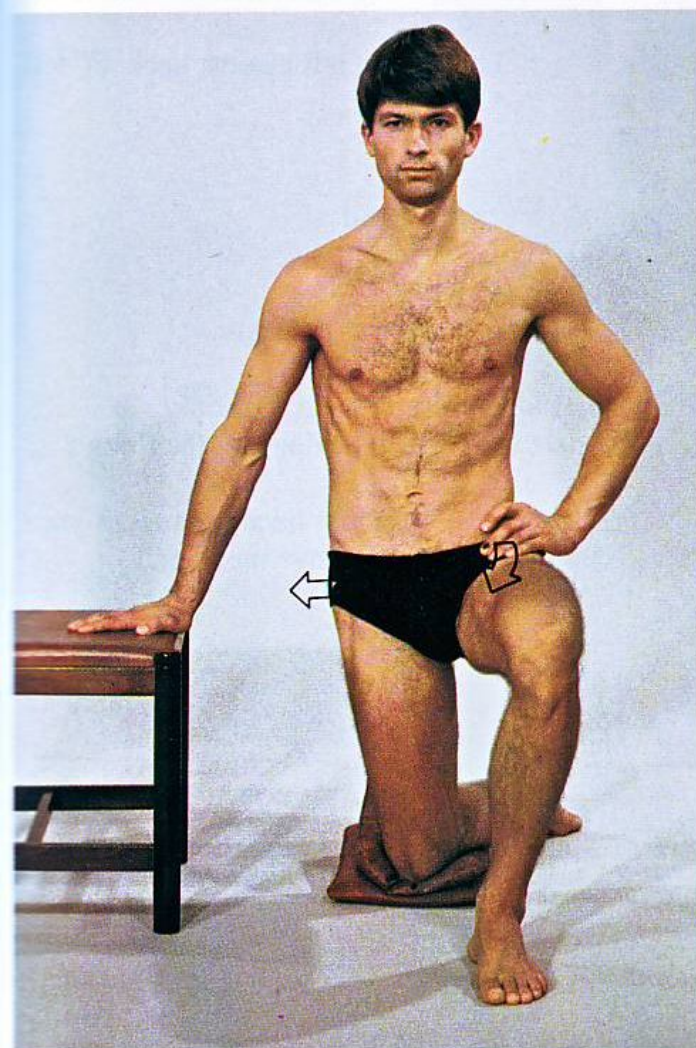
THE HIP 13 A.

Your difficulty is:	Crossing your thighs with hip kept straight while turning your thigh outward and your lower leg inward. Knee bent.
Tight Muscle:	Outer thigh muscle: <i>1 tensor fasciae latae.</i>
Equipment:	Chair, stool or similar support. Cushion or other comfortable knee pad.
Starting Position:	Place right hand on chair seat and right knee on cushion. Swing right foot and lower leg inward to limit – this makes right hip turn outward. (Right knee may be bent further if you put a cushion under right foot.) Slide left foot forward on floor. Bend left hip and knee; turn left leg outward. Place left hand on left hip, straighten right hip and push pelvis to the right. Keep back straight and pelvis tilted backward by 'pulling your tail between legs' and pulling lower belly up toward navel.
Stretching:	1. Drop left hip by moving left leg forward and right; pelvis now moves to the right and slightly forward, so that stretch is felt in outer side of right hip and thigh. 2. Tense muscles as if to open legs; hold for 5 seconds. 3. Relax and drop left hip further by moving left leg further forward and to the right, pelvis moving to the right and slightly forward. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position and cross legs as far as possible. 2. Hold position a few seconds.
Common Errors:	* Lower back bent to the left and arched. * Pelvis turned or tilted forward. * Right hip bent. * Pelvis not dropped on left side and not moved to the right.
Notes:	1. Pelvis and trunk should be a stable unit; move in hips only. 2. If kneeling is uncomfortable, this exercise may be done standing up. See exercise 13 B.
Normal Mobility:	Lying on your back with hips straight, you should be able to cross your legs until upper leg rests on opposite thigh just above the knee.



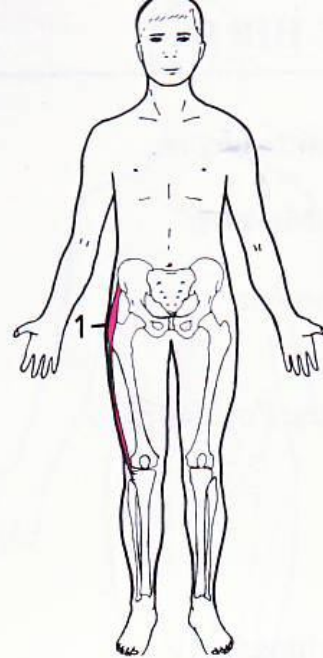
Starting Position:

Stretching:

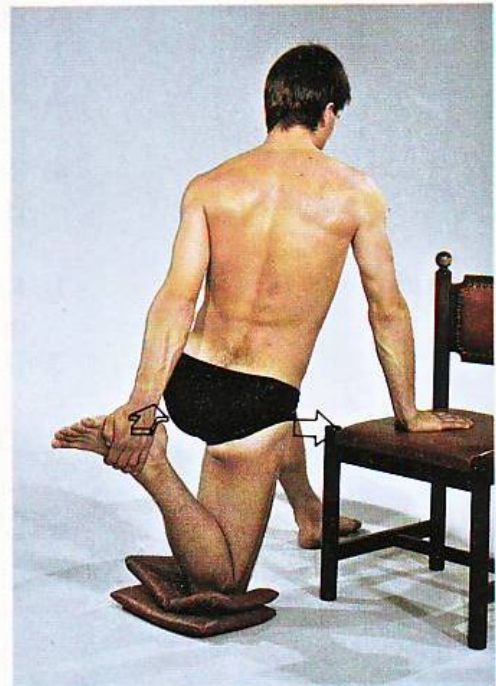
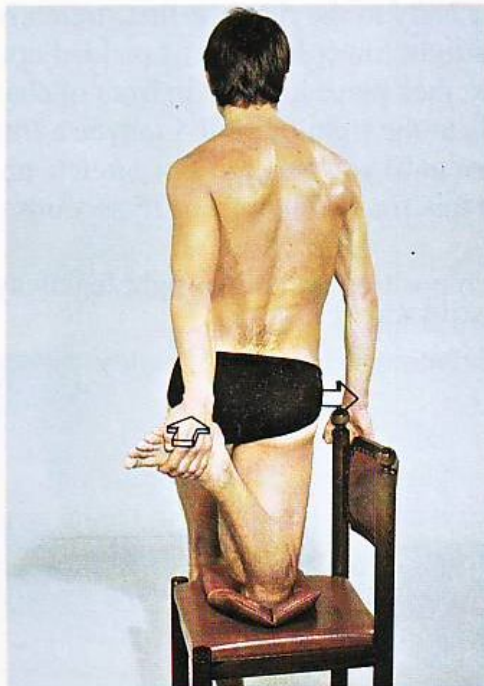


THE HIP 13 B.

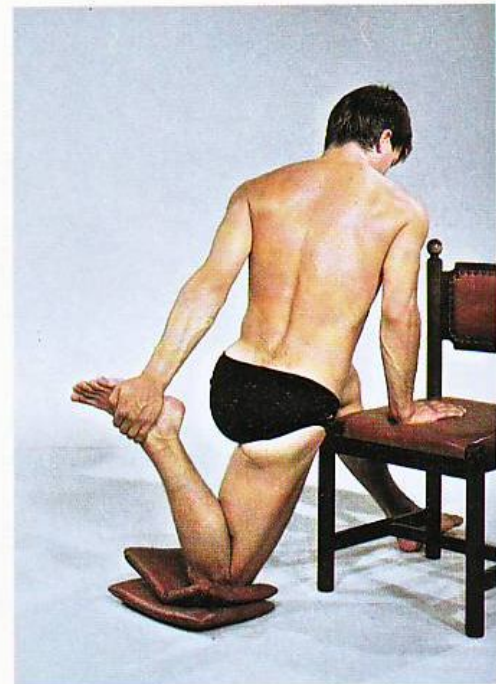
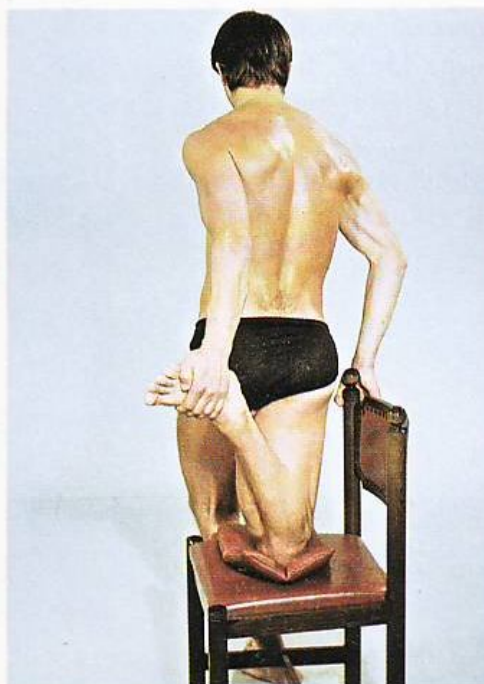
Your difficulty is:	Crossing your thighs with hip kept straight while turning your thigh outward and your lower leg inward. Knee bent all the way.
Tight Muscle:	Outer thigh muscle: <i>1 tensor fasciae latae.</i>
Equipment:	Chair, stool or similar support. Cushion or other comfortable knee pad.
Starting Position:	Stand on left leg, right knee on chair seat, and steady body with right hand on chair back. Reach behind body with left hand and grasp right foot and turn lower right leg inward. Now right hip turns outward. Pull right foot and lower leg toward left buttock, bending knee so that stretch is felt mainly on outside of hip. Drop left side of pelvis. Keep back straight and pelvis tilted by 'pulling tail between legs' and pulling lower belly up toward navel.
Stretching:	1. Move right hip forward and to the right and drop left hip so that stretch is felt in outer side of right hip and thigh. 2. Tense muscles as if to open legs; hold for 5 seconds. 3. Relax and move right hip forward and to the right to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip and position; press right knee to the left against back of left thigh. 2. Hold position a few seconds.
Common Errors:	* Lower back bent sideways to the left and arched. * Pelvis turned or tilted forward. * Right hip bent. * Pelvis not dropped on left side and not moved to the right.
Notes:	1. Pelvis and trunk should be a stable unit; move in hips only. 2. As shown to the right, this stretch may also be done on the floor.
Normal Mobility:	Lying on your back with hips straight, you should be able to cross your legs until upper leg rests on opposite thigh just above the knee.



Starting Position:



Stretching:



THE HIP 14.

Your difficulty is:

Turning your legs inward at hip.

Tight Muscles:

1 Muscles that turn legs outward and bend them at hip.

Equipment:

Strong, stable chair or bench with partly open back, or a similar vertical support, padded for comfort.

Starting Position:

Place right knee and shin on chair seat. 'Lock' ankle against inside of chair-back upright, foot over rear edge of seat. Keep back straight and tilt pelvis backward by 'pulling tail between legs' and pulling lower belly up toward navel. Straighten right hip and put right hand on chair back for support.

Stretching:

1. Place left foot in front of chair, pointing to the right, and turn pelvis and upper body to the right, so that stretch is felt in right hip.
2. Press right lower leg against padded upright; hold for 5 seconds.
3. Relax, then place left foot in front of chair, pointing to the right, and turn pelvis to the right to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position and move right leg away from chair upright to turn leg inward at hip to limit.
2. Hold that position a few seconds.

Common Errors:

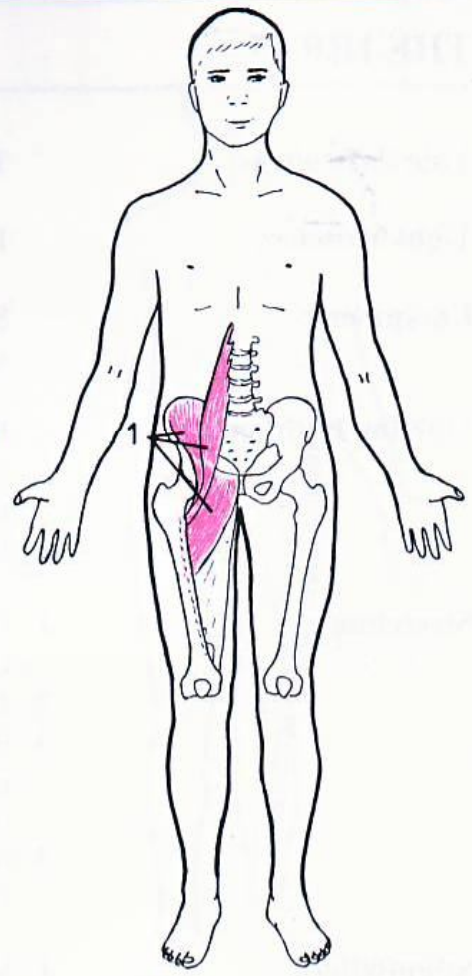
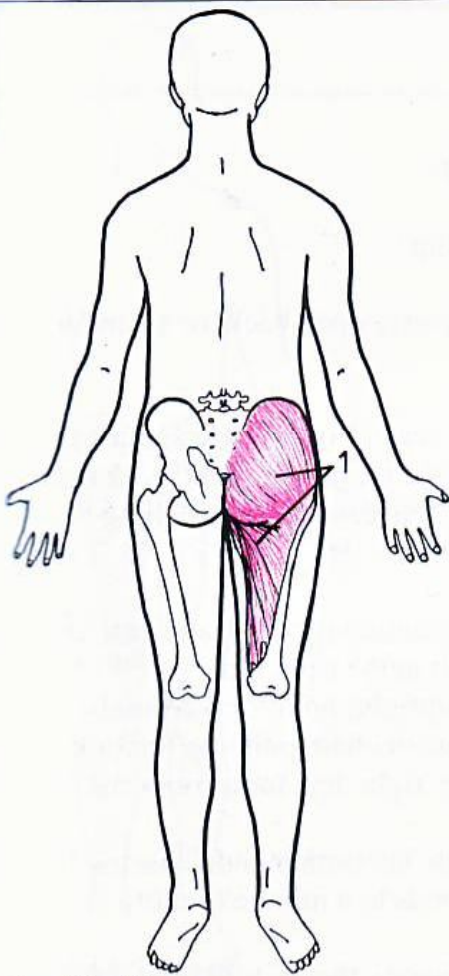
- * Chair slides on floor.
- * Lower back bent sideways or arched.
- * Lower back and pelvis not moved as a unit.

Notes:

1. If you do this exercise wrong, you may overstrain your knee. If you feel pain on inner side of right knee, stop stretching immediately, and check your stretching technique with your physical therapist or instructor.
2. Forceful stretching may cause hip pain; if so, stretch with less force over a longer time.
3. This stretch may also be done with hip bent.

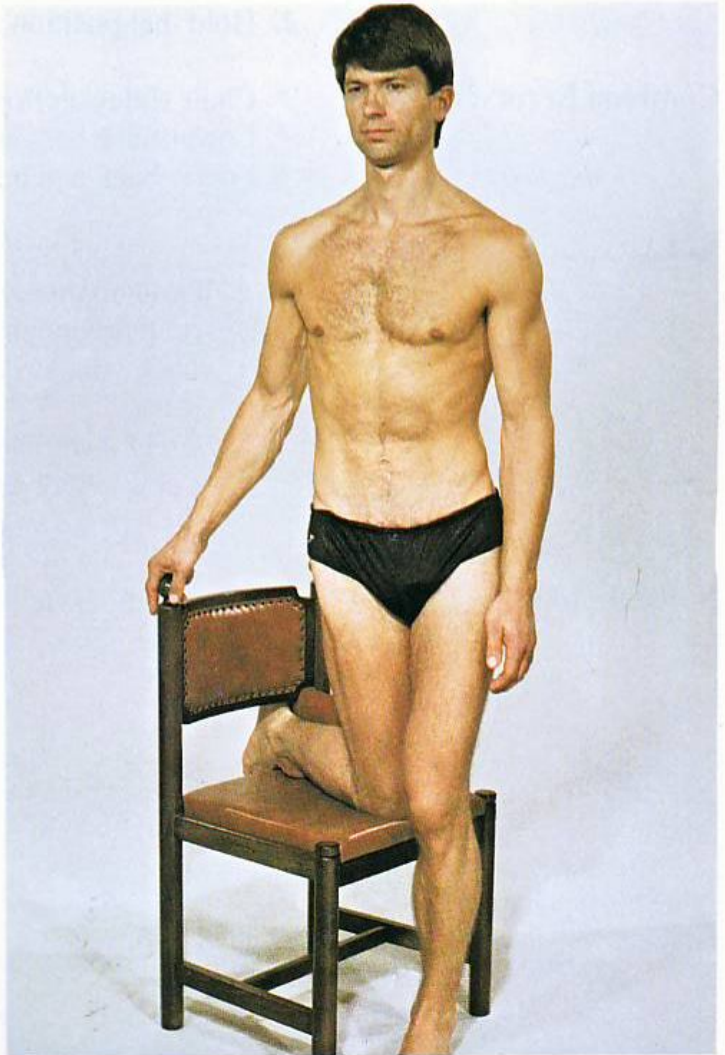
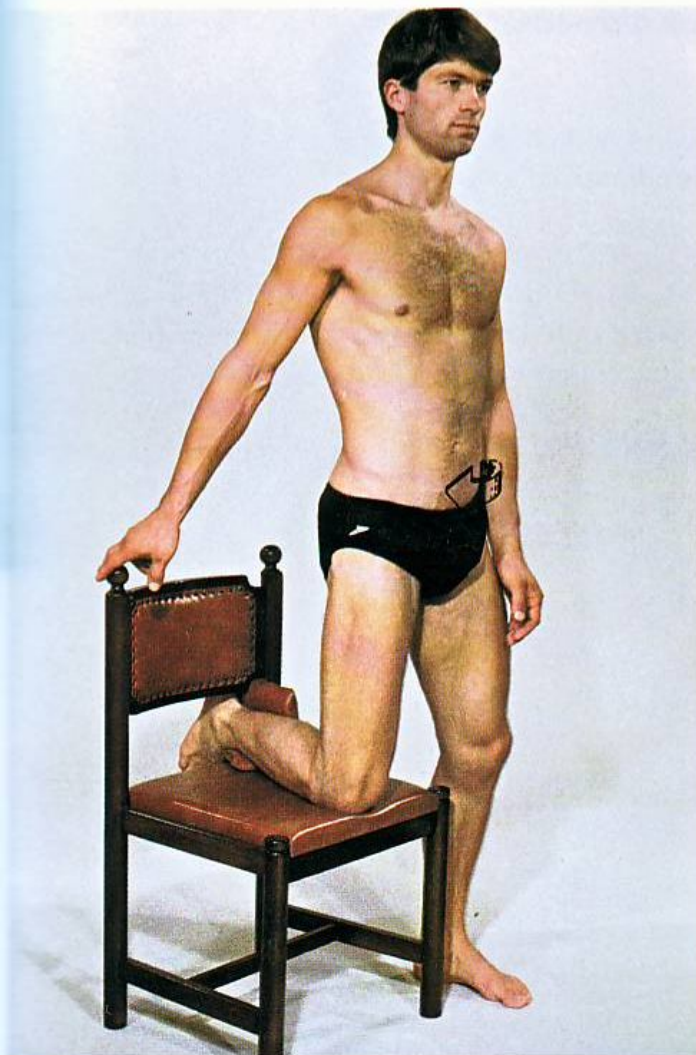
Normal Mobility:

You should be able to turn legs about 45 degrees inward at hip.



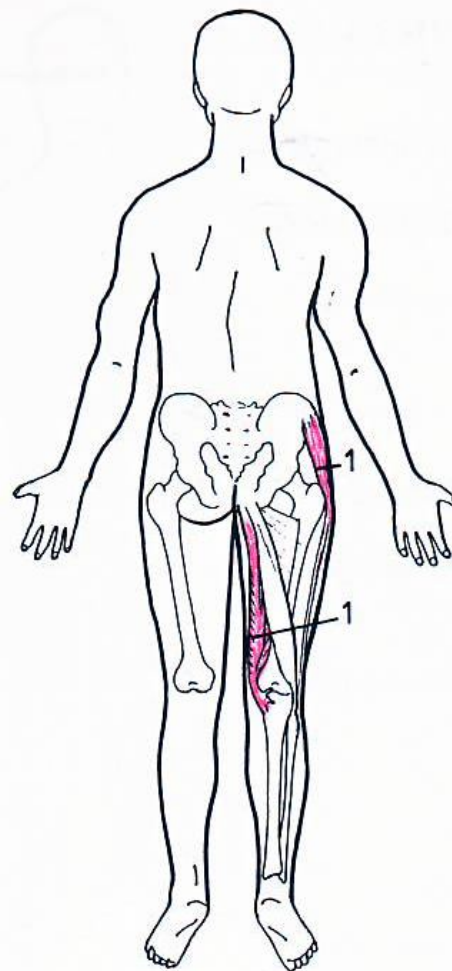
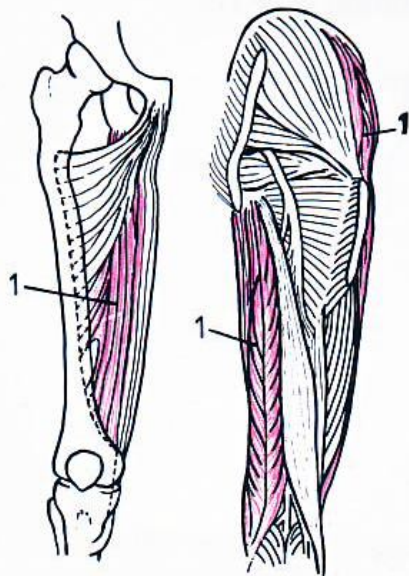
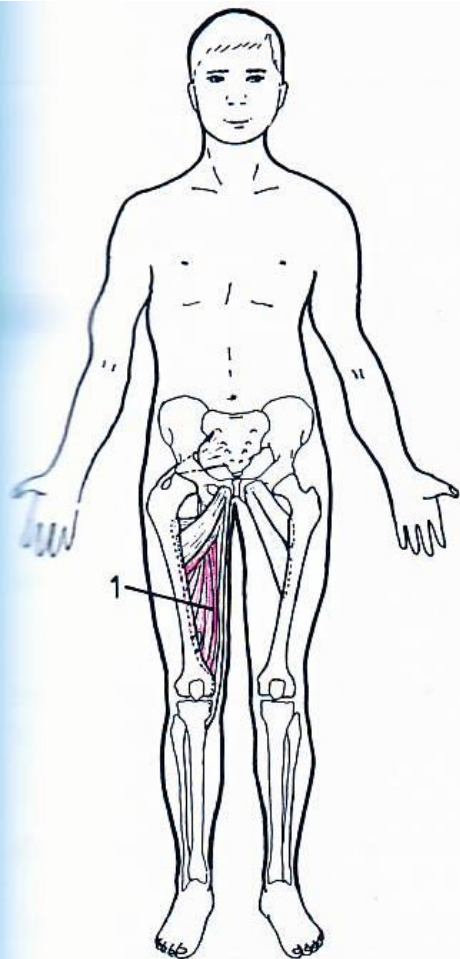
Starting Position:

Stretching:



THE HIP 15.

Your difficulty is:	Turning your legs outward at hip.
Tight Muscles:	1 Muscles that turn legs inward at hip.
Equipment:	Strong, stable chair or bench with partly open back, or a similar vertical support, padded for comfort.
Starting Position:	Place right knee and shin on chair seat. 'Lock' ankle against outside of chair-back upright, keeping foot over edge of seat. Keep back straight and tilt pelvis backward by 'pulling tail between legs' and pulling lower belly up toward navel. Straighten right hip.
Stretching:	1. Place left foot by left side of chair, pointing forward, and turn pelvis and trunk to the left so that stretch is felt in the right hip. 2. Press right lower leg against chair upright; hold for 5 seconds. 3. Relax, then place left foot by left side of chair, pointing forward, and turn pelvis and trunk to the left so that right leg turns outward to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Move right foot toward back of left knee – that is, turn right thigh outward to limit. 2. Hold that position a few seconds.
Common Errors:	* Chair slides on floor. * Lower back bent sideways or arched. * Lower back and pelvis not moved as a unit.
Notes:	1. If you do this exercise wrong, you may overstrain your knee. If you feel pain on inner side of right knee, stop stretching immediately, and check your stretching technique with your physical therapist or instructor. 2. Forceful stretching may cause hip pain; if so, stretch with less force over a longer time. 3. This stretch may also be done with hip bent.
Normal Mobility:	You should be able to turn legs about 45 degrees outward at hips.



Starting Position:

Stretching:



THE KNEE 1.

Your difficulty is:

Bending your knee.

Tight Muscles:

Three of the four muscles of the compound muscle *quadriceps femoris* mostly

1 *vastus lateralis* but also:

2 *vastus intermedius* and

3 *vastus medialis*.

4 *Rectus femoris* is not stretched.

Equipment:

Chair with padded seat and cushion to protect knee and shin.

Starting Position:

Place right knee and shin on chair seat with foot over edge, left foot on floor, right hand on chair back.

Stretching:

1. To protect knee joint, bend right knee by pressing along thigh toward knee. Sit down toward right heel so that stretch is felt in front side of right thigh.
2. Press right lower leg against chair seat; hold for 5 seconds.
3. Relax; press right thigh toward knee; sit down to limit – maybe a little more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

None!

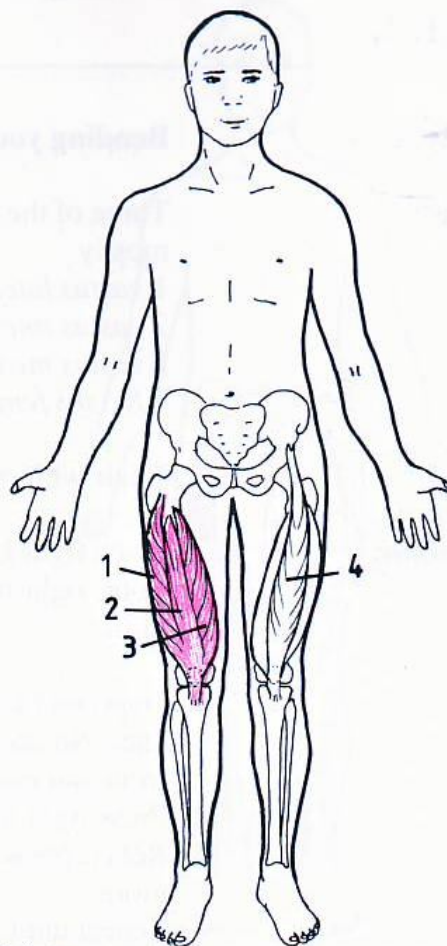
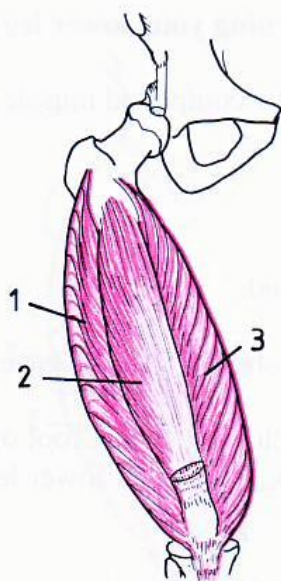
Muscles of opposite function – antagonists, in this case the back of your thigh – must not be stimulated, as this can cause cramps.

Common Errors:

- * Knee not held down to chair seat.
- * Thigh not pressed toward knee, so that knee takes too much strain.

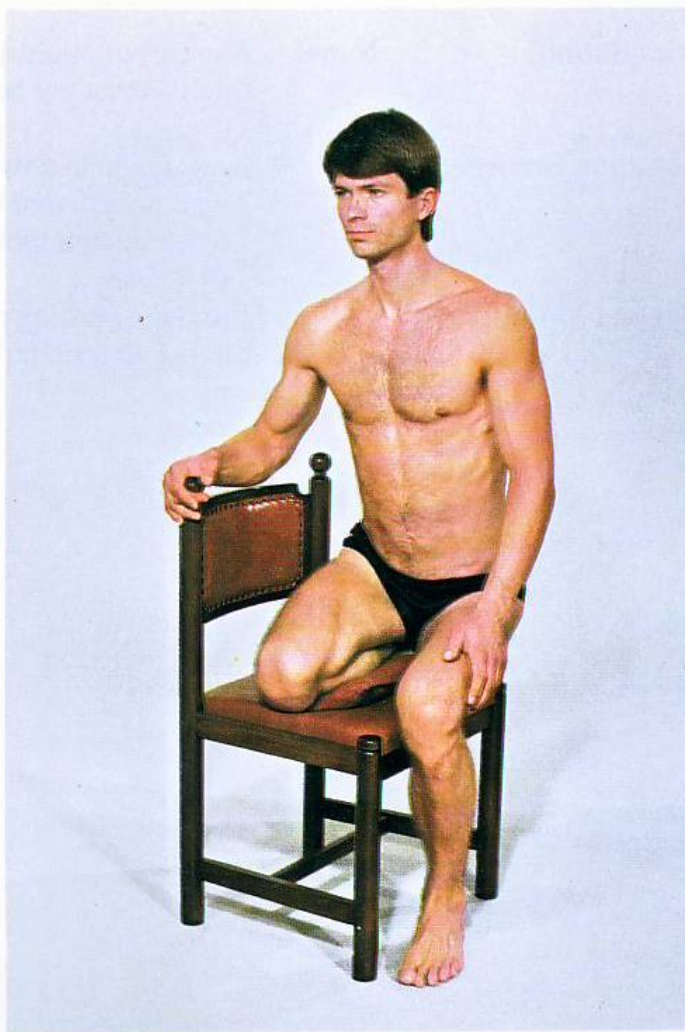
Normal Mobility:

From this starting position you should have no difficulty touching right buttock to heel.



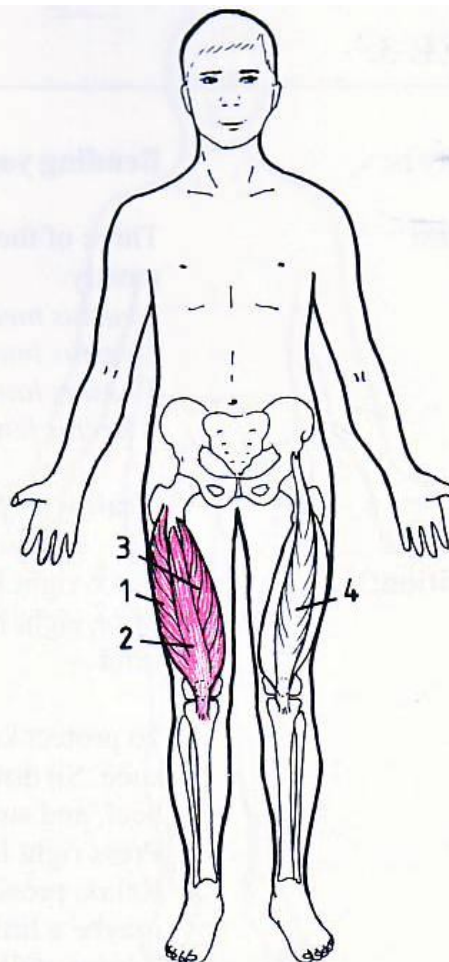
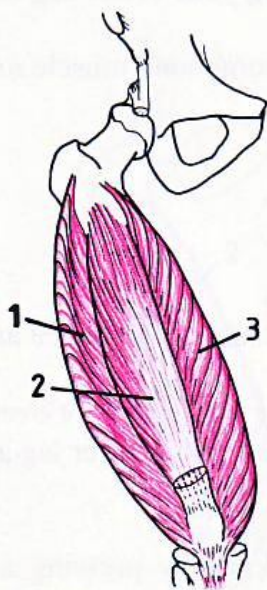
Starting Position:

Stretching:



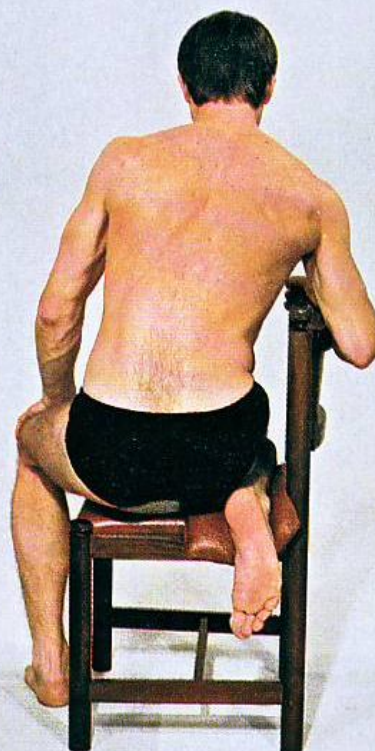
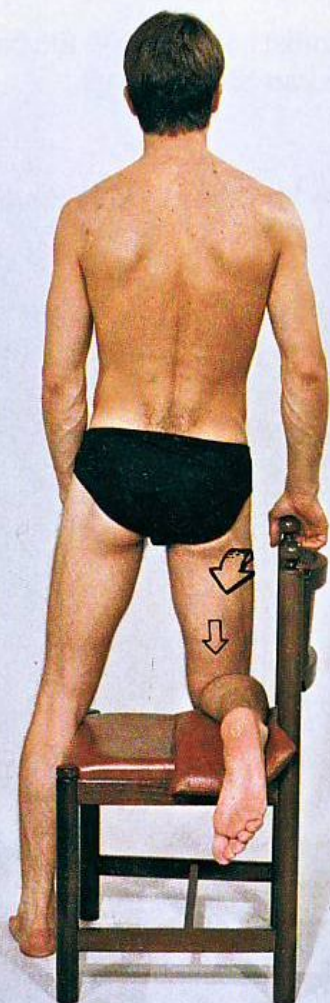
THE KNEE 2.

Your difficulty is:	Bending your knee while turning your lower leg inward.
Tight Muscles:	Three of the four muscles of the compound muscle <i>quadriceps femoris</i> : mostly 1 <i>vastus lateralis</i> but also 2 <i>vastus intermedius</i> and 3 <i>vastus medialis</i> . 4 <i>Rectus femoris</i> is not stretched.
Equipment:	Chair with padded seat and cushion to protect knee and shin.
Starting Position:	Place right knee and shin on chair seat with foot over edge, left foot on floor, right hand on chair back. Turn right lower leg and foot inward to limit.
Stretching:	1. To protect knee joint, bend right knee by pressing along thigh toward knee. Sit down toward inner side of right heel so that stretch is felt in front and outside of right thigh. 2. Press right lower leg against chair seat; hold for 5 seconds. 3. Relax; press right thigh toward knee; sit down to limit – maybe a little more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	None! Muscles of opposite function – antagonists, in this case the back of your thigh – must not be stimulated, as this can cause cramps.
Common Errors:	* Knee not held down to chair seat. * Thigh not pressed toward knee, so that knee takes too much strain. * Lower leg and foot turned outward.
Normal Mobility:	From this starting position, you should be able to touch outer side of right buttock to heel, unless flesh on the back of your thigh and calf gets in the way.



Starting Position:

Stretching:



THE KNEE 3.

Your difficulty is:

Bending your knee while turning your lower leg outward.

Tight Muscles:

Three of the four muscles of the compound muscle *quadriceps femoris*, mostly

1 *vastus medialis* but also

2 *vastus intermedius* and

3 *vastus lateralis*.

4 *Rectus femoris* is not stretched.

Equipment:

Chair with padded seat and cushion to protect knee and shin.

Starting Position:

Place right knee and shin on chair seat with foot over edge, left foot on floor, right hand on chair back. Turn right lower leg and foot outward to limit.

Stretching:

1. To protect knee joint, bend right knee by pressing along thigh toward knee. Sit down and to the right so that right buttock is to the right of heel, and stretch is felt in front and inner side of right thigh.
2. Press right lower leg against chair seat; hold for 5 seconds.
3. Relax; press right thigh toward knee; sit down to the right to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

None!

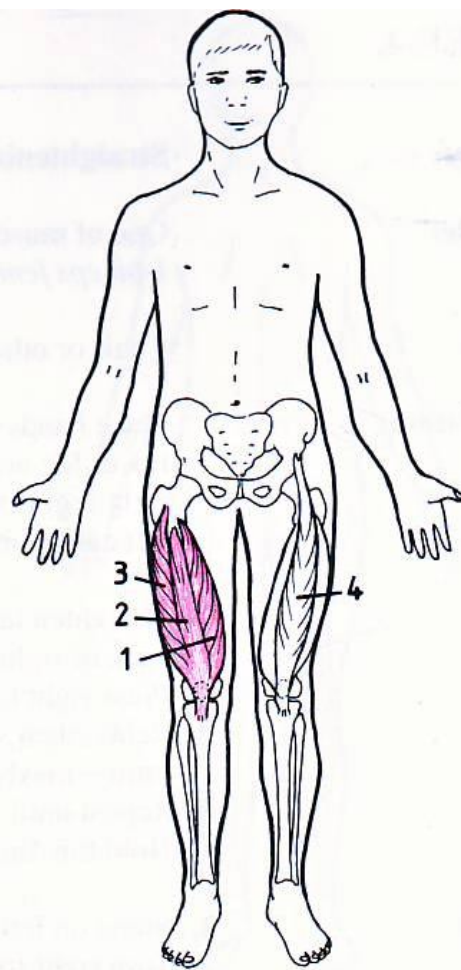
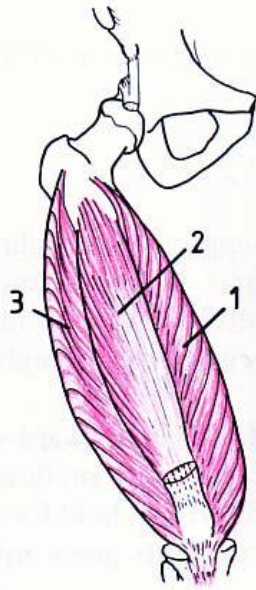
Muscles of opposite function – antagonists, in this case the back of your thigh – must not be stimulated, as this can cause cramps.

Common Errors:

- * Knee not held down to chair seat.
- * Thigh not pressed toward knee, so that knee takes too much strain.
- * Lower leg and foot turned inward.

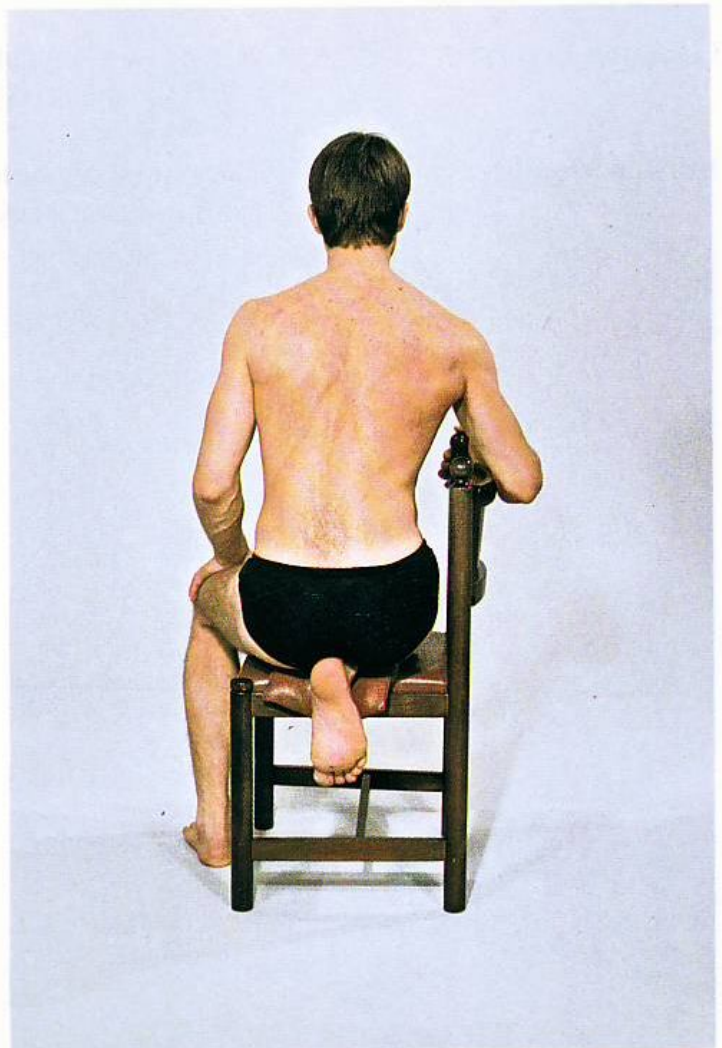
Normal Mobility:

From this starting position, you should be able to touch heel between buttocks, unless flesh on the back of your thigh and calf gets in the way.



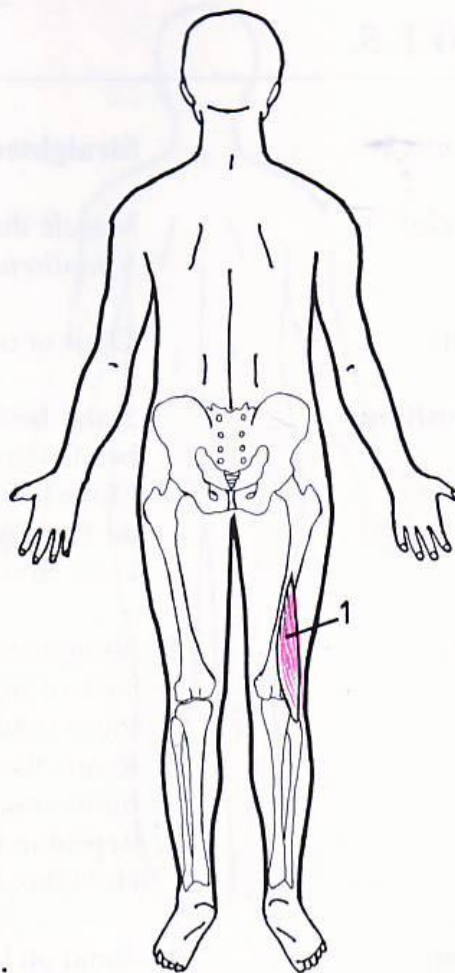
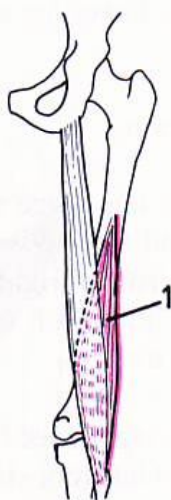
Starting Position:

Stretching:



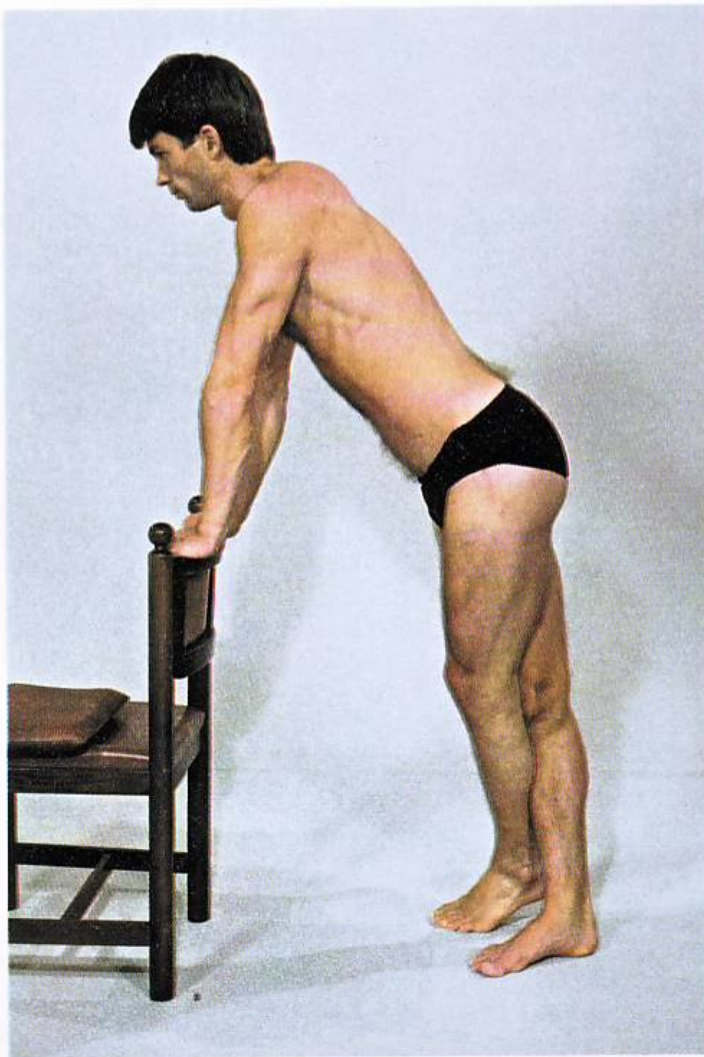
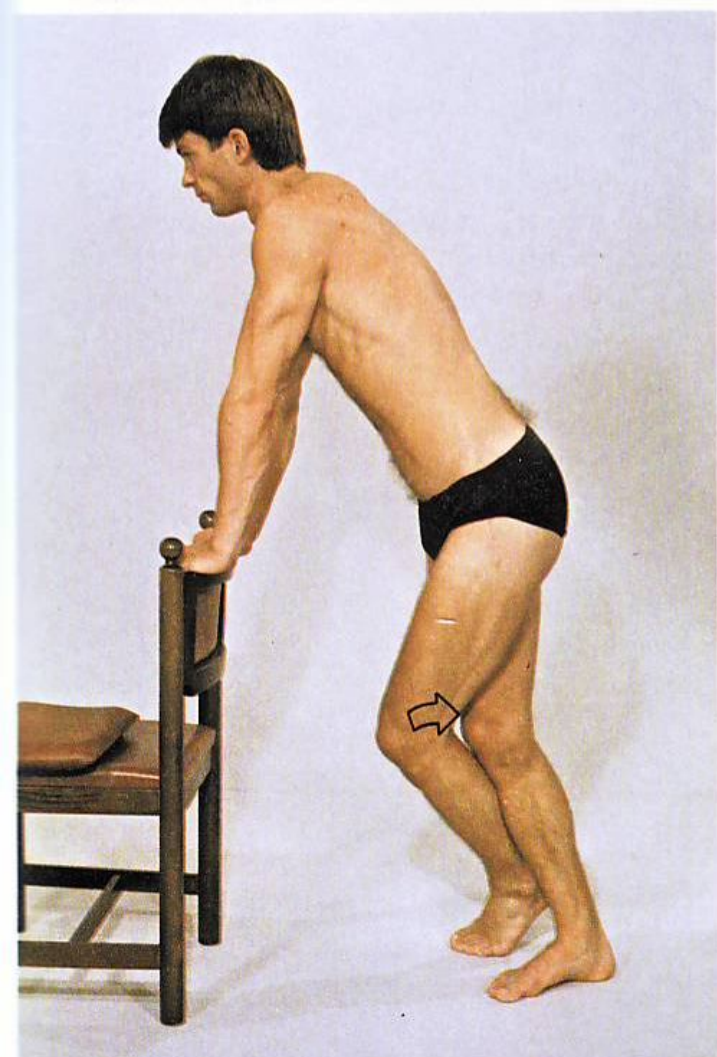
THE KNEE 4.

Your difficulty is:	Straightening your knee with your lower leg turned inward.
Tight Muscle:	One of muscles that bend knee: <i>1 biceps femoris, short head</i>
Equipment:	Chair or other suitable support.
Starting Position:	Place hands on chair back for support. Bend right knee slightly and turn lower leg and foot inward to limit. Move left leg across and in front of right leg; rest toes and ball of left foot on floor outside right foot. Place left calf against shin just below right knee. Straighten right knee to limit.
Stretching:	1. Straighten left knee to press right knee backward so that stretch is felt at back of right knee. Don't let left foot slide on floor. 2. Press right knee forward against left leg; hold for 5 seconds. 3. Relax, then straighten left knee more, to press right knee backward to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Stand on left leg. 2. Turn right foot and lower leg inward to limit and straighten knee. 3. Hold position a few seconds.
Common Errors:	* Right lower leg not turned far enough inward. * Left foot slides on floor.
Normal Mobility:	With lower leg turned inward, you should be able to straighten your knee until it 'bends backward' a little.



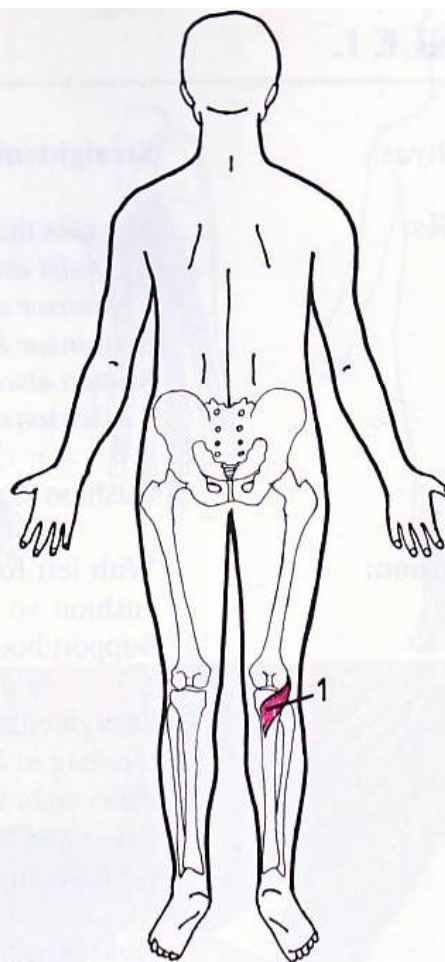
Starting Position:

Stretching:



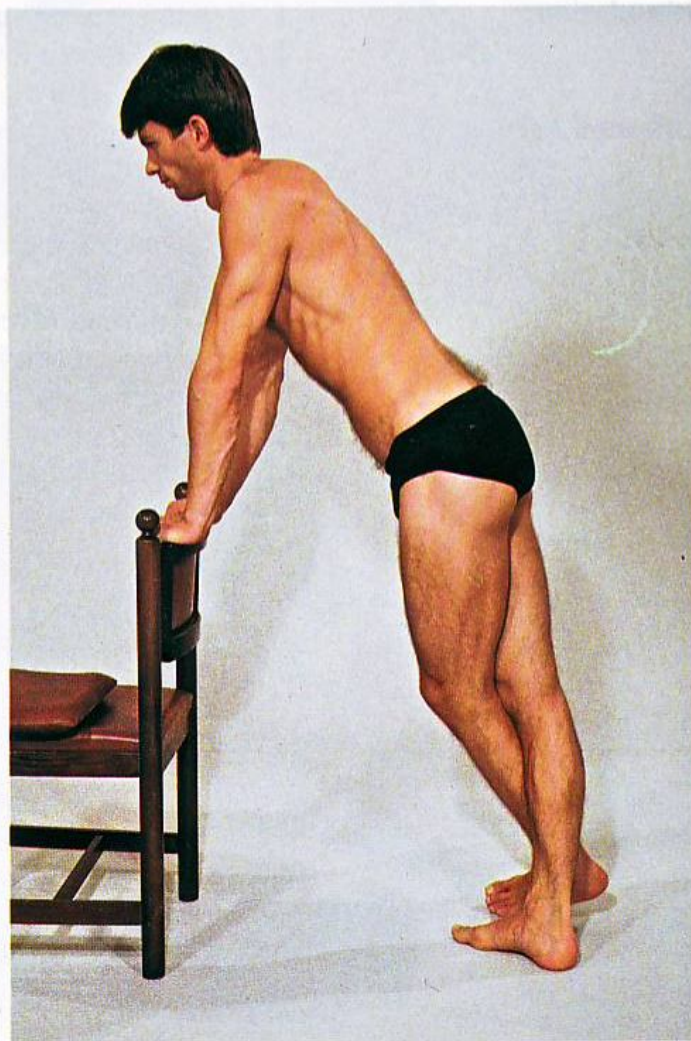
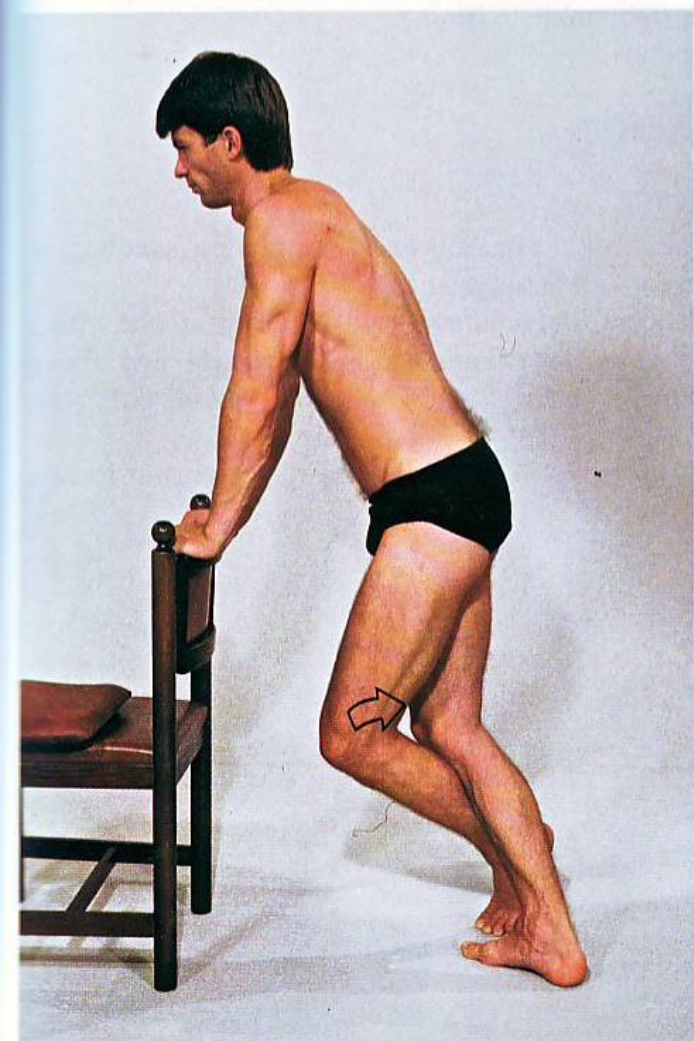
THE KNEE 5.

Your difficulty is:	Straightening your knee with your lower leg turned outward.
Tight Muscle:	Muscle that bends and turns lower leg at knee: <i>1 popliteus</i>
Equipment:	Chair or other suitable support.
Starting Position:	Stand behind chair on right leg, place hands on chair back for support, bend right knee slightly and turn lower leg and foot outward to limit. Move left leg across and in front of right leg; rest toes and ball of left foot on floor outside right foot. Place left calf against shin just below right knee. Straighten right knee to limit.
Stretching:	1. Straighten left knee to press right knee backward so that stretch is felt at back of right knee. Don't let left foot slide on floor. 2. Press right knee forward against left leg; hold for 5 seconds. 3. Relax, then straighten left knee more to press right knee backward to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Stand on left leg. 2. Turn right foot and lower leg outward to limit and straighten knee. 3. Hold position a few seconds.
Common Errors:	* Right lower leg not turned far enough outward. * Left foot slides on floor.
Normal Mobility:	With lower leg turned outward, you should be able to straighten your knee until it 'bends backward' a little.



Starting Position:

Stretching:



THE ANKLE 1.

Your difficulty is:

Straightening your ankle (for pulling on a sock or getting up on tiptoe)

Tight Muscles:

Muscles that bend ankle upward:

1 *tibialis anterior*

2 *extensor digitorum longus*

3 *extensor hallucis longus*.

Stretch also affects

4 *extensor digitorum brevis* if it is extremely shortened.

Equipment:

Cushion to protect knee and foot. Maybe also a sandbag or similar object.

Starting Position:

With left foot on floor, place right knee, shin and upper side of foot on cushion so that heel points straight up, buttock resting on right heel. Support body with folded arms resting on left knee.

Stretching:

1. Straighten right ankle by pressing right buttock down on right heel (sandbag in between for extra effect), so that stretch is felt in right shin.
2. Press right foot down on cushion; hold for 5 seconds.
3. Relax and sit lower, with buttocks pushing heel down to limit – may feel a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; stretch right ankle to limit.
2. Hold position a few seconds.

Common Errors:

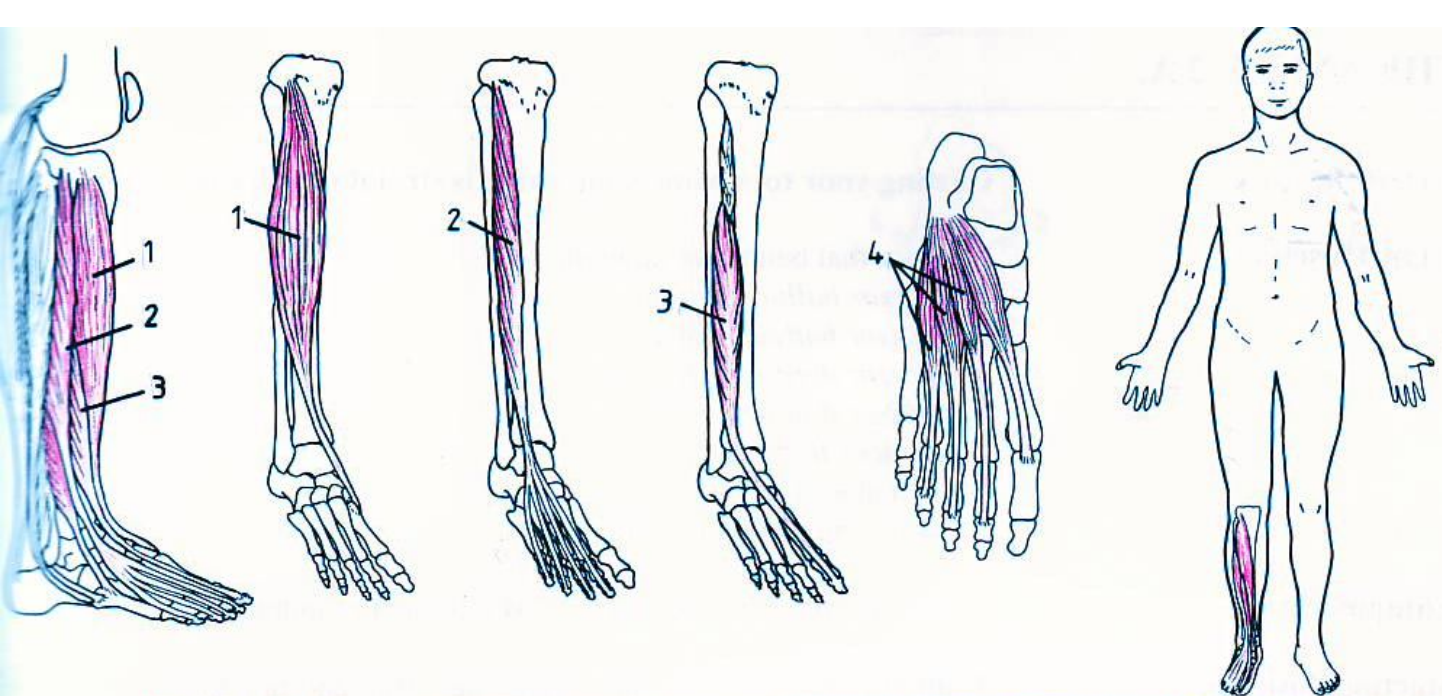
- * Buttock or sandbag slides off heel.
- * Heel turns outward.

Notes:

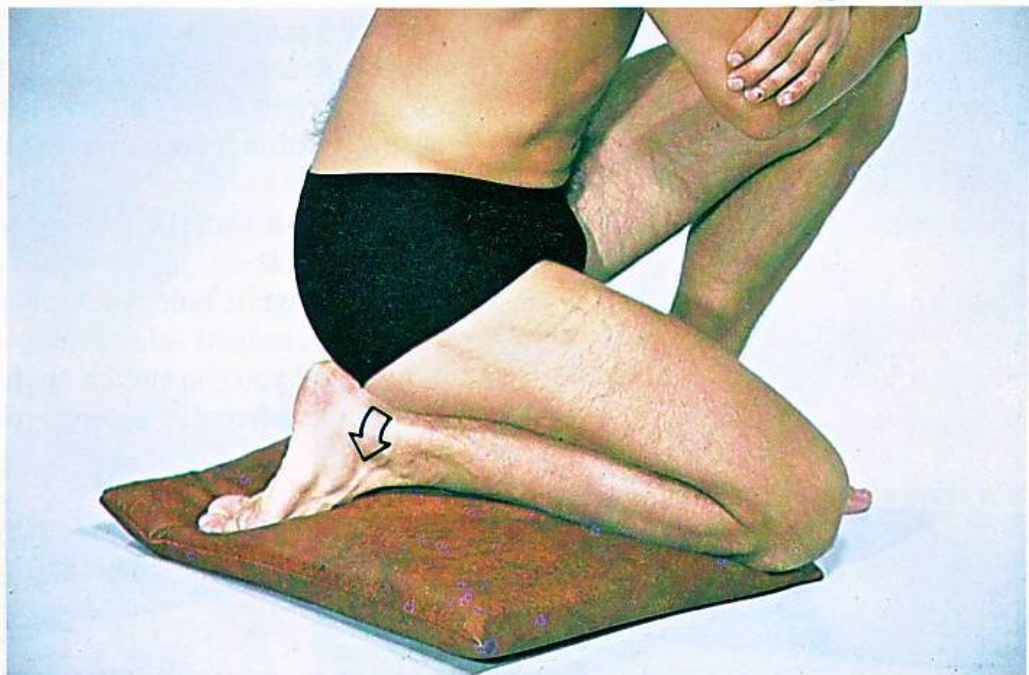
1. If you feel pain in your knee during this exercise, place a sandbag between knee and shin as shown in illustration for Ankle exercise 2 A.
2. Gymnasts, divers, dancers, and others may wish to increase the depth of this stretch. In that case, put a firm cushion under foot just above toes, and use both hands to lift right knee and lower leg off pad.

Normal Mobility:

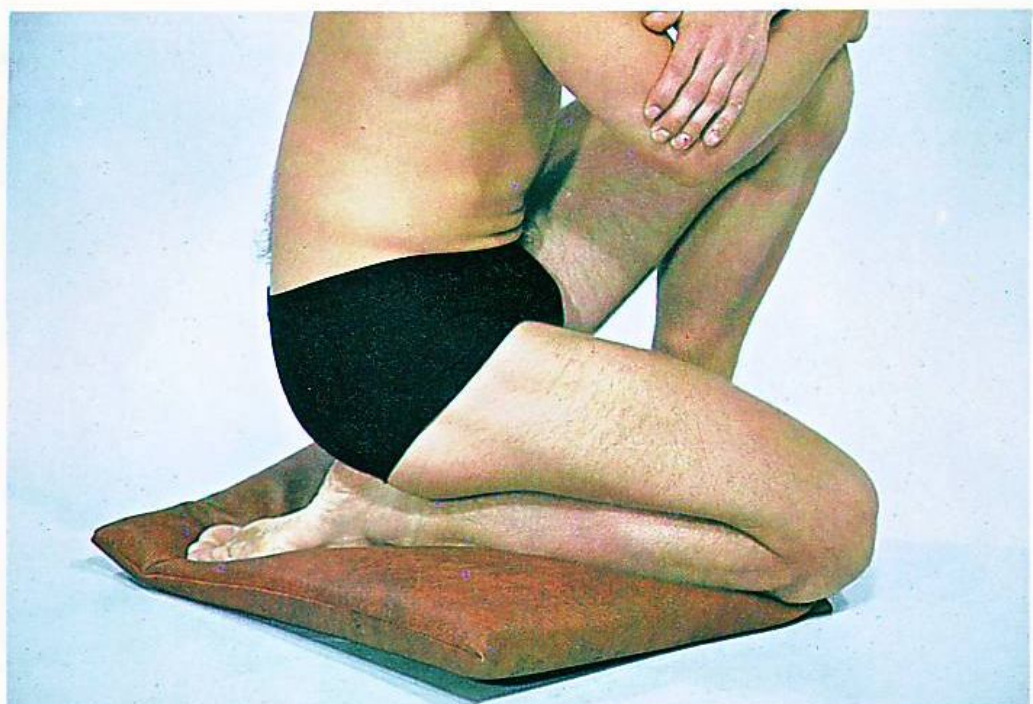
You should be able to straighten your ankle until foot and shin form a straight line.



Starting Position:



Stretching:



THE ANKLE 2 A.

Your difficulty is:

Curling your toes while your ankle is straightened. Kneeling.

Tight Muscles:

Muscles that bend toes upward:

- 1 *extensor hallucis longus*
- 2 *extensor hallucis brevis*
- 3 *extensor digitorum longus*
- 4 *extensor digitorum brevis*
- 5 *peroneus tertius*.

Stretch also affects

6 *tibialis anterior* if it is shortened.

Equipment:

Cushion to protect knee and foot. Maybe also a sandbag or similar object.

Starting Position:

With left foot on floor, place right knee, shin and upper side of foot on cushion so that heel points up and slightly inward, buttock resting on right heel – or if this is uncomfortable, on a small sandbag placed on heel. See illustrations to the right. Grasp all five toes of right foot with right hand and support body with left arm on left knee.

Stretching:

1. Pull toes upward toward sole of foot so that stretch is felt in right shin and along front of foot.
2. Press toes against fingers; hold for 5 seconds.
3. Relax and bend toes toward sole to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

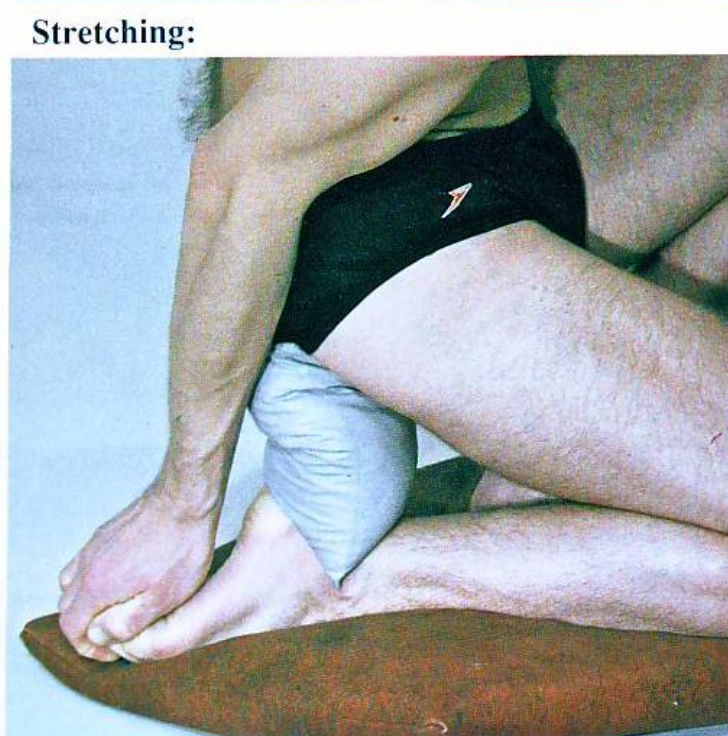
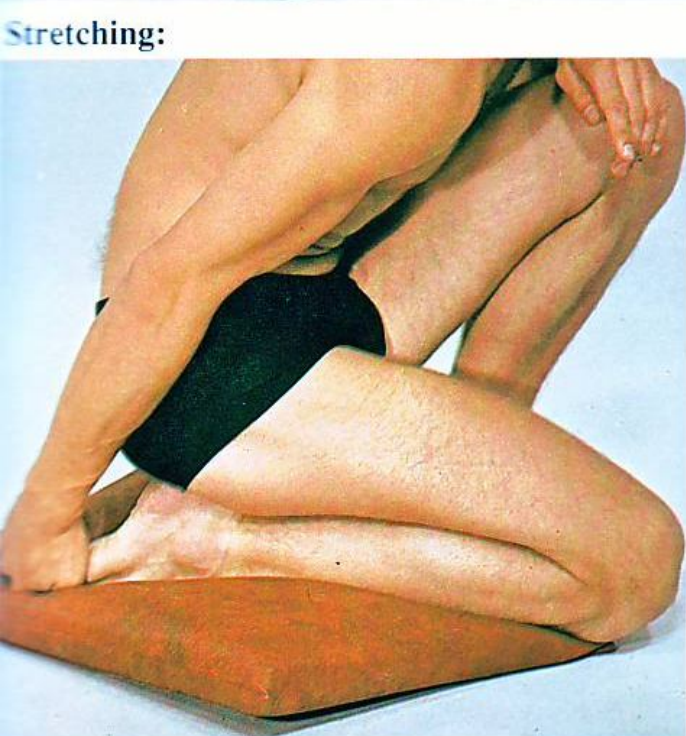
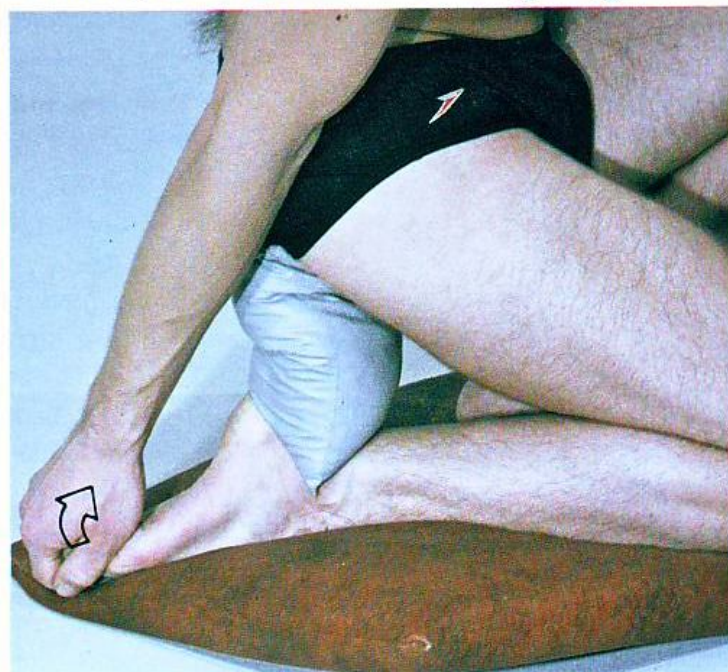
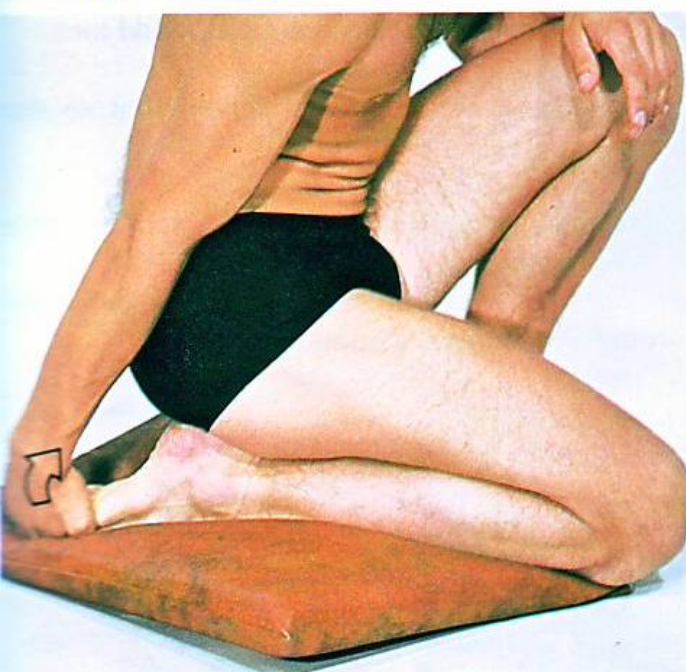
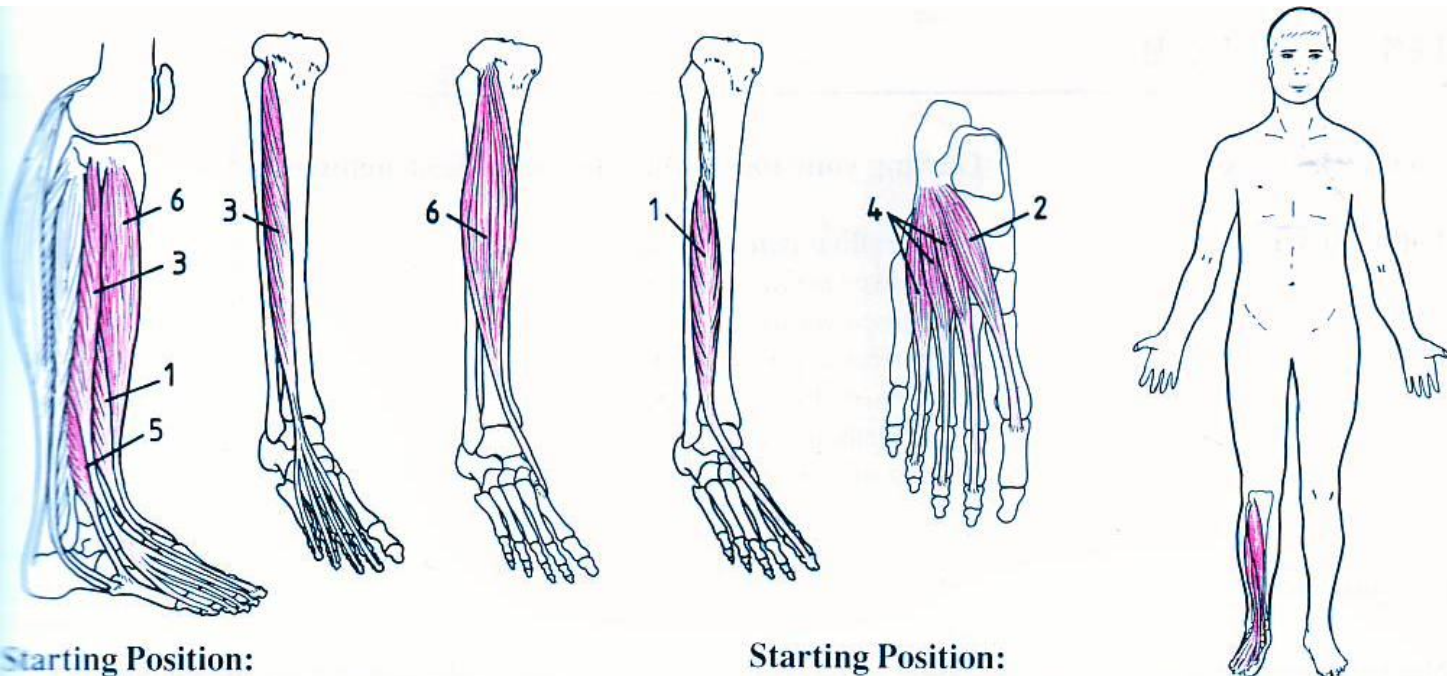
1. Retain grip.
2. Bend toes to limit; resist with palm of hand.
3. Hold position a few seconds.

Common Errors:

- * Heel turns outward.
- * Toes not bent at all joints.

Normal Mobility:

When front of foot is in a straight line with shin, you should be able to curl your toes a little.



THE ANKLE 2 B.

Your difficulty is:

Curling your toes while your ankle is straightened. Sitting.

Tight Muscles:

Muscles that bend toes upward:

1 *extensor hallucis longus*

2 *extensor hallucis brevis*

3 *extensor digitorum longus*

4 *extensor digitorum brevis*

5 *peroneus tertius*.

Stretch also affects

6 *tibialis anterior* if it is shortened.

Equipment:

Chair or stool.

Starting Position:

Sit with legs spread, left foot on floor, right hand grasping right shin just above ankle to hold heel against chair, left hand cupped around toes.

Stretching:

1. With left hand, pull toes toward sole of foot and straighten foot so that stretch is felt in right shin and along front of foot.
2. Press foot and toes against fingers; hold for 5 seconds.
3. Relax; straighten ankle and bend toes toward sole to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Take right hand away.
2. Bend toes to limit; resist with palm of left hand.
3. Hold position a few seconds.

Common Errors:

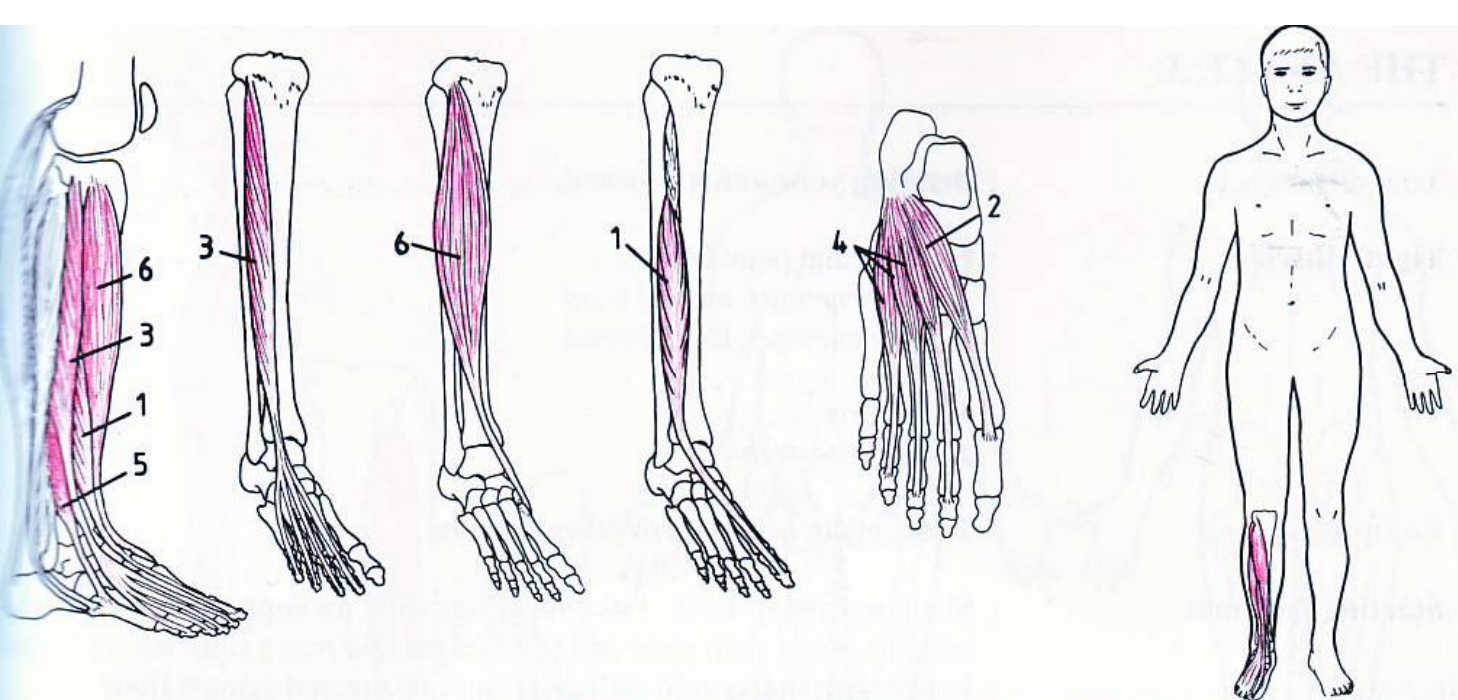
- * Ankle turns inward and inner side of foot turns upward.
- * Toes not bent in all joints.

Note:

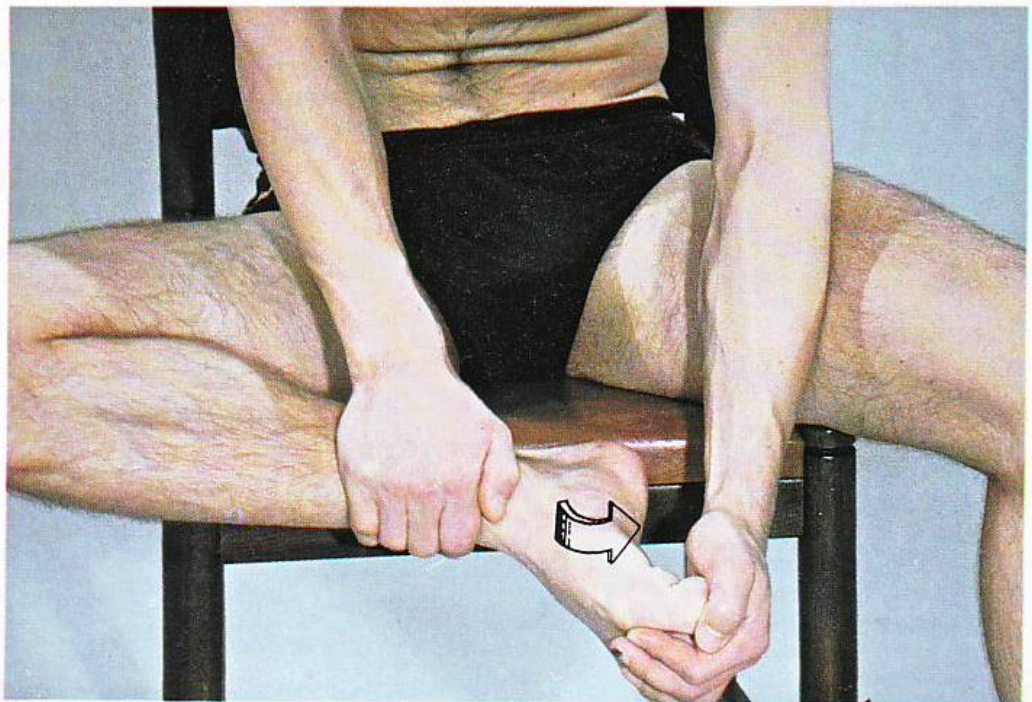
This is an alternative to exercise 2A, for those who find kneeling difficult.

Normal Mobility:

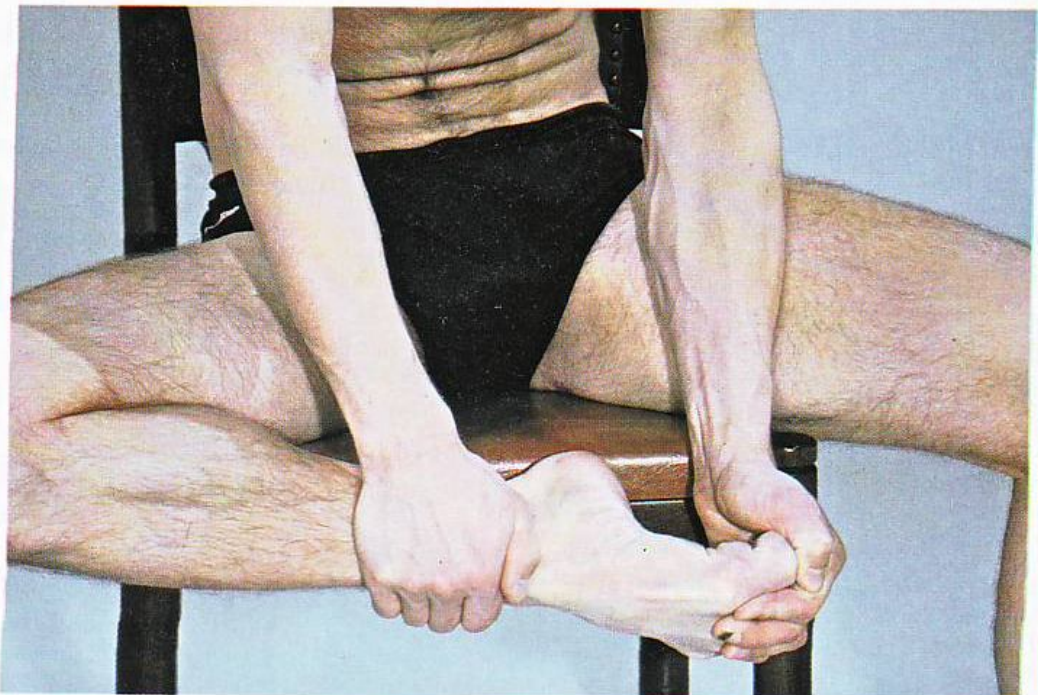
When front of foot is in a straight line with shin, you should be able to curl your toes a little.



Starting Position:



Stretching:



THE ANKLE 3.

Your difficulty is:

Bending your ankle upward.

Tight Muscles:

Muscles that point foot:

- 1 *gastrocnemius, medial head*
- 2 *gastrocnemius, lateral head*
- 3 *soleus*
- 4 *plantaris*
- 5 *tibialis posterior.*

Equipment:

Table, chair, wall, tree or other support.

Starting Position:

Stand in front of table. Place hands on table for support. Bend left knee and hip. Keep right knee and hip straight and move right leg backward in line with trunk, until right heel can't be pressed against floor.

Stretching:

1. Bend left knee and hip and push with arms to press right heel down on floor, so that stretch is felt in calf and back of knee.
2. Press downward with ball of right foot; hold for 5 seconds.
3. Relax; bend left knee and hip more and press right heel to floor.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; bend right ankle to limit with knee straight.
2. Hold position a few seconds.

Common Errors:

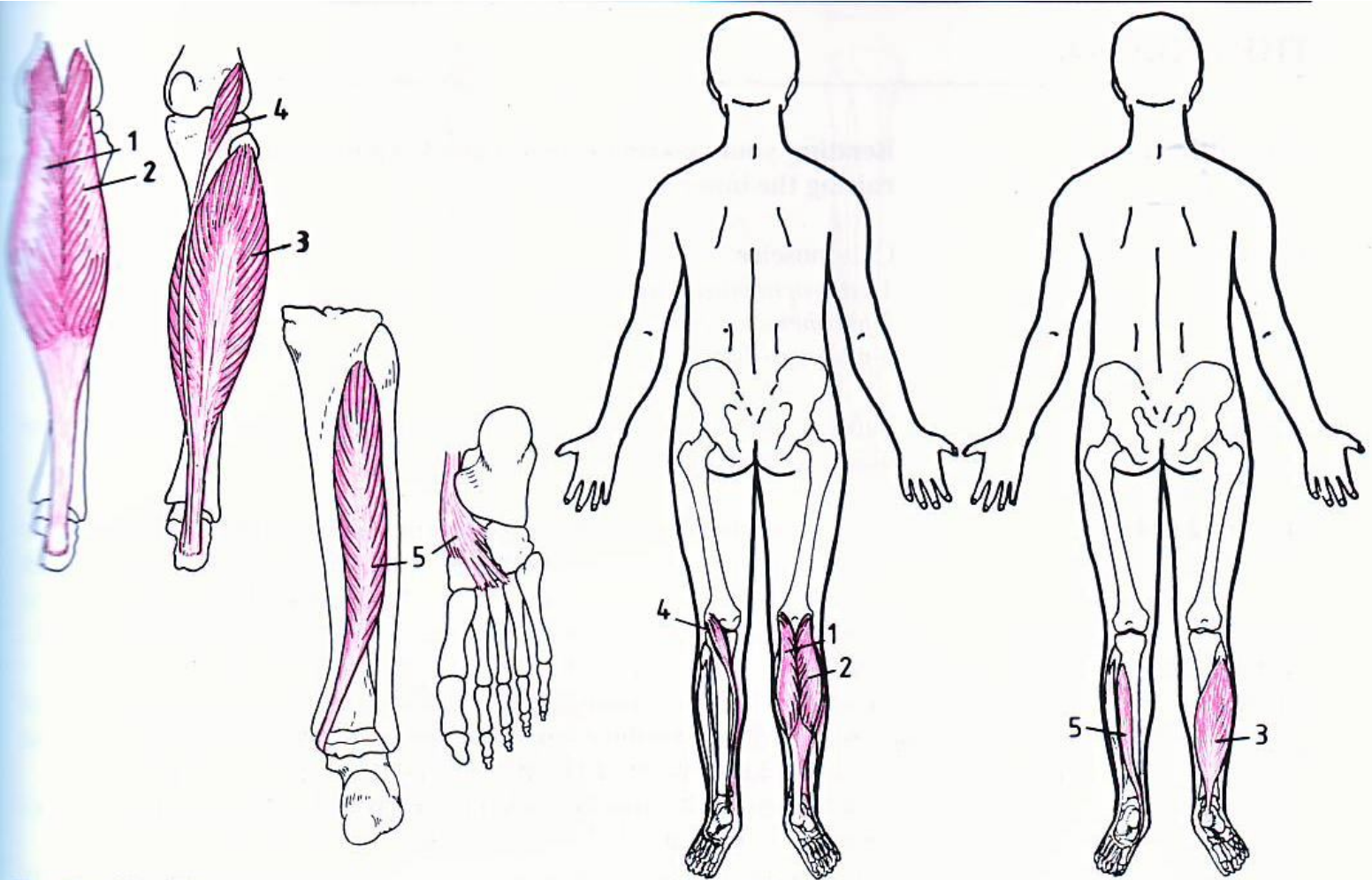
- * Lower back arched.
- * Chin juts forward.
- * Right knee and/or hip bent.

Notes:

1. Stretch should be felt only in calf and back of knee. Tightness along front of ankle or foot may be a sign that you've achieved maximum mobility of ankle joint.
2. This stretch is important for persons suffering frequent calf cramps.
3. For best effect, right foot should be gradually moved backward as stretching progresses.

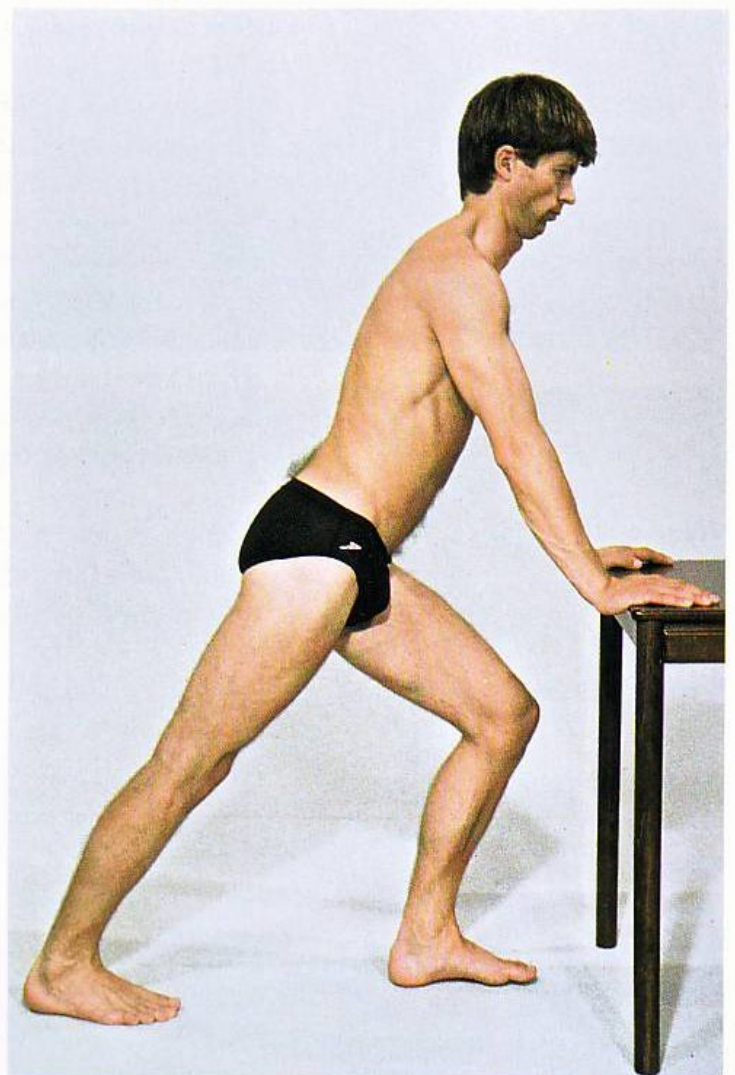
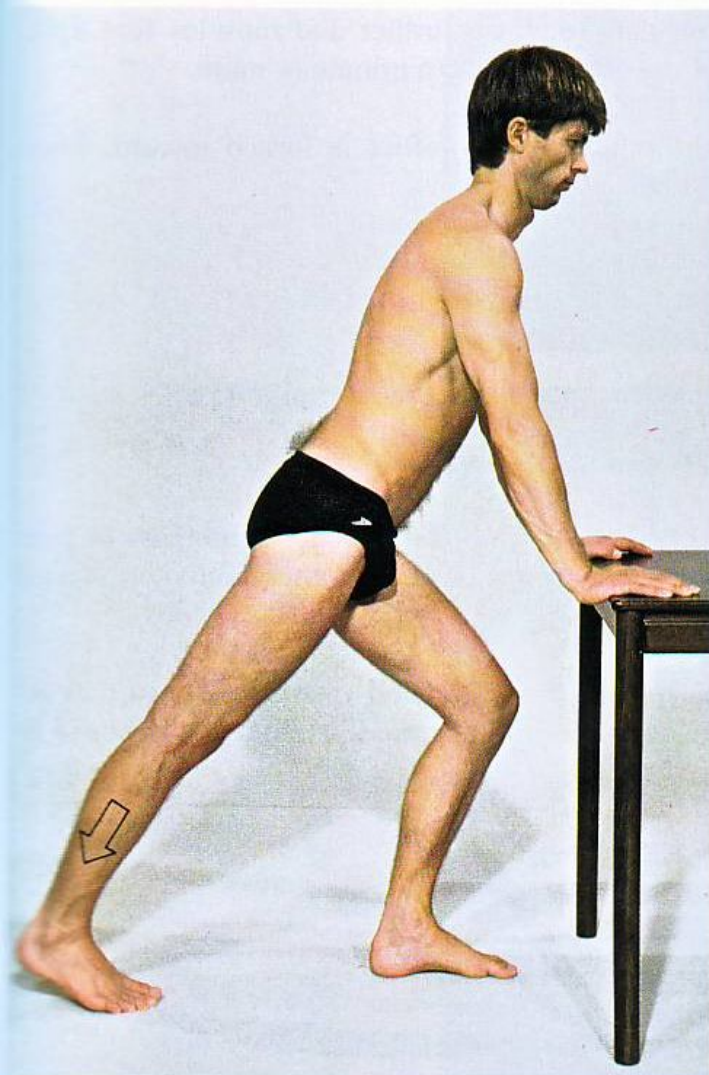
Normal Mobility:

You should be able to bend your ankle upward as far as joint allows without any tightness in calf.



Starting Position:

Stretching:



THE ANKLE 4.

Your difficulty is:

Bending your ankle upward while keeping your knee straight and raising the inner side of your foot.

Tight Muscles:

Calf muscles:

1 *gastrocnemius, lateral head*

2 *peroneus longus*

3 *peroneus brevis.*

Equipment:

Table, chair, wall or other support. Book, piece of wood or other firm object to raise inner edge of foot.

Starting Position:

Stand, leaning forward, hands supporting upper body, left foot two to three foot lengths from support, right leg and hip in straight line with upper body, right foot so far back that heel cannot be pressed down to floor/ground, big toe and innermost ball of foot resting on book/board.

Stretching:

1. Bend left knee and hip and push with arms to press right heel and sole of foot down onto book/board and floor, so that stretch is felt in back and outside of knee and lower leg.
2. Press downward with big toe and innermost ball of foot; hold for 5 seconds.
3. Relax; bend left knee and hip more and push with arms to press right heel and sole of foot down on outer edge of book/board.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Raise inner edge of right foot until sole of foot is turned inward. Knee straight. Bend ankle to limit.
2. Hold position a few seconds.

Common Errors:

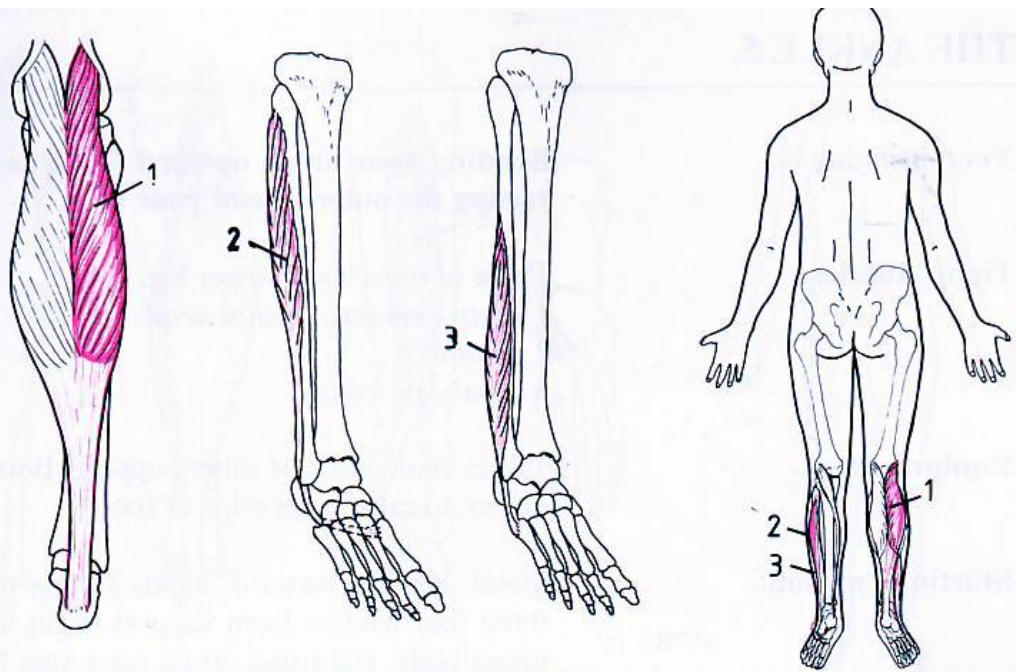
- * Lower back arched.
- * Chin juts forward.
- * Right knee and/or hip bent.
- * Right foot turned outward.
- * Toes and ball of foot not resting on book/board.

Note:

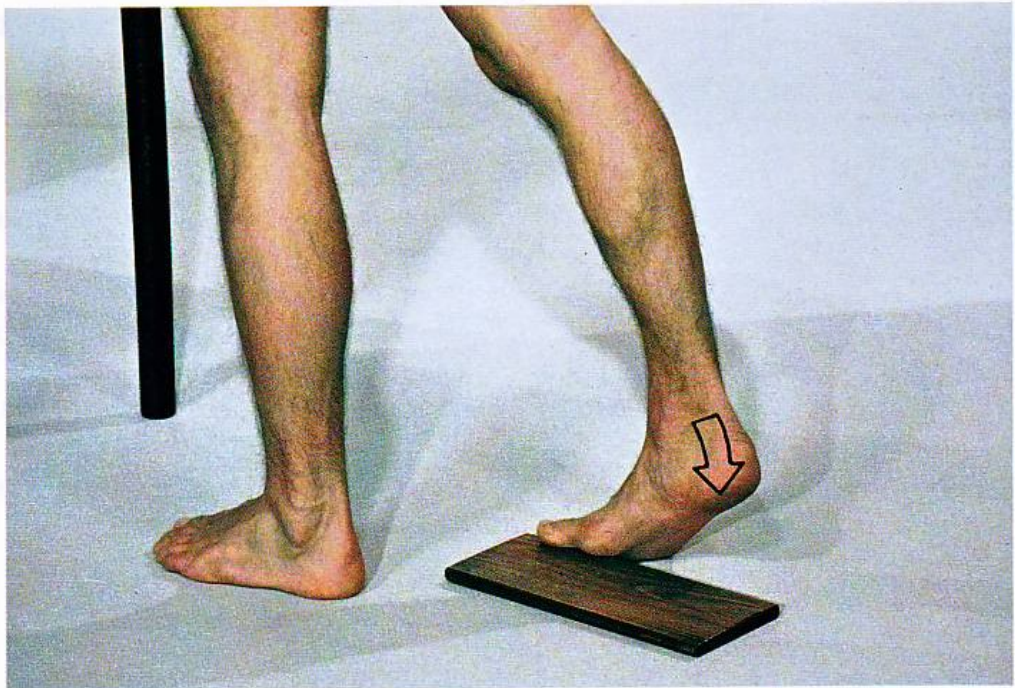
Stretch should be felt only in calf and back of knee. Tightness or pain along front of ankle and foot may be a sign that you've achieved maximum mobility of ankle joint.

Normal Mobility:

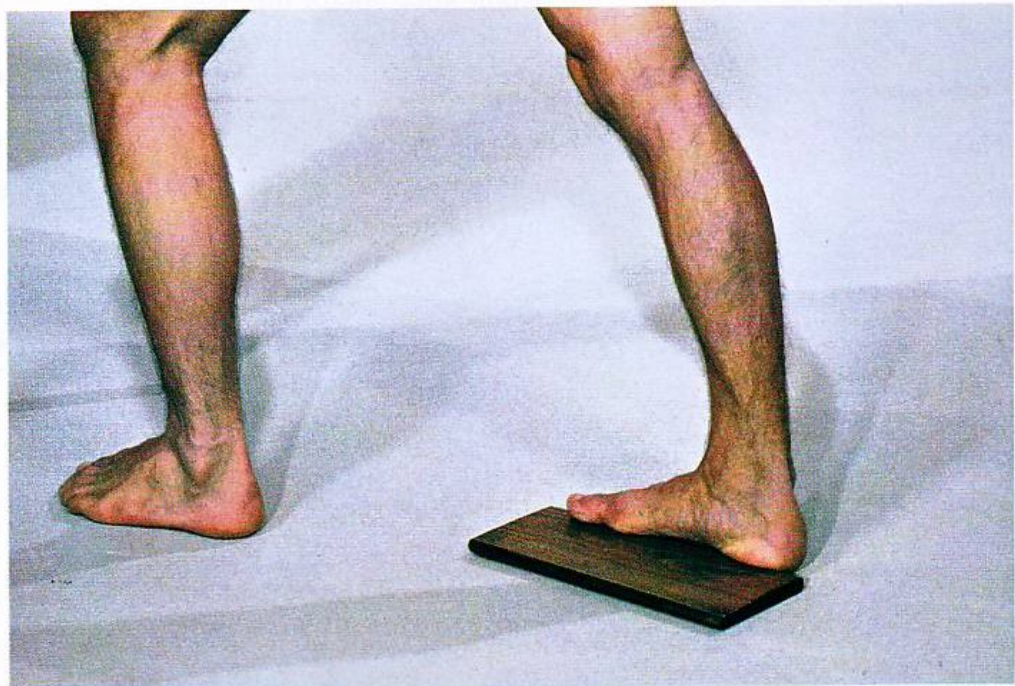
With knee straight, you should be able to bend your ankle upward as far as joint allows while inner edge of foot is raised, without any tightness in calf.



Starting Position:

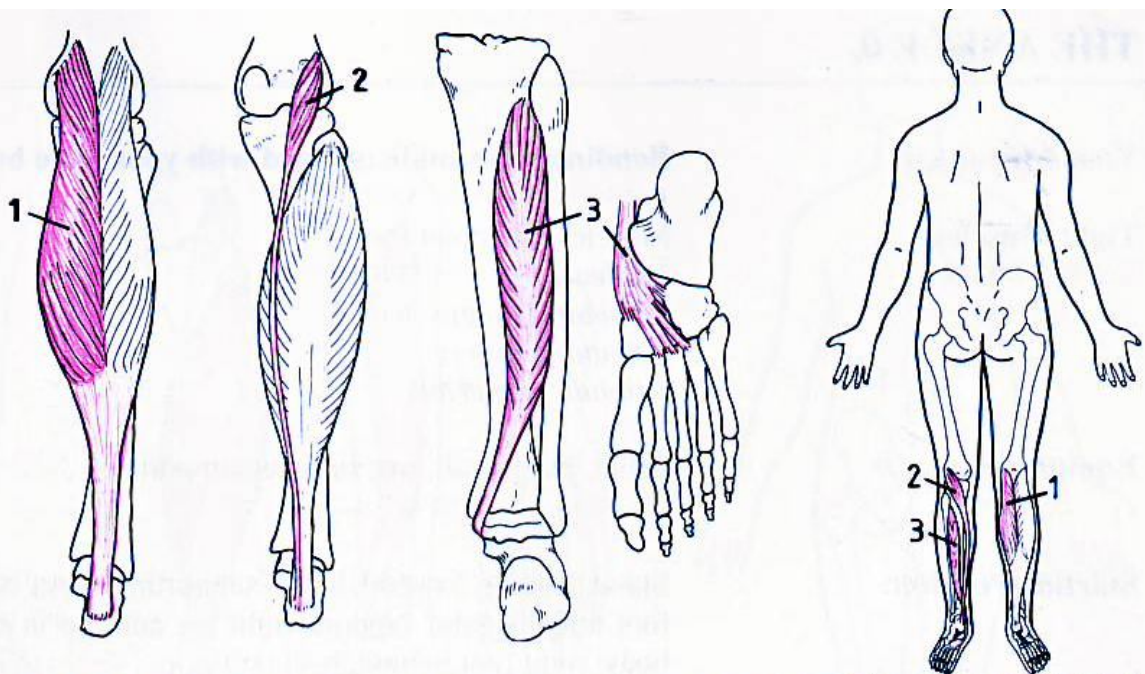


Stretching:

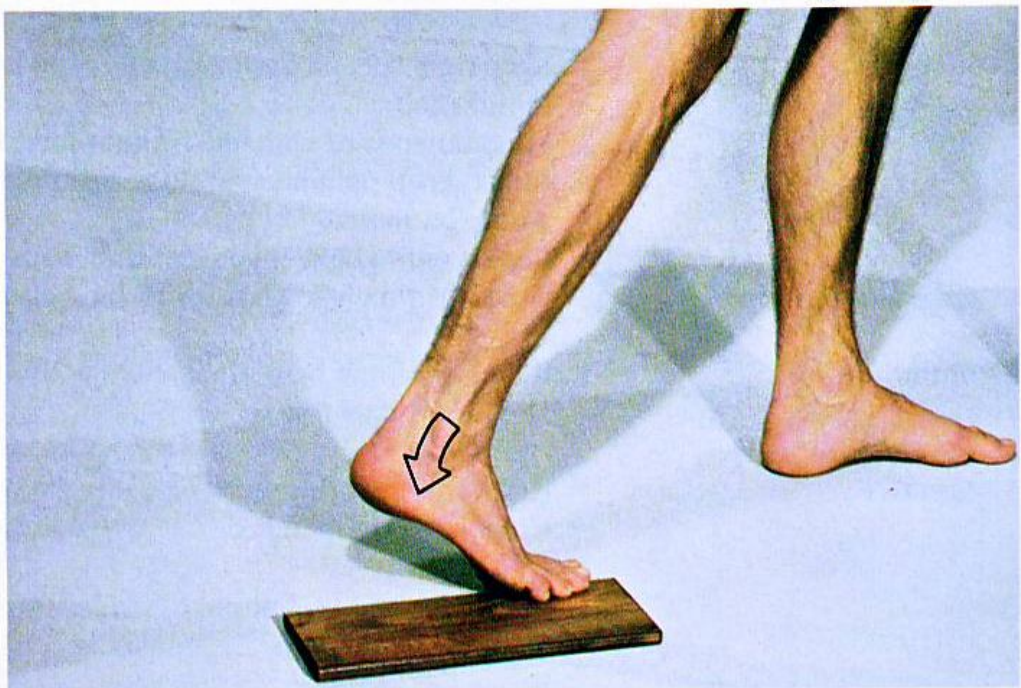


THE ANKLE 5.

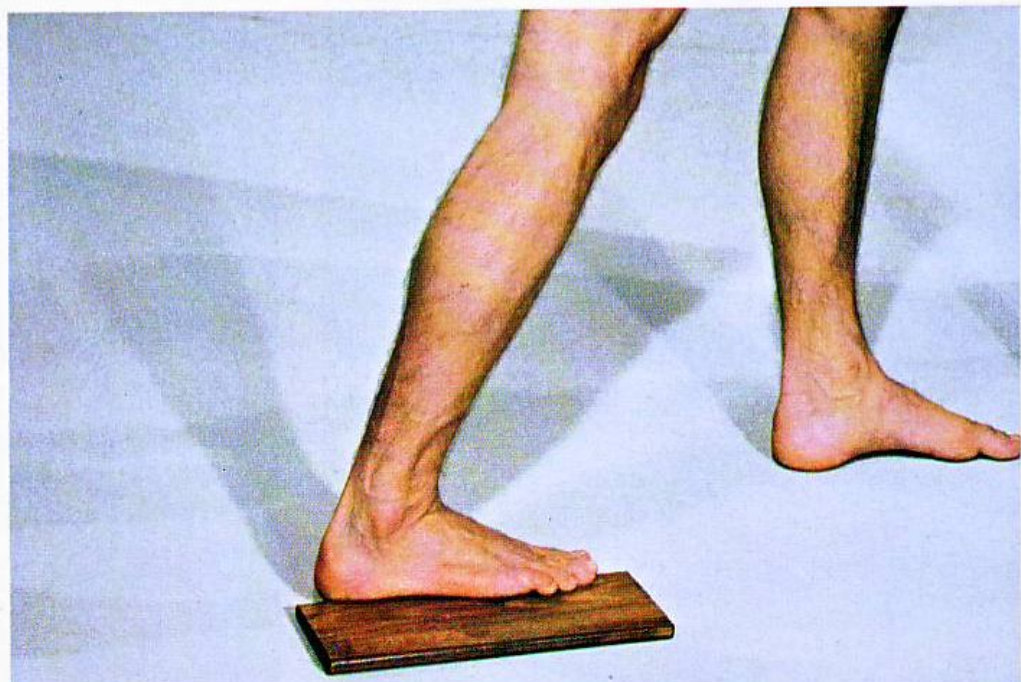
Your difficulty is:	Bending your ankle upward while keeping your knee straight and raising the outer side of your foot.
Tight Muscles:	Three of muscles in lower leg: 1 <i>gastrocnemius, medial head</i> 2 <i>plantaris</i> 3 <i>tibialis posterior.</i>
Equipment:	Table, chair, wall or other support. Book, piece of wood or other firm object, to raise outer edge of foot.
Starting Position:	Stand, leaning forward, hands supporting upper body, left foot two to three foot lengths from support, right leg and hip in straight line with upper body, right foot so far back that heel cannot be pressed down to floor/ground, outer toes and outermost ball of foot resting on book/board.
Stretching:	1. Bend knee and hip and push with arms to press heel and sole of right foot down onto book/board and floor, so that stretch is felt in back and inner side of knee and lower leg. 2. Press downward with outer toes and outermost ball of right foot; hold for 5 seconds. 3. Relax; bend left knee and hip more and push with arms to press right heel and sole of foot down on inner edge of book/board. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Raise outer edge of right foot until sole of foot is turned outward. Knee straight. Bend ankle to limit. 2. Hold position a few seconds.
Common Errors:	* Lower back arched. * Chin juts forward. * Right knee and/or hip bent. * Right foot turned inward. * Outer toes and toe ball not resting on book/board.
Note:	Stretch should be felt only in calf and back of knee. Tightness or pain along front of ankle and foot may be a sign that you've achieved maximum mobility of ankle joint.
Normal Mobility:	With knee straight, you should be able to bend your ankle upward as far as joint allows while outer edge of foot is raised, without any tightness in calf or back of knee.



Starting Position:



Stretching:



THE ANKLE 6.

Your difficulty is:

Bending your ankle upward with your knee bent.

Tight Muscles:

Muscles that point foot:

- 1 *soleus*
- 2 *fibularis longus*
- 3 *fibularis brevis*
- 4 *tibialis posterior*.

Equipment:

Table, chair, wall, tree or other support.

Starting Position:

Stand, leaning forward, hands supporting upper body, left foot one to two foot lengths from support, right leg and hip in straight line with upper body, right foot behind, heel on floor.

Stretching:

1. Keep right heel on floor and bend right knee and hip so that stretch is felt in right calf.
2. Press downward with ball of right foot; hold for 5 seconds.
3. Relax; keep right heel on floor, bend right knee and hip to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain position; bend right ankle to limit with knee bent.
2. Hold position a few seconds.

Common Errors:

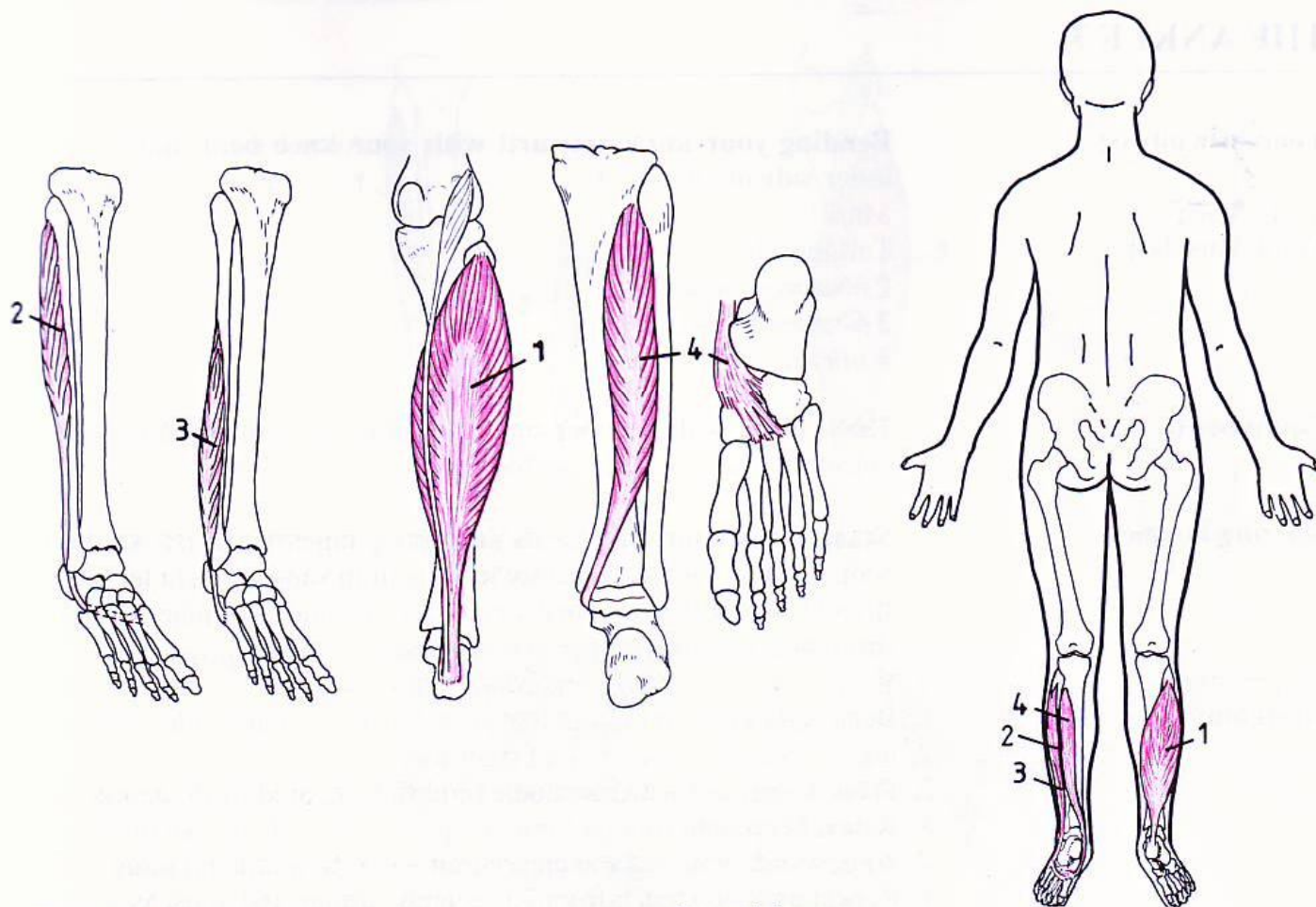
- * Right heel raised from floor.
- * Right knee straightened.

Note:

Stretch should be felt only in calf. Tightness or pain felt along front of ankle or foot may be a sign that you've achieved full mobility of ankle joint.

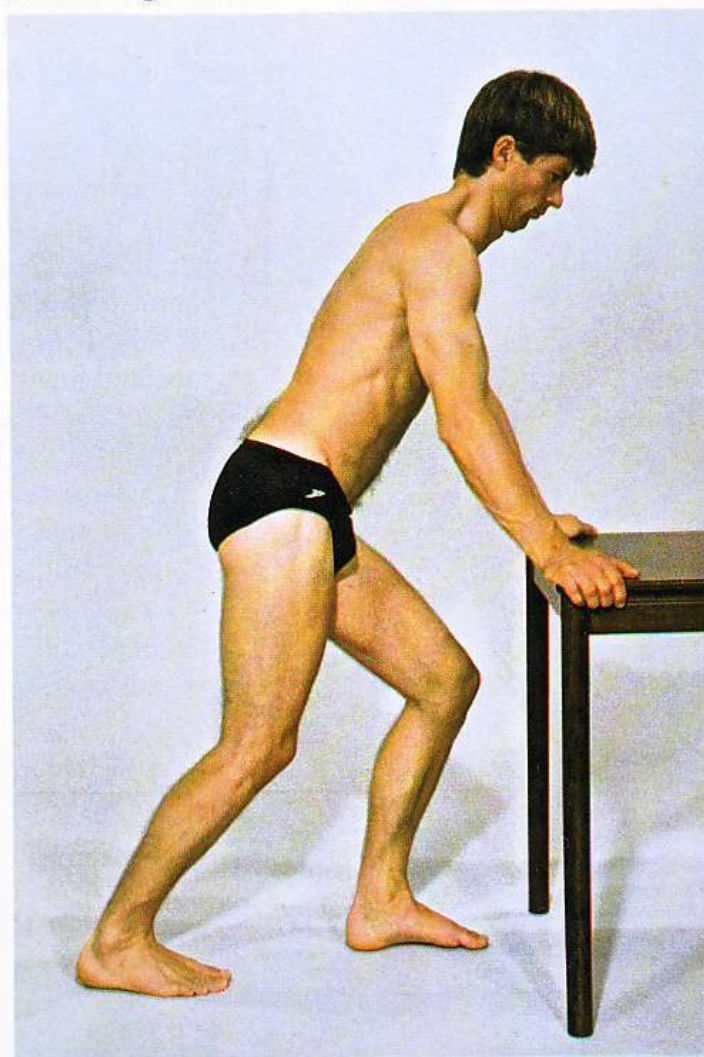
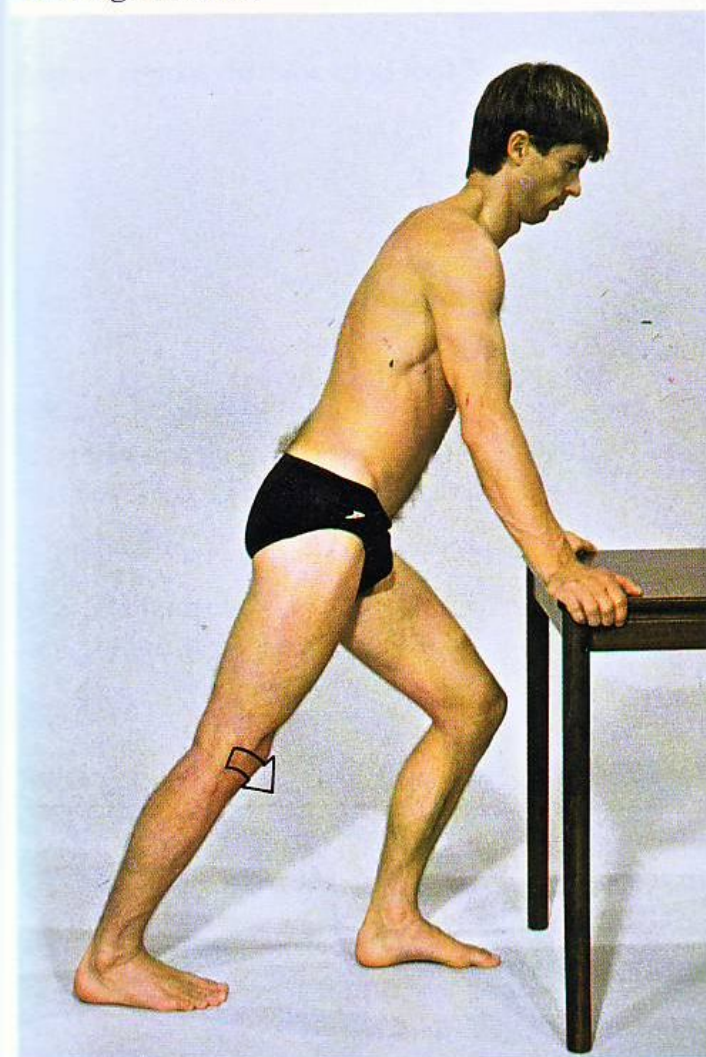
Normal Mobility:

With knee bent, you should be able to bend your ankle upward as far as joint allows. Calf muscles should not hinder this movement.



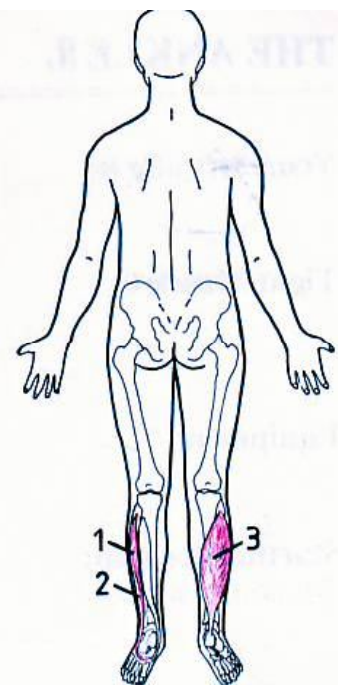
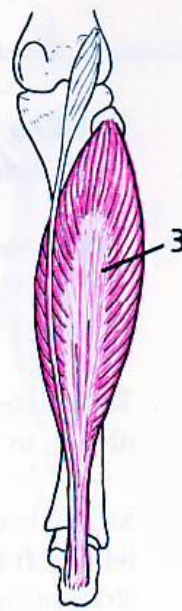
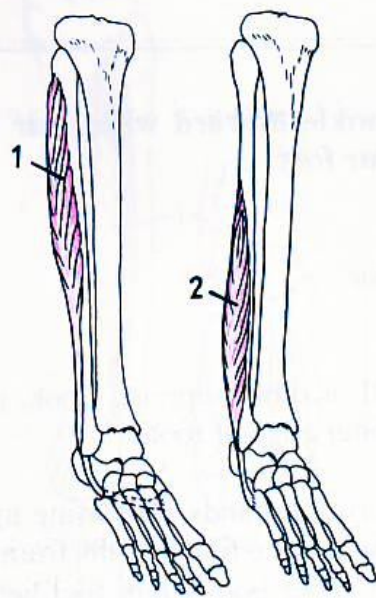
Starting Position:

Stretching:

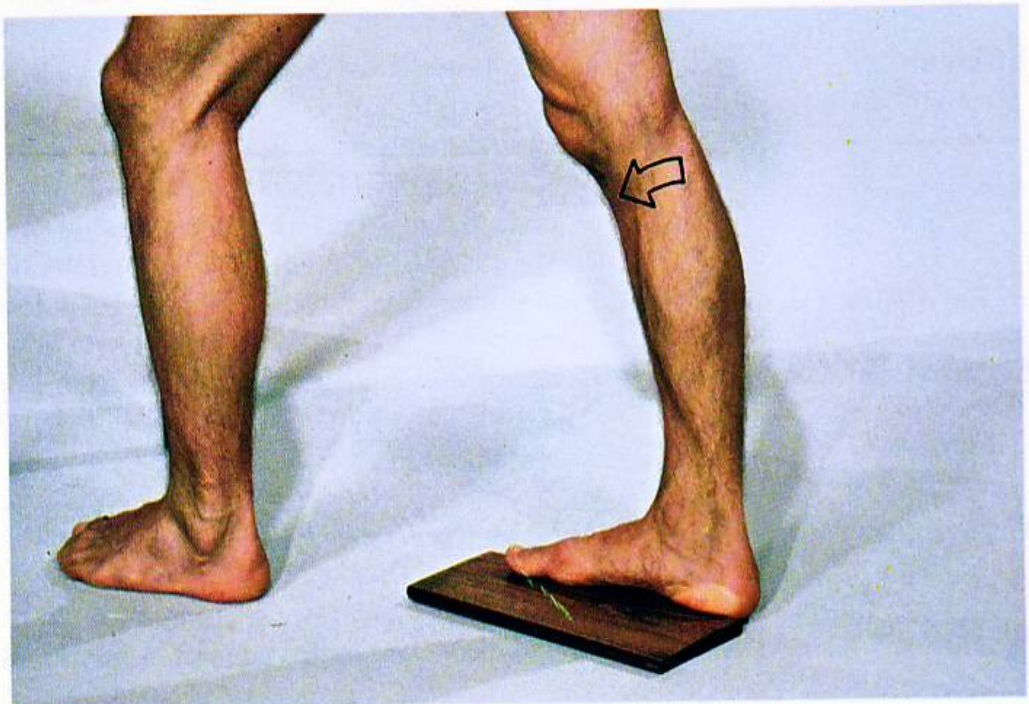


THE ANKLE 7.

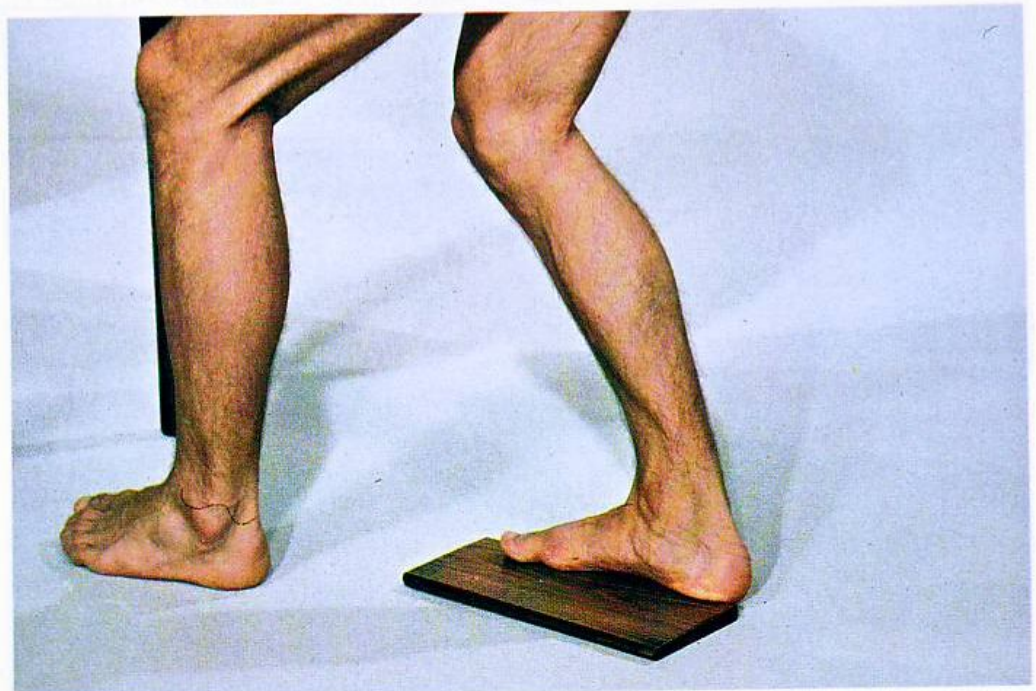
Your difficulty is:	Bending your ankle upward with your knee bent and raising the inner side of your foot.
Tight Muscles:	Calf muscles: 1 <i>fibularis longus</i> 2 <i>fibularis brevis</i> 3 <i>soleus</i> .
Equipment:	Table, chair, wall or other support. Book, piece of wood or other firm object to raise inner edge of foot.
Starting Position:	Stand, leaning forward, hands supporting upper body, left knee and hip bent; left foot two to three foot lengths from support, right leg and hip in straight line with upper body, right foot behind, and inner edge of foot (from heel to toes) resting on book/board.
Stretching:	1. Bend right knee and hip so that stretch is felt in outer side of lower right leg. 2. Press downward with inner side of right foot; hold for 5 seconds. 3. Relax; keep right foot on floor and press inner side of foot down against book/board; bend right ankle to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Bend right knee and raise inner edge of foot until sole of foot is turned inward. 2. Bend ankle to limit. 3. Hold position a few seconds.
Common Errors:	* Lower back arched. * Chin juts forward. * Right knee not bent far enough. * Big toe and inner edge of foot not resting on book/board.
Note:	Stretch should be felt only in outside and back of calf. Tightness or pain felt along front of ankle or foot may be a sign that you've achieved full mobility of ankle joint.
Normal Mobility:	With knee bent and inner side of foot turned upward, you should be able to bend your ankle upward as far as joint allows, without any tightness in outside of calf.



Starting Position:

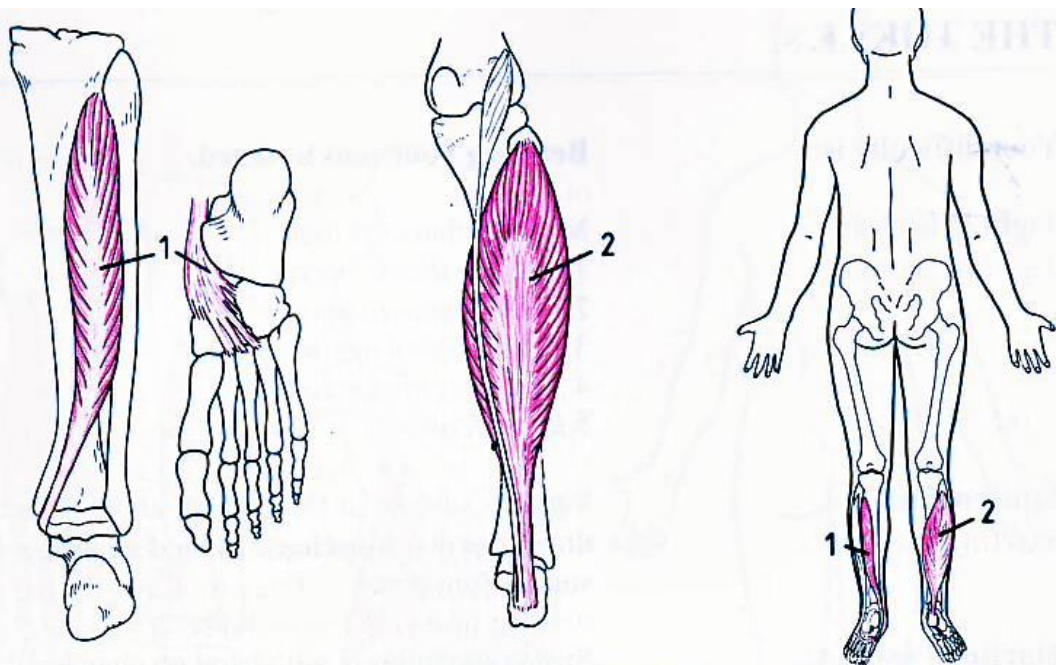


Stretching:

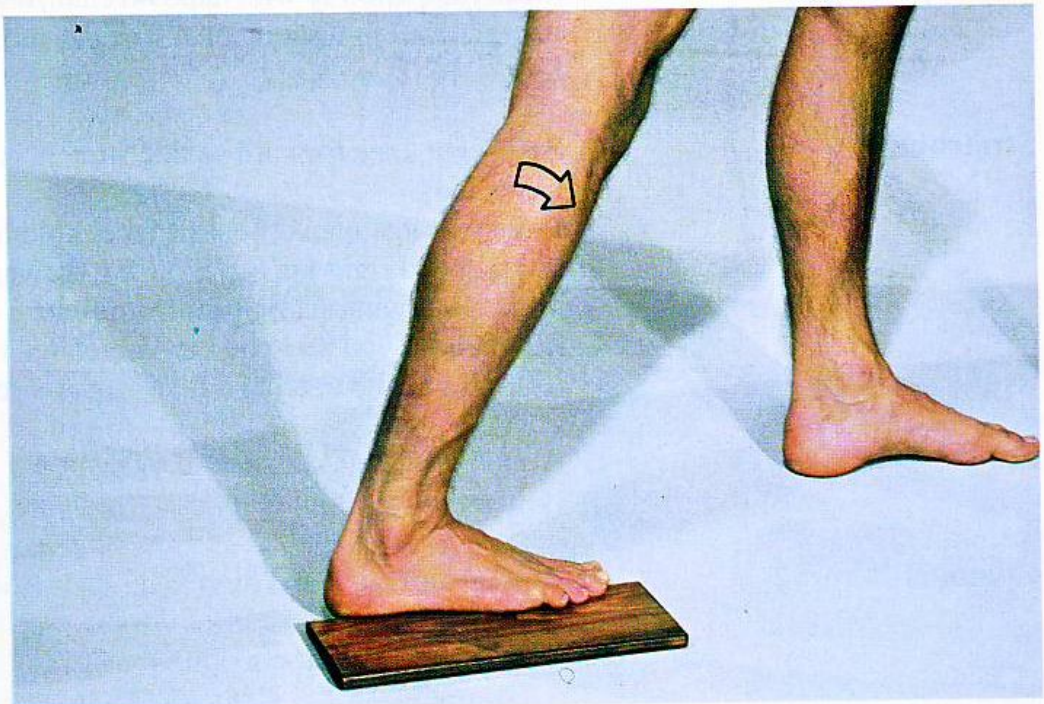


THE ANKLE 8.

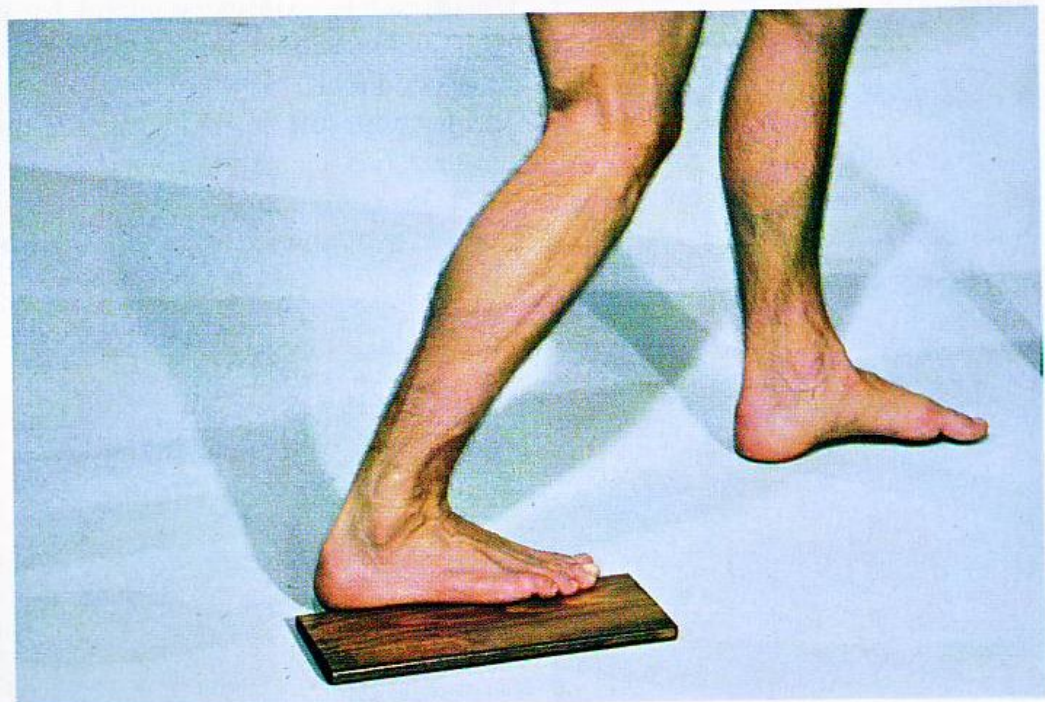
Your difficulty is:	Bending your ankle upward with your knee bent and raising the outer side of your foot.
Tight Muscles:	Calf muscles: 1 <i>tibialis posterior</i> 2 <i>soleus</i> .
Equipment:	Table, chair, wall or other support. Book, piece of wood or other firm object, to raise outer edge of foot.
Starting Position:	Stand, leaning forward, hands supporting upper body, left knee and hip bent; left foot two to three foot lengths from support, right leg and hip in straight line with upper body, right foot behind, and outer edge of foot (from heel to toes) resting on book/board.
Stretching:	1. Bend right knee and hip so that stretch is felt in inner side and back of lower right leg. 2. Press downward with outer side of right foot; hold for 5 seconds. 3. Relax; keep right foot on floor and press inner side of foot down against book/board; bend right knee and hip to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Bend right knee and raise outer edge of foot until sole of foot is turned outward. 2. Hold position a few seconds.
Common Errors:	* Lower back arched. * Chin juts forward. * Right knee not bent far enough. * Outer toes and outer edge on book/board.
Note:	Stretch should be felt mostly on inner side and back of calf. Tightness or pain felt along front of ankle or foot may be a sign that you've achieved full mobility of ankle joint.
Normal Mobility:	With knee bent and outer side of foot turned upward you should be able to bend your ankle upward, as far as joint allows, without any tightness in calf.



Starting Position:



Stretching:



THE TOES 1.

Your difficulty is:

Bending your toes upward.

Tight Muscles:

Muscles that curl toes:

- 1 *flexor hallucis brevis*
- 2 *flexor hallucis longus*
- 3 *flexor digitorum brevis*
- 4 *flexor digitorum longus*
- 5 *lumbricales*.

Equipment:

Vertical surface at floor level, about 3 inches high, such as a stair riser, drawer or hard briefcase placed against a wall, etc. Wall, chair or other suitable support.

Starting Position:

Steady upper body with hand on chair/wall; place right foot on floor, toes bent upward to limit against vertical surface; support right heel with left foot.

Stretching:

1. Push right knee forward so that stretch is felt in sole of foot and deep inside calf.
2. Press toes against vertical surface; hold for 5 seconds.
3. Relax; bend right knee and push it forward to limit – maybe a little bit more – without raising heel from floor.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Bend toes and ankle upward to limit.
2. Hold position a few seconds.

Common Errors:

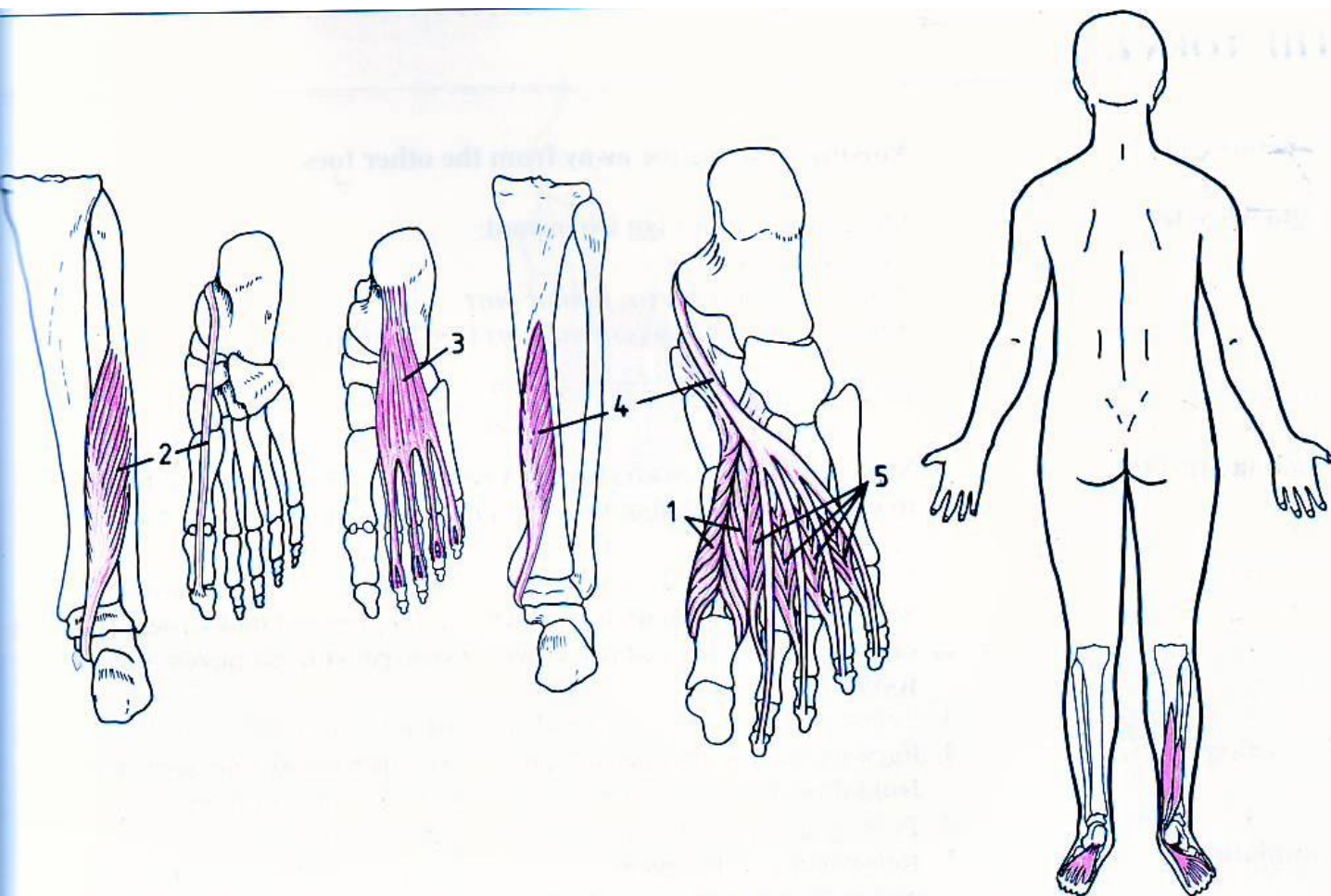
- * Vertical surface is too high and blocks forward movement of shin.
- * Heel/sole of foot raised from floor.
- * Not all toes bent far enough upward.

Notes:

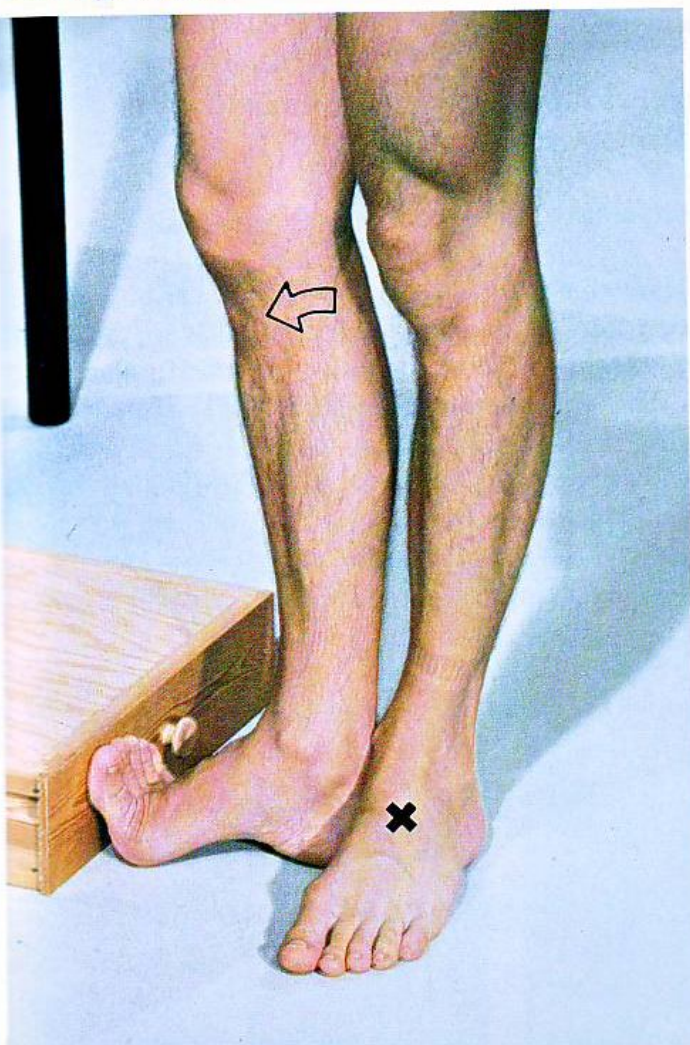
1. This stretch is extremely useful for dancers, runners, jumpers, and others who use their feet a lot, and for persons suffering cramps in calves and feet.
2. Persons with soft or flat feet should use arch supports when doing this exercise.

Normal Mobility:

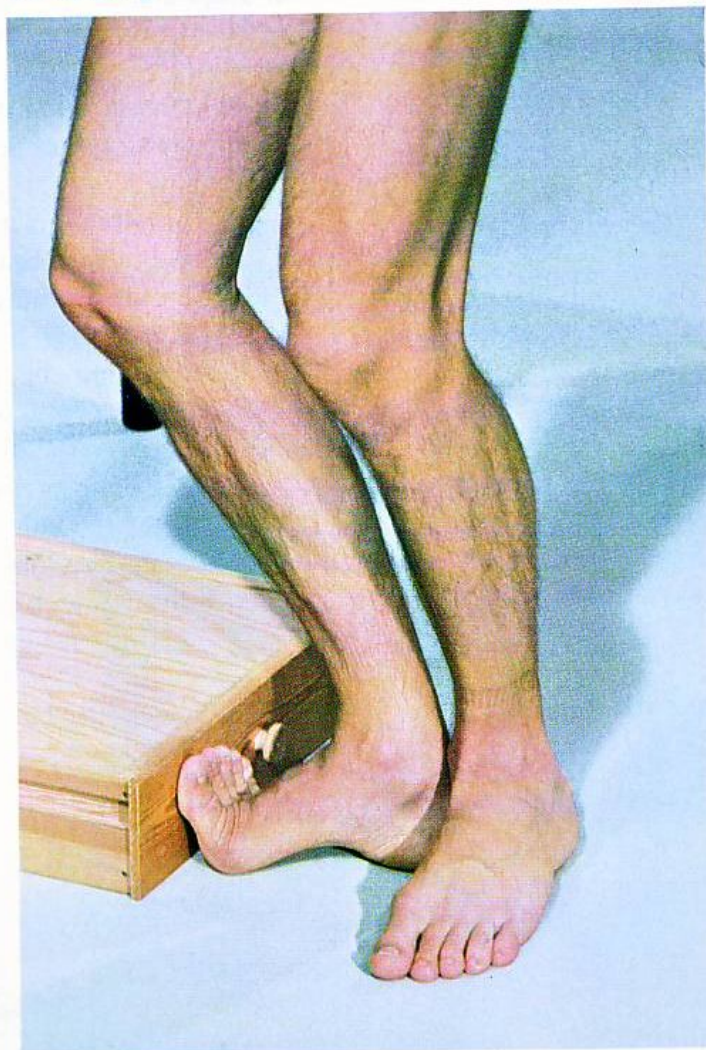
With ankle bent upward, you should be able to bend toes upward, too.



Starting Position:



Stretching:



THE TOES 2.

Your difficulty is:

Moving your big toe away from the other toes.

Tight Muscles:

Muscles that move big toe inward:

1 *adductor hallucis*

2 *flexor hallucis brevis, fibular part*

3 *flexor hallucis brevis, tibial part* (see Note 4)

Equipment:

Chair or stool.

Starting Position:

Sit on chair/stool, with right foot resting on left knee and right knee out to side. Grasp right foot with right hand, and right big toe with left hand.

Stretching:

1. Hold right foot steady with right hand. Pull big toe forward and outward with left hand, so that stretch is felt in toe and under foot.
2. Try to press big toe against other toes; resist with left hand; hold for 5 seconds.
3. Relax; pull big toe forward and outward to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Release grip of left hand.
2. Move big toe outward to limit.
3. Resist slightly with left hand.
4. Hold position a few seconds.

Common Errors:

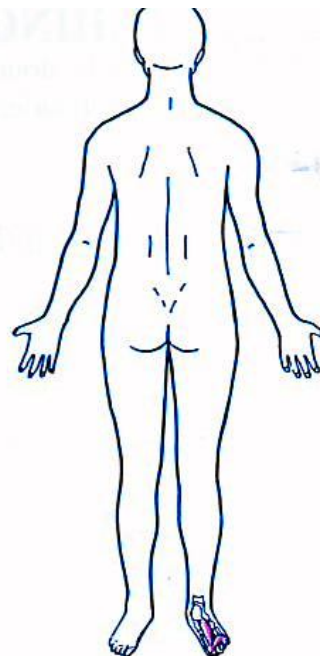
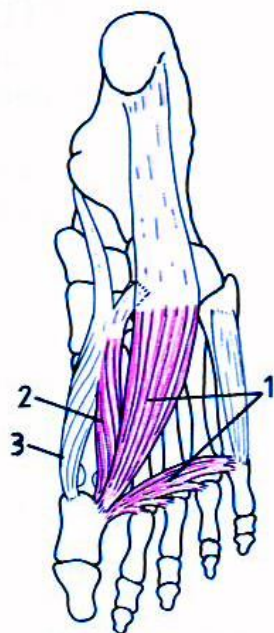
- * Not enough forward pull on big toe – too much strain on joint.
- * Right hand does not hold foot steady.

Notes:

1. This stretch is important for all 'civilized' people who wear the wrong kind of footwear.
2. This stretch may also be done with toe bent upward at various angles.
3. In rare cases, big toe points away from the other toes. If so, the same stretch may be used, except that left hand pulls big toe forward and closer to other toes. This way, the muscle marked (3) is stretched.
4. This exercise may also be done standing up. Left heel keeps right big toe still by pressing down on floor. Right foot is then pulled backward. To add effect, right leg is gradually turned outward (heel inward), so that distance between big toe and other toes increases to limit while right foot is being pulled backward. See alternative illustrations (right).

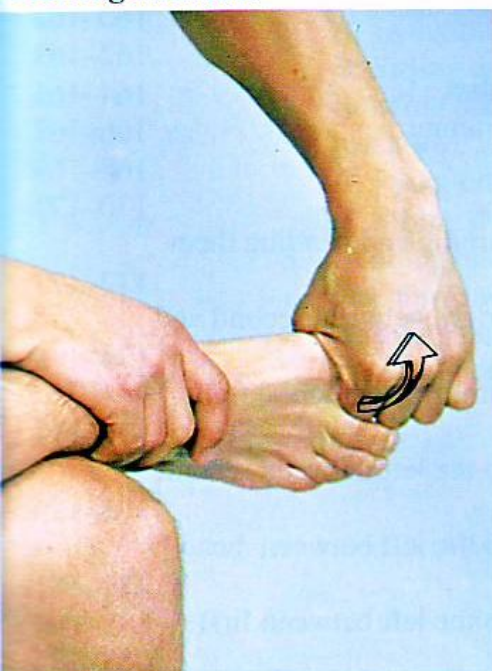
Normal Mobility:

Big toe should be able to point away from other toes.



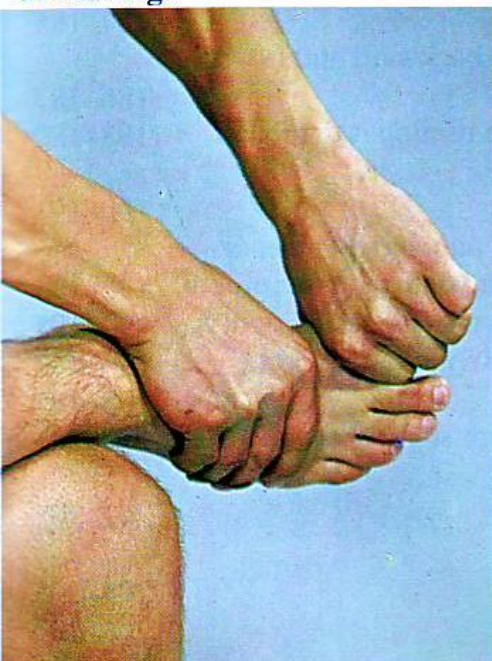
Starting Position:

Starting Position:



Stretching:

Stretching:



AUTOSTRETCHING FOR MUSCLES OF THE BACK AND JAW

Note: Exercises that can be done on left or right side of the body are always shown on the right. When you want to do them on the left side, swap "left" and "right" in all descriptions and pictures.

REGISTER

Body part	Exercise No.	Your difficulty is...	Page
The Neck	1	Bending your head and neck forward.	148-149
	2	Bending forward between head and first vertebra.	150-151
	3	Bending forward between first and second vertebrae.	152-153
	4	Bending forward between second and third vertebrae.	154-155
	5	Bending your head and neck forward while turning and bending them sideways to the right.	156-157
	6	Bending forward, turning and bending to the right between second and third vertebrae.	158-159
	7	Bending your head and neck forward while turning them to the right and bending them sideways to the left.	160-161
	8	Bending your head and neck backward.	162-163
	9	Bending backward between head and first vertebra.	164-165
	10	Bending backward between first and second vertebrae.	166-167
	11	Bending your middle and lower neck backward.	168-169
	12	Bending your head and upper neck backward.	170-171
	13	Bending your head and neck backward while turning and bending them sideways to the right.	172-173
	14	Bending backward, turning and bending to the right between second and third vertebrae.	174-175
	15	Bending your head and neck backward while turning them to the right and bending them to the left.	176-177
	16	Bending backward, turning right and bending to the left between second and third vertebrae.	178-179
	17	Bending backward, turning right and bending to the left between head and first vertebra.	180-181
	18	Bending backward, turning right and bending to the left between first and second vertebrae.	182-183
	19	Turning your head and neck to the right while bending them backward and to the left.	184-185
	20	Turning your neck to the right, while bending it backward and to the left.	186-187
	21	Bending your neck forward and to the left while turning it to the left.	188-189
The Jaw	1	Moving your jaw to the left.	190-191
	2	Opening your mouth, because your jaw is stuck on the right side, or because your lower jaw moves to the right when you open your mouth.	192-193
	3	Opening your mouth slightly without lower jaw moving to the right.	194-195
	4	Opening your mouth wide without lower jaw moving to the right.	196-197
	5	Pulling in lower jaw with mouth closed.	198-199
	6	Pulling in lower jaw on the right side, with mouth slightly open.	200-201
The Upper Back	1	Bending forward above the waist.	202-203
	2	Bending forward at shoulder level.	
		A: Lying face down.	204-205
		B: Sitting.	206-207

The Upper Back	3	Bending forward above the waist while turning and bending sideways to the right.	208–209
	4	Bending forward, turning and bending to the right in some part of your back above the waist.	210–211
	5	Bending backward in some part of your back above the waist.	212–213
	6	Bending backward, turning right and bending to the left in some part of your back above the waist.	214–215
	7	Breathing in.	216–217
	8	Breathing out.	218–219
The Lower Back	1	Bending the lowest part of your back forward.	220–221
	2	Bending forward while turning and bending to the right at waist level.	222–223
	3	Bending forward while turning right and bending sideways to the right just above waist level.	224–225
	4	Bending backward just above waist level.	226–227
	5	Bending backward at waist level.	228–229
	6	Bending backward while turning right and bending sideways to the left at waist level.	
		A: Lying on your side, back arched.	230–231
		B: Sitting down, back arched.	232–233
	7	Bending backward while turning right and bending sideways to the left just above waist level.	
		A: Lying on your side, back arched.	234–235
		B: Sitting down, back arched.	236–237
	8	Bending backward while turning right and bending sideways to the left just above waist level.	
		A: Lying on your side, lower back bent forward.	238–239
		B: Sitting down, lower back bent forward.	240–241

The spine – how it's made and how it works

The spine is made up of short pieces of bone called vertebrae. The movements of the vertebrae are much smaller than those of the other joints in your body – sometimes they can hardly be detected at all. But they have a lot of influence on movements in other parts, as everyone knows that ever suffered from lumbago. Be the movements ever so small, they still play a very important part in the way your back works.

Stretching the muscles that control the spine is just as necessary as any other stretching, but it must be done with great care. Doing it wrong can be much more dangerous around the spine than elsewhere, since these muscles are so close to vital and vulner-

able tissues like the spinal cord, nerves and discs. To avoid injury, all stretching exercises must be performed with the utmost care and caution. Don't start stretching your neck and back right away. Leave those exercises until you're quite sure you have learnt to do the arm and leg stretches right.

The spine is the most complicated structure in your entire skeleton. It keeps your body upright, but even though 'good posture' is often described as a 'straight back', the spine is neither straight nor stiff.

The spine should carry your head, support your body and protect the spinal cord with all its sensitive contents. At the same time it should let you move freely.

The spine is divided into four parts (Fig 1):

1. The cervical spine, 7 vertebrae (the neck, to you).
2. The thoracic spine, 12 vertebrae and the ribs (from your shoulders to just above your waist).
3. The lumbar spine, 5 vertebrae (your waist level and below).
4. The sacrum and coccyx (the very end, down in the pelvis).

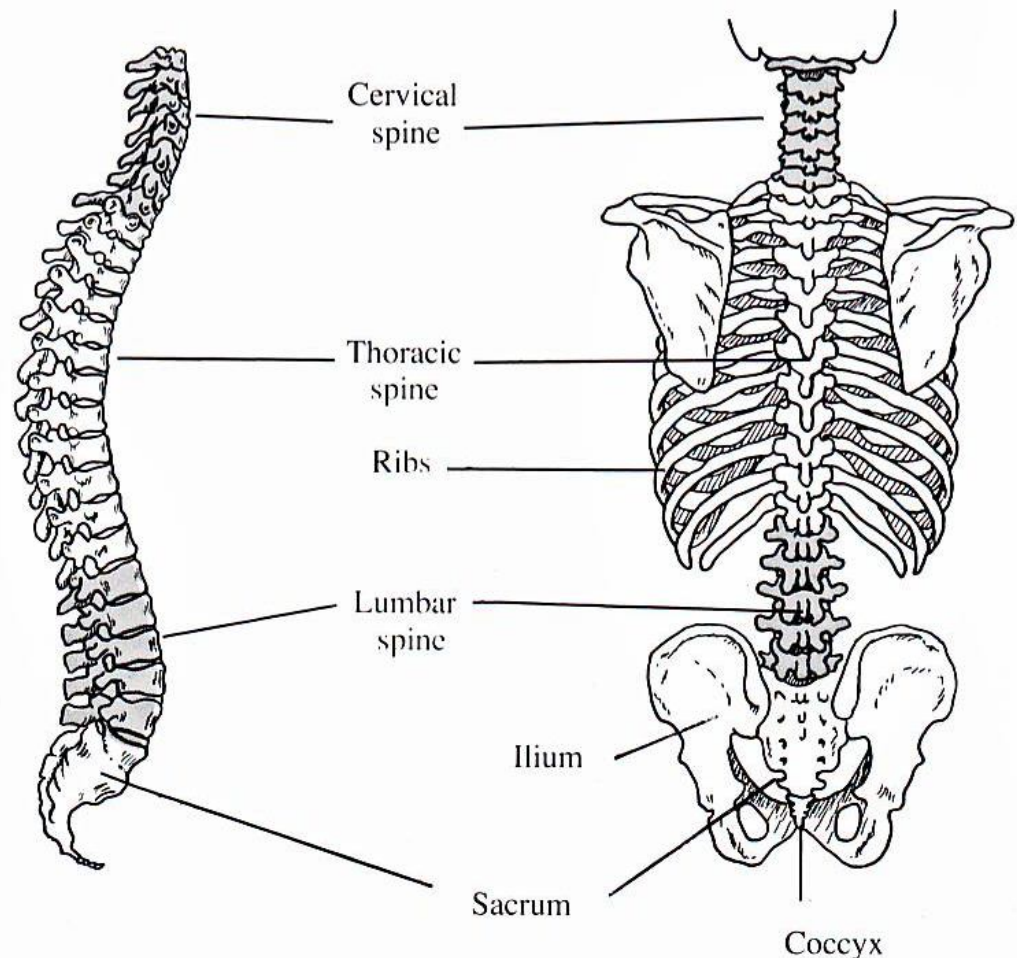


Fig 1.

The two top vertebrae are different from the rest. The uppermost one is called the *atlas* – named after the giant Atlas in Greek mythology, who carried the heavens on his shoulders – and has no body and no spinous process. The atlas supports the head (also called the *occiput*). The second vertebra is known as the *axis*, because it provides an axis for turning the head; atlas and axis together give the head ample range of movement in various directions. The axis has a spinous process which is easy to locate: it feels like a bump in the hollow at the back of your neck (Fig 2).

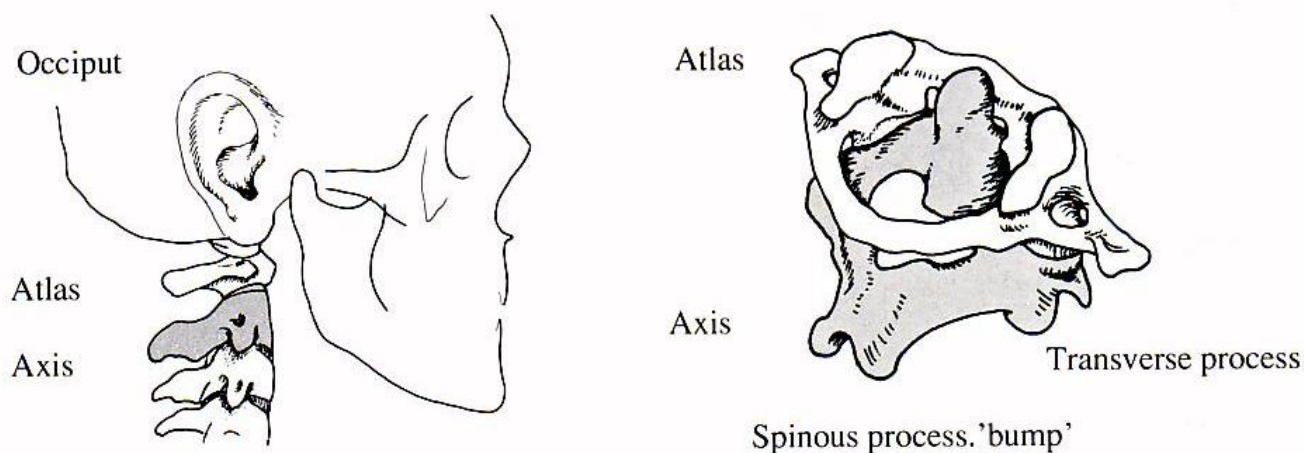


Fig 2

Some of the neck exercises are described in terms of segments. A segment is a pair of adjacent vertebrae. (We describe them in pairs in order to make clear how they move relative to each other). The top segment is the head and the first vertebra; this segment is called 'occiput on atlas'. The next is the first and second vertebrae – 'atlas on axis'. Then comes the second and third vertebrae, 'axis on 3rd cervical vertebrae', and so on. The last segment of this part of the spine is '7th cervical on 1st thoracic vertebrae' – where the neck meets the back proper.

The movements of the cervical spine are more complicated than any other back movements. The surrounding tissues are relatively unprotected and they can be injured quite easily, even by minor accidents or careless movements.

The spine – how it should move

The spine is so intricately fitted together that you can't bend it in a combined forward-sideways or backward-sideways motion without turning (rotating) it, too.

If you bend *forward and to the right* at the same time, the whole row of vertebrae turn (rotate) *to the right* (Fig 3).

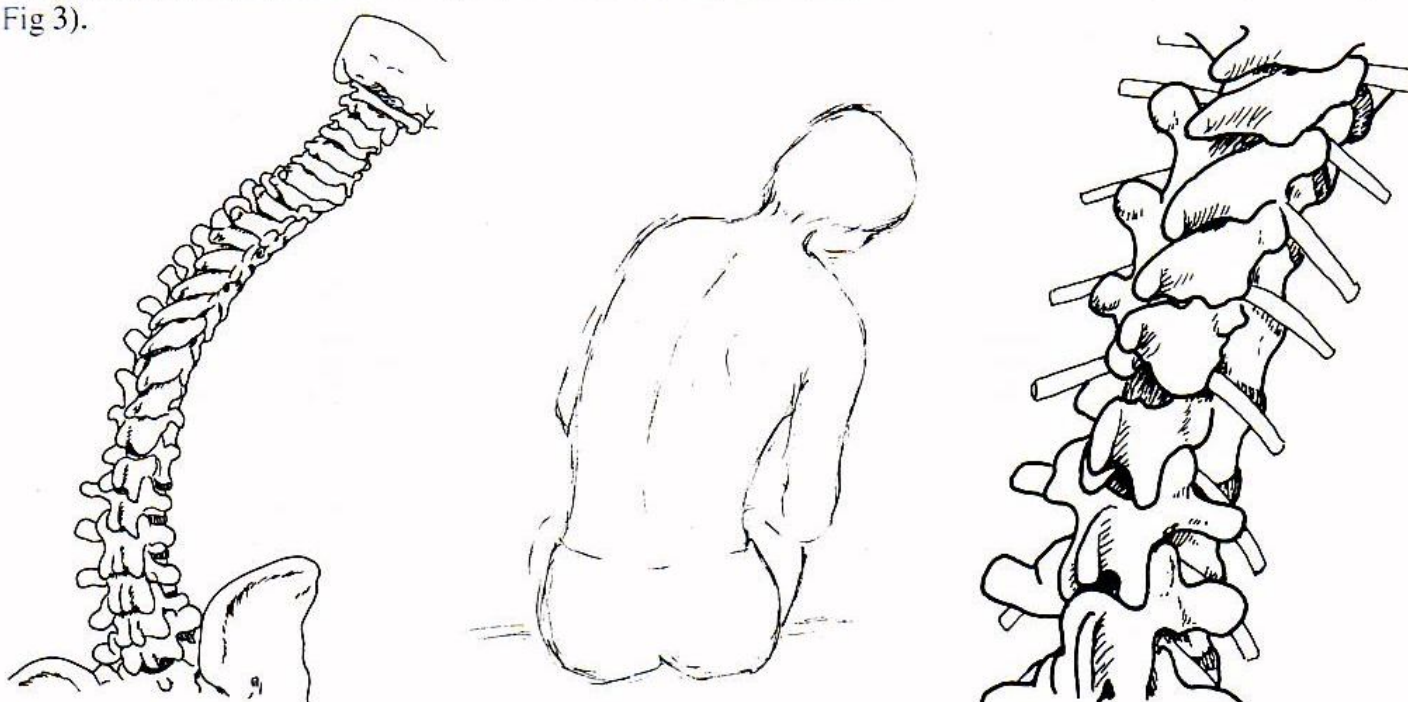


Fig 3. Movement pattern when bending forward

If you bend *backward and to the right* at the same time, the vertebrae of the thoracic and lumbar spine turn (rotate) *to the left* (Fig 4).



Fig 4. Movement pattern when bending backward

These normal movement patterns can be used to protect those parts of the back which must not move during a stretching exercise. The exercise called Upper Back 4 (page 210) is an example (Fig 5): The lower (lumbar) spine is *bent forward*, and the cushion under the left buttock keeps it *bent to the left*. This means that the lumbar vertebrae are *turned (rotated) to the left*, too. If you bend and turn your upper (thoracic) spine to the right *while sitting in this position*, the lumbar vertebrae don't follow the thoracic ones; the shape of the vertebrae won't let them. The lower back is protected.

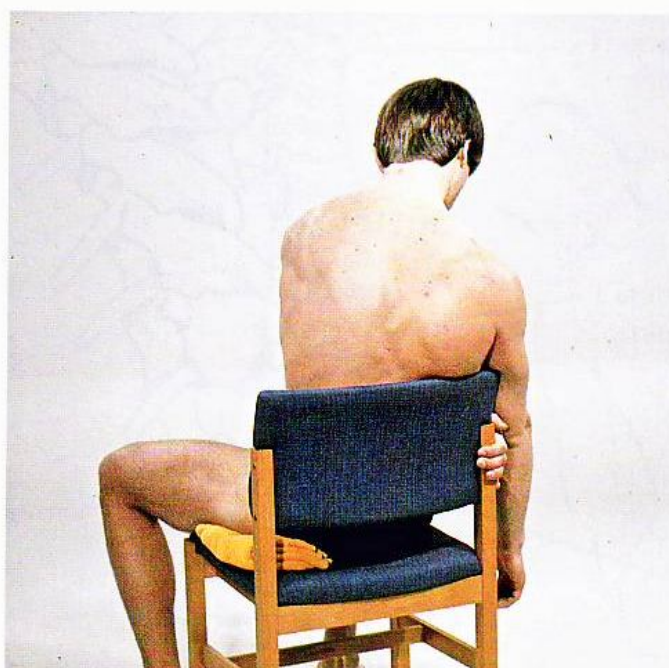
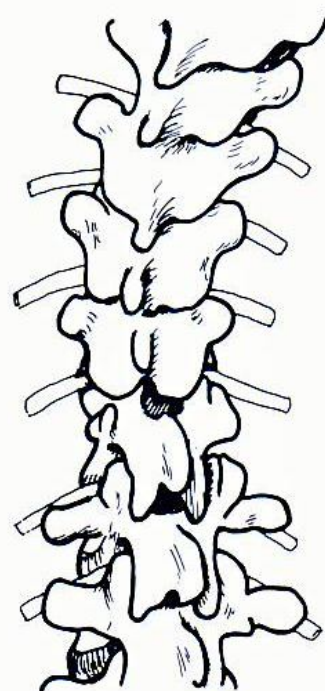


Fig 5.



Another example is the exercise Upper Back 6 (page 214). Here the lower back is protected according to the same principle (Fig 6). The lumbar spine is *bent backward*, and the cushion under the right buttock keeps it *bent sideways to the right*. This means that the lumbar vertebrae are *turned to the left*. If you bend and turn your upper (thoracic) spine to the right *while sitting in this position*, the lumbar vertebrae don't follow the thoracic ones. The shape of the vertebrae prevents such a movement. The lower back is protected.

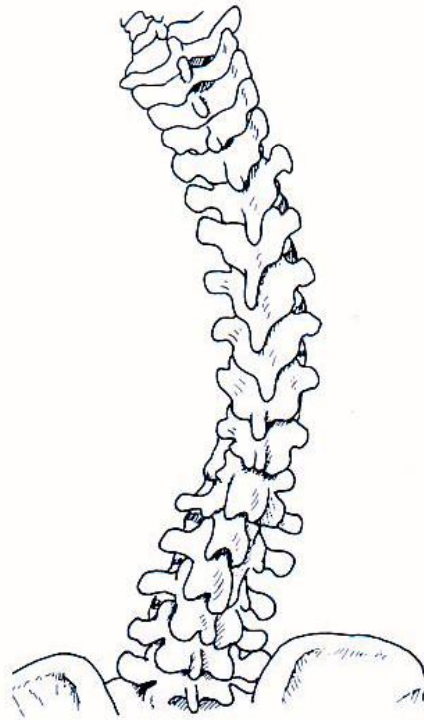
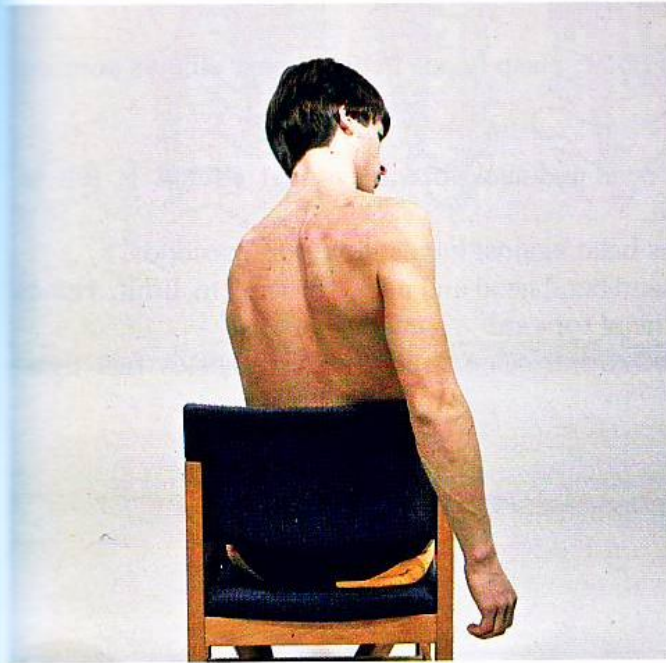


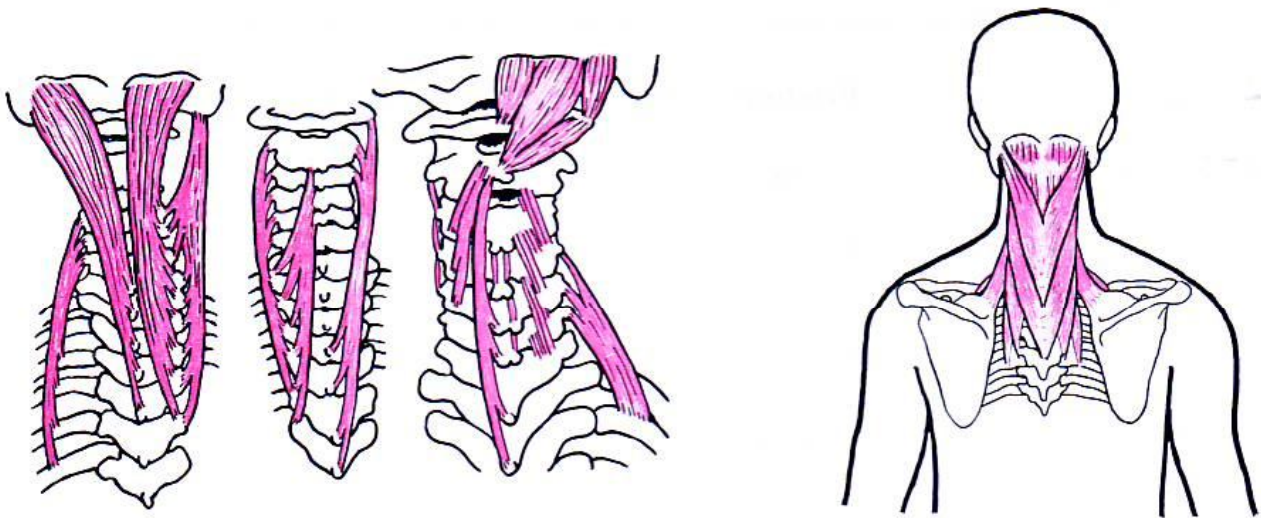
Fig 6.

The exercises recommended for neck and spine have other uses than just stretching back muscles. They're excellent when you want to get stiff joints between vertebrae to move more freely.

If you follow the advice given in the introduction and guide, you can avoid injury, improve your suppleness and movements and so stay in good shape.

THE NECK 1.

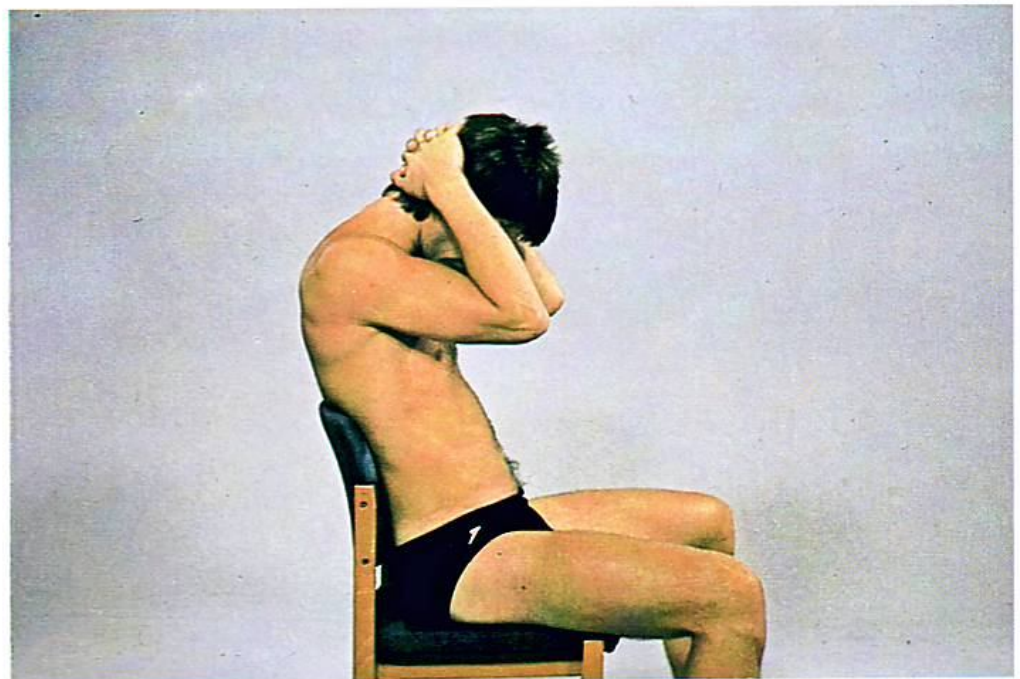
Your difficulty is:	Bending your head and neck forward.
Tight Muscles:	All muscles moving head and neck backward.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair; clasp hands behind neck, elbows pointing forward.
Stretching:	1. Look downward; bend head and neck forward so that stretch is felt in back of neck up to head. 2. Look upward, and press head against hands; hold for 5 seconds. 3. Relax; look downward and bend head and neck forward to limit. Hands follow, but do not pull head forward. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release grip with hands; look downward. 2. Relax jaw; open mouth; draw chin back. 3. Bend head and neck forward to limit. 4. Resist this movement with one hand against forehead. 5. Hold position a few seconds.
Common Errors:	* Chin juts forward. * Elbows not pointing forward. * Jaw not relaxed. * Back not against chair back.
Note:	Stretch should be felt only in back of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal Mobility:	With support for your back, you should be able to touch your chin to your chest.



Starting Position:



Stretching:



THE NECK 2.

Your difficulty is:

Bending forward between head and first vertebra.

Tight Muscles:

Primarily, muscles that tilt head backward on atlas.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Grasp back of neck with right hand, little finger over top vertebra (atlas – marked with a small x on skeleton drawing), found just above the knobby bump in lower end of hollow beneath back of skull (the bump is the 2nd vertebra or axis). The rest of right hand supports neck. Place left hand on back of skull, with forearm resting on top of head. Both elbows should point forward.

Stretching:

1. Look downward; draw chin back and bend head slowly forward, as if to nod, so that stretch is felt high up in neck. Movement only above right little finger.
2. Look upward, and press head against left hand; hold for 5 seconds.
3. Relax; look downward; draw chin back and bend head forward to limit; assist with slight left hand pull.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; release left hand grip; look downward.
2. Relax jaw; open mouth slightly; draw chin back; press neck back against right hand.
3. Bend head forward to limit. Movement only above little finger of right hand.
4. Resist with left hand against forehead.
5. Hold position a few seconds.

Common Errors:

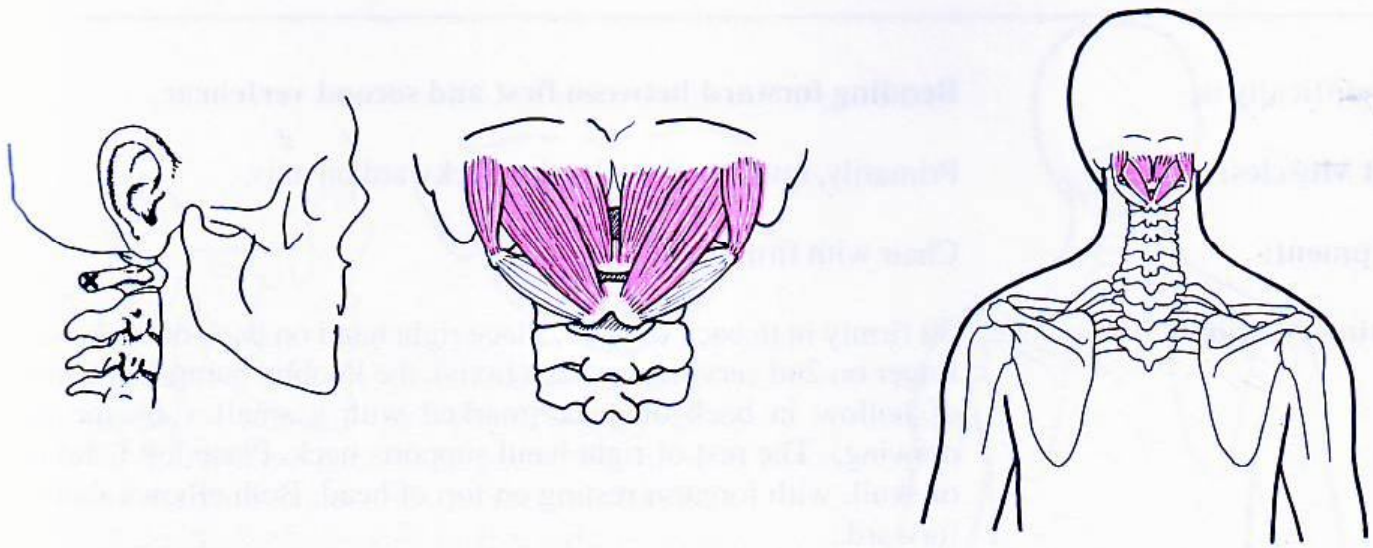
- * Right hand too far down on neck or right hand grip not firm enough for stable support.
- * Chin not drawn far enough back.
- * Elbows not pointing forward.
- * Jaw not relaxed.

Note:

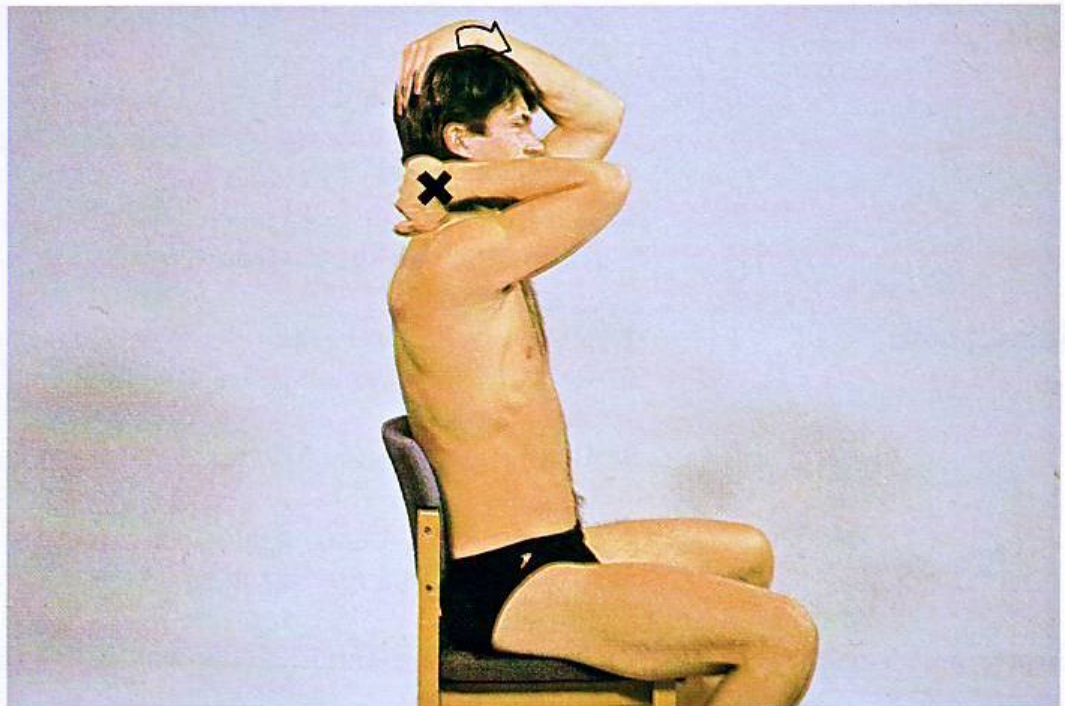
Stretch should be felt only in back of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

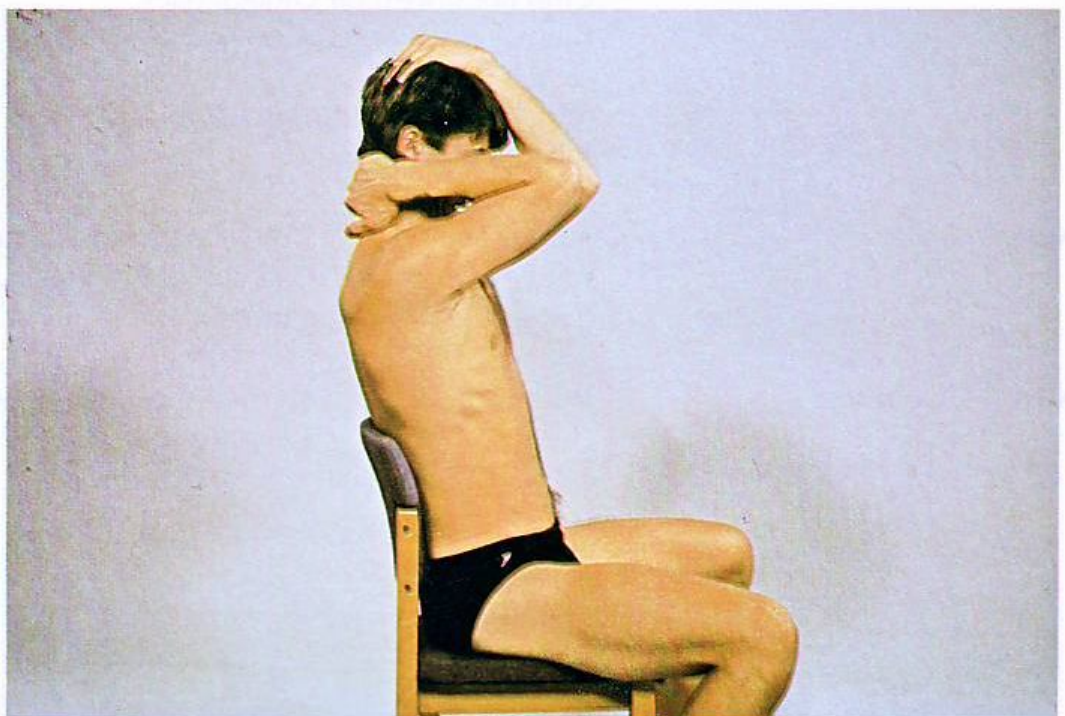
With neck 'long', you should be able to nod your head by pulling in your chin.



Starting Position:



Stretching:



THE NECK 3.

Your difficulty is:

Bending forward between first and second vertebrae.

Tight Muscles:

Primarily, muscles that tilt atlas backward on axis.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place right hand on back of neck, with little finger on 2nd cervical vertebra (axis), the knobby bump at the lower end of hollow in back of neck (marked with a small x on the skeleton drawing). The rest of right hand supports neck. Place left hand on back of skull, with forearm resting on top of head. Both elbows should point forward.

Stretching:

1. Look downward, draw chin back and bend head slowly forward, as if to nod, so that stretch is felt high up in neck. Movement only above right little finger.
2. Look upward, and press head against left hand; hold for 5 seconds.
3. Relax; look downward, draw chin back and bend head forward to limit; assist with slight left hand pull.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; release left hand grip; look downward.
2. Relax jaw; open mouth slightly, draw chin back, press neck back against right hand.
3. Bend head forward to limit. Movement only above little finger of right hand.
4. Resist with left hand against forehead.
5. Hold position a few seconds.

Common Errors:

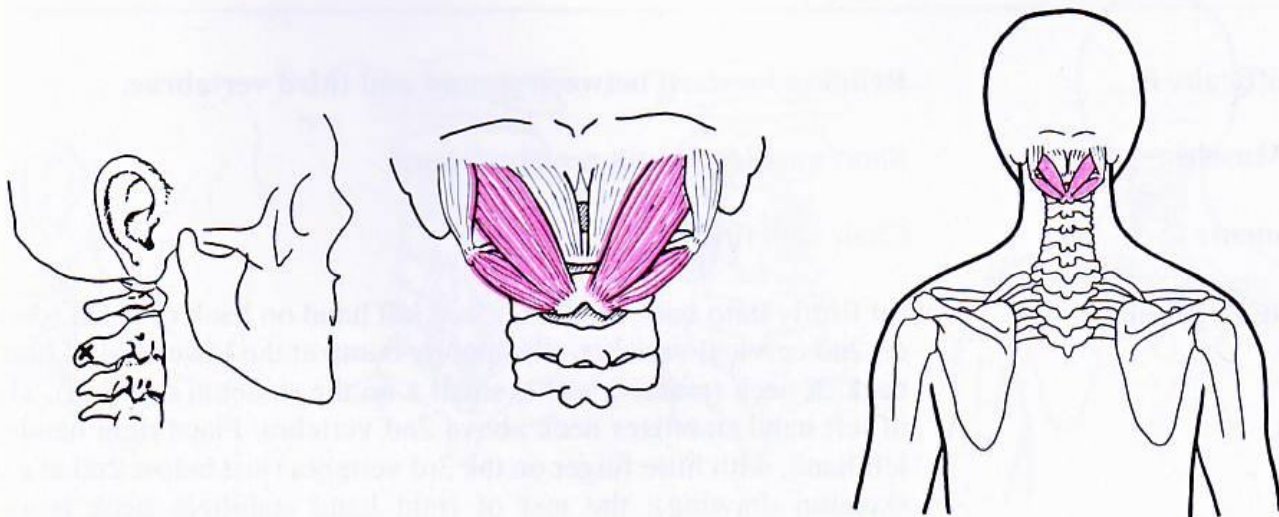
- * Right hand too far down on neck or right hand grip not firm enough for stable support.
- * Chin not drawn far enough back.
- * Elbows not pointing forward.
- * Head turned.
- * Shoulders and chest moved forward.
- * Jaw not relaxed.

Note:

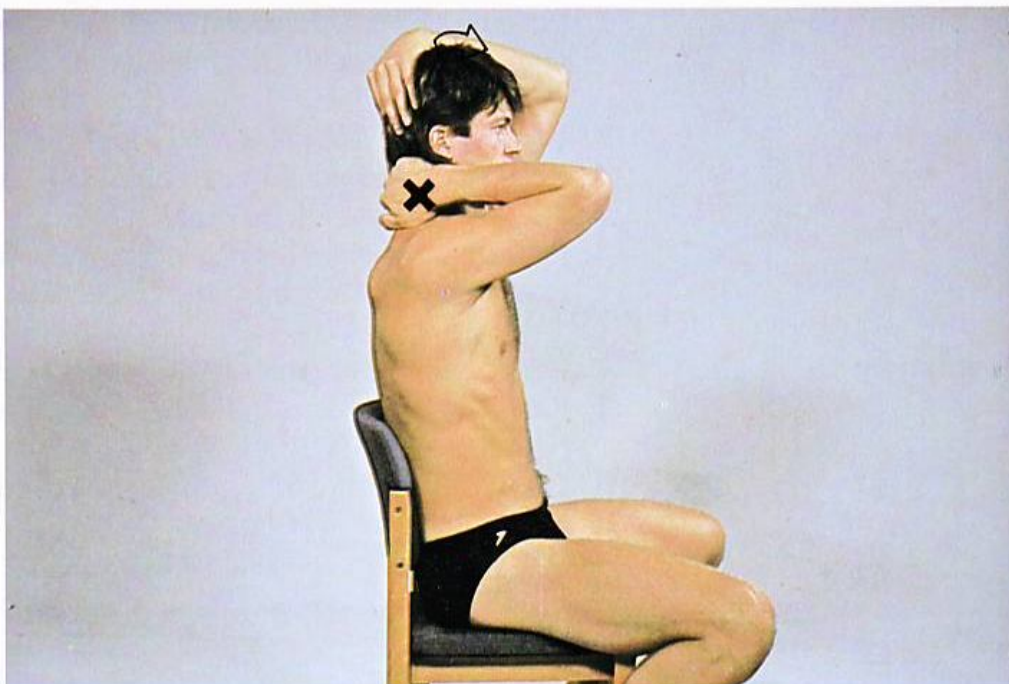
Stretch should be felt only uppermost in back of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

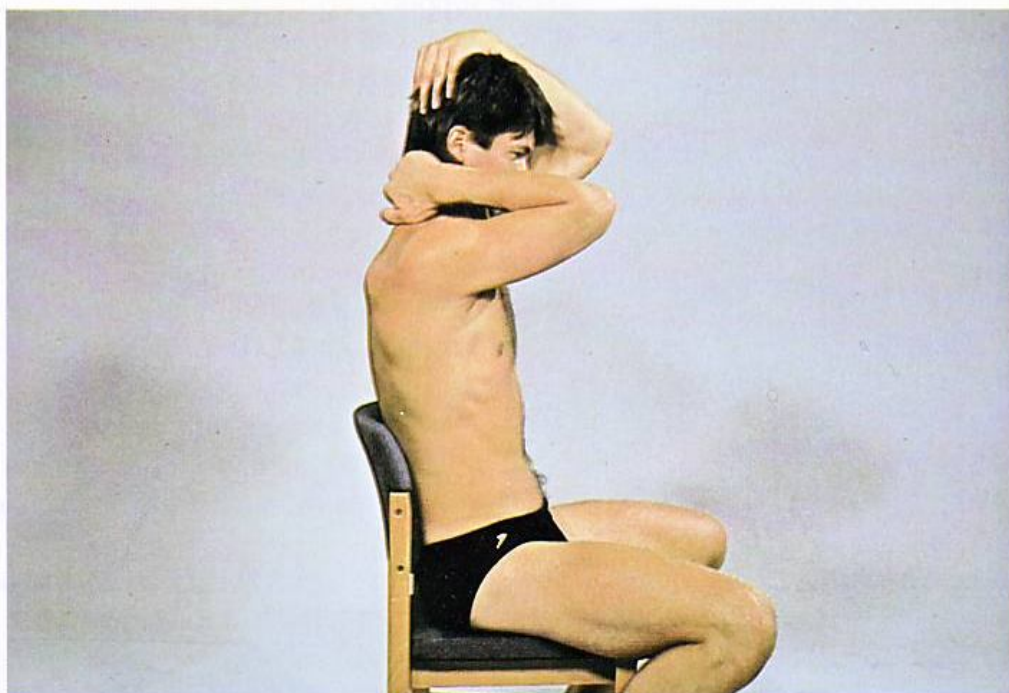
With neck 'long', you should be able to nod quite far by pulling in your chin.



Starting Position:



Stretching:



THE NECK 4.

Your difficulty is:

Bending forward between second and third vertebrae.

Tight Muscles:

Short muscles that tilt neck backward.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place left hand on back of neck, forefinger on 2nd cervical vertebra, the knobby bump at the lower end of hollow in back of neck (marked with a small x on the skeleton drawing). The rest of left hand stabilizes neck above 2nd vertebra. Place right hand below left hand, with little finger on the 3rd vertebra (just below 2nd at x on the skeleton drawing); the rest of right hand stabilizes neck below 3rd vertebra.

Stretching:

1. Look downward, draw chin back and bend head slowly forward, as if to nod, so that stretch is felt high up in neck and bend is entirely above right little finger.
2. Look upward, and press head against left hand; hold for 5 seconds.
3. Relax; look downward, draw chin back and bend head forward to limit; assist with slight left hand pull.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; release left hand grip; look downward.
2. Relax jaw; open mouth slightly, draw chin back, press neck back against right hand.
3. Bend head forward to limit. Movement only above little finger of right hand.
4. Resist with left hand against forehead.
5. Hold position a few seconds.

Common Errors:

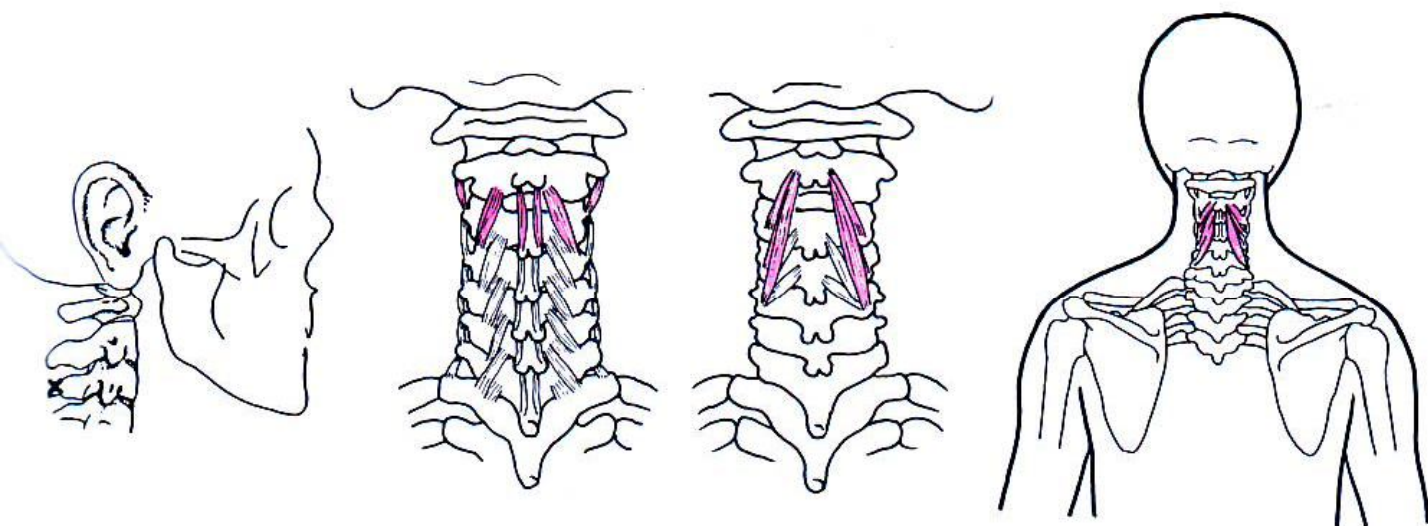
- * Right hand too far down on neck or right hand grip not firm enough for stable support.
- * Chin not drawn far enough back.
- * Elbows not pointing forward.
- * Head turned.
- * Shoulders and chest moved forward.
- * Jaw not relaxed.

Notes:

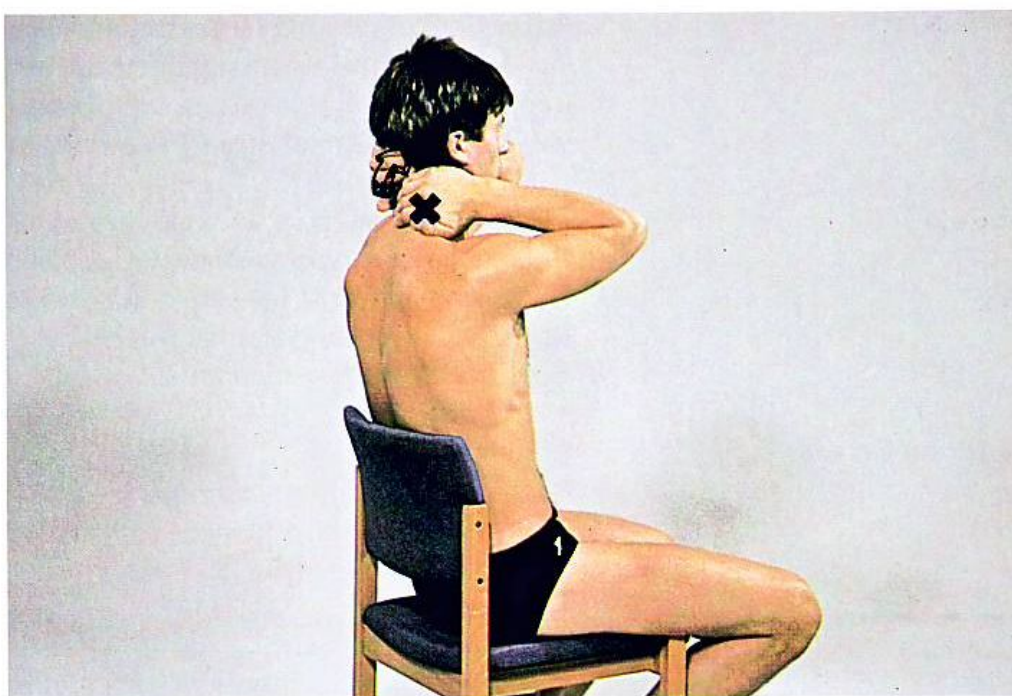
1. This exercise can be done the same way for the whole neck, in segments (pairs) of vertebrae from the above and down to 7th cervical on 1st thoracic, (last neck vertebra on first of upper back). Just move hands down accordingly.
2. Stretch should be felt only in muscles at back of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

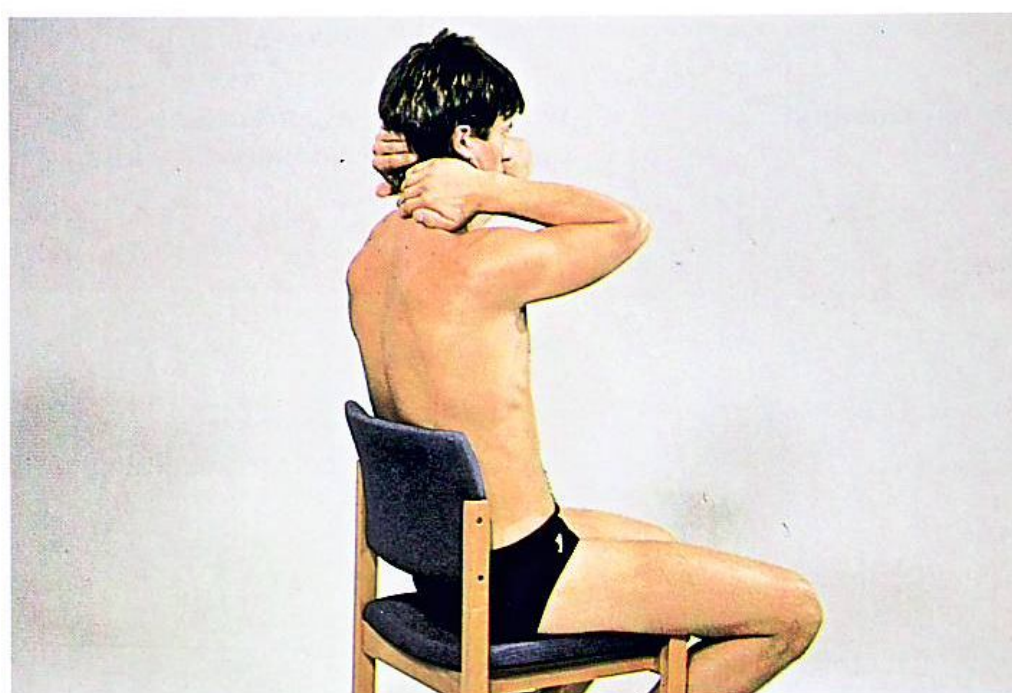
With neck 'long', you should be able to nod quite far by pulling in your chin.



Starting Position:

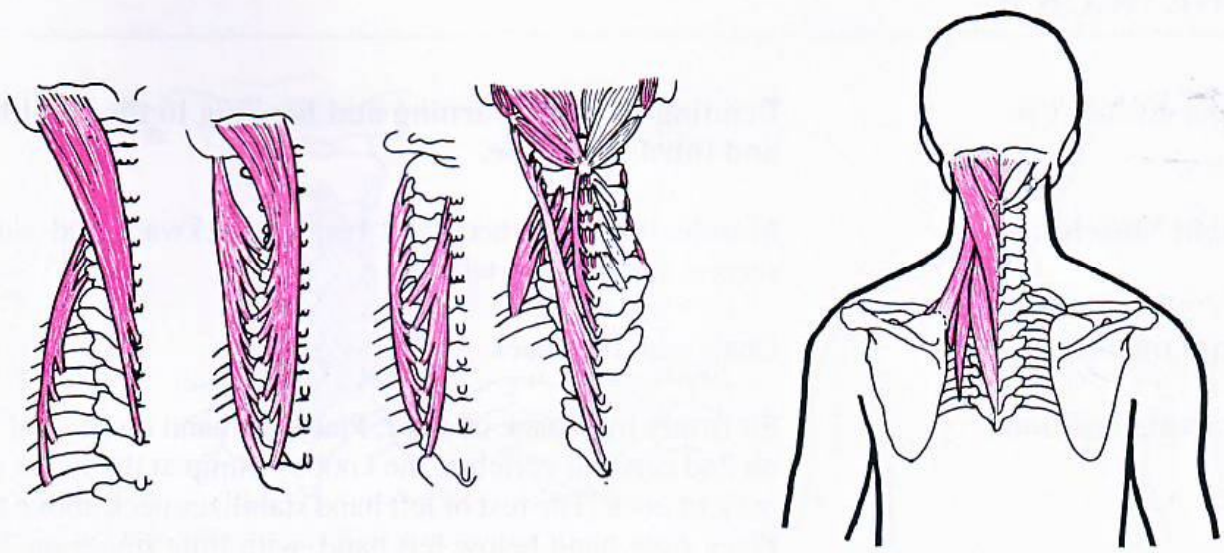


Stretching:

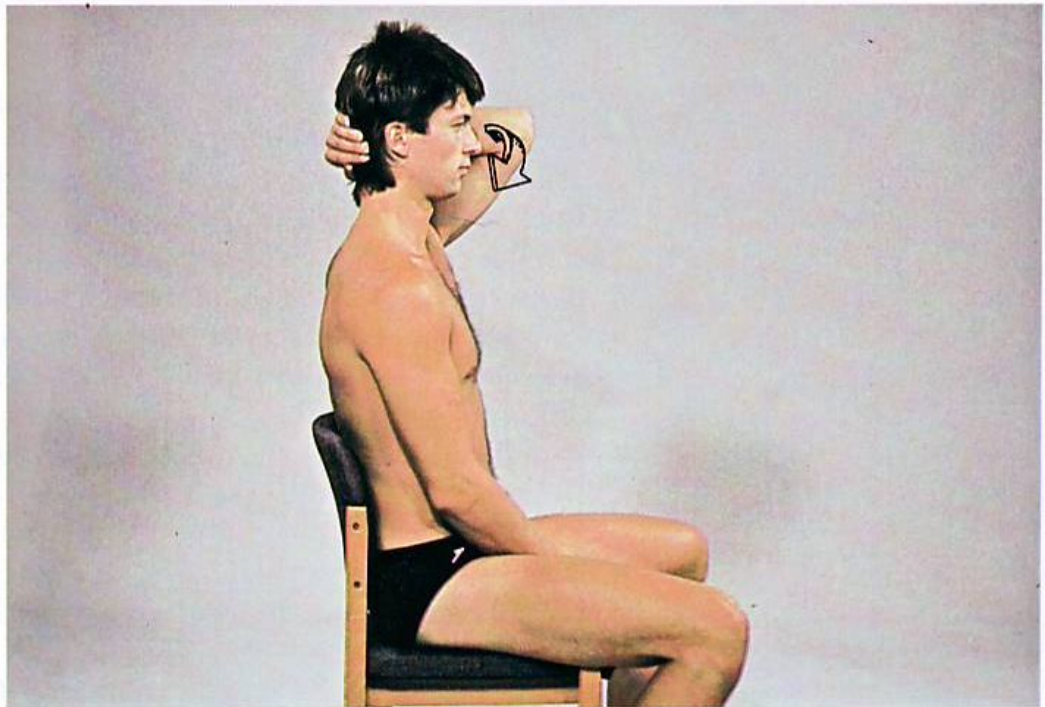


THE NECK 5.

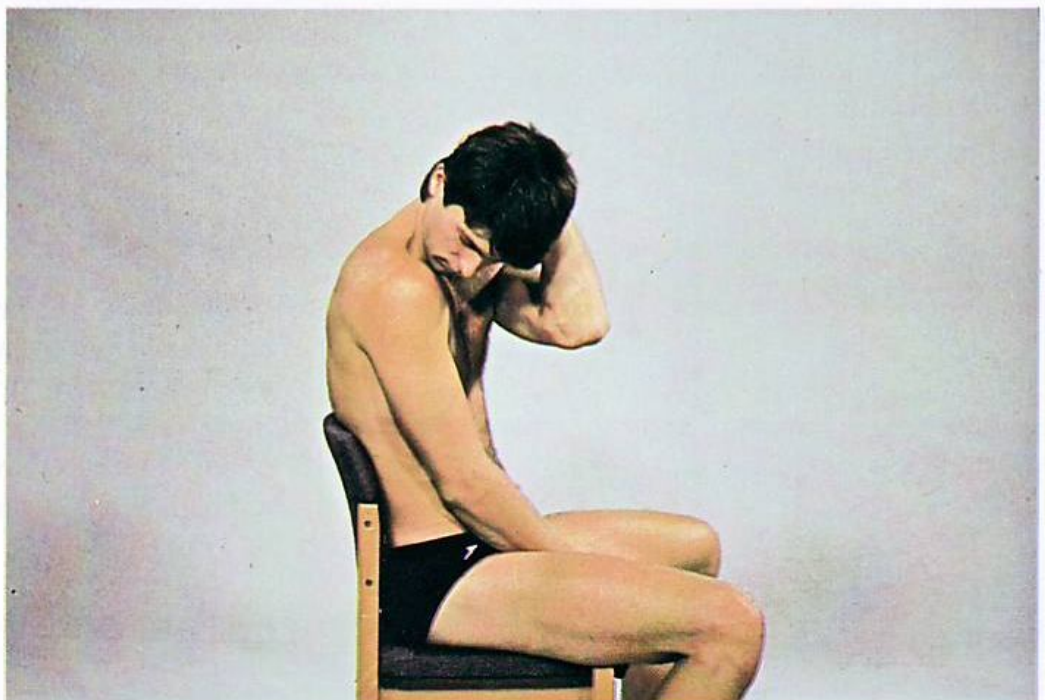
Your difficulty is:	Bending your head and neck forward while turning and bending them sideways to the right.
Tight Muscles:	Muscles that turn neck and bend it backward and sideways.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair. Place left hand on back of head, at base of skull.
Stretching:	1. Look down at right shoulder, bending head and neck forward and down to the right, so that stretch is felt in back of neck and head on left side. 2. Look up and to the left and press head against left forearm and hand; hold for 5 seconds. 3. Relax; look down and backward to the right, and bend head and neck forward and down to the right to limit, assisting with slight left hand pull. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release left hand grip; look down and backward to the right. 2. Relax jaw; open mouth slightly, draw chin back. 3. Bend head and neck forward and down to the right to limit. 4. Resist with left hand against forehead. 5. Hold position a few seconds.
Common Errors:	* Chin juts forward. * Back pulls away from chair back. * One of the three movements – forward or sideways bend, or turn – is too small. * Jaw not relaxed.
Note:	Stretch should be felt only in back and rear left side of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal Mobility:	With back held against chair back, you should be able to bend forward and down while turning right until chin touches chest.



Starting Position:

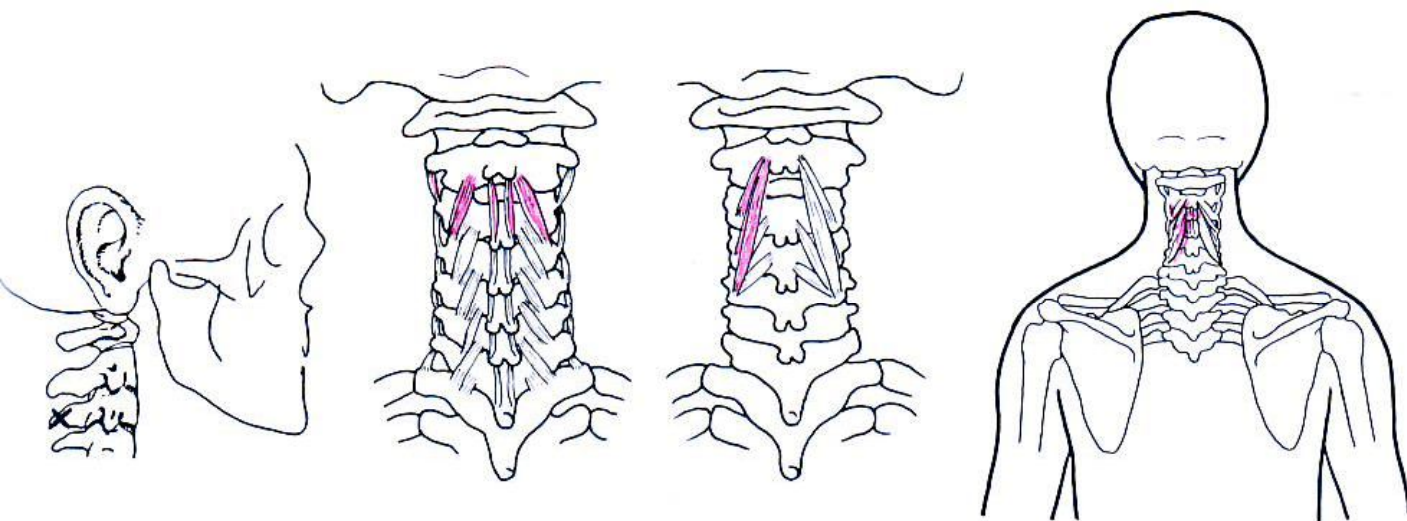


Stretching:

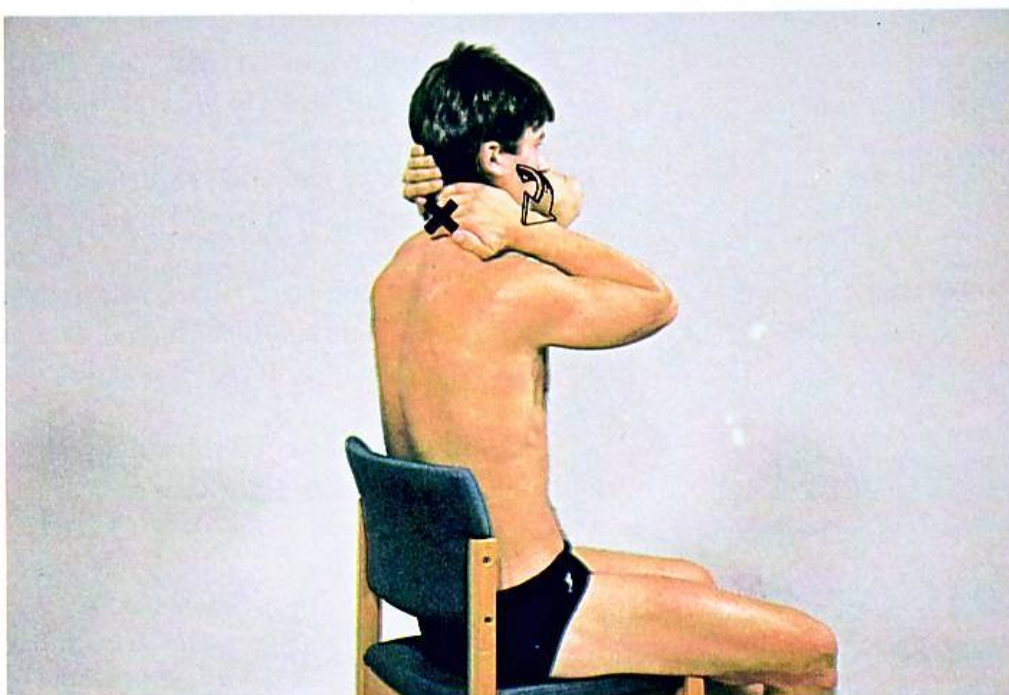


THE NECK 6.

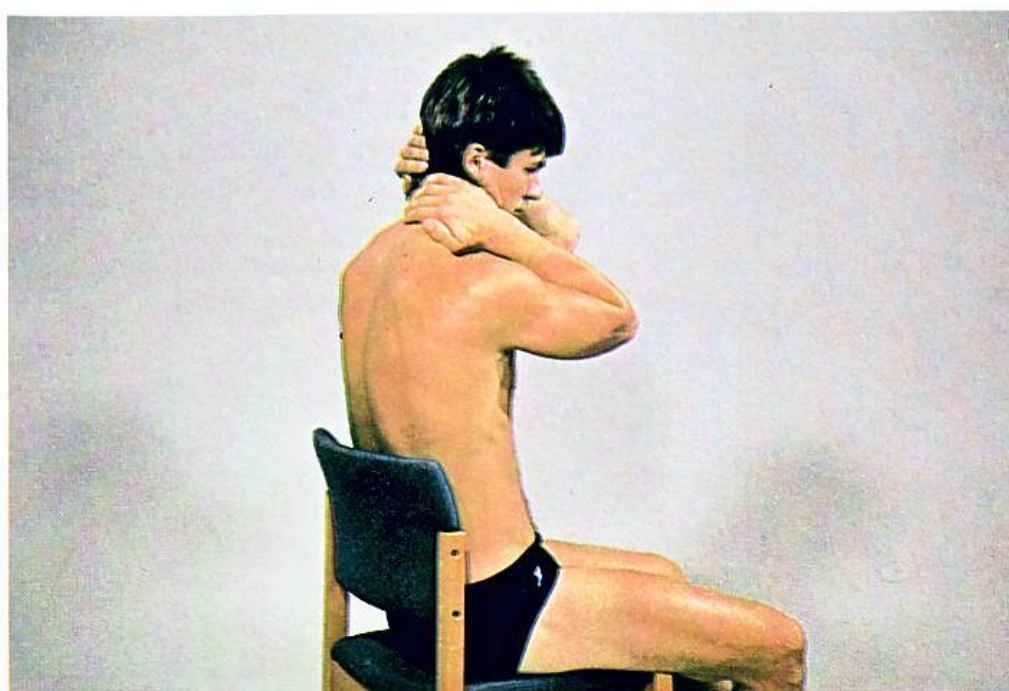
Your difficulty is:	Bending forward, turning and bending to the right between second and third vertebrae.
Tight Muscles:	Muscles that turn neck and bend it backward and sideways between second and third vertebrae.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair. Place left hand on back of head, forefinger on 2nd cervical vertebra, the knobby bump at the lower end of hollow in back of neck. The rest of left hand stabilizes neck above the 2nd vertebra. Place right hand below left hand, with little finger on 3rd vertebra, just below the 2nd (marked with a small x on the skeleton drawing) and touching left forefinger; the rest of right hand stabilizes neck below the 3rd vertebra.
Stretching:	1. Look down and to the right; draw chin back and bend head forward and to the right while turning it to the right, so that stretch is felt around 2nd and 3rd vertebrae. Movement only above little finger of right hand. 2. Look up and to the left and press head against left hand; hold for 5 seconds. 3. Relax; look down and to the right; draw chin back, pushing slightly with left hand; bend head forward and to the right, and turn it to the right, with head and two uppermost vertebrae as a single unit as opposed to the 3rd vertebra, to limit. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain right hand grip; release left hand grip; look down and to the right. 2. Relax jaw; open mouth slightly, draw chin back; press neck back against right hand. 3. Bend head forward and to the right and turn it to the right to limit. Movement only above little finger of right hand. 4. Resist forward movement with left hand against forehead. 5. Hold position a few seconds.
Common Errors:	* Right little finger and left forefinger not touching. * Right hand not stable; moves with movement. * Chin not drawn far enough back and jaw not relaxed.
Notes:	1. This exercise can be done the same way for the rest of the neck, in segments (pairs) of vertebrae from the above and down to 7th cervical on 1st thoracic (last neck vertebra on first of upper back). Just move hands down accordingly. 2. Stretch should be felt only in neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal Mobility:	You should be able to bend your head and upper neck quite a bit forward and sideways while turning it to the side.



Starting Position:



Stretching:



THE NECK 7.

Your difficulty is:

Bending your head and neck forward while turning them to the right and bending them sideways to the left.

Tight Muscles:

Muscles that turn neck and bend it backward and sideways.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place left hand on back of head, fingers around right side of head.

Stretching:

1. Look down to the right, bending head and neck forward and down to the left, and turn head to the right so that stretch is felt in neck and back of head.
2. Look up and to the left and press head against left hand; hold for 5 seconds.
3. Relax; look down to the right; bend head and neck forward and down to the left, and turn head to the right to limit, assisting with slight left hand pull.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Release left hand grip; look down to the right.
2. Relax jaw; open mouth slightly, draw chin back.
3. Bend head and neck forward and down to the left and turn head to the right to limit.
4. Resist movement with left hand against left ear.
5. Hold position a few seconds.

Common Errors:

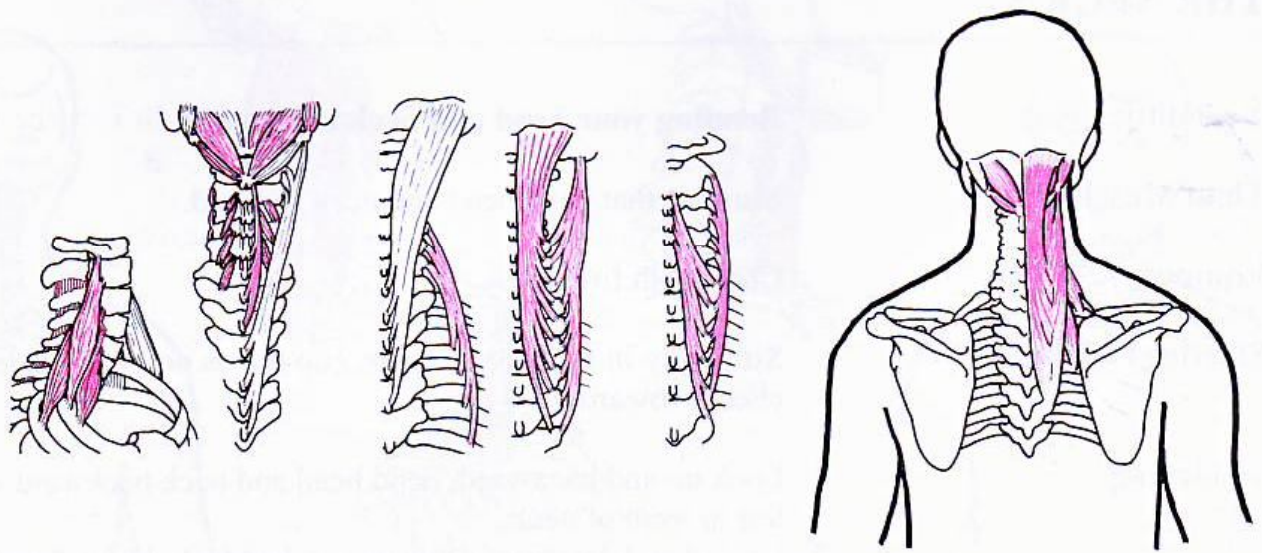
- * Chin juts forward.
- * Back pulls away from chair back.
- * One of the three movements – forward or sideways bend, or turn – is too small.
- * Movement jerky.
- * Jaw not relaxed.

Note:

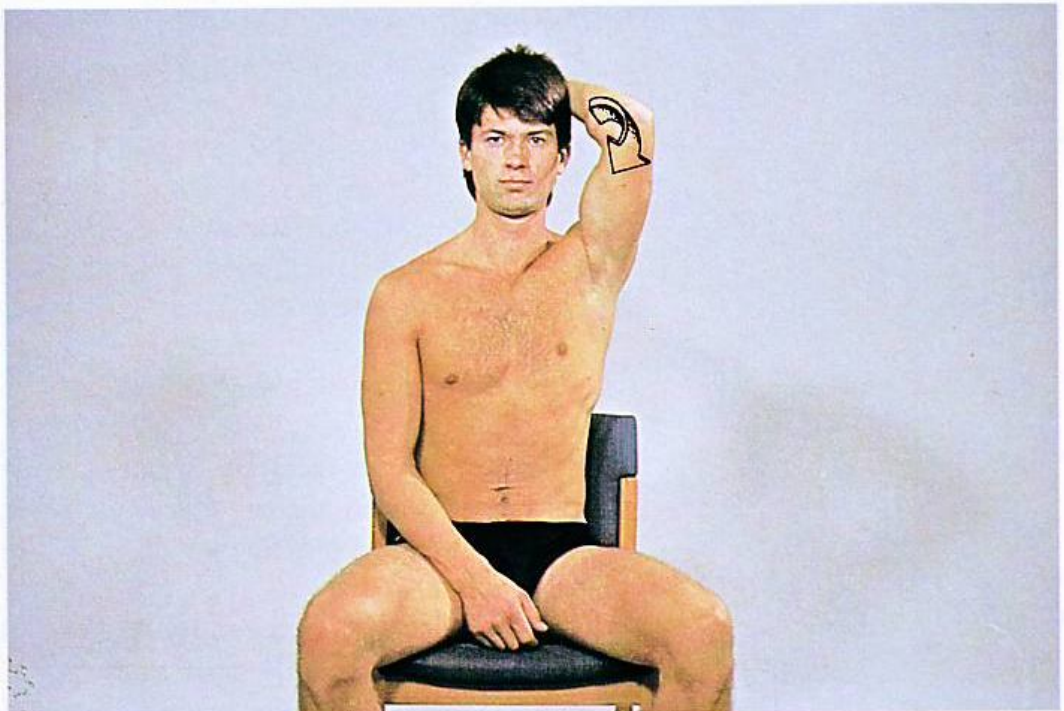
Stretch should be felt only in muscles in neck and back of head. If you feel discomfort or pain in your head, throat, shoulders, arms or any other part of your body, stop stretching immediately.

Normal Mobility:

With back held against chair back, you should be able to bring left side of chin almost down to chest.



Starting Position:



Stretching:



THE NECK 8.

Your difficulty is:

Bending your head and neck backward.

Tight Muscles:

Muscles that bend head and neck forward.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair; cup hands on chin, fingers upward along cheeks toward ears.

Stretching:

1. Look up and backward; bend head and neck backward so that stretch is felt in front of neck.
2. Look down and press chin against hands; hold for 5 seconds.
3. Relax; look up and backward and bend head and neck backward to limit, assisting with slight hand push.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Release grip and clasp hands behind neck.
2. Look up and backward.
3. Bend head and neck backward to limit.
4. Resist backward movement with hands.
5. Hold position a few seconds.

Common Error:

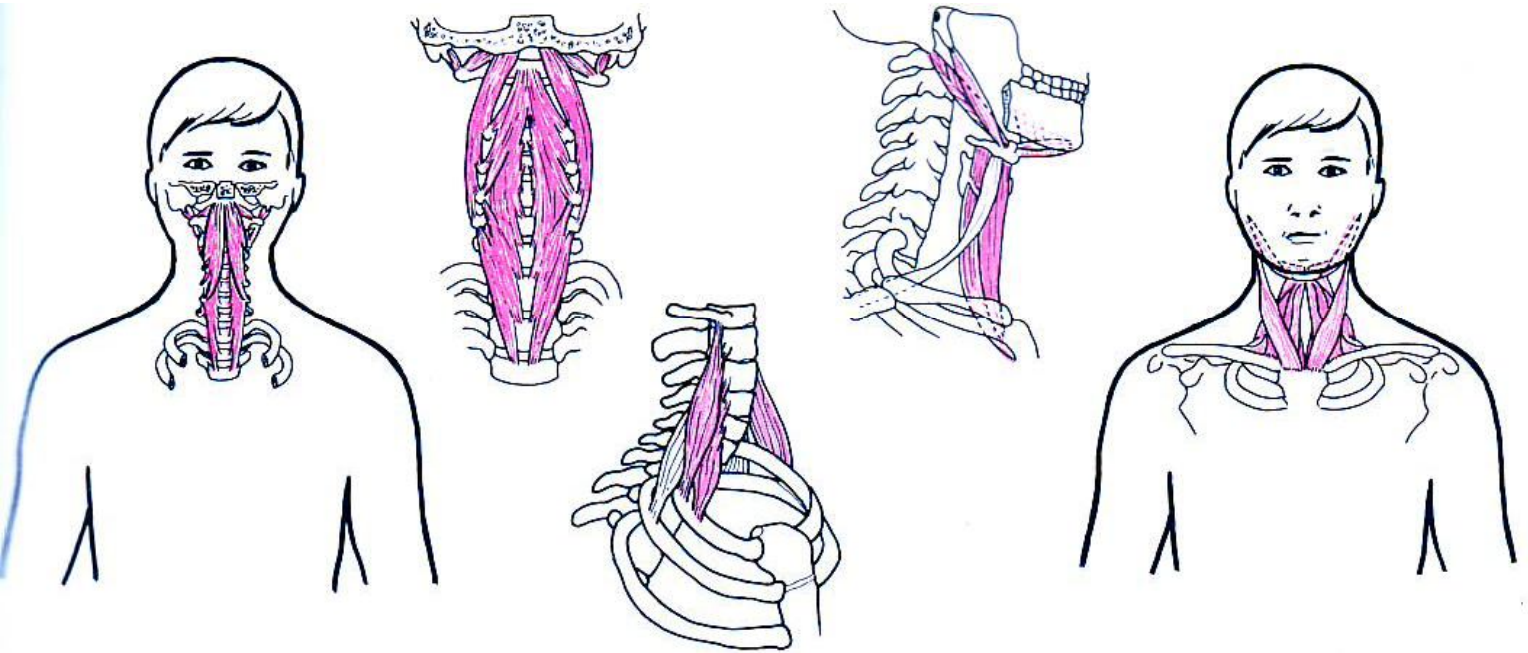
- * This exercise is usually done correctly.

Note:

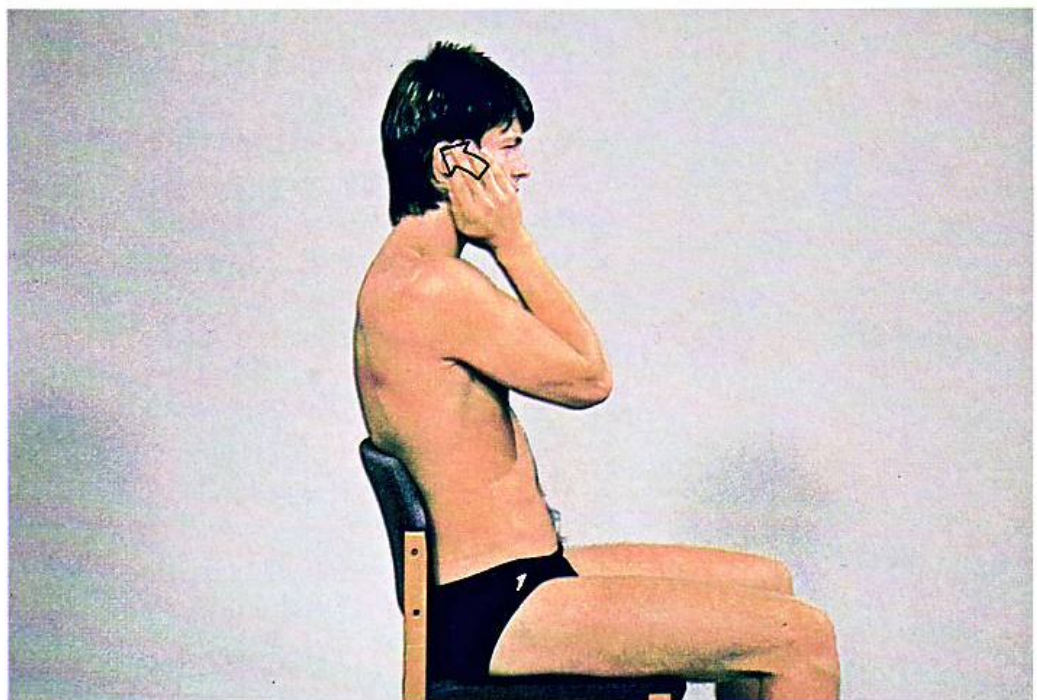
Stretch should be felt only in front side of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

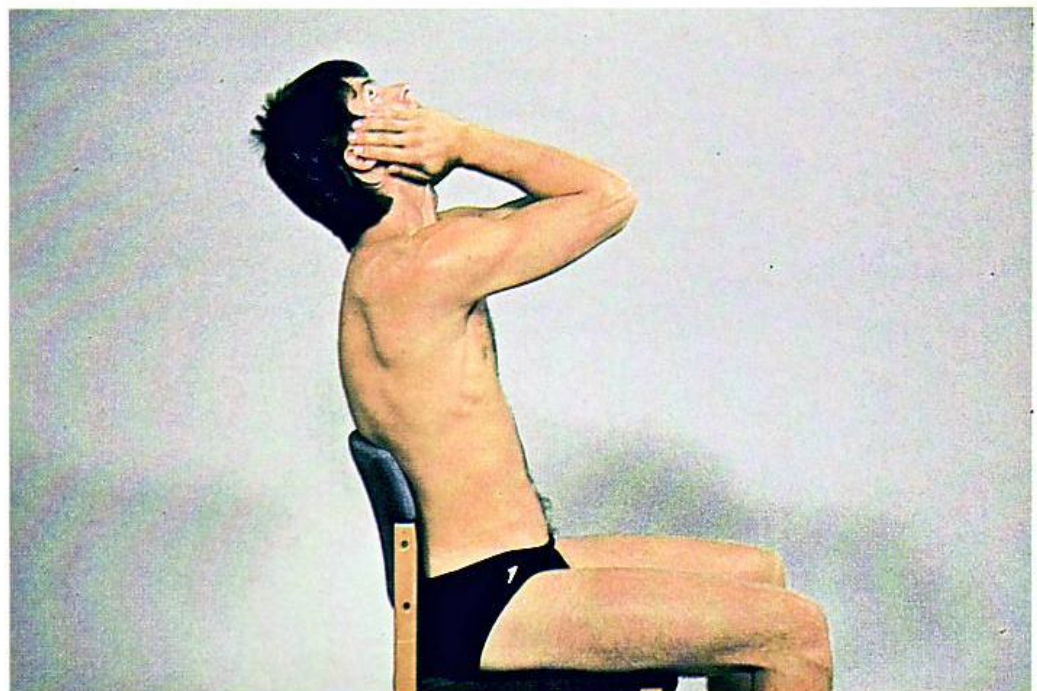
You should be able to bend your head backward until forehead is horizontal.



Starting Position:

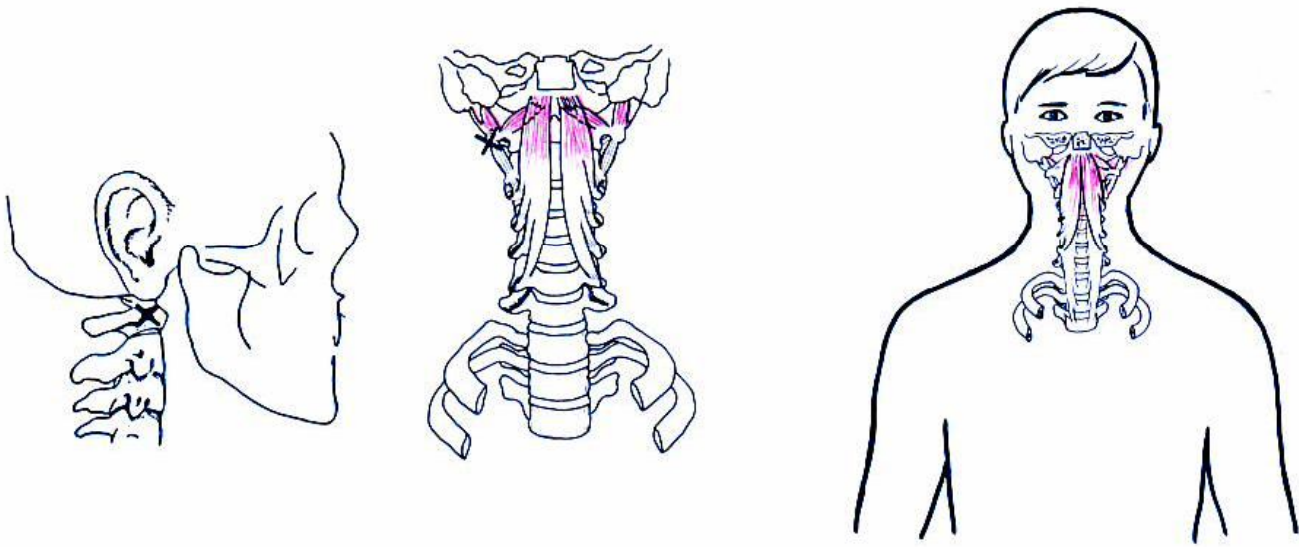


Stretching:

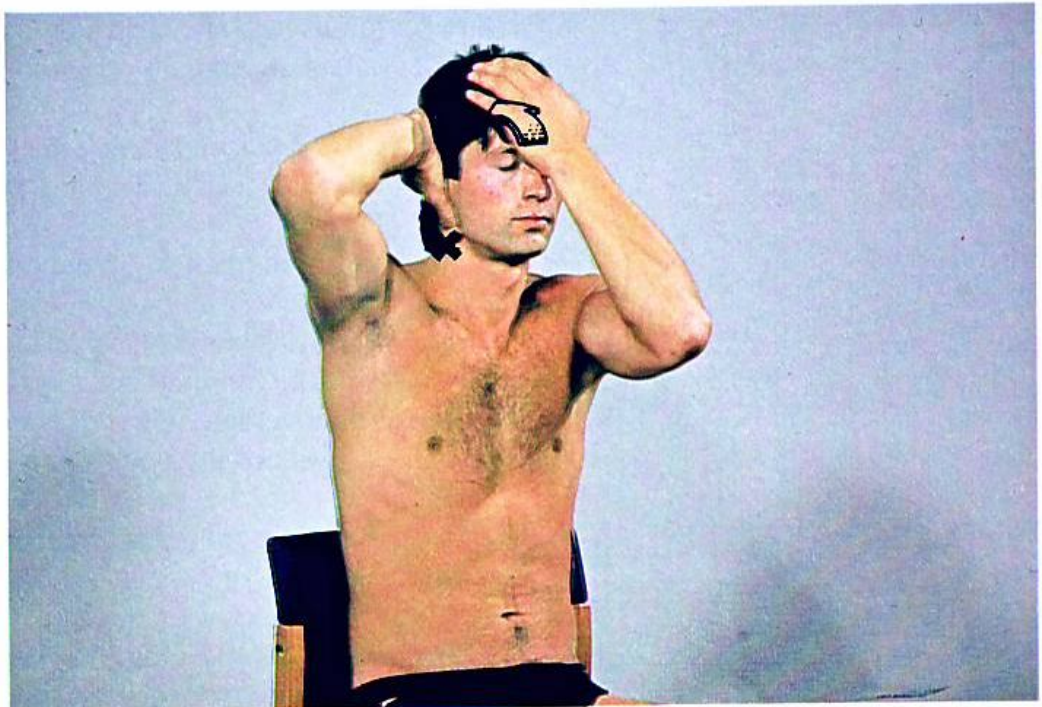


THE NECK 9.

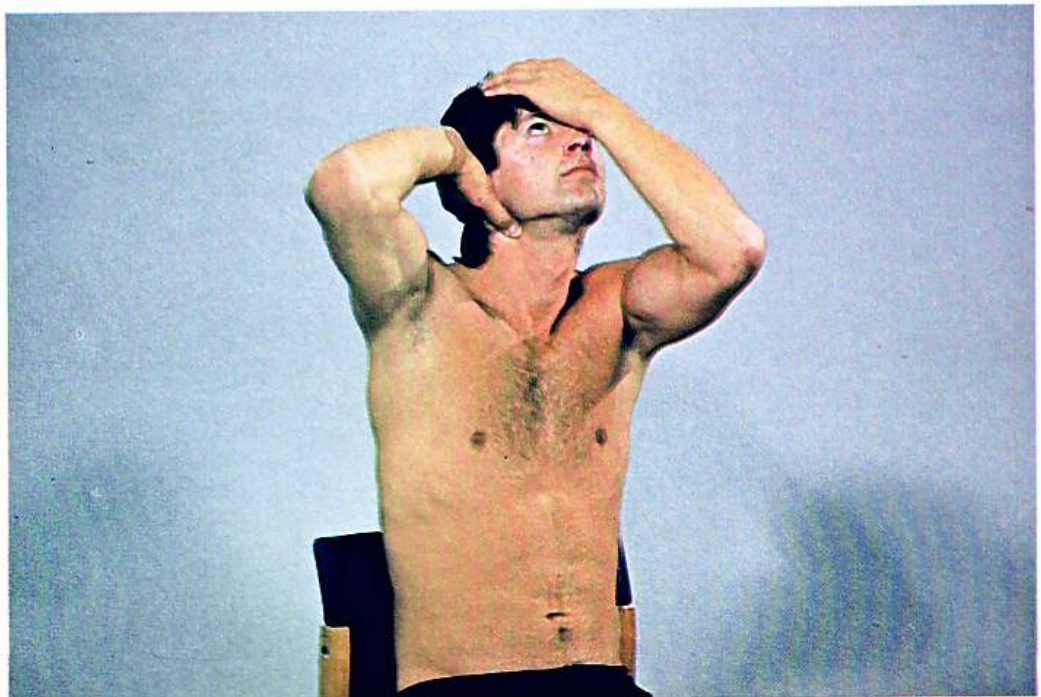
Your difficulty is:	Bending backward between head and first vertebra.
Tight Muscles:	Muscles that bend head forward on atlas.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair, with neck slightly bent forward. Place right thumb on forward edge of right transverse process of top vertebra. (Marked with a small x on the skeleton drawing. See also fig. 2 on page 145). You can feel the spot just behind jaw, below right ear. Use left hand to support back of head, and right hand to support forehead.
Stretching:	1. Look up; press with right thumb; thrust chin out and bend head but not neck backward so that stretch is felt high up in front side of neck. Aid with left hand. 2. Look down; draw chin back and press forehead against left hand; hold for 5 seconds. 3. Relax; look up; bend head but not neck backward to limit so that chin moves forward and up, assisting with slight left hand push. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain right hand grip; place left hand on back of head. 2. Look up; bend head – but not neck – backward to limit so that chin moves forward and up. 3. Resist backward movement with left hand on back of head; relax jaw. 4. Hold position a few seconds.
Common Errors:	* Right thumb doesn't stay in place. * Neck not bent far enough forward, so that exercise takes effect too far down. * Jaw not relaxed.
Note:	Repeat exercise on opposite side: left thumb stabilizing left transverse process of atlas, right hand cupped on forehead. Stretch should be felt only along front of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal mobility:	With neck 'long', you should be able to bend your head backward a little without moving neck.



Starting Position:

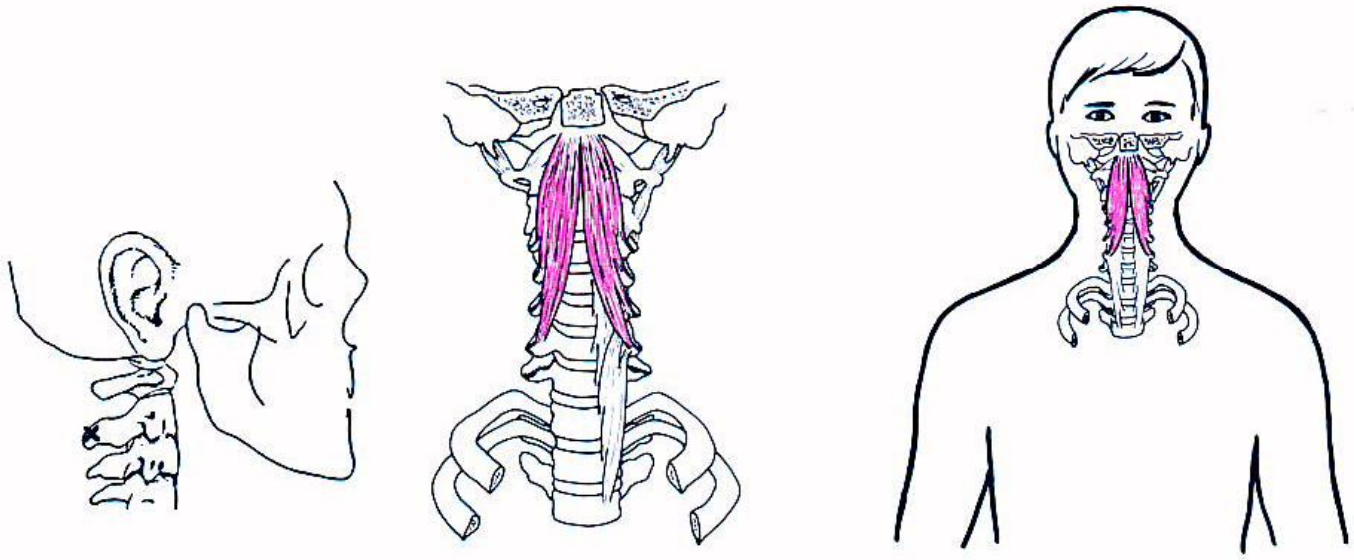


Stretching:

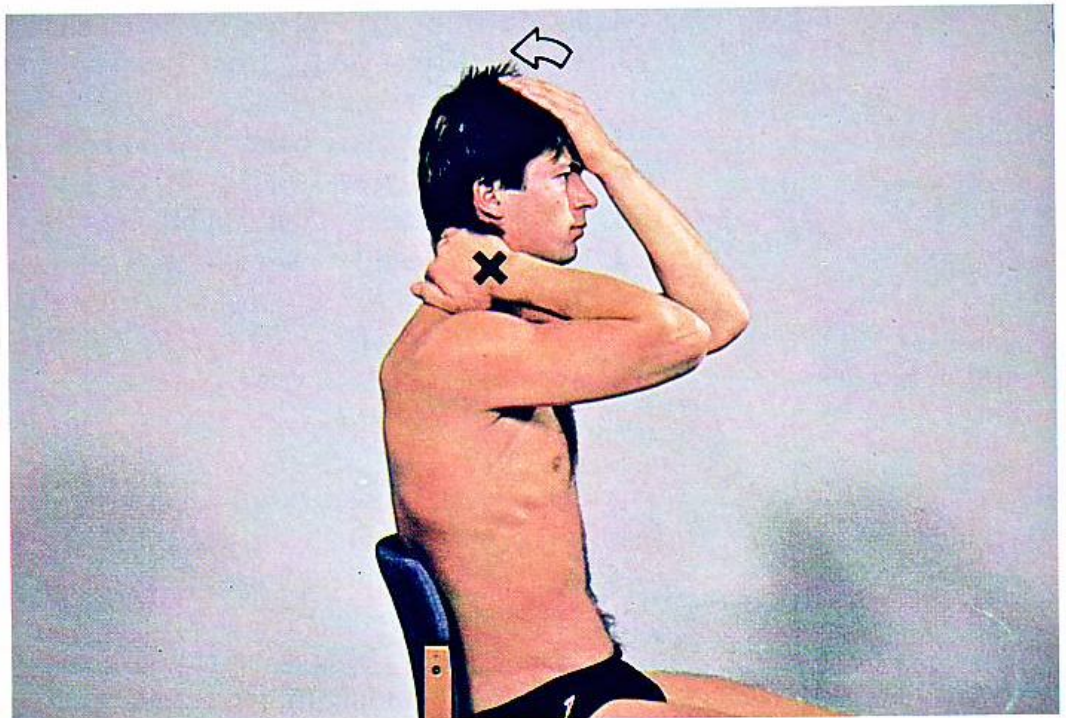


THE NECK 10.

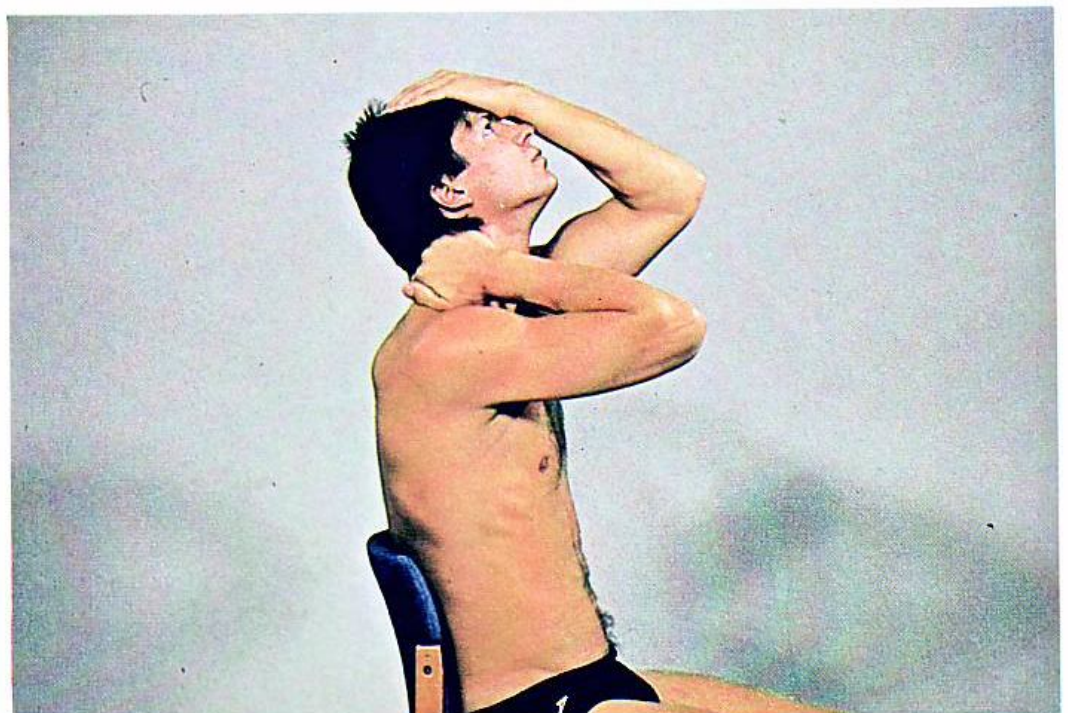
Your difficulty is:	Bending backward between first and second vertebrae.
Tight Muscles:	Muscles that bend atlas forward on axis.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair with neck slightly bent. Place right hand on back of neck, with little finger on 2nd cervical vertebra (axis), the knobby bump (marked with a small x on the skeleton drawing) at the lower end of hollow in back of neck. The rest of right hand supports neck. Cup left hand on left forehead. Elbows forward.
Stretching:	1. Look up; relax jaw and bend head backward so that stretch is felt high up along front of neck. Movement only above little finger of right hand. 2. Look down and press forehead against left hand; hold for 5 seconds. 3. Relax; look up; bend head backward to limit, assisting with slight left hand push. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain right hand grip; place left hand on back of head. 2. Look up. 3. Open mouth slightly, relax jaw and bend head backward to limit. Movement only above little finger of right hand. 4. Resist backward movement with left hand on back of head. 5. Hold position a few seconds.
Common Errors:	* Right little finger slides off 2nd vertebra. * Jaw not relaxed.
Note:	Stretch should be felt only along uppermost front of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal Mobility:	With neck 'long', you should be able to bend your head noticeably backward without moving the neck.



Starting Position:

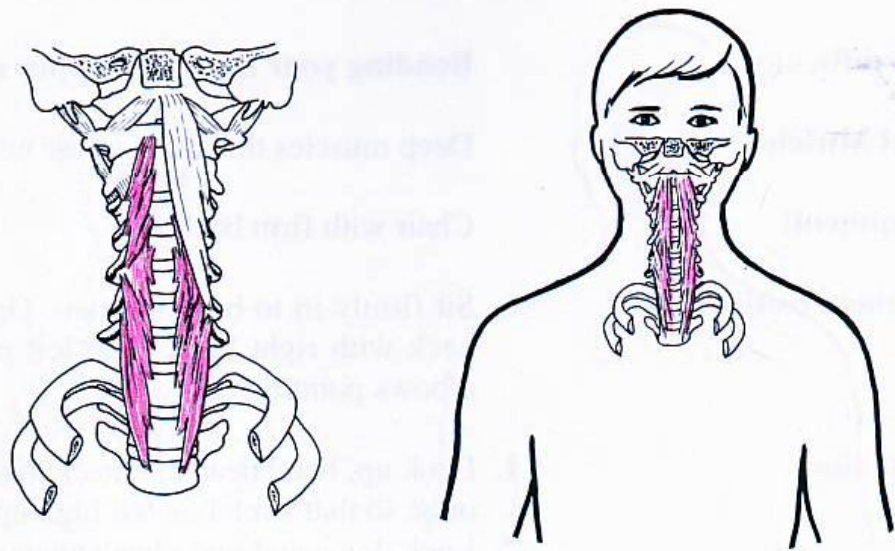


Stretching:



THE NECK 11.

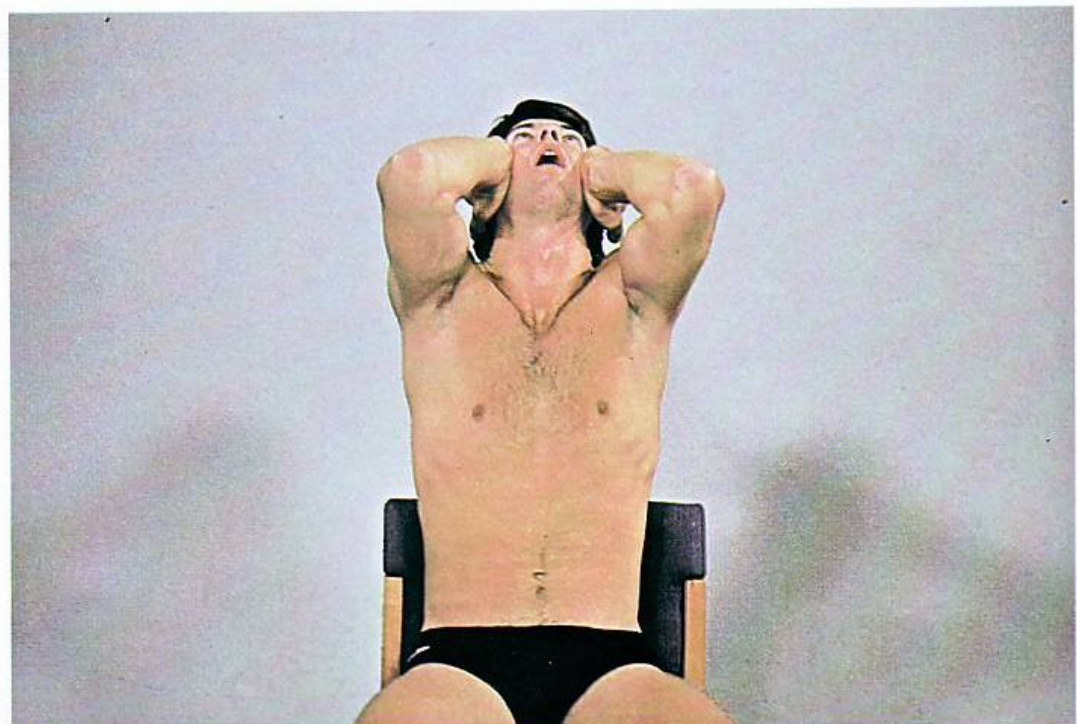
Your difficulty is:	Bending your middle and lower neck backward.
Tight Muscles:	Deep muscles that bend neck forward.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair. Cup hands on cheeks, fingers pointing backward. Open mouth slightly and draw chin back.
Stretching:	1. Look up; using hands, bend head and neck backward so that stretch is felt deep inside front of neck. 2. Look down and press head against cupped palms; hold for 5 seconds. 3. Relax; look up; bend head and neck backward to limit, assisting with slight push of hands. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release grip; clasp hands behind neck. 2. Look up. 3. Relax jaw; open mouth slightly and bend head backward to limit. 4. Resist backward movement with clasped hands on back of neck. 5. Hold position a few seconds.
Common Errors:	* Mouth closed. * Chin juts forward.
Note:	Stretch should be felt only deep inside front of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal Mobility:	You should be able to bend your neck noticeably backward all the way down to beginning of upper back.



Starting Position:

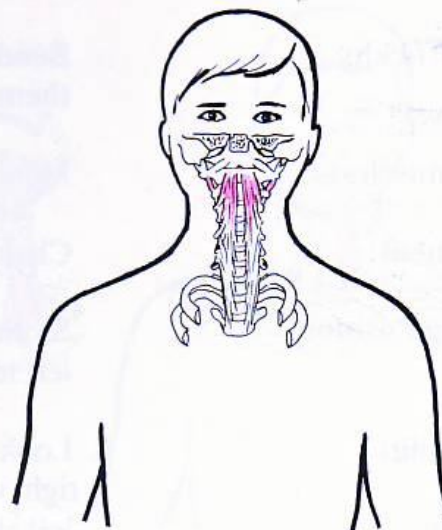
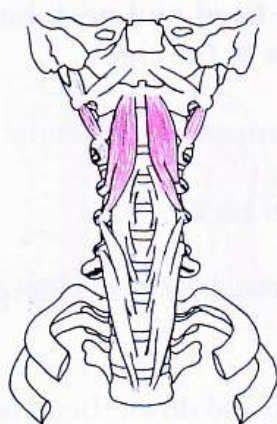


Stretching:

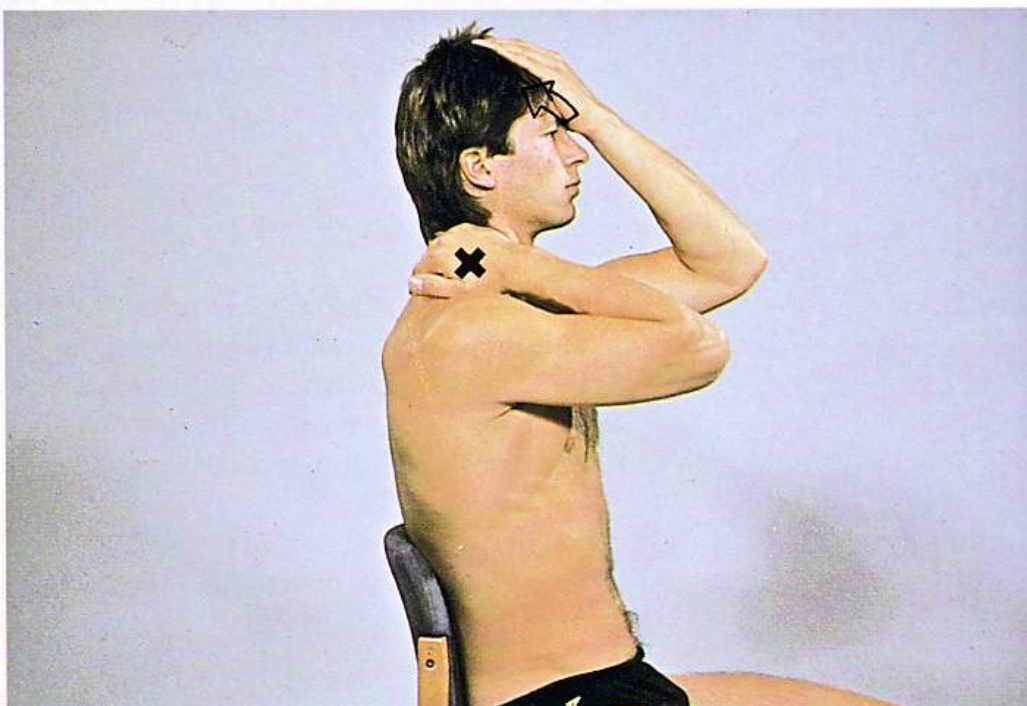


THE NECK 12.

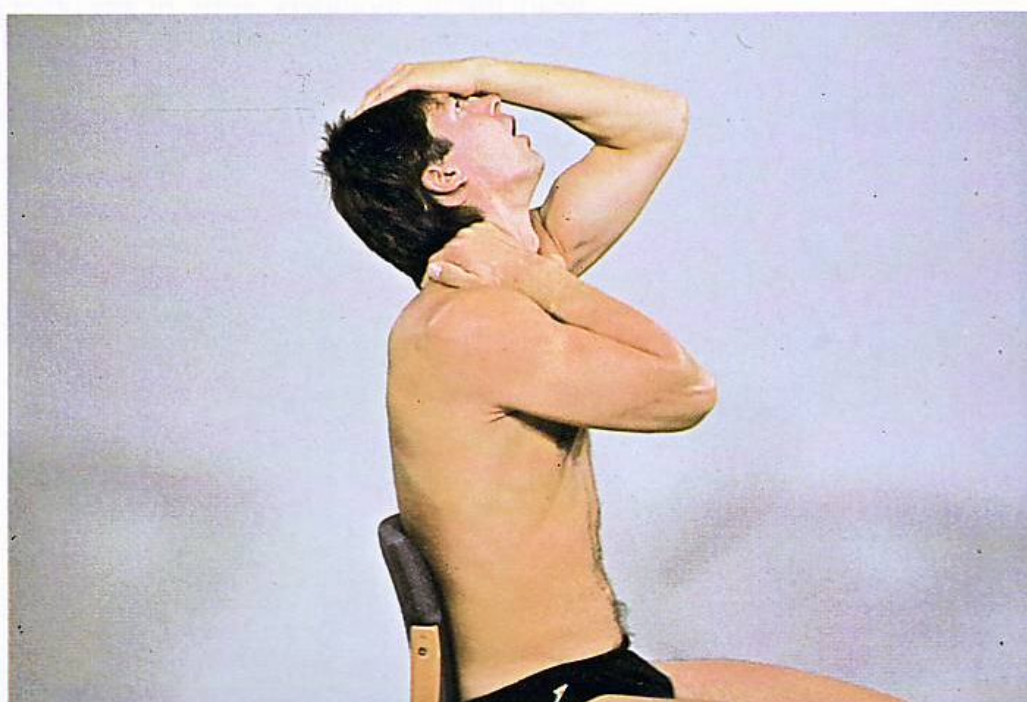
Your difficulty is:	Bending your head and upper neck backward.
Tight Muscles:	Deep muscles that bend upper neck forward.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair. Open mouth to relax jaw. Support lower neck with right hand. Cup left palm on left forehead, fingers upward, elbows pointing forward.
Stretching:	1. Look up; bend head and neck backward, above supporting right hand only, so that stretch is felt high up along front of neck. 2. Look down and press head against cupped left palm; hold for 5 seconds. 3. Relax; look up; bend head and neck backward to limit, assisting with slight push of left palm. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain right hand grip; slide left hand backward to grip back of head; elbows pointing forward. 2. Look up. 3. Open mouth slightly and bend head and neck backward to limit. 4. Resist backward movement with left hand on back of head. 5. Hold position a few seconds.
Common Errors:	* Mouth closed. * Jaw tensed. * Head turned.
Note:	Stretch should be felt only high up along front side of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.
Normal Mobility:	With mouth held open, you should be able to bend head and upper neck backward until forehead is almost horizontal.



Starting Position:



Stretching:



THE NECK 13.

Your difficulty is:

Bending your head and neck backward while turning and bending them sideways to the right.

Tight muscles:

Muscles that turn neck and bend it forward and sideways.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place right hand on top of head, fingers on left temple.

Stretching:

1. Look backward and down. Bend head and neck backward and to the right while turning head to the right, so that stretch is felt along front and left side of neck.
2. Look up and to the left and press head against right hand; hold for 5 seconds.
3. Relax; look down and backward to the right. Bend head backward and to the right while turning it to the right to limit, pulling slightly with right hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Move right hand to right temple.
2. Look backward and down to the right.
3. Bend neck to move head backward to the right and turn head right to limit.
4. Resist movement with right hand.
5. Hold position a few seconds.

Common Errors:

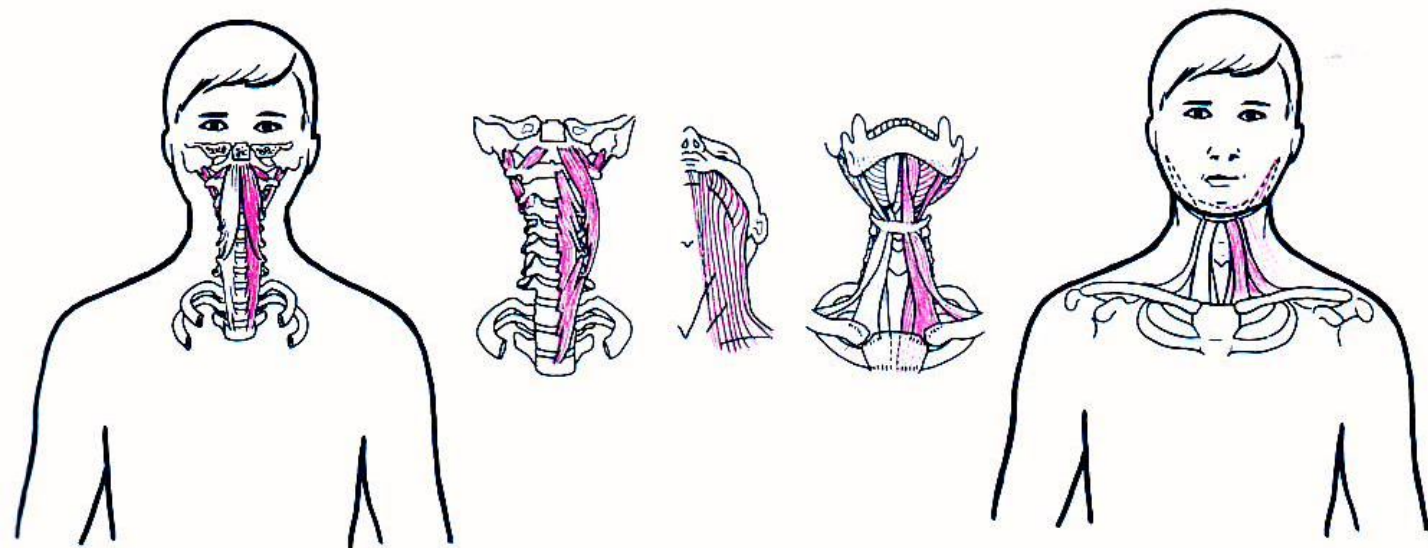
- * Right hand slips on head.
- * One of the three movements – backward, sideways or turning – is too small.

Note:

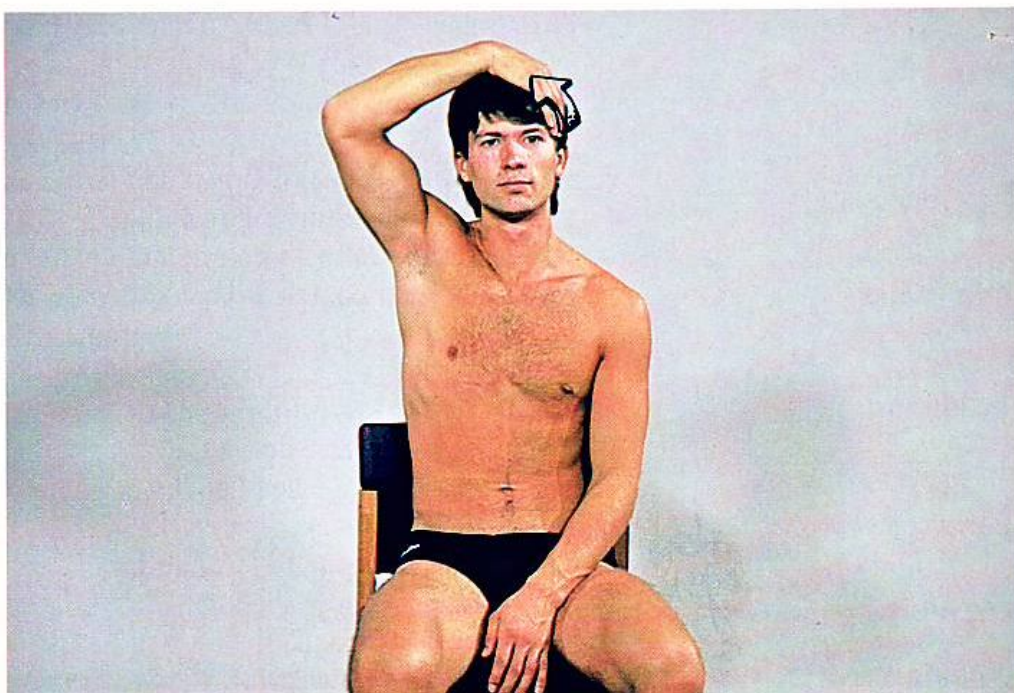
Stretch should be felt only in neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

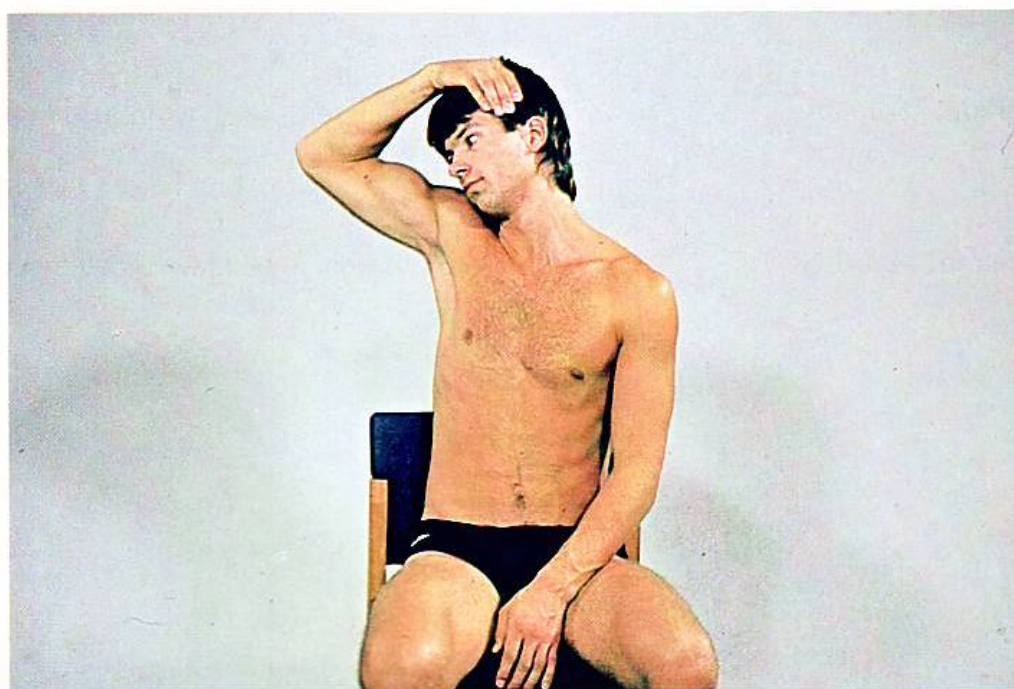
You should be able to bend head backward and turn right until you can look down your back.



Starting Position:



Stretching:



THE NECK 14.

Your difficulty is:

Bending backward, turning and bending to the right between second and third vertebrae.

Tight Muscles:

Muscles that turn neck and bend it forward and sideways.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place right hand on back of neck, with little finger on the 3rd cervical vertebra (marked with a small x on the skeleton drawing) just below the 2nd, which can be felt as the knobby bump at the lower end of hollow in back of neck. Cup left palm on left temple.

Stretching:

1. Look backward and down to the right. Bend head and neck backward and to the right while turning head to the right. Movement only above little finger of right hand, so that stretch is felt along front and left side of neck.
2. Look up and to the left and press head against left hand; hold for 5 seconds.
3. Relax; look backward, down and to the right. Bend head backward and to the right while turning it right to limit, pushing slightly with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; move left hand to right temple.
2. Look backward and down to the right.
3. Bend neck to move head backward and to the right while turning head right to limit.
4. Resist movement with left hand.
5. Hold position a few seconds.

Common Errors:

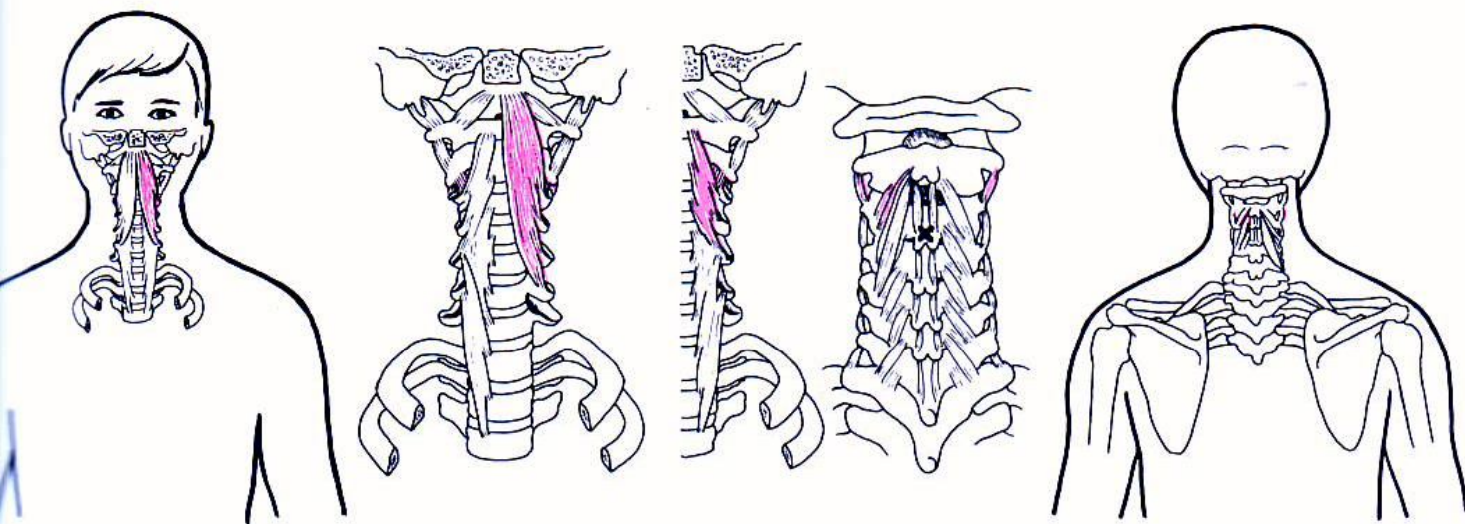
- * Right little finger slips off the 3rd vertebra.
- * One of the three movements – backward, sideways or turning – is too small.

Note:

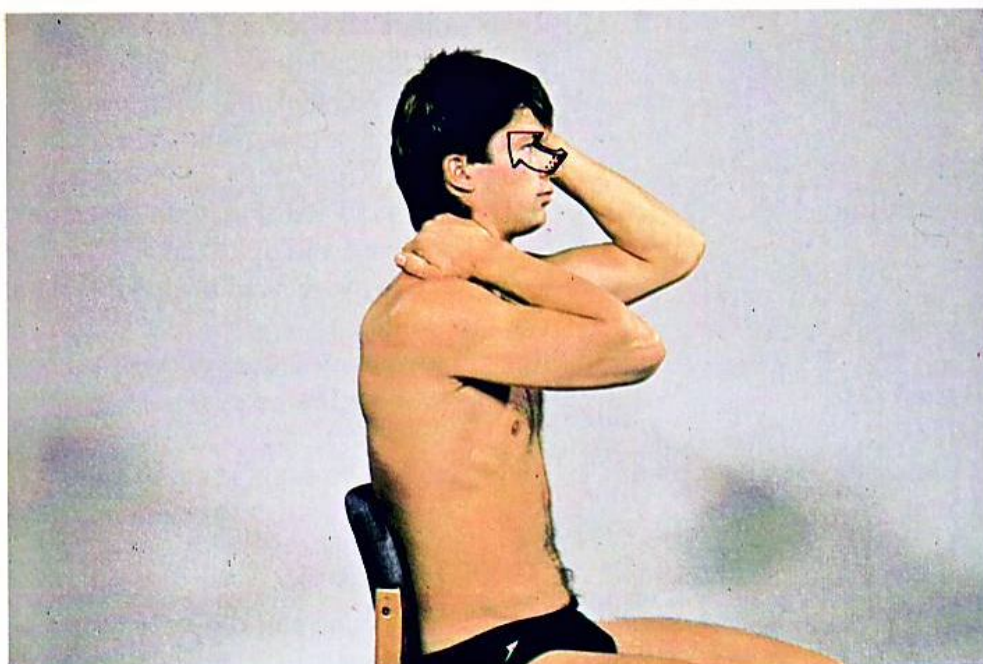
Stretch should be felt only along front and left side of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

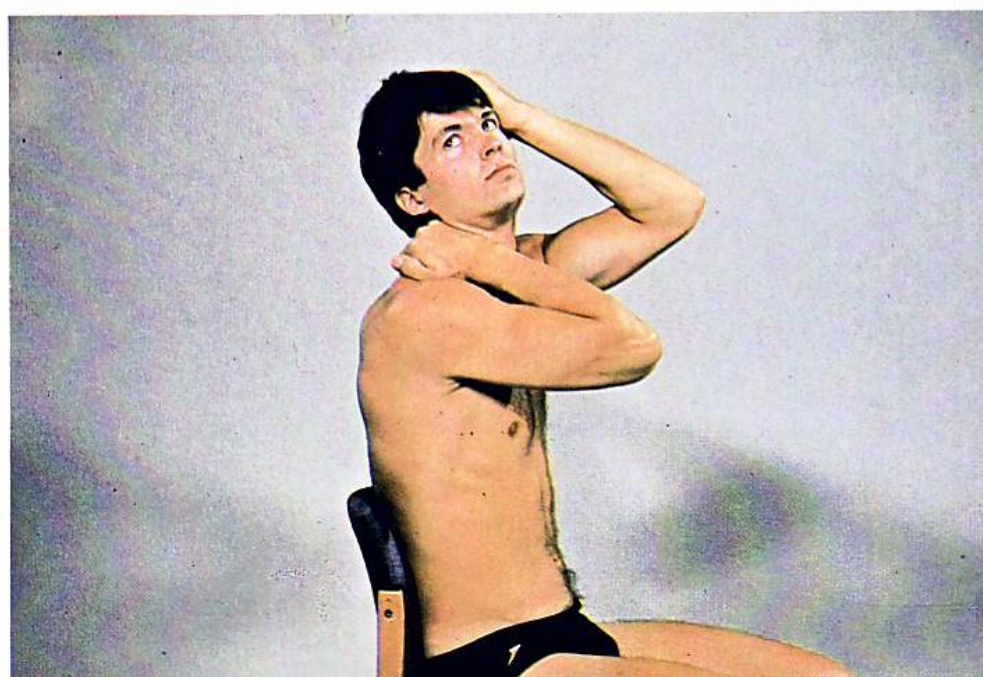
You should be able to bend head backward and to the right, while turning it to the right, until you can look down your back.



Starting Position:



Stretching:



THE NECK 15.

Your difficulty is:

Bending your head and neck backward while turning them to the right and bending them to the left.

Tight Muscles:

Muscles that turn neck and bend it forward and sideways.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Cup left hand on left side of jaw and chin.

Stretching:

1. Look backward and up to the right. Bend head and neck backward and to the left while turning head to the right, so that stretch is felt along front and right side of neck.
2. Look down and to the left and press chin against left hand; hold for 5 seconds.
3. Relax; look backward, up, and to the right. Bend head and neck backward and to the left and turn right to limit, pushing slightly with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain left hand position, with fingers around right side of chin.
2. Look backward and up to the right.
3. Bend neck to move head backward and to the left and turn head to the right to limit.
4. Resist movement with fingers of left hand.
5. Hold position a few seconds.

Common Errors:

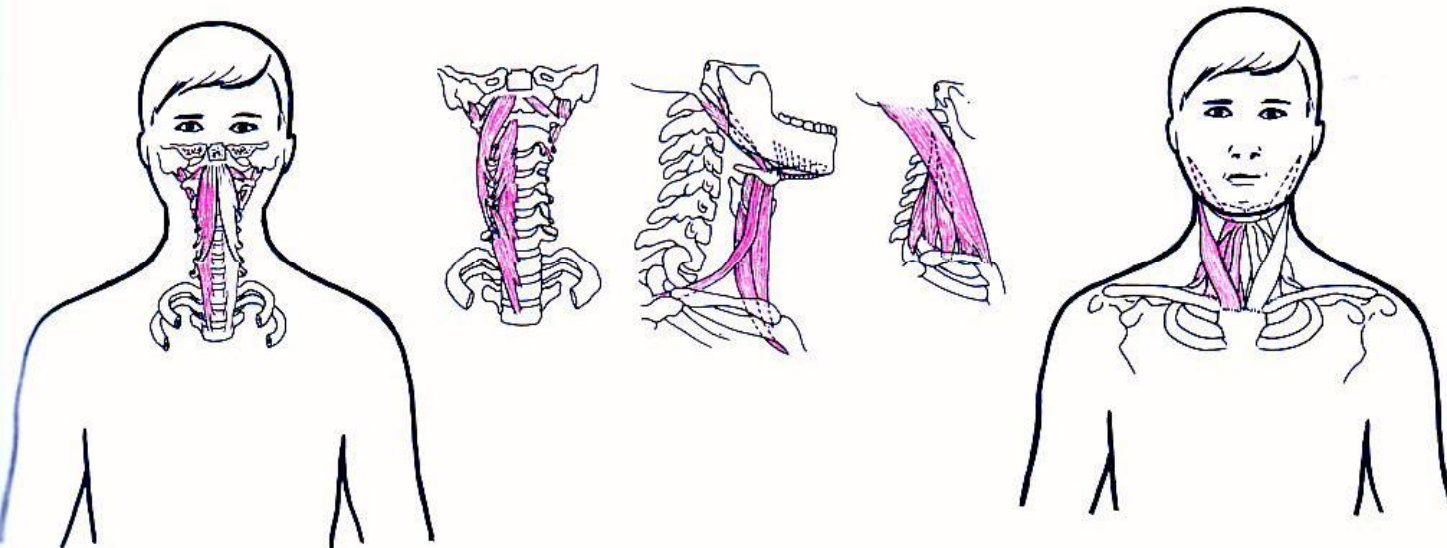
- * Left hand fails to support chin firmly.
- * One of the three movements – backward, sideways or turning – is too small.

Note:

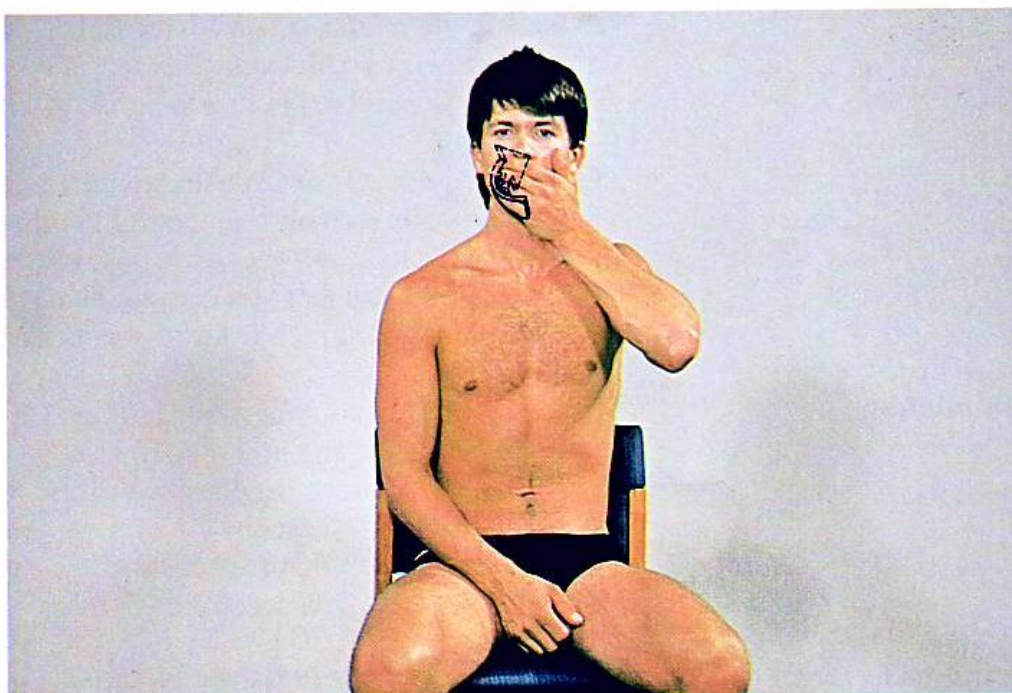
Stretch should be felt only along front, right side of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

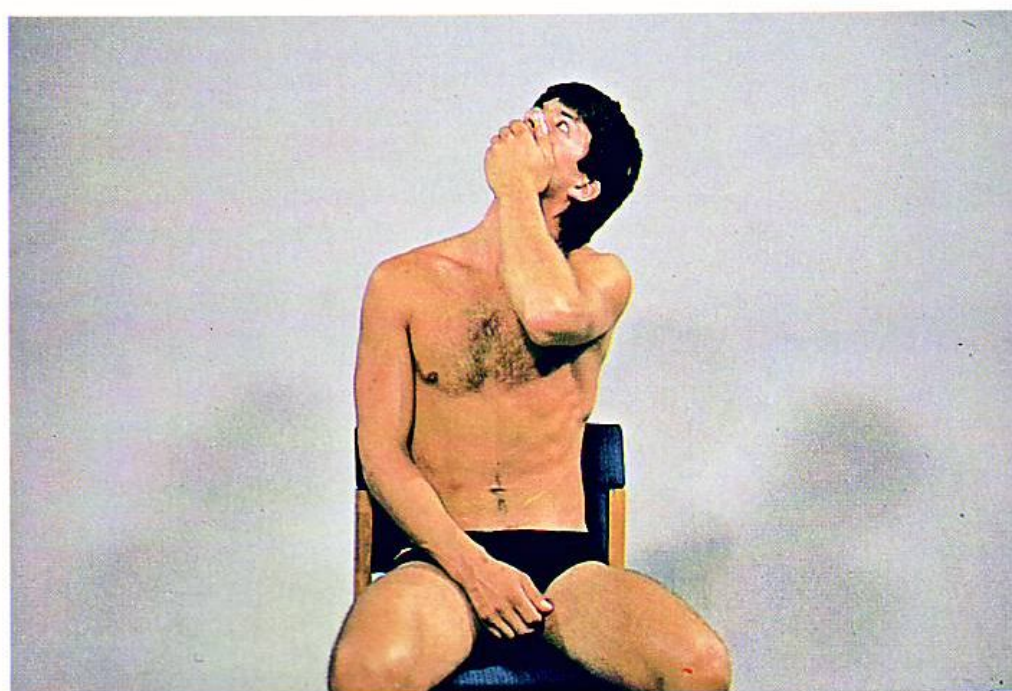
With hand grip described above, you should be able to look straight up.



Starting Position:



Stretching:



THE NECK 16.

Your difficulty is:

Bending backward, turning right and bending to the left between second and third vertebrae.

Tight Muscles:

Muscles that turn neck and bend it forward and sideways.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place right hand on back of neck, with little finger on the 3rd cervical vertebra (marked with a small x on the skeleton drawing), just below the 2nd, which can be felt as the knobby bump at the lower end of hollow in back of neck. Cup left hand on left side of jaw and chin.

Stretching:

1. Look up and backward to the right. Bend head and neck backward and to the left while turning head to the right. Movement only above little finger of right hand, so that stretch is felt in neck.
2. Look down and to the left and press chin against left hand; hold for 5 seconds.
3. Relax; look backward, up and to the right. Bend head backward and to the left while turning it to the right to limit, pushing slightly with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; move left hand to right side of chin.
2. Look backward and up to the right.
3. Bend neck to move head backward and to the left and turn head to the right to limit.
4. Resist movement with left hand.
5. Hold position a few seconds.

Common Errors:

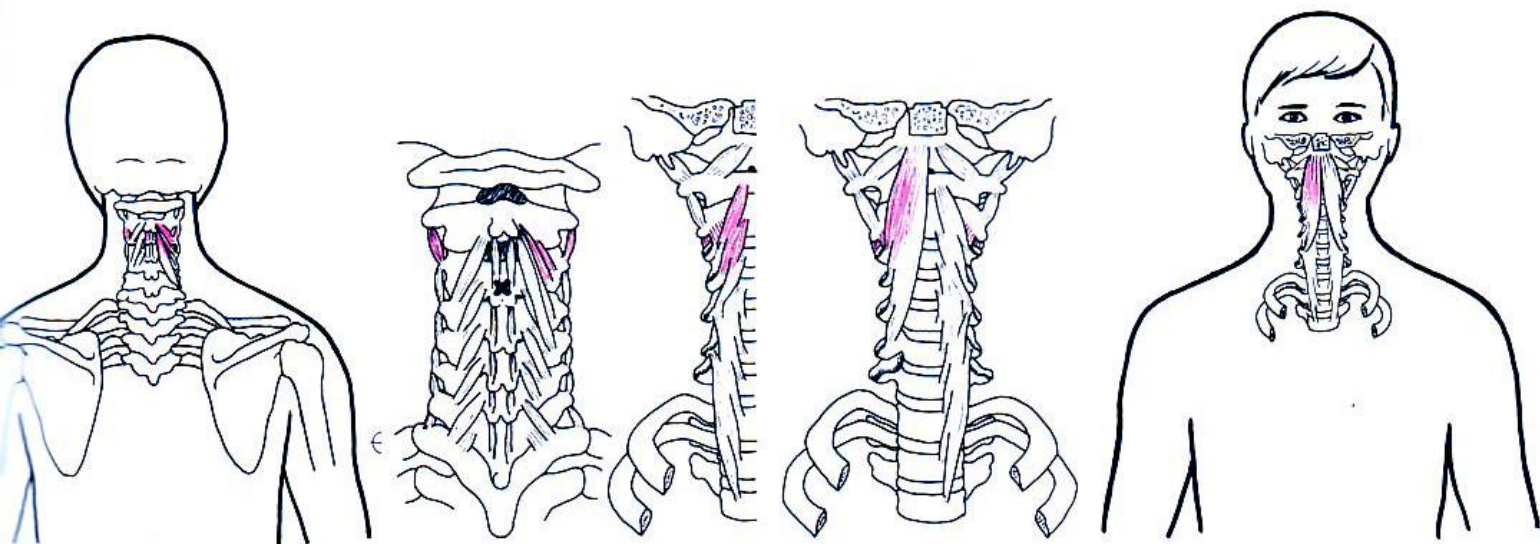
- * Right little finger slides off the 3rd vertebra.
- * One of the three movements – backward, sideways or turning – is too small.
- * Head bent too far to the left, preventing turn to the right.
- * Back not against back of chair.

Note:

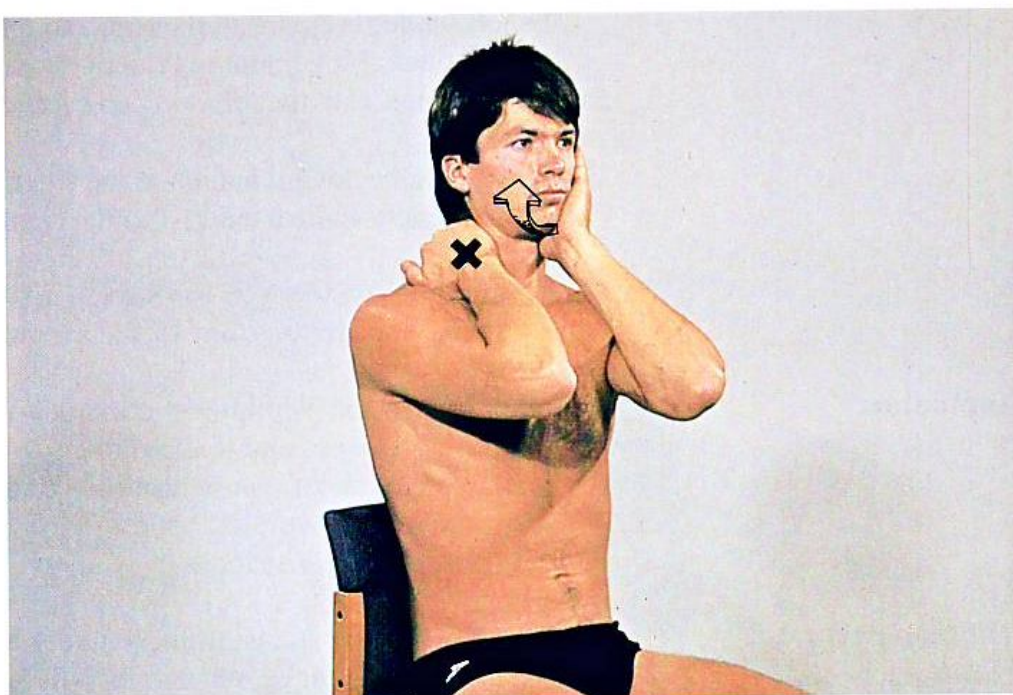
Stretch should be felt only in neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

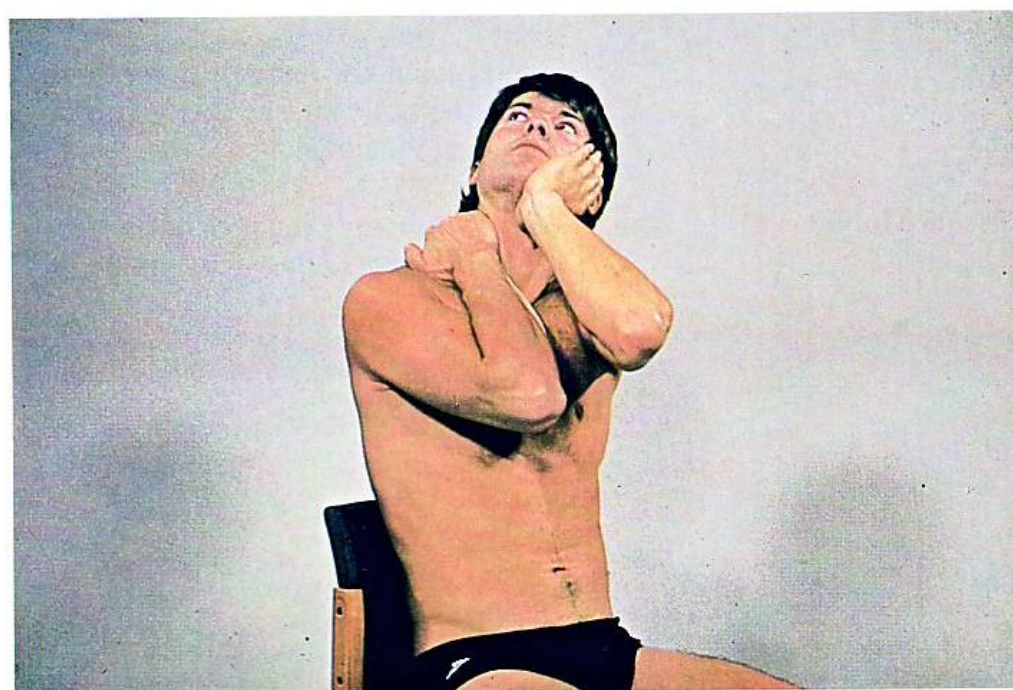
With hand grip described above, you should be able to look almost straight up.



Starting Position:



Stretching:



THE NECK 17.

Your difficulty is:.

Bending backward, turning right and bending to the left between head and first vertebra.

Tight Muscles:

Muscles that turn head and bend it forward and sideways.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place right hand on back of neck, with little finger over top vertebra (atlas), just above the knobby bump found in the lower end of hollow in back of neck. (This bump is the 2nd vertebra or axis). The rest of right hand supports back of neck. Place left hand on left cheek, fingers upward.

Stretching:

1. Look up, backward and to the right. Bend head slightly backward and to the left while turning it to the right, so that stretch is felt in uppermost back of neck. Movement only above right little finger.
2. Look down and to the left and press left cheek against left hand; hold for 5 seconds.
3. Relax; look backward and up to the right. Bend head slightly backward and to the left while turning it to the right to limit, pushing slightly with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; move left hand to right cheek.
2. Look up, backward and to the right.
3. Bend head to the left while turning it to the right to limit.
4. Resist movement with left hand.
5. Hold position a few seconds.

Common Errors:

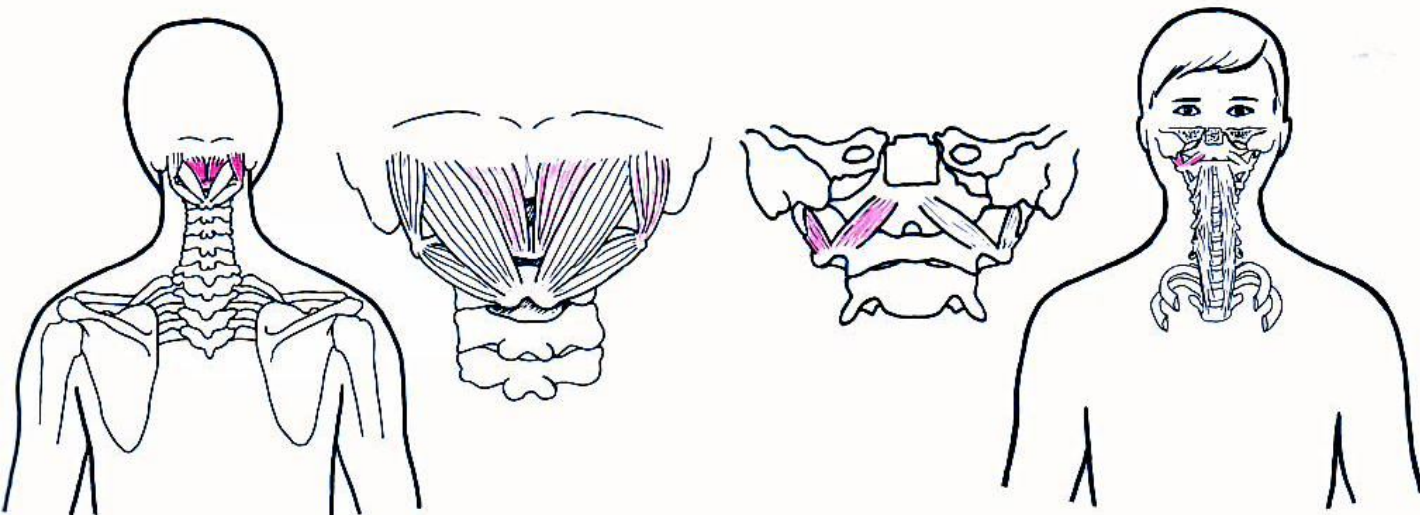
- * Right little finger slides off the 1st vertebra.
- * Head turned too far or bent too far sideways.
- * Upper back leaves chair back.

Note:

Stretch should be felt only at top of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

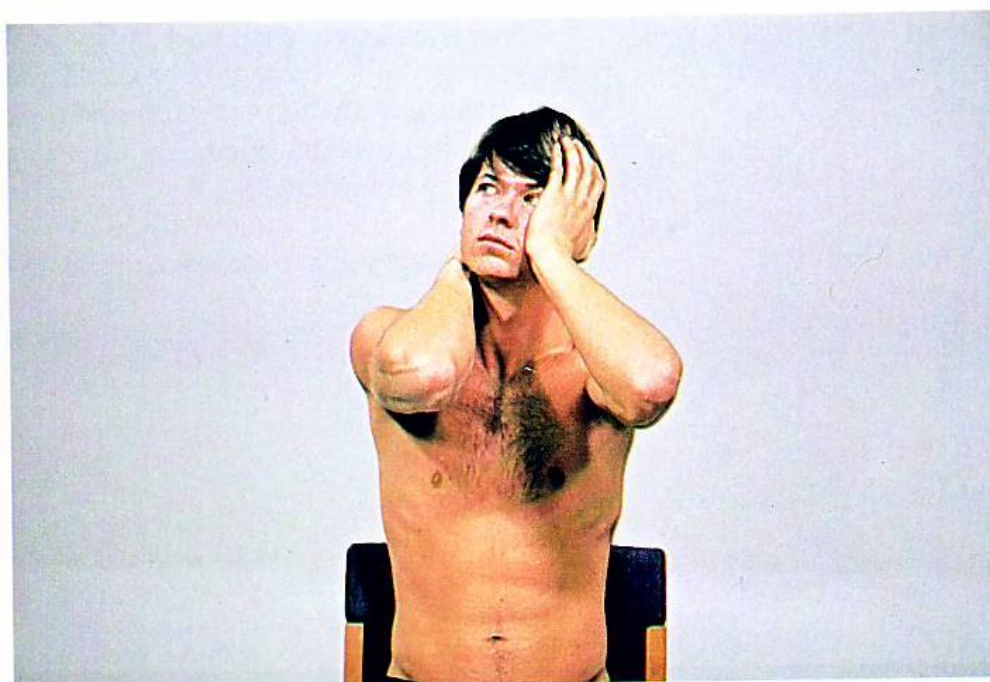
With neck 'long', you should be able to bend head noticeably to the left while turning it to the right, without moving neck.



Starting Position:



Stretching:



THE NECK 18.

Your difficulty is:

Bending backward, turning right and bending to the left between first and second vertebrae.

Tight Muscles:

Muscles that turn neck and bend it forward and sideways between atlas and axis.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Place right hand on back of neck, with little finger on the 2nd cervical vertebra (axis), the knobby bump at the lower end of hollow in back of neck (marked with a small x on the skeleton drawing). Cup left hand on left side of chin and jaw.

Stretching:

1. Look backward, up and to the right. Turn head and atlas (top vertebra) to the right; bend them to the left and slightly backward. Movement only above little finger of right hand, so that stretch is felt high up in neck.
2. Look down and to the left and press jaw and chin against left hand; hold for 5 seconds.
3. Relax; look backward, up and to the right. Bend head to the left and slightly back, and turn it to the right to limit, pushing slightly with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain right hand grip; move left hand to right cheek.
2. Look backward, up and to the right.
3. Turn head and top vertebra to the right; bend them slightly backward and as far to the left as you can.
4. Resist movement with left hand.
5. Hold position a few seconds.

Common Errors:

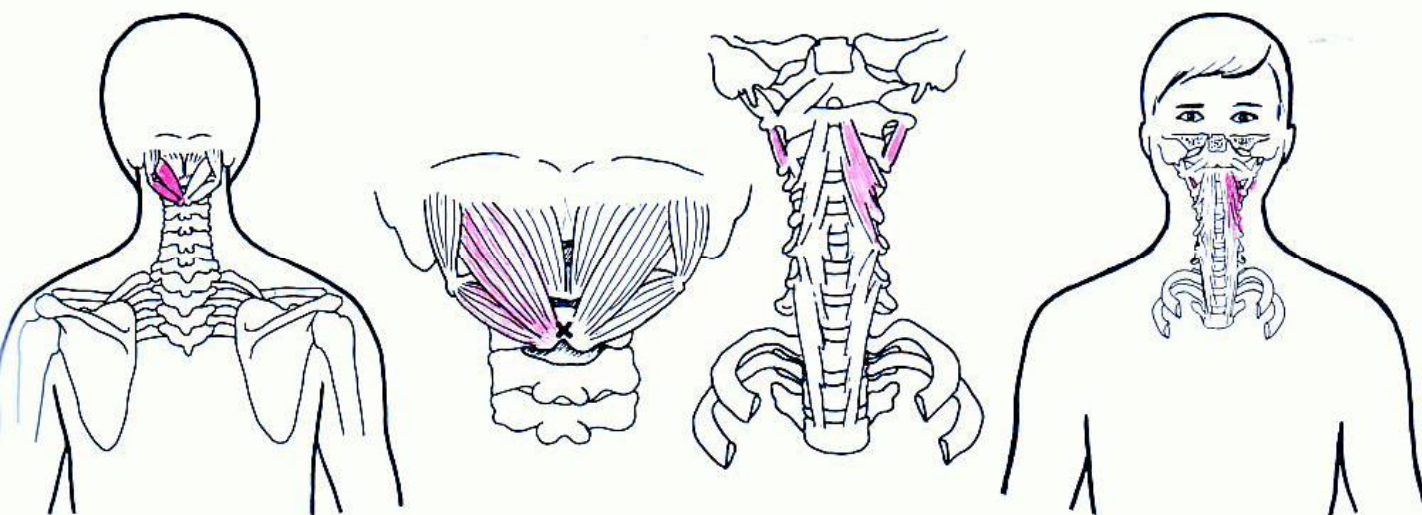
- * Right little finger slides off the 2nd vertebra.
- * Head turned too far or bent too far sideways.
- * Upper back leaves chair back.

Note:

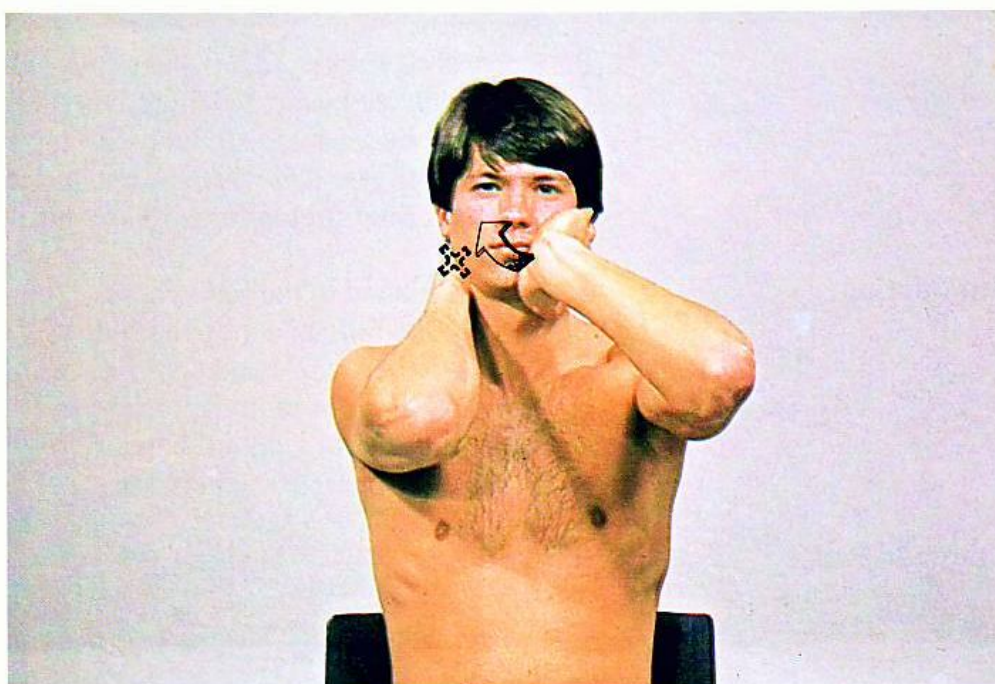
Stretch should be felt only at top of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

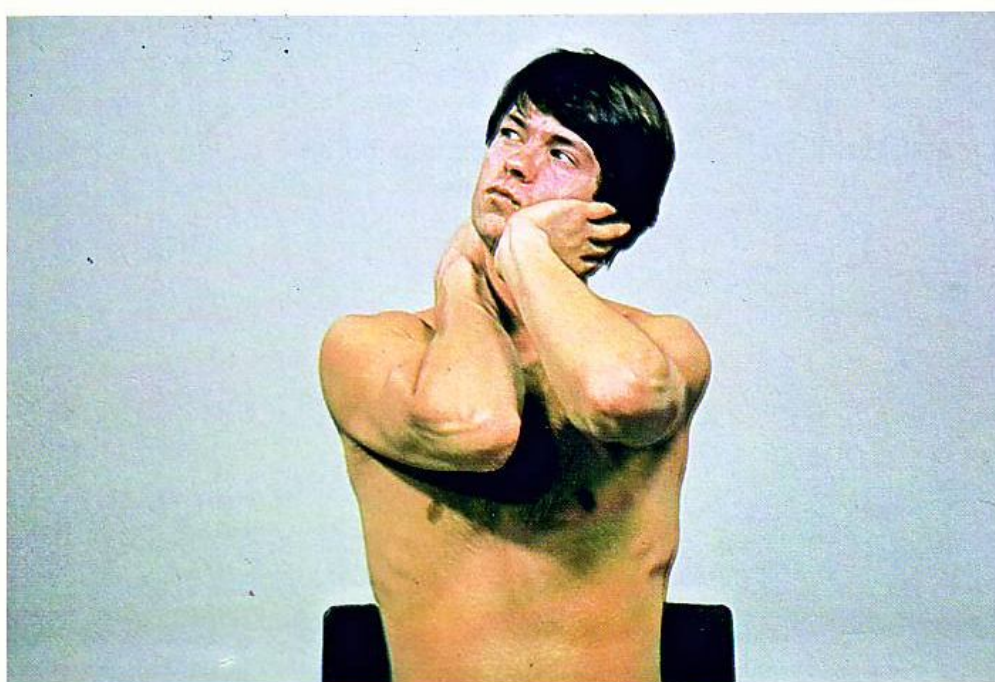
You should be able to turn your head 45 degrees to the right.



Starting Position:



Stretching:



THE NECK 19.

Your difficulty is:

Turning your head and neck to the right while bending them backward and to the left.

Tight Muscle:

Primarily:

1 *sternocleidomastoideus*.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Cup left hand on left side of chin and jaw.

Stretching:

1. Look backward, up and to the right. Draw chin back and exhale. Bend neck backward and slightly to the left while turning head to the right so that stretch is felt in neck.
2. Inhale; look to the left and press jaw and chin against left hand; hold for 5 seconds.
3. Relax; look backward, up and to the right. Draw chin back and exhale. Bend neck backward and slightly to the left while turning head to the right to limit, pushing slightly with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Move left hand to the right cheek.
2. Look backward, up and to the right
3. Draw chin back and bend neck backward and slightly to the left, while turning head right to limit.
4. Resist movement with left hand.
5. Hold position a few seconds.

Common Errors:

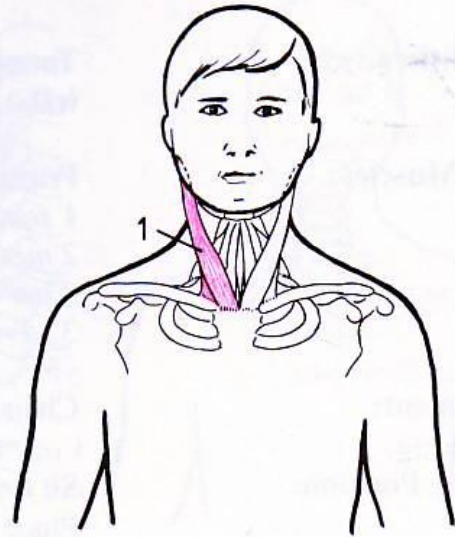
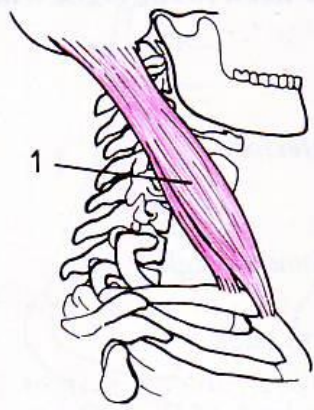
- * Right hand slips on head.
- * Chin not drawn back.
- * Upper back leaves chair back.

Note:

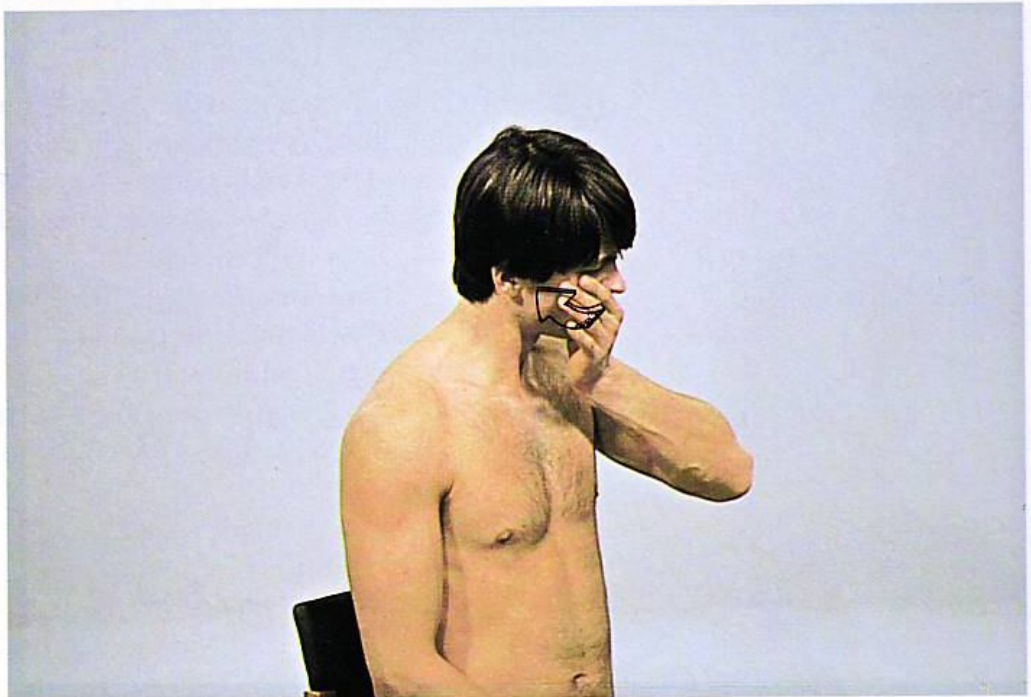
Stretch should be felt only in neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

You should be able to turn your head until chin is directly over the shoulder.



Starting Position:



Stretching:



THE NECK 20.

Your difficulty is:

Turning your neck to the right while bending it backward and to the left.

Tight Muscles:

Primarily:

1 *scalenus anterior*

2 *medius*.

Also

3 *sternocleidomastoideus*.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Grip under chair with right hand, just at hip. Place left hand on back of neck with little finger on the 2nd cervical vertebra (axis), the knobby bump at the lower end of hollow in back of neck.

Stretching:

1. Look backward, up and to the right. Draw chin back and exhale. Turn head and neck to the right, while bending backward and to the left so that stretch is felt in right, front side of neck.
2. Inhale; look down to the left and press right side of neck against fingers of left hand. Hold for 5 seconds.
3. Relax; look backward, up and to the right. Draw chin back and exhale. Bend head and neck backward and to the left, while turning head to the right to limit; assist with left hand.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Move left hand to left side of neck.
2. Look up to the right.
3. Draw chin back and exhale.
4. Bend neck and head backward and to the left, while turning head to the right to limit.
5. Resist movement with left hand.
6. Hold position a few seconds.

Common Errors:

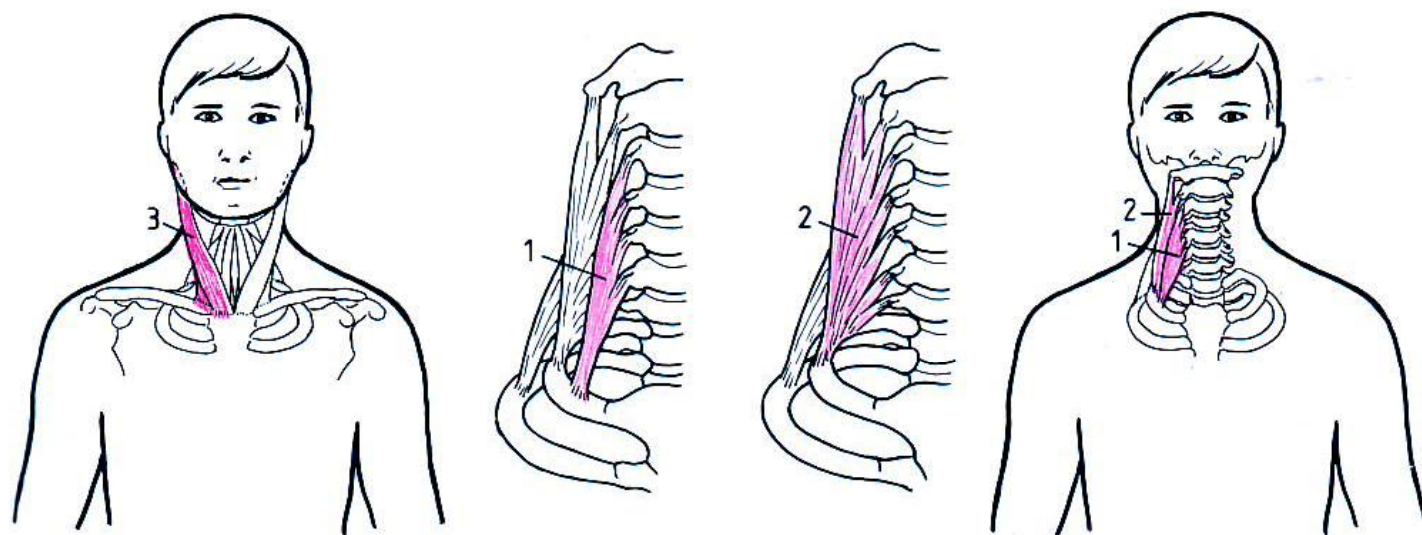
- * Left little finger slips off the 2nd vertebra.
- * Chin not drawn back.

Notes:

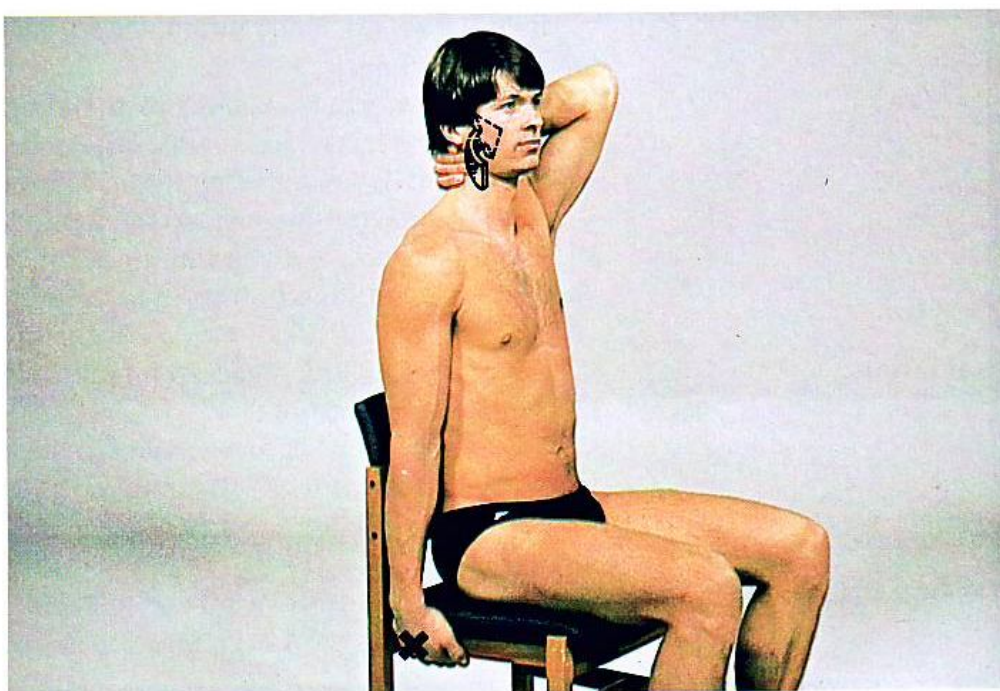
1. If you do this exercise with left hand on right ear, you also stretch the muscle marked 3. (See exercise 19).
2. Stretch should be felt only on the right side and in front of the neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

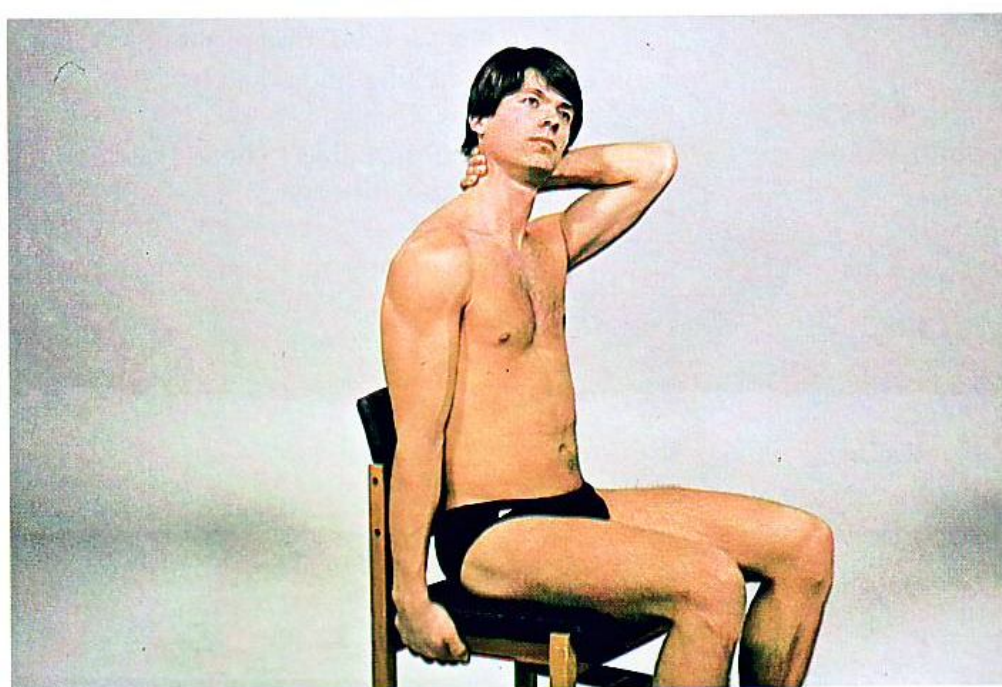
You should be able to turn your head and neck until chin is directly over the shoulder.



Starting Position:



Stretching:



THE NECK 21.

Your difficulty is:

Bending your neck forward and to the left while turning it to the left.

Tight Muscles:

Primarily:

1 *scalenus posterior*.

Equipment:

Chair with firm back.

Starting Position:

Sit firmly in to back of chair. Grip under chair with right hand, just behind the hip. Place left palm on right side of neck with fingers pointing backward on the spinous processes (see Fig 2 on page 145) of vertebrae in lower neck. Incline trunk to the left and slightly forward so that right arm is straightened and shoulder is drawn backward and down.

Stretching:

1. Look down to the left. Exhale and bend head and neck to the left and slightly forward, while turning head to the left so that stretch is felt in right side of neck.
2. Inhale; draw chin back and look to the right and backward. Press neck to the right and backward against left hand; hold for 5 seconds.
3. Relax; look down to the left. Exhale. Bend head and neck forward and to the left, while turning head to the left to limit; assist with left hand.
4. Repeat until you feel you can stretch no more and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Move left hand to left cheek and left side of neck.
2. Look down to the left.
3. Move head and neck forward and to the left, to limit.
4. Resist movement with left hand.
5. Hold position a few seconds.

Common Errors:

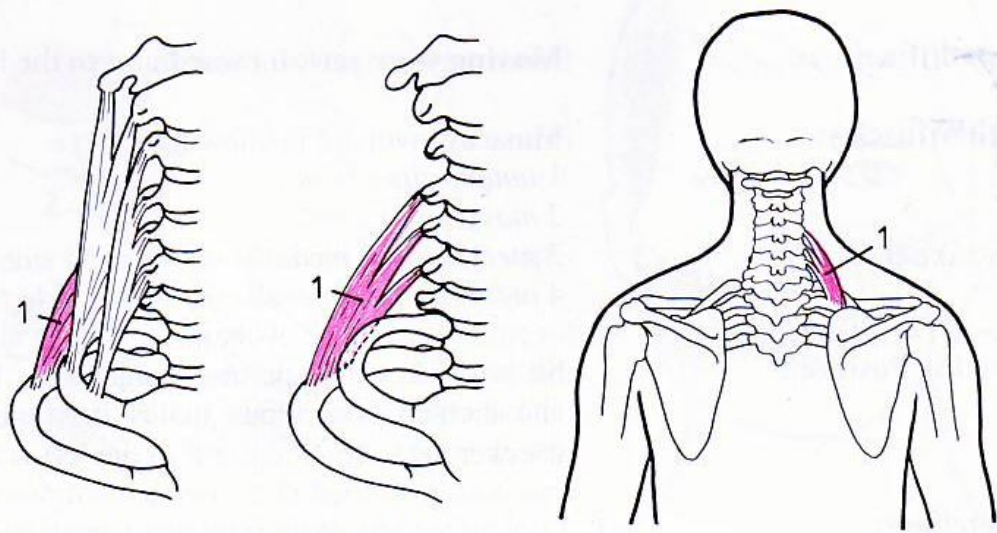
- * Trunk not inclined forward and to the left.
- * Right hand lets go of neck.

Note:

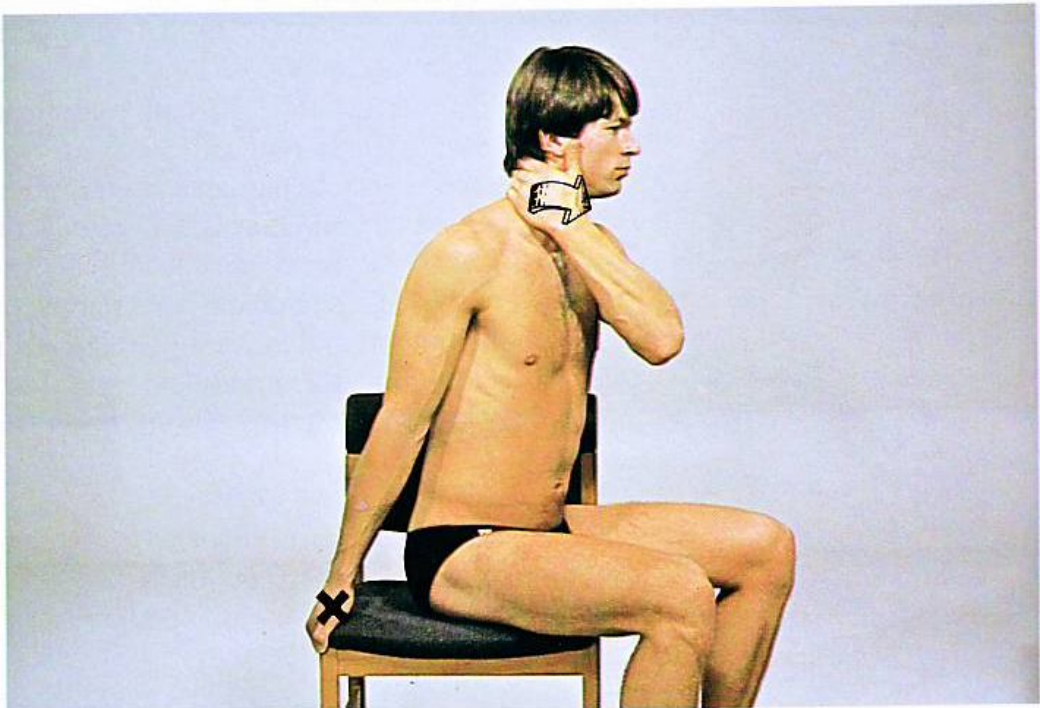
Stretch should be felt only on right side of neck. If you feel discomfort or pain in your head, throat, shoulders, arms, or any other part of your body, stop stretching immediately.

Normal Mobility:

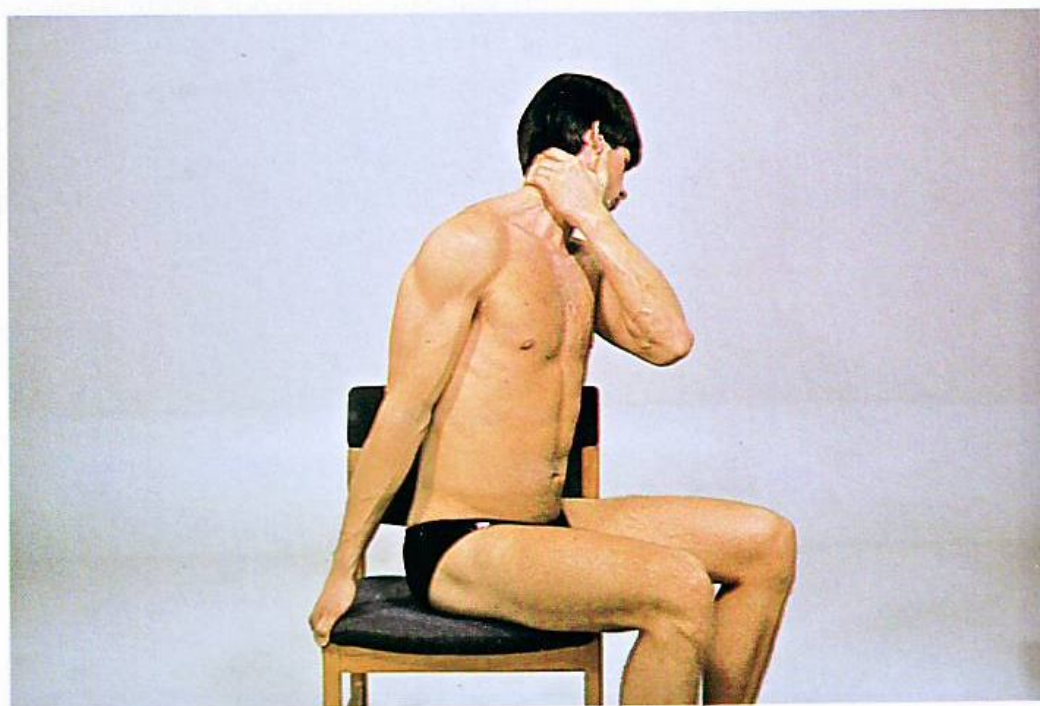
You should be able to bend head and neck forward, while turning them to the left, until your chin rests on chest.



Starting Position:



Stretching:



THE JAW 1.

Your difficulty is:

Moving your jaw to the left.

Tight Muscles:

Muscles involved in chewing:

1 *temporalis*

2 *masseter*

3 *pterygoideus medialis* on the right side, and/or

4 *pterygoideus lateralis* on the left side.

Starting Position:

Sit with back straight and 'long' neck. Place left palm on left temple, above cheek bone. Place ball of right thumb on right side of jaw, below cheek bone.

Stretching:

1. Look to the left. With right hand, push jaw to the left so that stretch is felt in right side of jaw.
2. Look to the right. Try to move jaw to the right against pressure of right hand; hold for 5 seconds.
3. Relax and look to the left. With right hand, push jaw to the left to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Reverse grip; right palm on right temple, left thumb along left side of jaw.
2. Look to the left and move jaw to the left to limit.
3. Resist that movement with left hand.
4. Hold position a few seconds.

Common Errors:

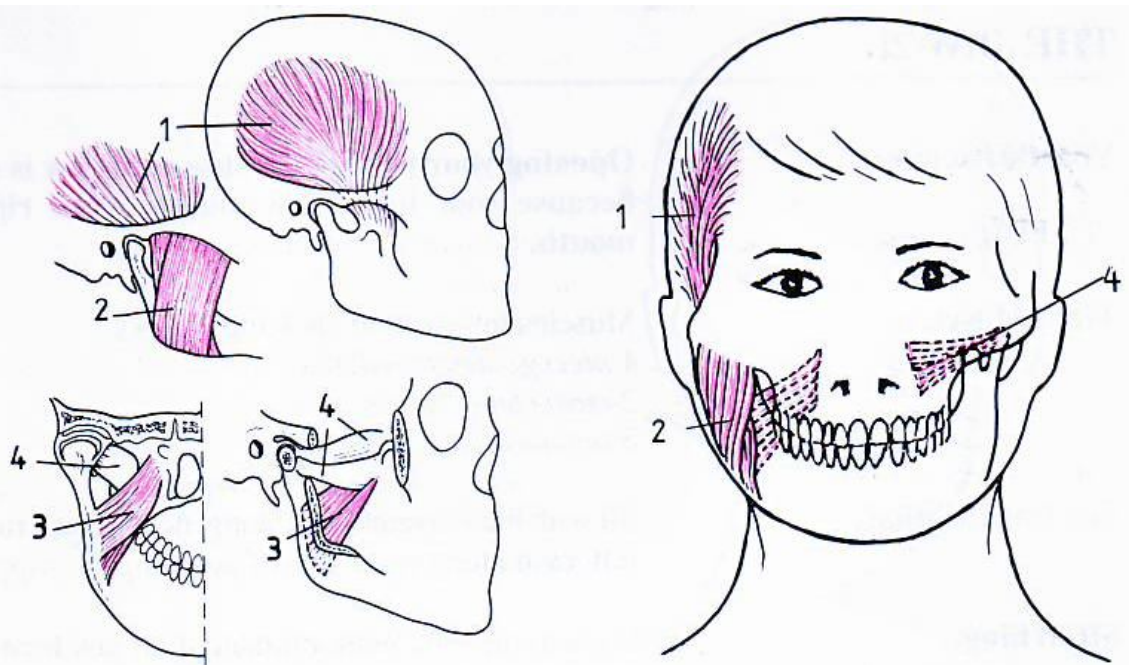
- * Head turns.
- * Neck bent backward.
- * Eyes look in wrong direction.
- * Wrong hand grip.

Notes:

1. Eye movements make this exercise easier to do.
2. If you can't open your mouth, stretch both sides.
3. If stretch is painful, consult a doctor.
4. If you wear glasses, remove them before stretching, as their frames may be in the way.

Normal Mobility:

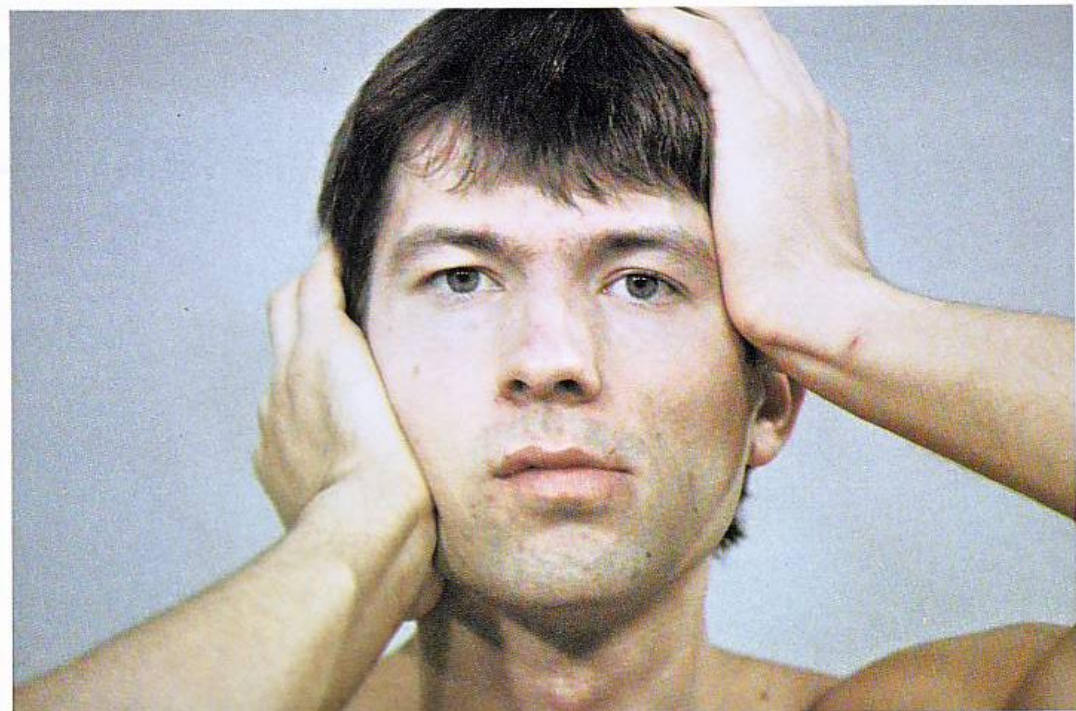
Jaw should be able to move at least the width of little finger to either side. Check movement in a mirror.



Starting Position:



Stretching:



THE JAW 2.

Your difficulty is:

Opening your mouth, because your jaw is stuck on the right side, or because your lower jaw moves to the right when you open your mouth.

Tight Muscles:

Muscles involved in chewing:

1 *pterygoideus medialis*

2 *masseter*

3 *temporalis*.

Starting Position:

Sit with back straight and 'long' neck. Place right hand on forehead. Place left hand along right side of jaw, fingers gripping around back of jaw.

Stretching:

1. Look to the left. With left hand, pull jaw forward and to the left, so that stretch is felt in right side of jaw.
2. Look to the right. Try to move jaw to the right against pressure of left hand; hold for 5 seconds.
3. Relax and look to the left. With left hand, pull jaw forward and to the left to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Keep right hand on forehead; move left hand to left side of jaw.
2. Look to the left and move jaw forward and left to limit.
3. Resist movement with left hand.
4. Hold position a few seconds.

Common Errors:

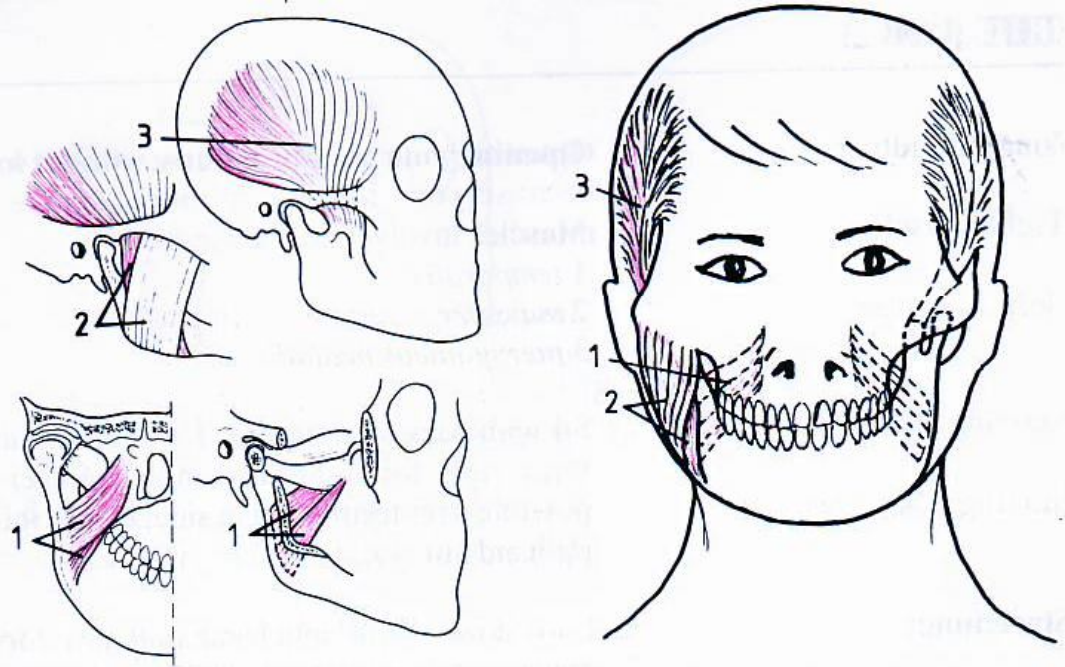
- * Head turns.
- * Neck bent backward.
- * Eyes look in wrong direction.
- * Left hand lets go.

Notes:

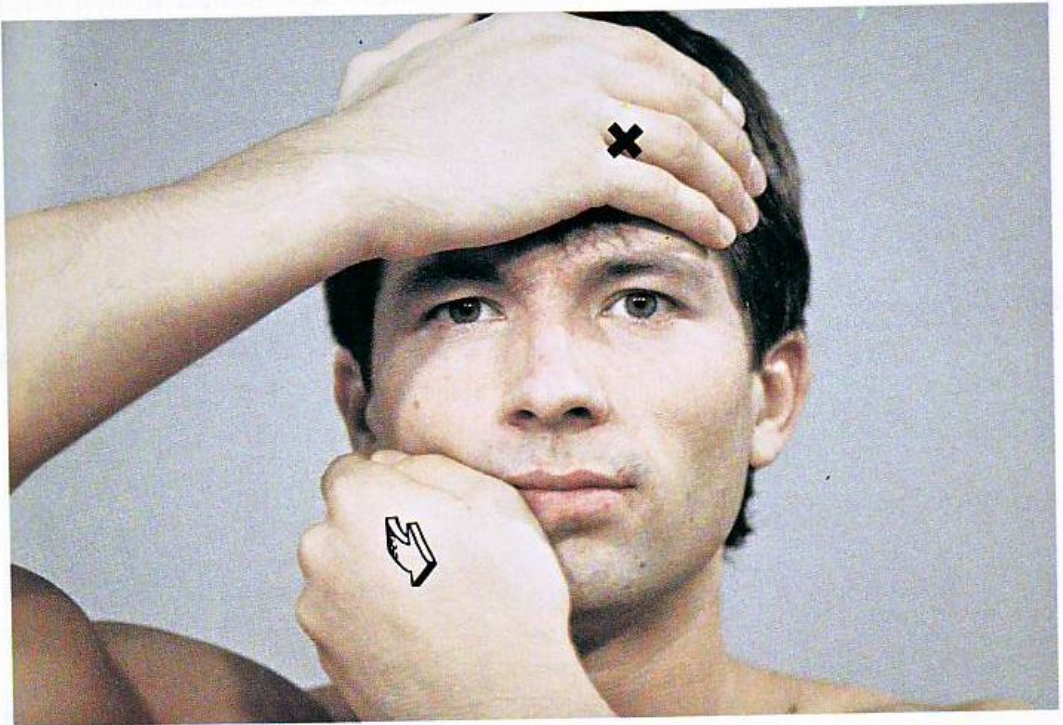
1. Eye movements make this exercise easier to do.
2. Stretch should be felt only on right side.
3. If you can't open your mouth, stretch both sides.
4. If stretch is painful, consult a doctor.

Normal Mobility:

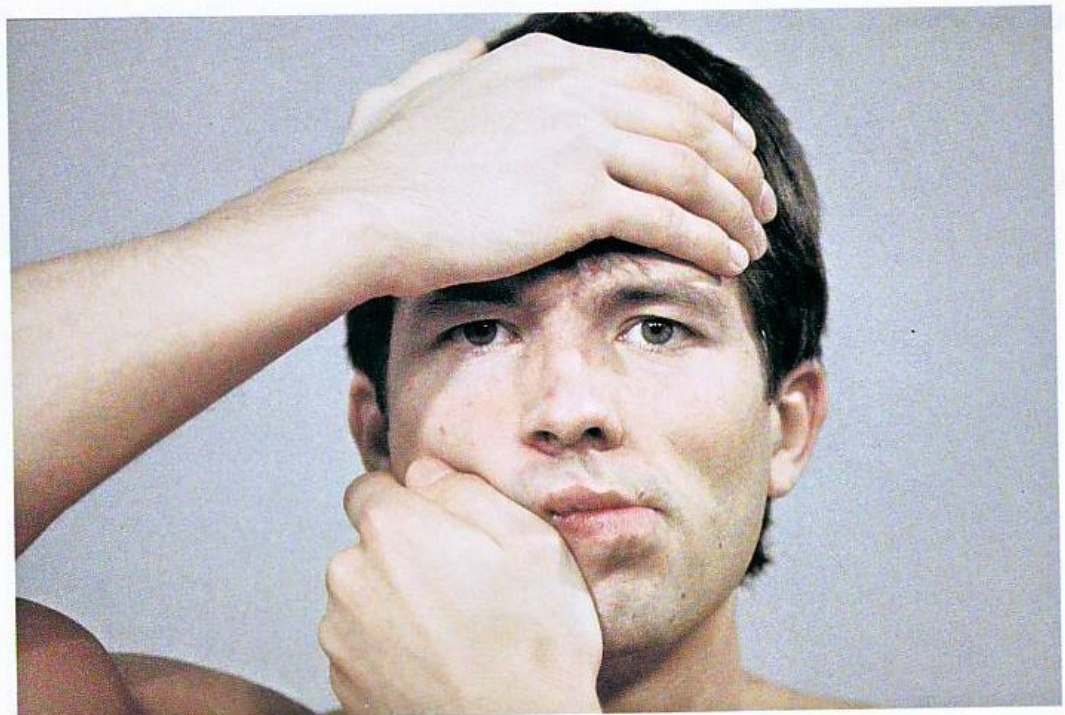
Jaw should be able to move about as far forward as the width of a little finger.



Starting Position:



Stretching:



THE JAW 3.

Your difficulty is:

Opening your mouth slightly without lower jaw moving to the right.

Tight Muscles:

Muscles involved in chewing:

- 1 *temporalis*
- 2 *masseter*
- 3 *pterygoideus medialis*.

Starting Position:

Sit with back straight and 'long' neck. Support forehead with left hand. Place right forefinger and middle finger inside mouth, as far back as possible over teeth on right side; steady this grip with right thumb against right side of jaw.

Stretching:

1. Look down. With right hand, pull jaw forward, pressing its back edge down with finger tips, so that stretch is felt in right side of jaw.
2. Look up. Try to move jaw backward against pressure of right hand; hold for 5 seconds.
3. Relax and look down. With right hand, pull jaw forward and press down with fingers to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Reverse grip, right hand to back of neck, left hand to left side of jaw.
2. Look down and to the left, move jaw down and to the left to limit.
3. Resist that movement with left hand.
4. Hold position a few seconds.

Common Errors:

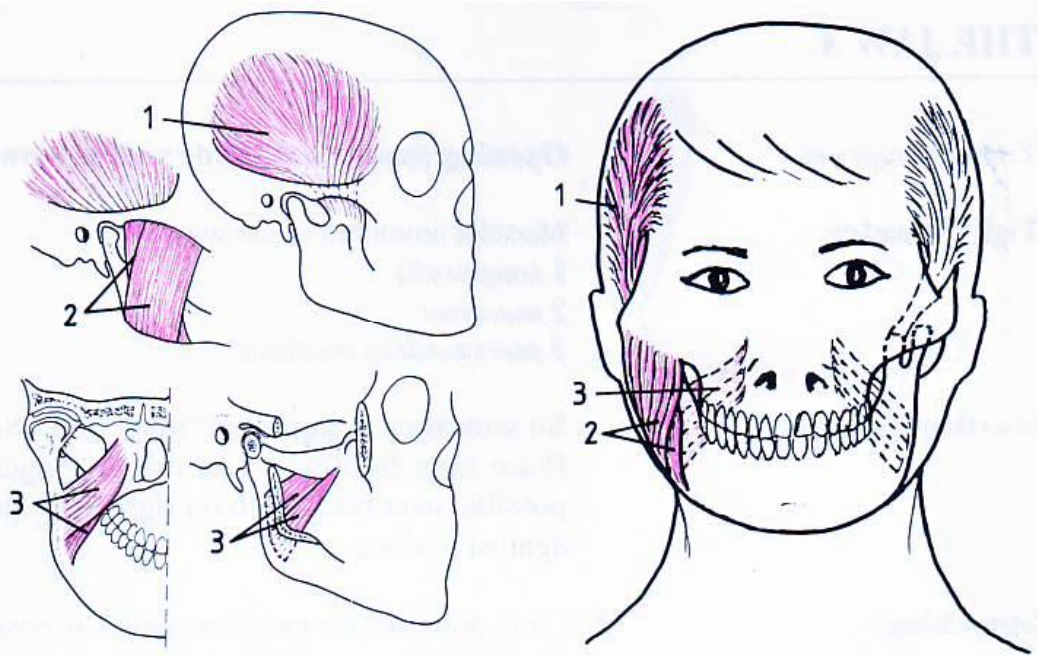
- * Head turns.
- * Neck bent backward.
- * Eyes look in wrong direction.
- * Wrong hand grip.
- * Fingers slide off back teeth.
- * Right thumb not firmly on jaw.

Notes:

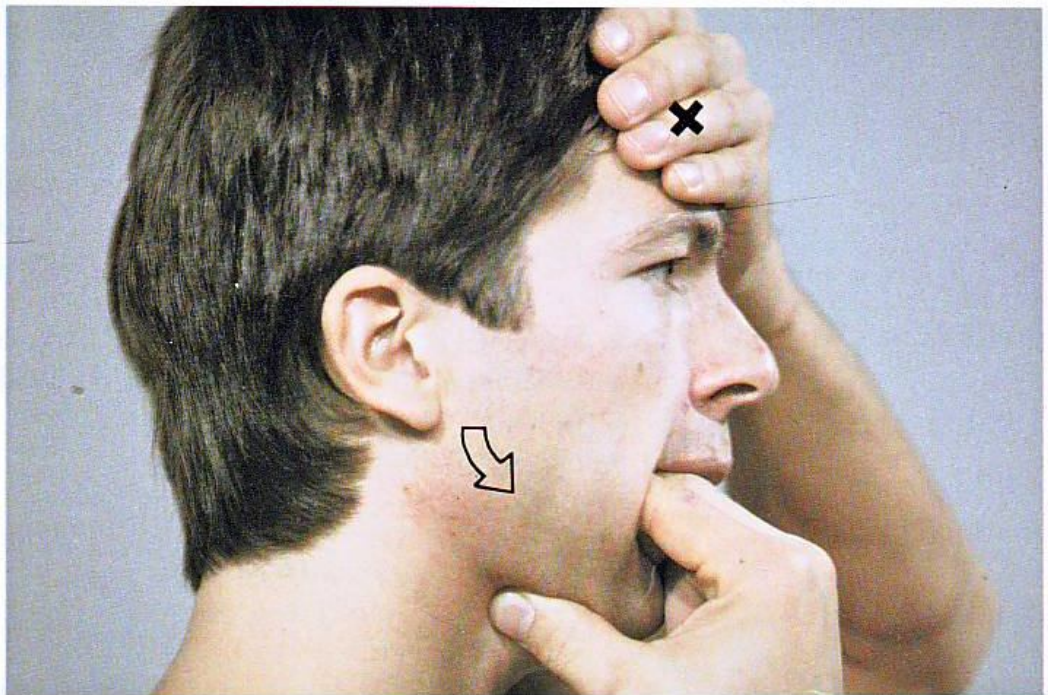
1. Eye movements make this exercise easier to do.
2. Stretch should be felt only on right side.
3. If stretch is painful, consult a doctor.

Normal Mobility:

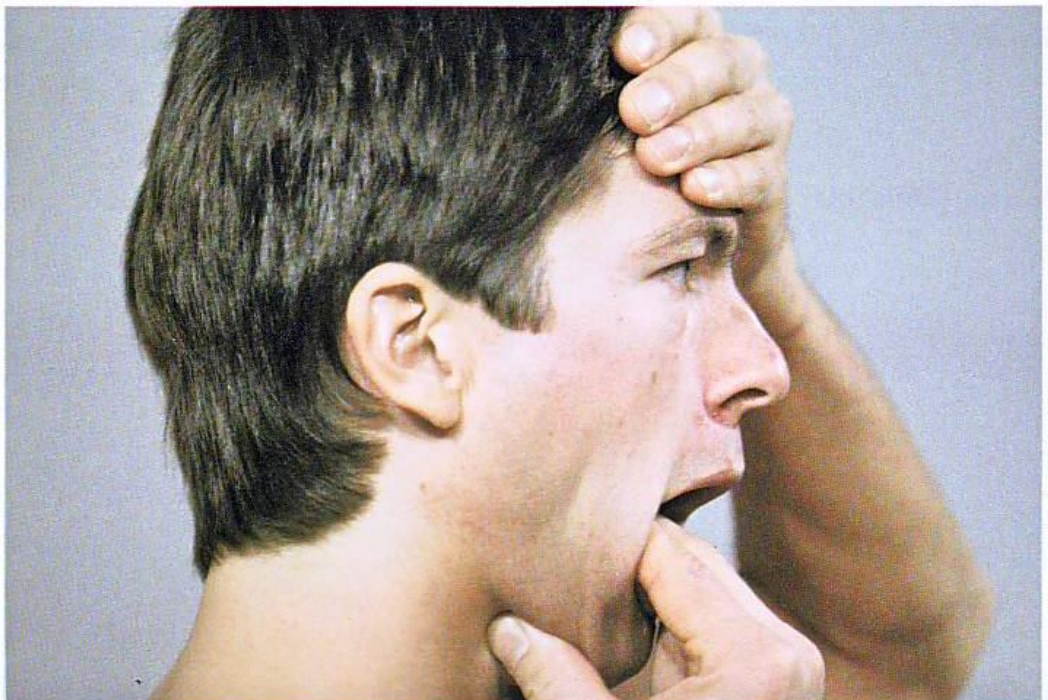
You should be able to give yourself a noticeably underhung jaw.



Starting Position:



Stretching:



THE JAW 4.

Your difficulty is:

Opening your mouth wide without lower jaw moving to the right.

Tight Muscles:

Muscles involved in chewing:

1 *temporalis*

2 *masseter*

3 *pterygoideus medialis*.

Starting Position:

Sit with back straight and 'long' neck. Support forehead with left hand. Place right forefinger and middle finger inside mouth, as far back as possible over back teeth on right side; steady this grip with right thumb against jaw bone.

Stretching:

1. Look down. Open mouth as much as possible by using right hand to pull jaw forward and right fingers to press back edge down, so that stretch is felt in right side of jaw.
2. Look up. Try to close mouth as if to bite, against pressure of right hand; hold for 5 seconds.
3. Relax and look down. Open mouth to limit – maybe a little bit more – by pulling forward and down with right hand and fingers.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Reverse grip, right hand to back of neck, left hand to left side of jaw.
2. Look down and to the left and move jaw down, opening mouth to limit.
3. Resist that movement with left hand.
4. Hold position a few seconds.

Common Errors:

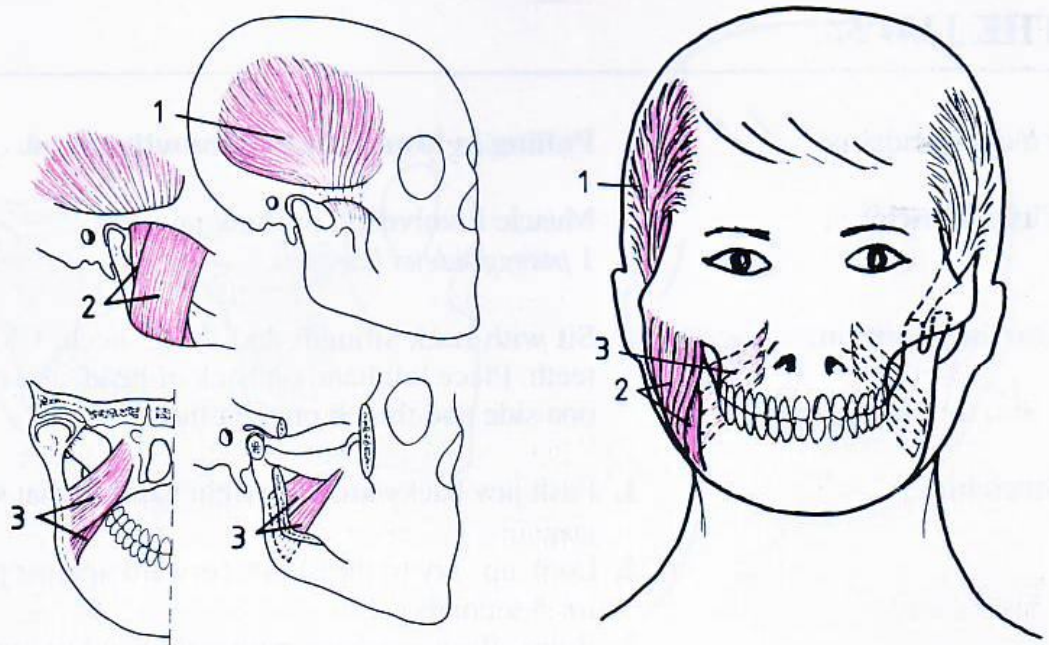
- * Head turns.
- * Neck bent backward.
- * Eyes look in wrong direction.
- * Wrong hand grip.
- * Right thumb not firmly on jaw; right fingers slide off back teeth.

Notes:

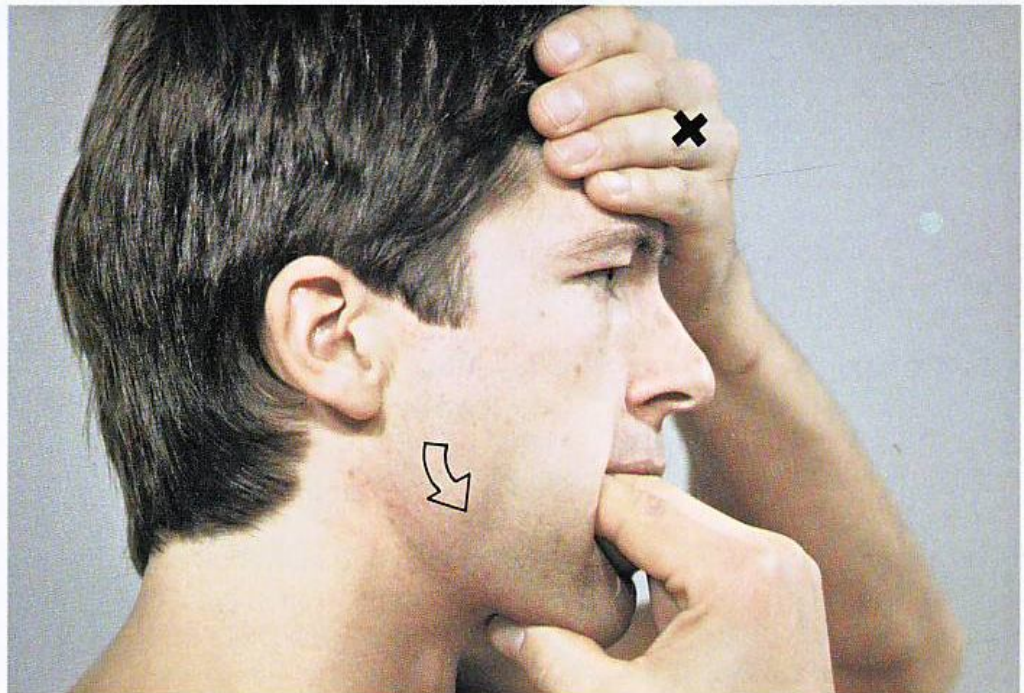
1. Eye movements make this exercise easier to do.
2. Stretch should be felt only on right side.
3. If stretch is painful, consult a doctor.

Normal Mobility:

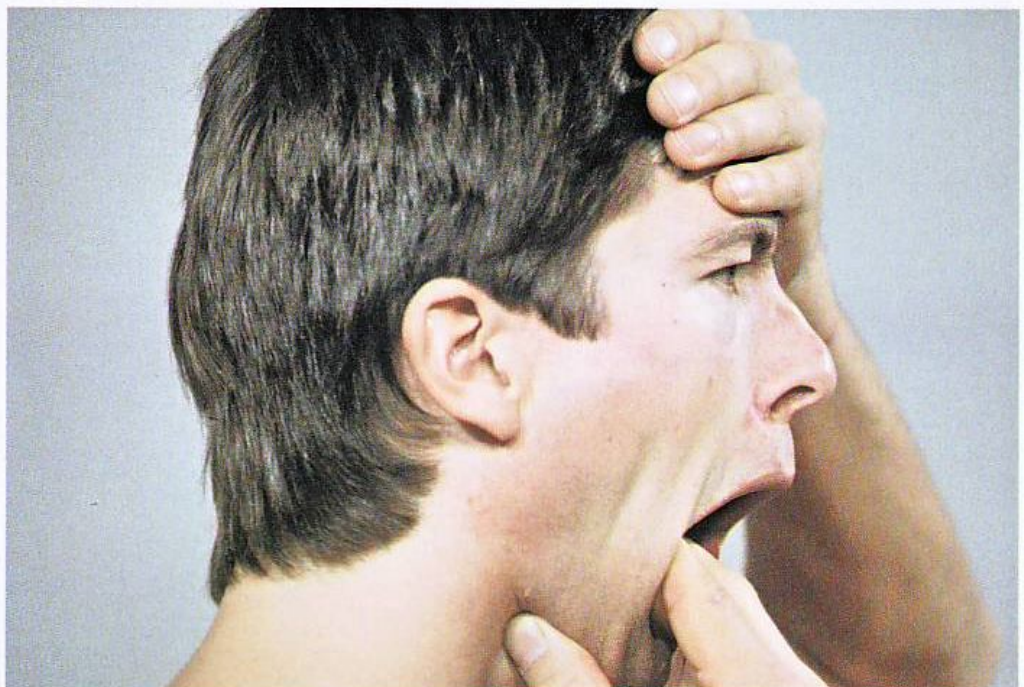
Mouth should be able to open three finger widths between upper and lower teeth.



Starting Position:

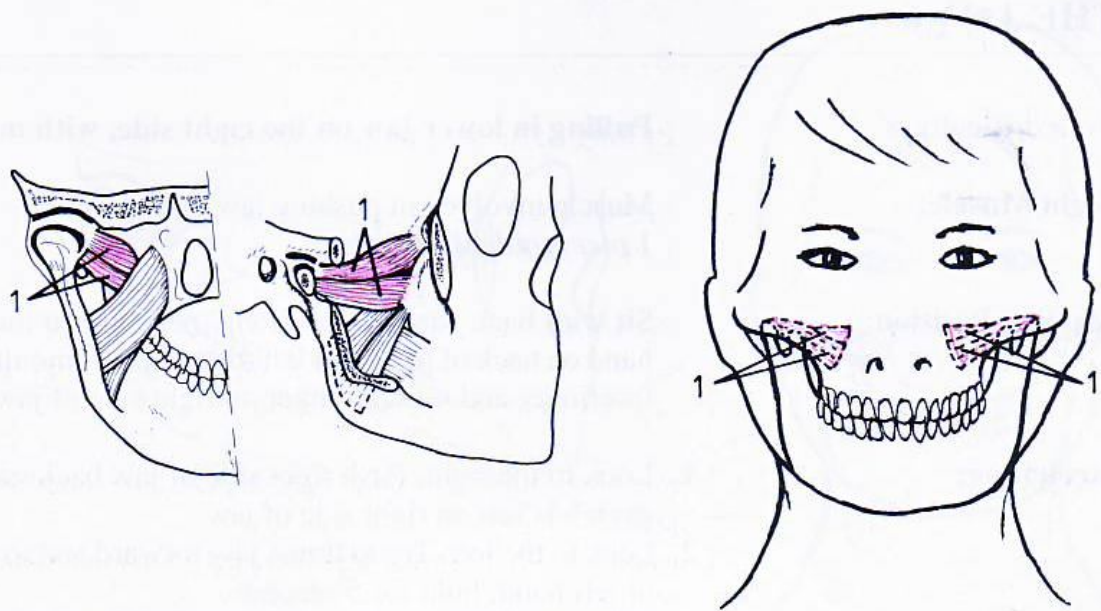


Stretching:

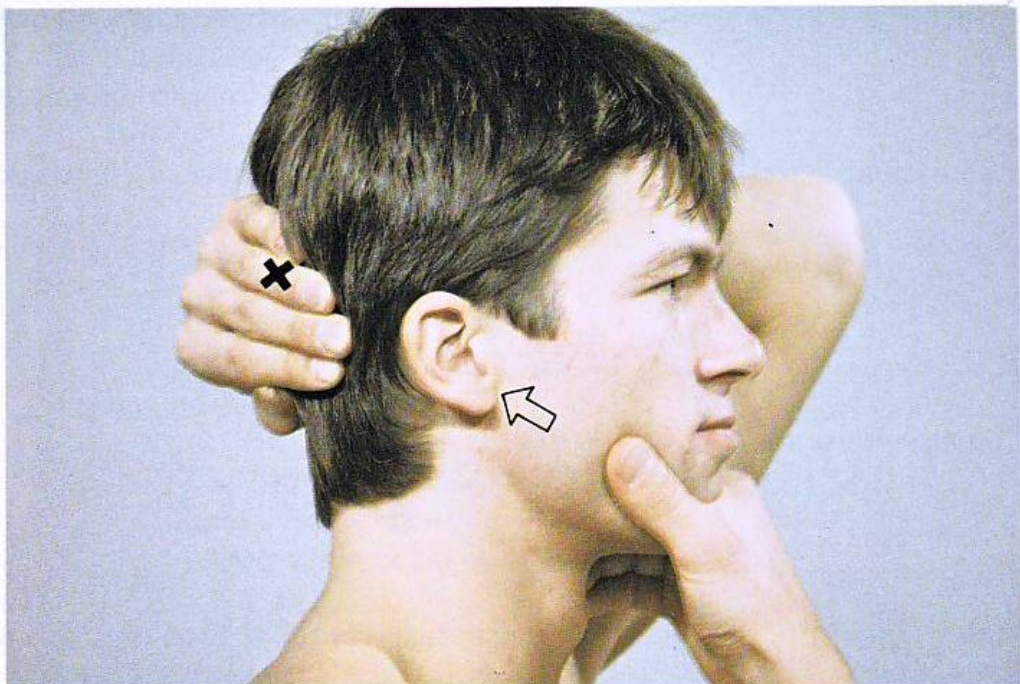


THE JAW 5.

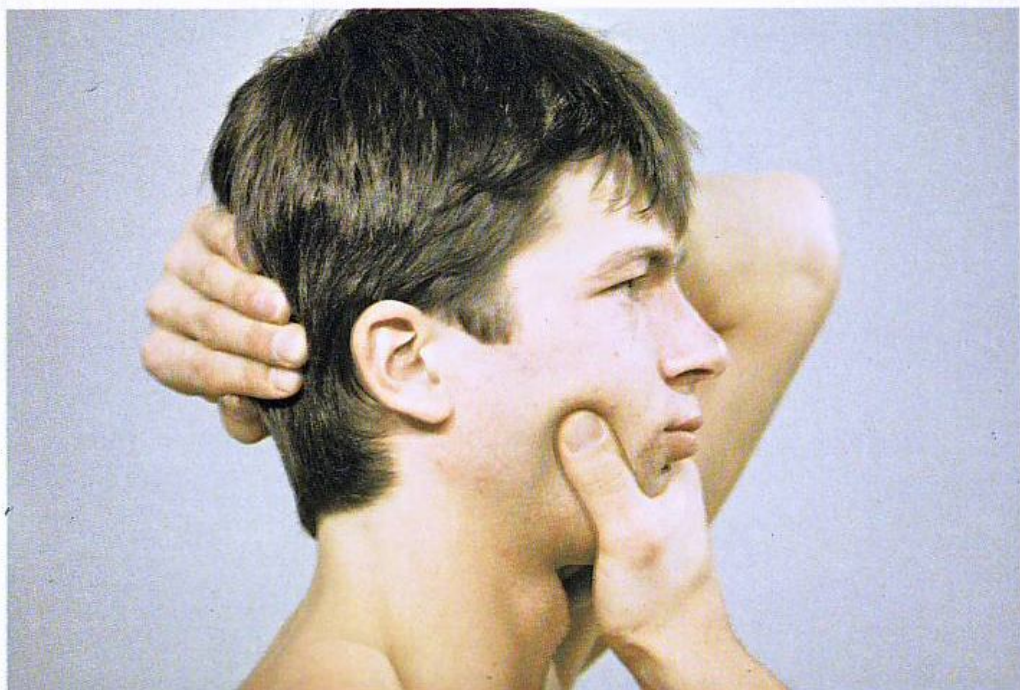
Your difficulty is:	Pulling in lower jaw with mouth closed.
Tight Muscle:	Muscle involved in pushing jaw out: <i>1 pterygoideus lateralis.</i>
Starting Position:	Sit with back straight and 'long' neck. Close mouth but do not clench teeth. Place left hand on back of head, and right hand on chin, fingers on one side and thumb on the other.
Stretching:	1. Push jaw backward with right hand so that stretch is felt on both sides of jaw. 2. Look up. Try to thrust jaw forward against pressure of right hand; hold for 5 seconds. 3. Relax. Push jaw back with right hand to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Release grip. Move hands to either side of jaw, fingers hooked around back of jaw. 2. Push jaw back to limit. 3. Resist movement with both hands. 4. Hold position a few seconds.
Common Errors:	* Head turns. * Neck bent backward. * Mouth opens. * Wrong hand grip.
Notes:	1. Stretch should be felt on both sides of jaw. 2. If jaw can be pushed back on one side only, stretch the other with mouth closed (Exercise 6).
Normal Mobility:	You should be able to pull your jaw in a little.



Starting Position:



Stretching:



THE JAW 6.

Your difficulty is:

Pulling in lower jaw on the right side, with mouth slightly open.

Tight Muscle:

Muscle involved in pushing jaw out:
1 *pterygoideus lateralis*.

Starting Position:

Sit with back straight and 'long' neck. Open mouth slightly. Place right hand on back of head and left thumb inside mouth on right back teeth, left forefinger and middle finger on right side of jaw.

Stretching:

1. Look to the right. Push right side of jaw backward with left hand so that stretch is felt on right side of jaw.
2. Look to the left. Try to thrust jaw forward and to the left against pressure of left hand; hold for 5 seconds.
3. Relax and look to the right. Use left hand to push right side of jaw backward to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Release grip. Place left hand on right side of jaw, fingers hooked over back edge.
2. Look to the right. Open mouth slightly, and move jaw back and to the right to limit.
3. Resist movement with left hand.
4. Hold position a few seconds.

Common Errors:

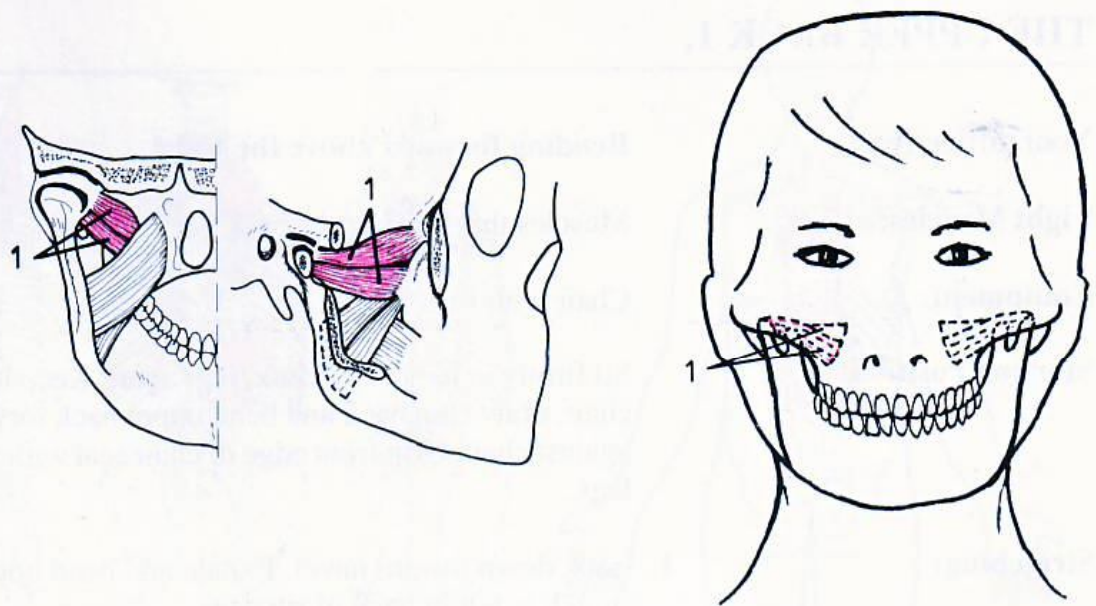
- * Head turns.
- * Neck bent backward.
- * Thumb slides off back teeth.
- * Fingers fail to support jaw.

Note:

Stretch should be felt only on right side of jaw.

Normal Mobility:

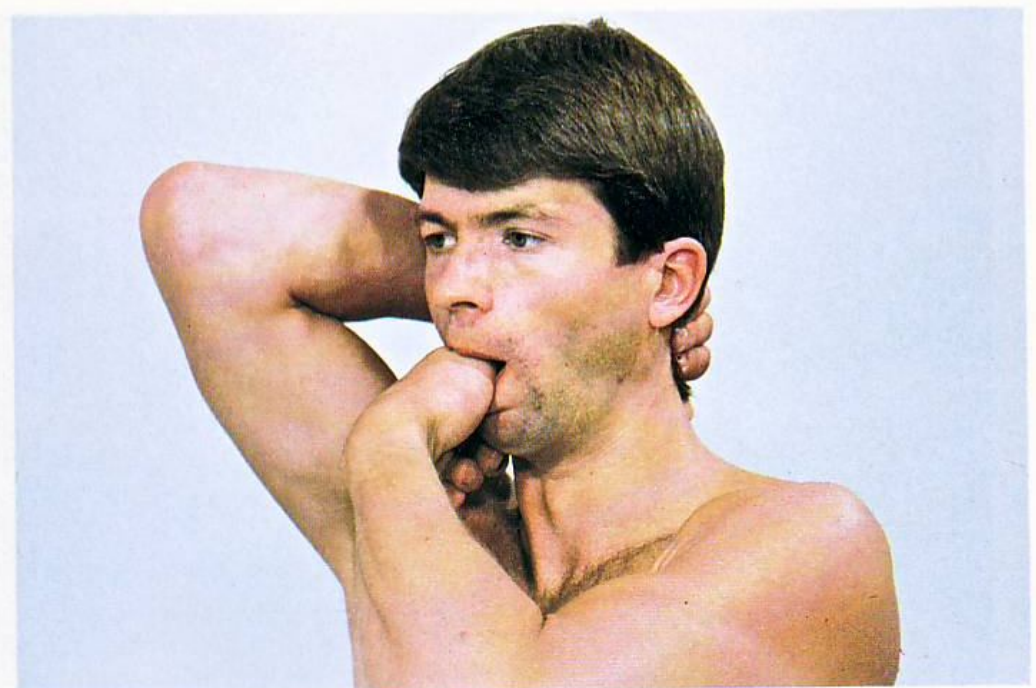
You should be able to pull your jaw in a little.



Starting Position:

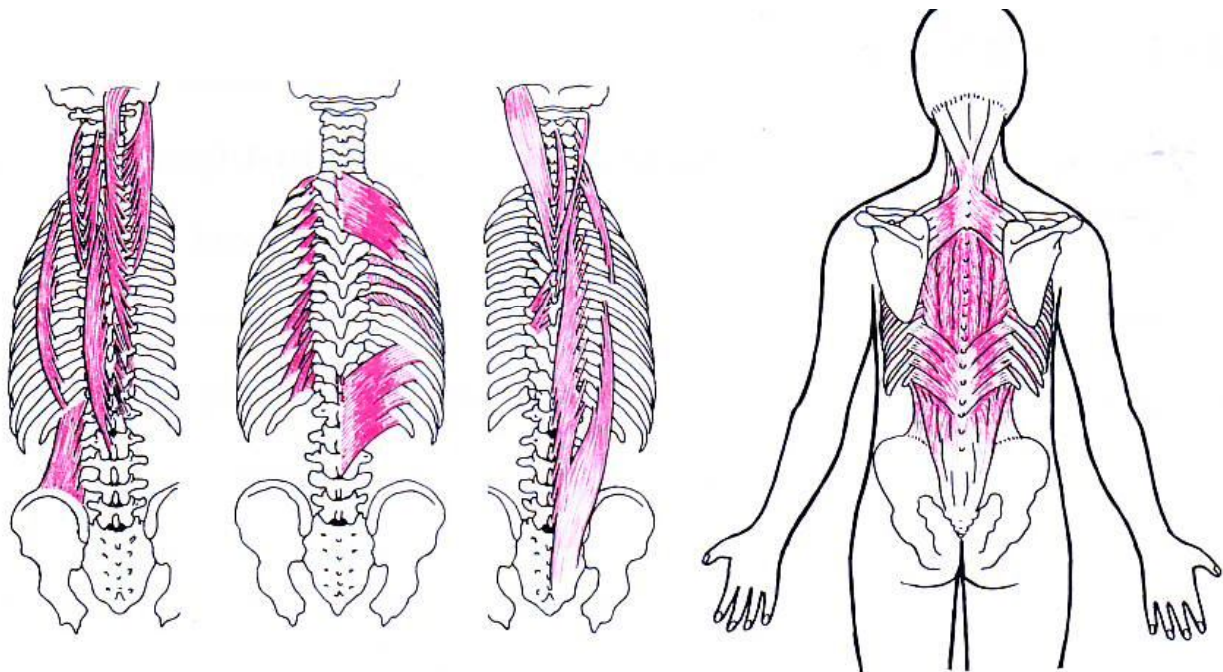


Stretching:

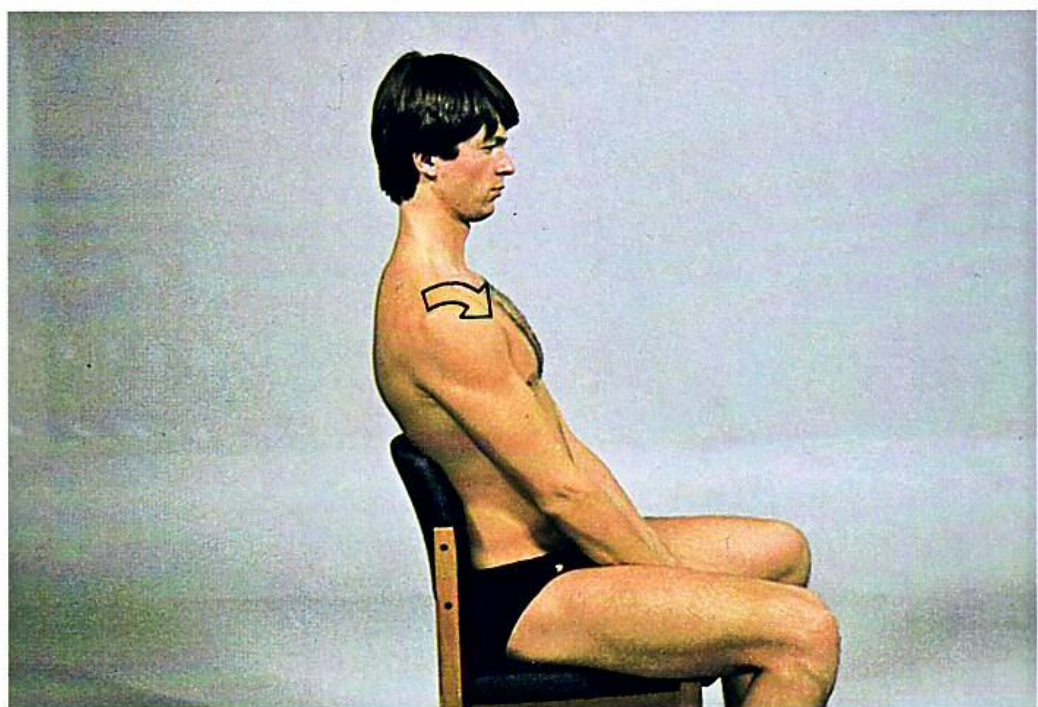


THE UPPER BACK 1.

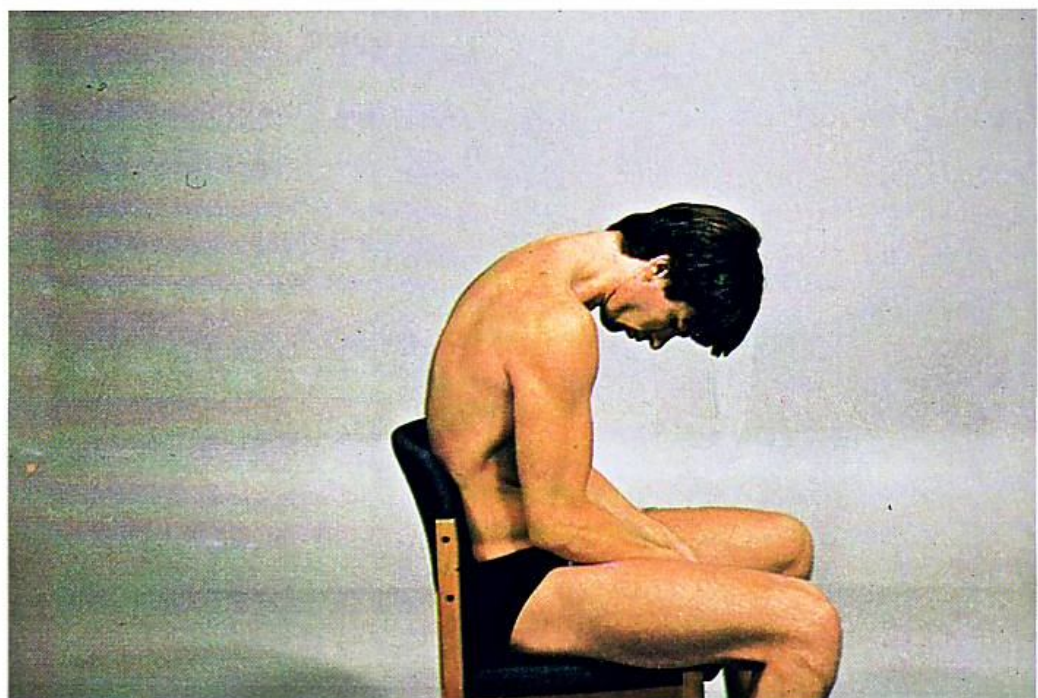
Your difficulty is:	Bending forward above the waist.
Tight Muscles:	Muscles that bend upper back backward.
Equipment:	Chair with firm back.
Starting Position:	Sit firmly in to back of chair, legs apart. Keep lower back against back of chair, draw chin back and bend upper back forward, pressing lower back against chair. Grip front edge of chair seat with both hands, arms between legs.
Stretching:	1. Look down toward navel. Exhale and bend upper back forward so that stretch is felt in back of rib cage. 2. Inhale and try to straighten back while resisting movement with arms; hold for 5 seconds. 3. Relax and look down toward navel. Exhale and pull with arms to bend back forward to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip and look down. 2. Exhale and bend upper back forward and down to limit. 3. Resist that movement with arms and hands. 4. Hold position a few seconds.
Common Errors:	* Lower back leaves chair back. * Chin juts forward.
Note:	Stretch should be felt only in the upper back, not in lower back or elsewhere.
Normal Mobility:	You should have no difficulty bending your upper back.



Starting Position:

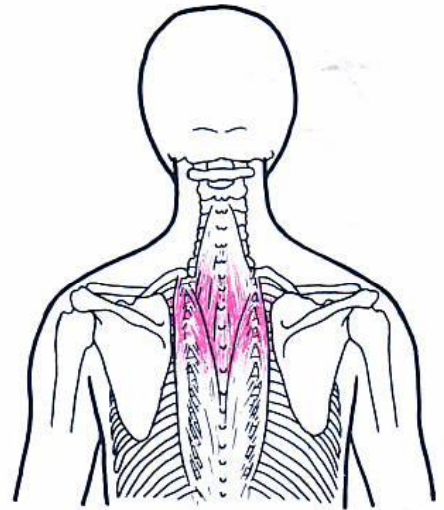
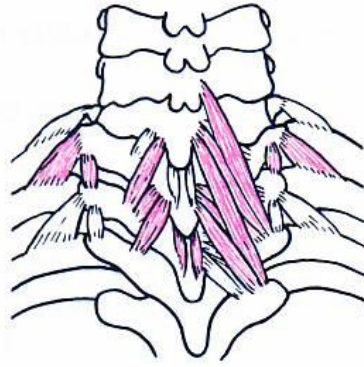
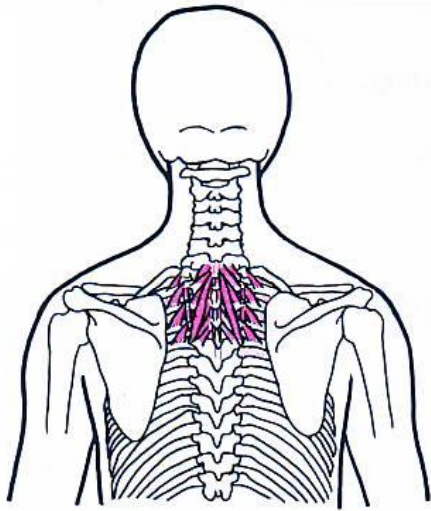


Stretching:



THE UPPER BACK 2A.

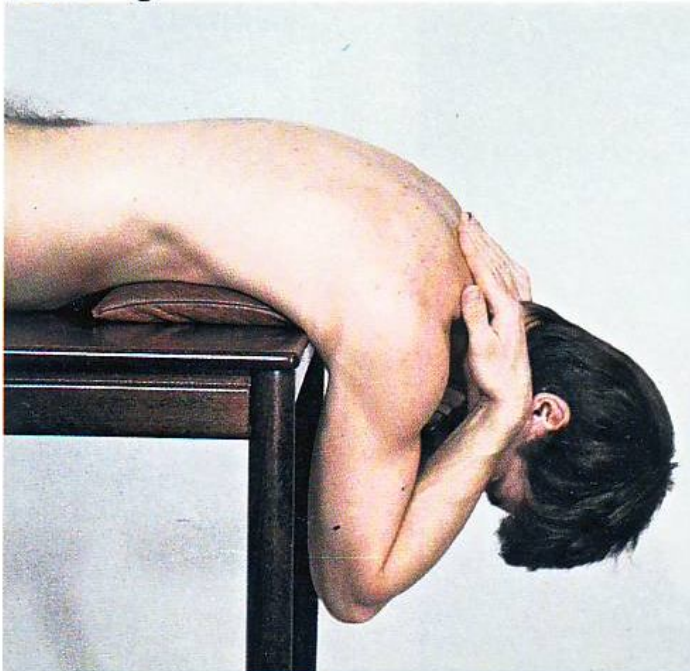
Your difficulty is:	Bending forward at shoulder level. Lying face down.
Tight Muscles:	Muscles that bend upper back backward.
Equipment:	Table or bench. Cushion or other pad to soften edge. Maybe a belt.
Starting Position:	Lie face down on table, upper torso beyond edge. Hold body steady by hooking feet under edge of table or by strapping legs down with a belt. Place both hands on shoulders, fingers along spine.
Stretching:	1. Look in direction of navel. Exhale and bend upper back forward, pulling forward and down with hands, so that stretch is felt in back of rib cage. 2. Draw chin back and inhale. Try to straighten neck and back, while resisting movement with hands; hold for 5 seconds. 3. Relax and look in direction of navel. Exhale and bend forward and down, pulling with hands, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Grip table legs with hands, or place palms on floor or other support. 2. Look down toward navel. 3. Exhale and bend upper back forward and down to limit. 4. Resist movement with arms and hands. 5. Hold position a few seconds.
Common Errors:	* Chin juts forward. * Pelvis raised from table.
Notes:	1. Stretch should be felt only in upper back, not in lower back or elsewhere. 2. If you move trunk farther out over edge, the effect of this stretch comes further down the back. 3. As shown to the right, this exercise may also be done with hands grasping table legs.
Normal Mobility:	You should have no difficulty bending your upper back.



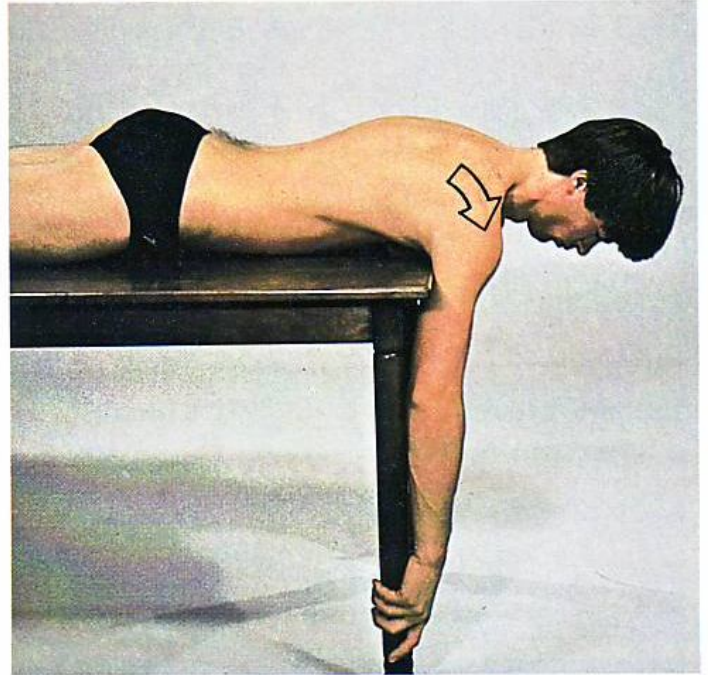
Starting Position:



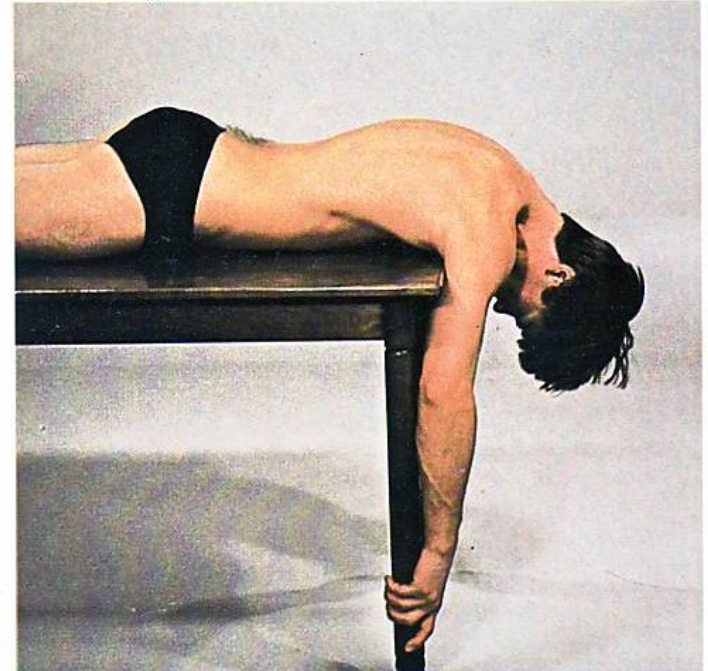
Stretching:



Starting Position:

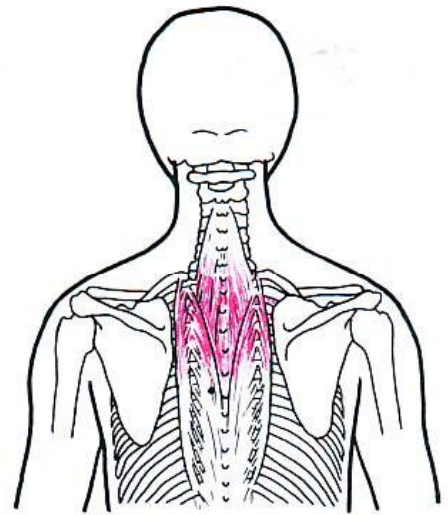
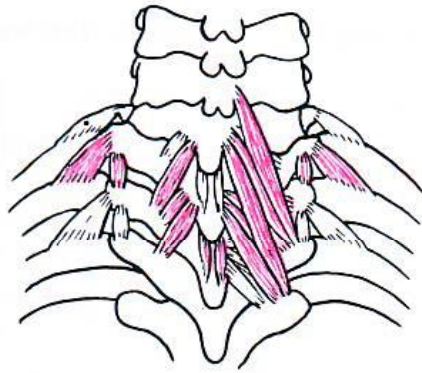
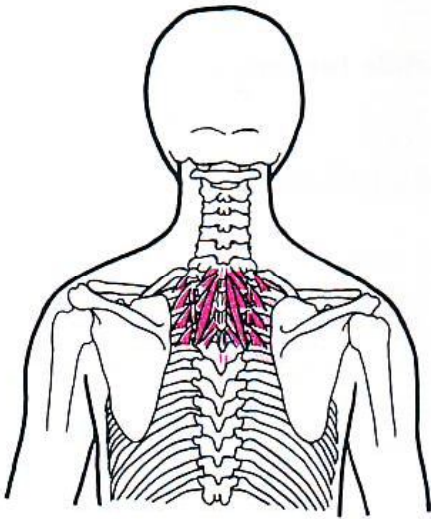


Stretching:

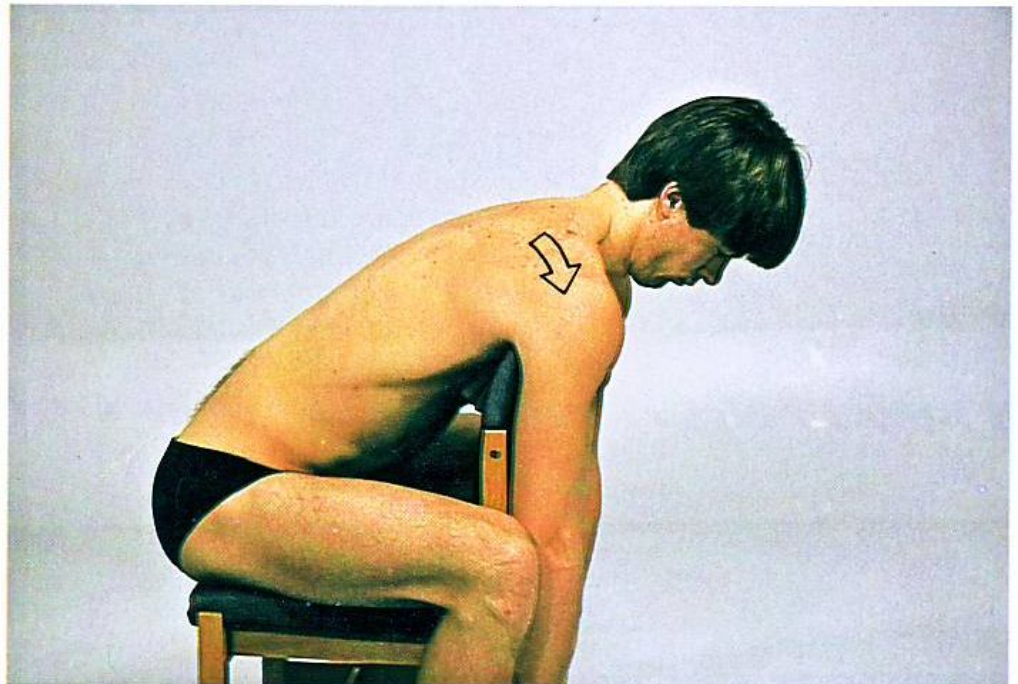


THE UPPER BACK 2B.

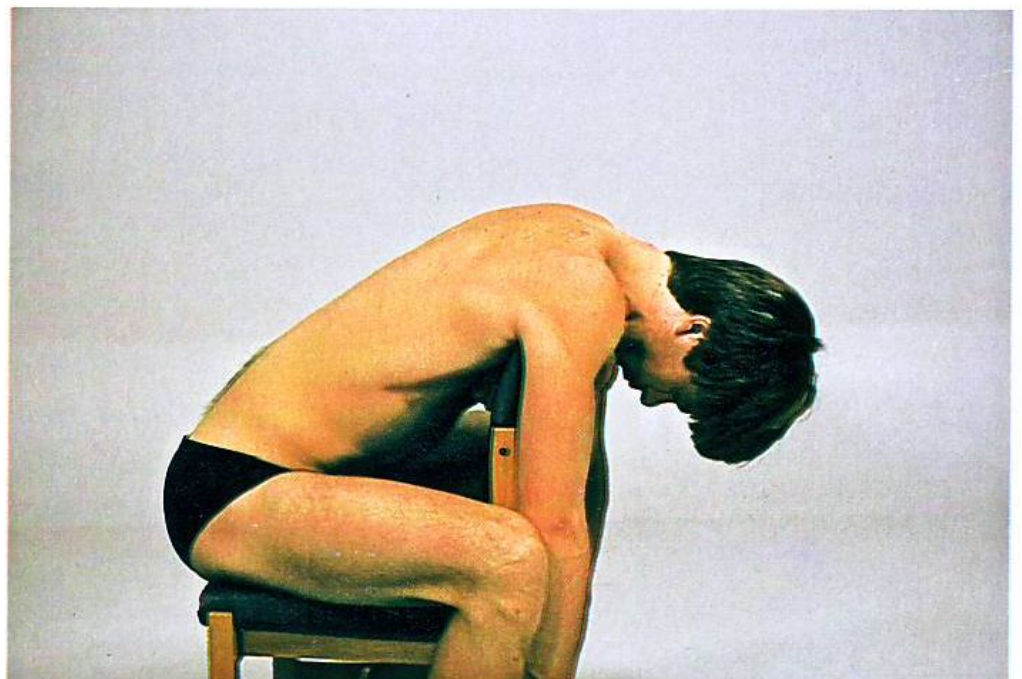
Your difficulty is:	Bending forward at shoulder level. Sitting.
Tight Muscles:	Muscles that bend upper back backward.
Equipment:	Chair with padded back.
Starting Position:	Sit astride outer part of chair seat, facing chair back. Rest middle of chest on padded upper edge of chair back; let arms hang straight down over chair back; grasp legs of chair. Draw chin back.
Stretching:	1. Look toward navel. Exhale and bend upper body forward so that stretch is felt in back of rib cage. 2. Look up. Draw chin back and inhale. Try to straighten back, while resisting movement with arms; hold for 5 seconds. 3. Relax and look toward navel. Exhale and bend forward, assisting by pulling with arms, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position; look down toward navel. 2. Exhale and bend upper body forward over back of chair to limit. 3. Resist movement with arms. 4. Hold position a few seconds.
Common Error:	* Chin juts forward.
Notes:	1. Stretch should be felt only in upper back, not in lower back or elsewhere. 2. For effect higher up in your back, move resting point of chest upward.
Normal Mobility:	You should be able to touch your chin to your chest.



Starting Position:

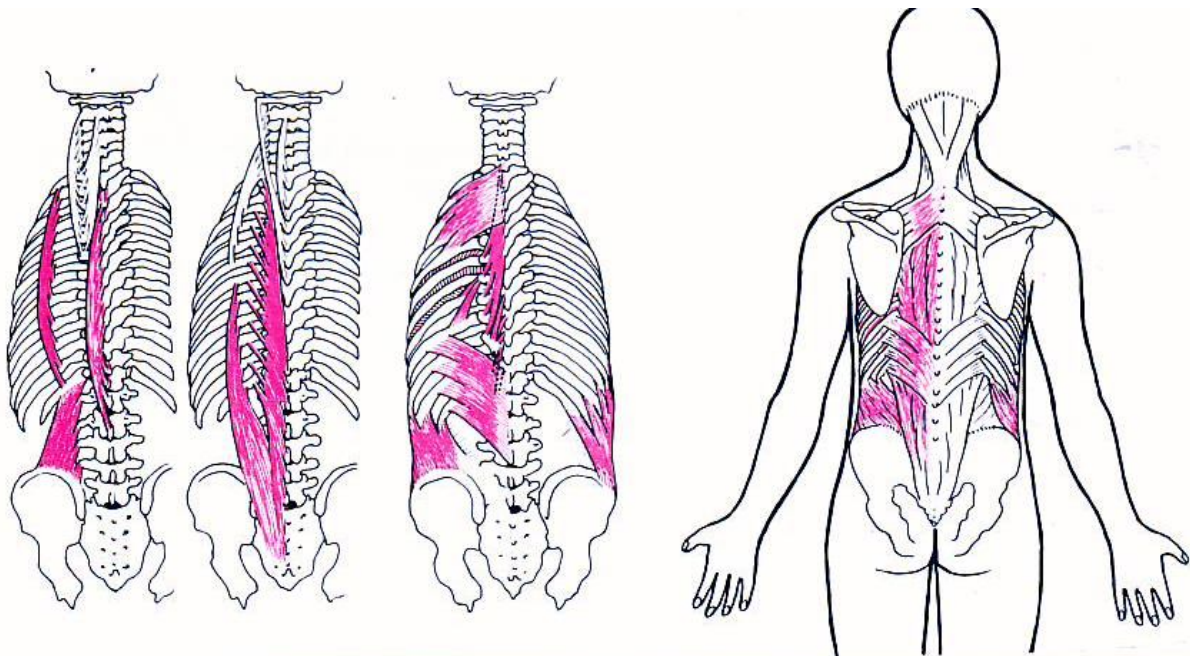


Stretching:

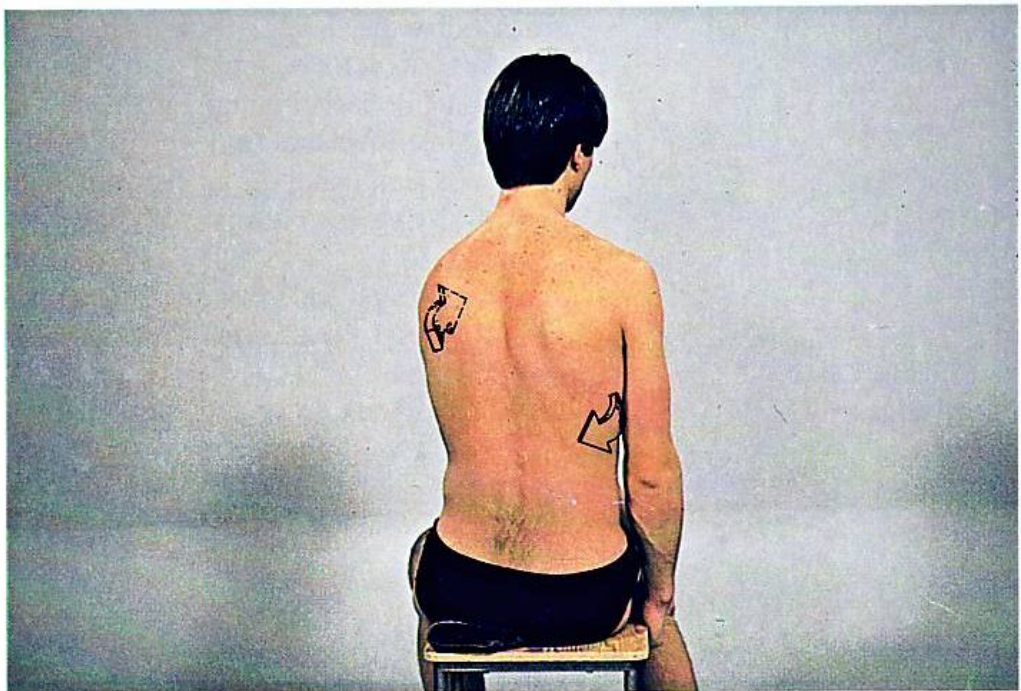


THE UPPER BACK 3.

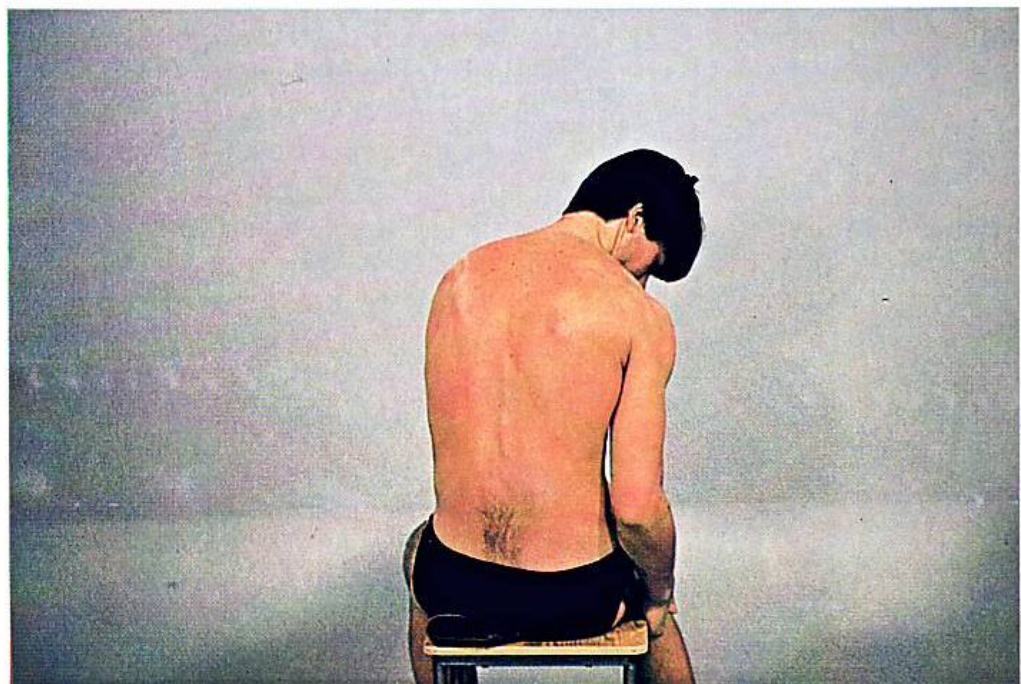
Your difficulty is:	Bending forward above the waist while turning and bending sideways to the right.
Tight Muscles:	Muscles that turn upper back and bend it backward and sideways.
Equipment:	Chair or stool; small cushion or folded towel.
Starting Position:	Sit on chair with trunk leaning slightly forward, cushion under left buttock and thigh to prevent lower back turning to the right, feet apart with soles firmly on floor. Grip with both hands under chair seat, outside right thigh, or with right hand under chair seat and left hand under right thigh.
Stretching:	1. Look down and backward to the right. Exhale and bend upper body forward to the right while turning it right, so that stretch is felt around chest. 2. Inhale and look to the left. Try to straighten back while resisting movement with arms; hold for 5 seconds. 3. Relax; look down and backward to the right; exhale. Let right shoulder down and lean trunk forward and to the right while turning it right, assisting by pulling with arms, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip; look down and backward to the right. 2. Exhale and bend upper body forward and to the right and turn it right to limit. 3. Resist movement with arms, palms against chair seat or against right thigh. 4. Hold position a few seconds.
Common Errors:	* Lower back not bent forward. * Left buttock raised from chair so that lower back turns to the right. * Too much force used.
Note:	Stretch should be felt only in upper back, not in lower back or elsewhere.
Normal Mobility:	You should be able to turn your shoulders until they are almost at a right angle to your pelvis.



Starting Position:

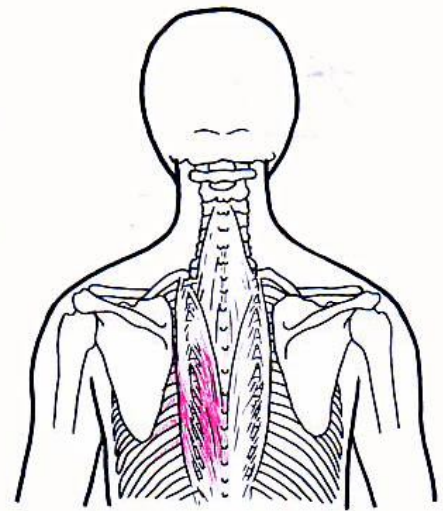
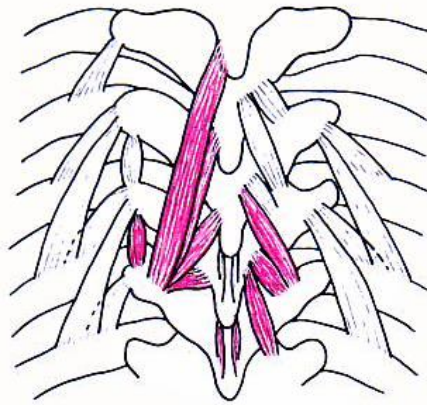
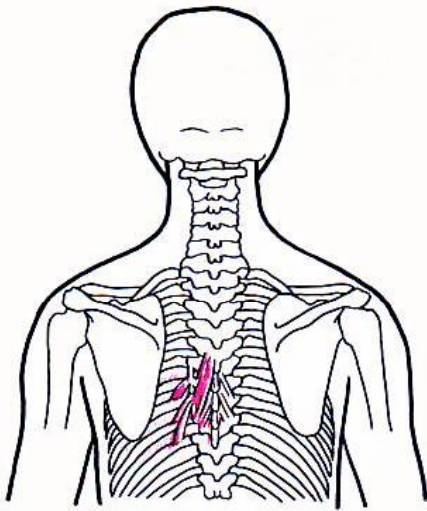


Stretching:

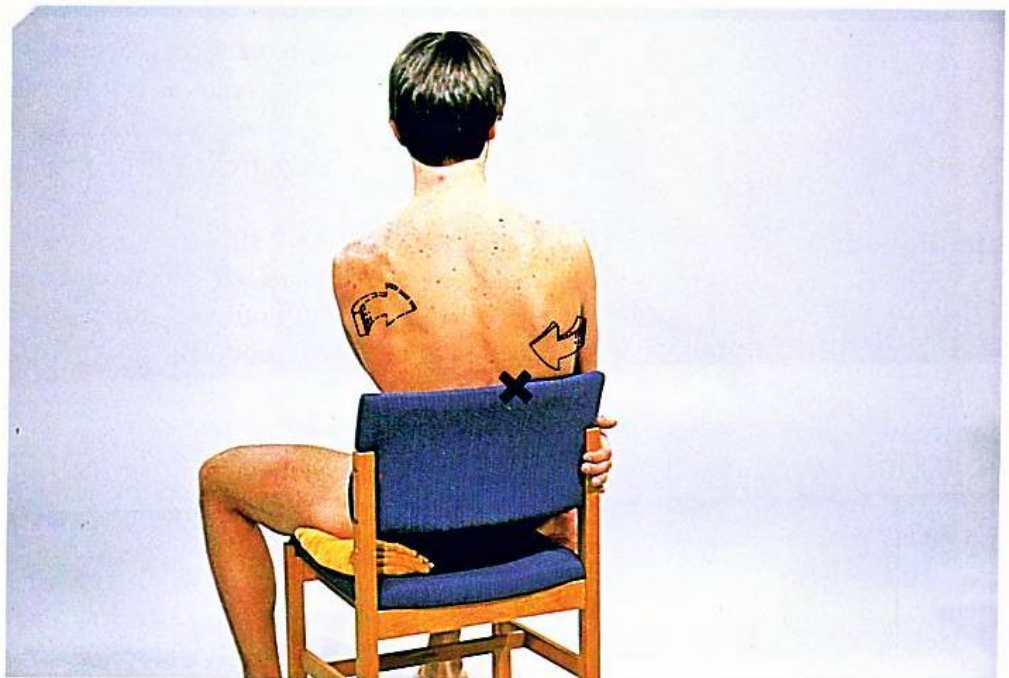


THE UPPER BACK 4.

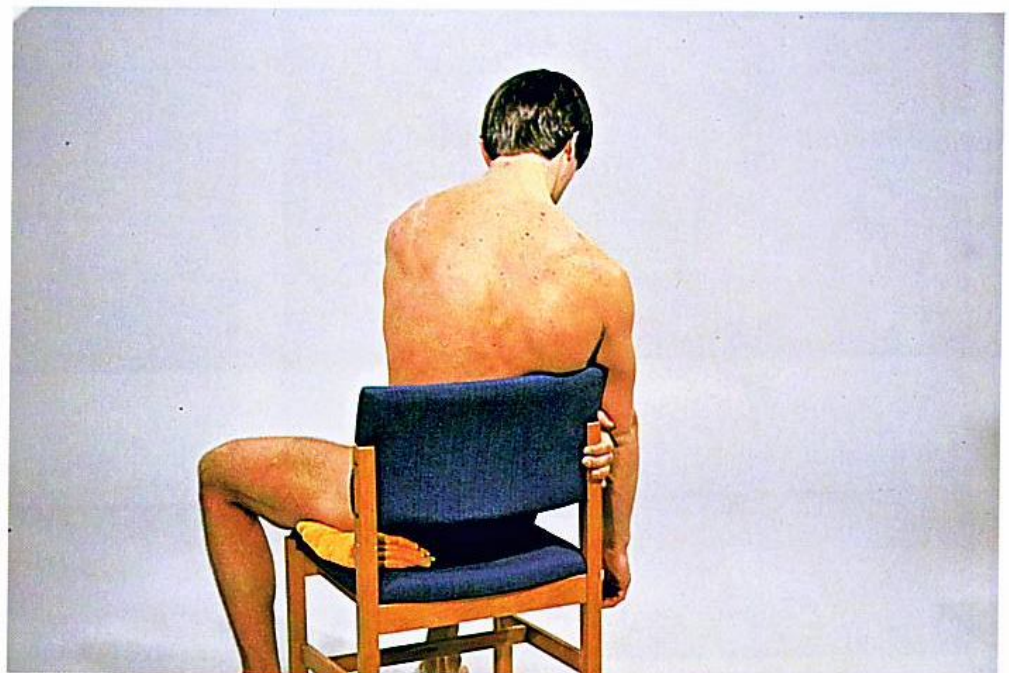
Your difficulty is:	Bending forward, turning and bending to the right in some part of your back above the waist.
Tight Muscles:	Muscles that turn upper back and bend it backward and sideways.
Equipment:	Chair with firm support for lower back; firm cushion.
Starting Position:	Sit out from back of chair with cushion under left buttock and thigh. (This bends back to the left.) Rest lower back against chair back to keep it bent. Lean upper back forward and to the right; grip back of chair with left hand, just inside right elbow. Let right arm hang free.
Stretching:	1. Look down and backward to the right. Exhale and bend upper body forward and to the right while turning it right, so that stretch is felt around rib cage. 2. Inhale and look to the left. Try to straighten back and turn upper body to the left, while resisting movement with arms; hold for 5 seconds. 3. Relax; look down and backward to the right; exhale. Let right shoulder down and lean upper body forward and to the right while turning it right, assisting by pulling with left arm, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip; look down and backward to the right. 2. Exhale and bend upper body forward and to the right and turn it right, to limit. 3. Resist movement with left arm, palm pressing against back of chair. 4. Hold position a few seconds.
Common Errors:	* Lower back not bent forward. * Left buttock raised from chair so that lower back turns to the right.
Notes:	1. The thicker and firmer the cushion, the more your lower back bends sideways and the higher up the effect of the stretch; and vice versa. 2. By using a chair with a back that can be adjusted in height, you can get a more specific effect from this exercise.
Normal Mobility:	You should be able to turn your shoulders until they are almost at a right angle to your pelvis.



Starting Position:

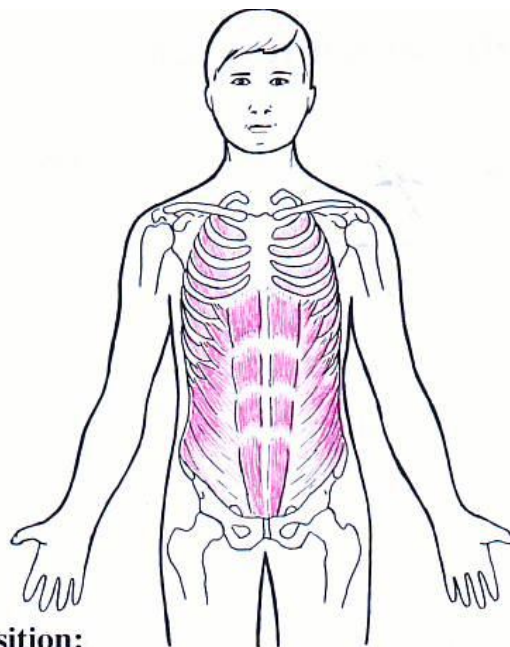
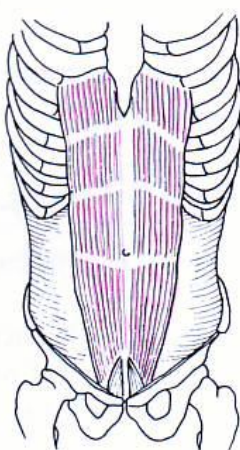
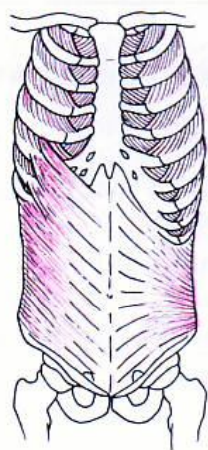


Stretching:



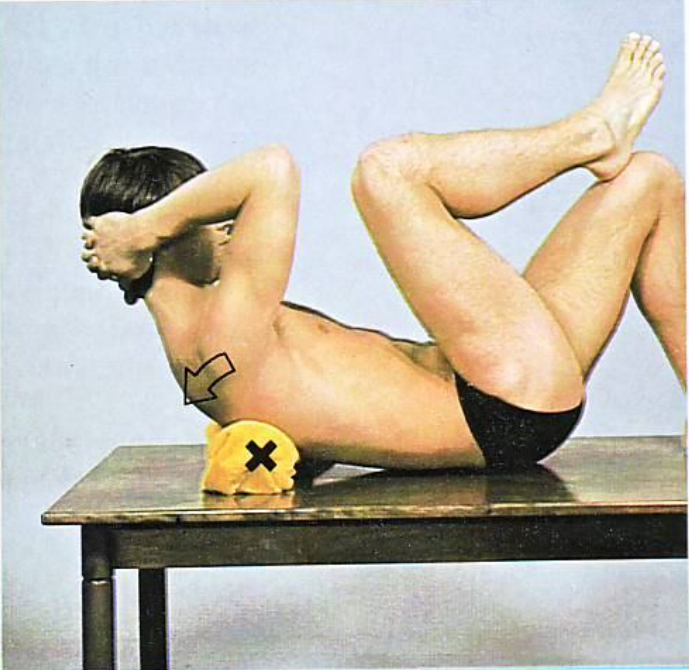
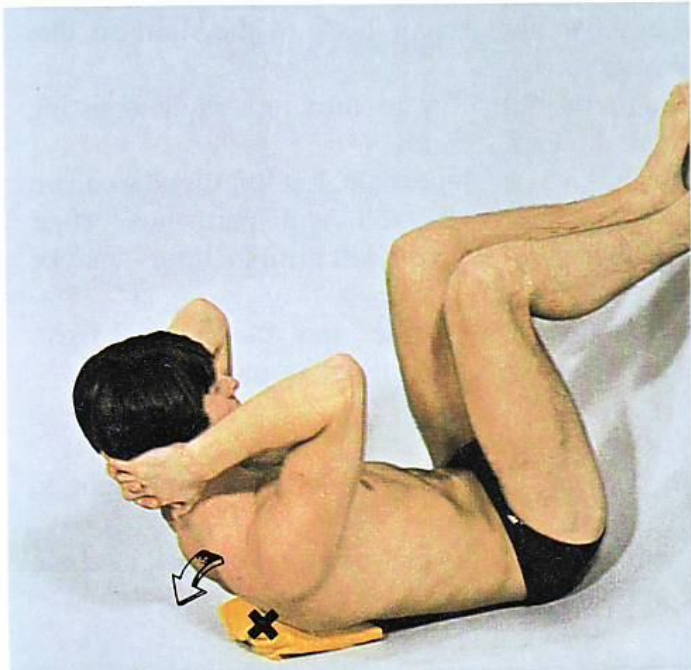
THE UPPER BACK 5.

Your difficulty is:	Bending backward in some part of your back above the waist.
Tight Muscles:	Muscles that bend upper back forward.
Equipment:	Firm cushion or large, tightly rolled towel.
Starting Position:	Lie on your back on floor with buttocks close to wall, knees drawn up, and feet on wall. Cushion under tight part of back, hands clasped behind neck. Alternatively (see pictures at far right): Place left foot on floor, knee bent, and right heel on left knee.
Stretching:	1. Draw chin back. Exhale and let upper back sink down over cushion toward floor, so that stretch is felt in front of rib cage. 2. Look toward navel. Inhale and tense chest and belly muscles; hold for 5 seconds. 3. Relax and draw chin back. Exhale and let upper back sink further down over cushion, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Draw chin back; look straight up. 2. Exhale and press head, shoulders and upper rib cage down over cushion as far as you can without arching back. 3. Hold position a few seconds.
Common Errors:	* Lower back arched. * Chin juts forward. * Cushion slides or is too soft.
Notes:	1. Move cushion up or down to get effect in desired part of back. 2. If strain is too great with cushion placed near waist, so that you can't relax, then try lying on a sloping surface with head and upper back a little higher – halfway to a sitting position. 3. In this exercise, stretch is often felt only in upper back, which is a sign that spine is stiff in this part and needs limbering up.
Normal Mobility:	You should be able to straighten your upper back and bend it slightly backward.



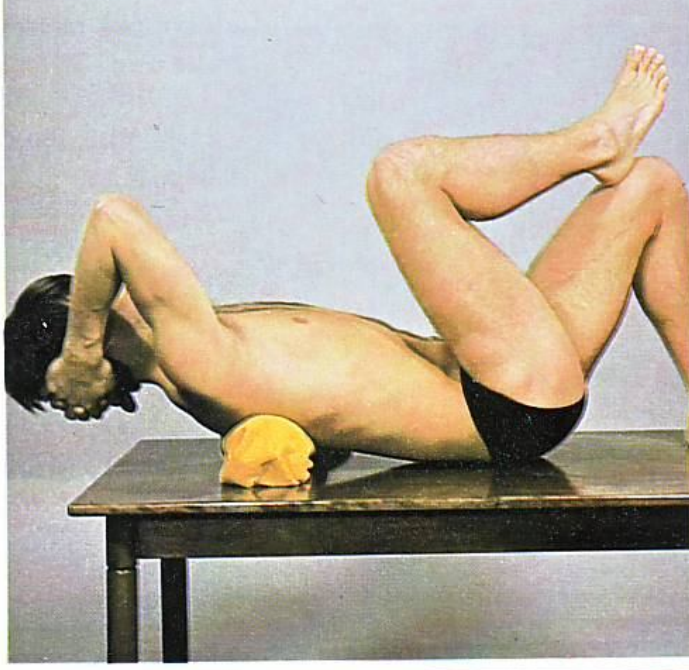
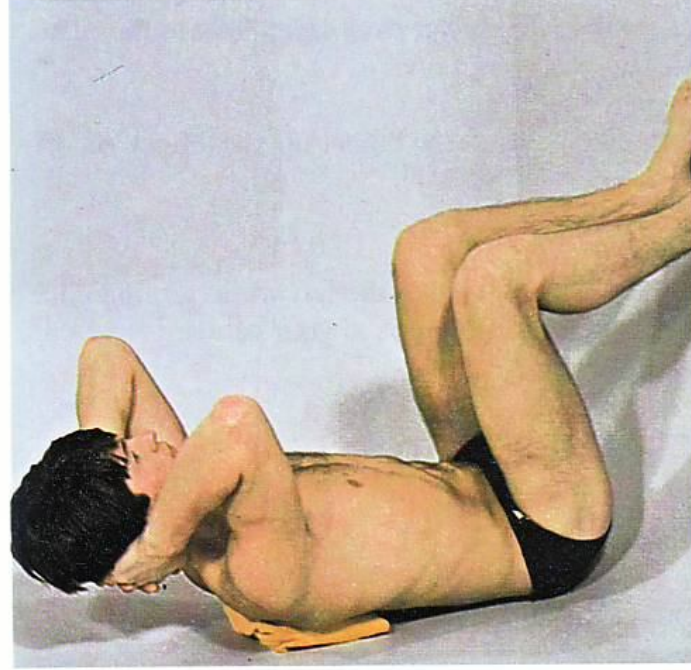
Starting Position:

Starting Position:



Stretching:

Stretching:



THE UPPER BACK 6.

Your difficulty is:

Bending backward, turning right and bending to the left in some part of back above the waist.

Tight Muscles:

Muscles that turn upper back and bend it forward and sideways.

Equipment:

Chair with firm back; firm cushion or folded towel.

Starting Position:

Sit well into chair, with cushion under right buttock and thigh. Lean backward, with tight part of back just above back of chair. This way your lower back is bent backward and to the right, which prevents it from turning right and thus improves effect of stretch in upper back. Grasp chair back with left hand just inside right elbow. Let right arm hang free.

Stretching:

1. Look up, backward and to the right. Exhale and bend upper body backward and to the left, and turn part above chair back to the right so that stretch is felt around rib cage.
2. Inhale and look down and to the left. Try to turn left while resisting movement with left hand; hold for 5 seconds.
3. Relax; look up, backward and to the right; exhale. Let left shoulder down and lean upper body backward and to the left, with part above chair back turned to the right; assist by pulling with left arm, to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain grip; look up, back and to the right.
2. Exhale and bend upper body backward and to the left and turn it right, to limit.
3. Resist that movement with left arm, palm pressing against back of chair.
4. Hold position a few seconds.

Common Errors:

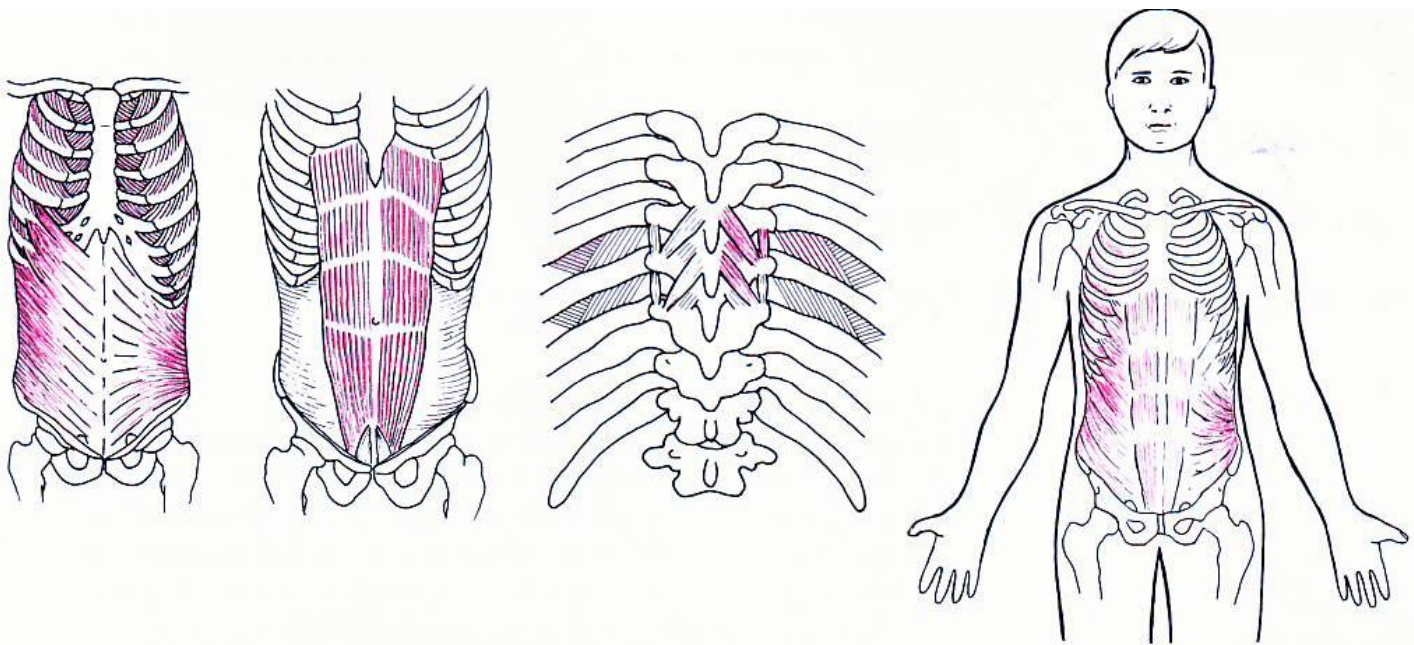
- * Lower back not bent far enough backward.
- * Left shoulder raised.
- * Left buttock raised from chair so that lower back is not bent to the right.
- * Lower back bent to the left.

Notes:

1. The higher the support of chair back, the higher up the effect of the stretch.
2. Stretch should be felt only in rib cage.

Normal Mobility:

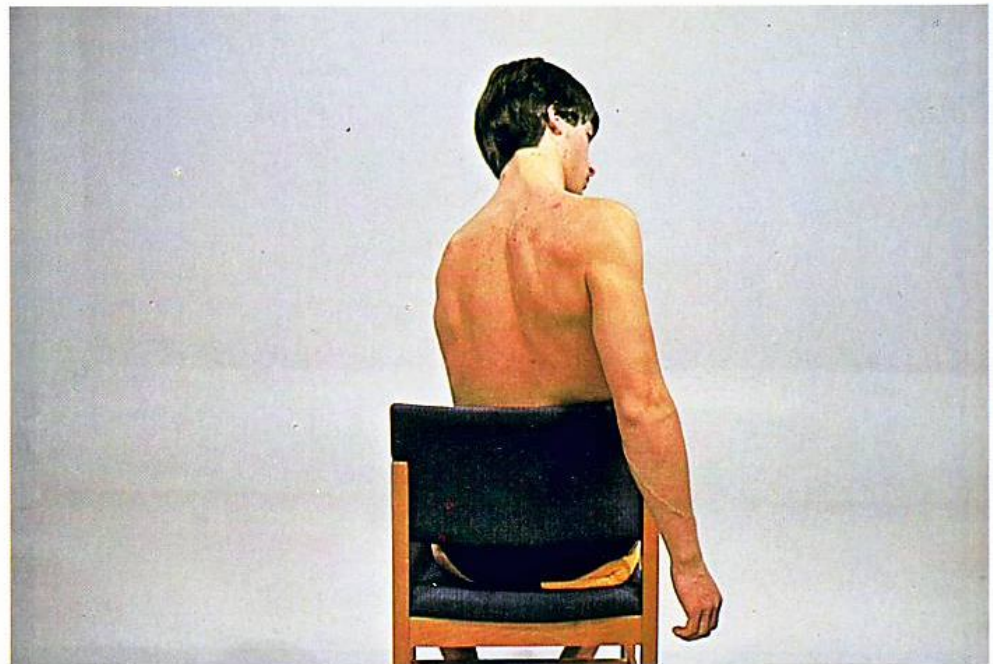
You should be able to bend backward and to the left while turning your shoulders until they are almost at a right angle to your pelvis.



Starting Position:

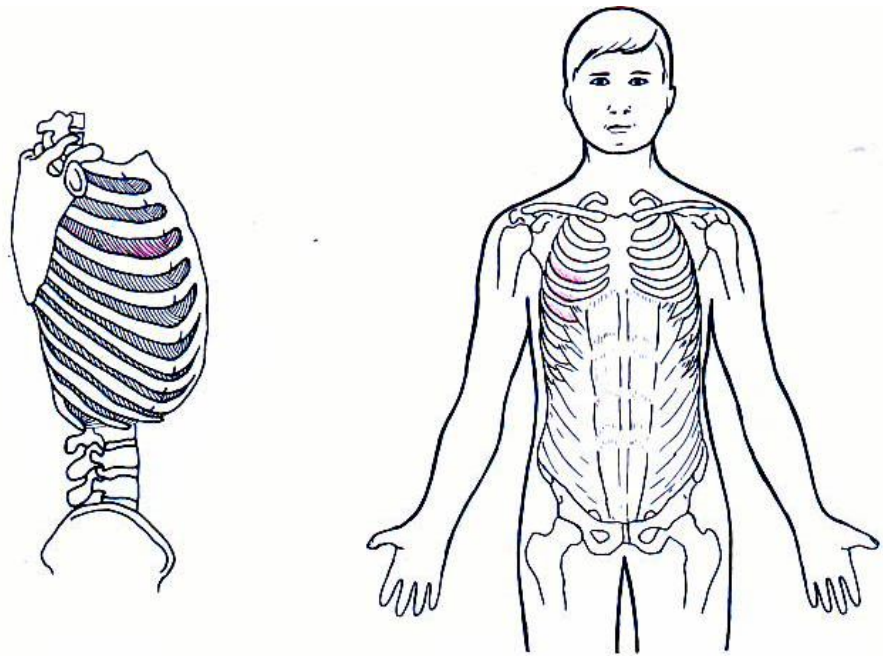


Stretching:

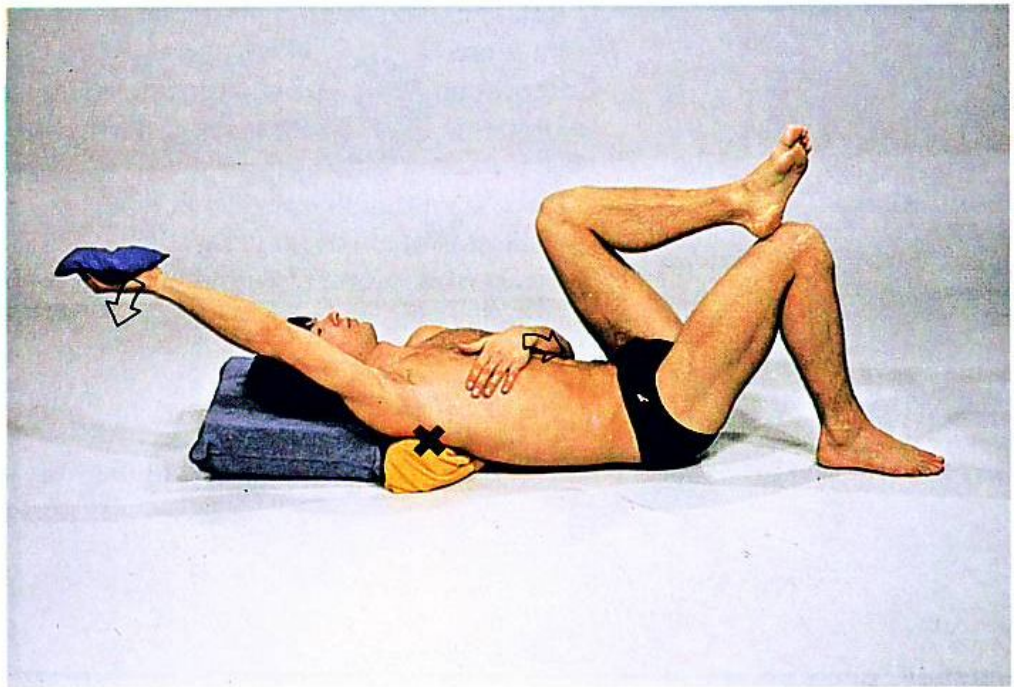


THE UPPER BACK 7.

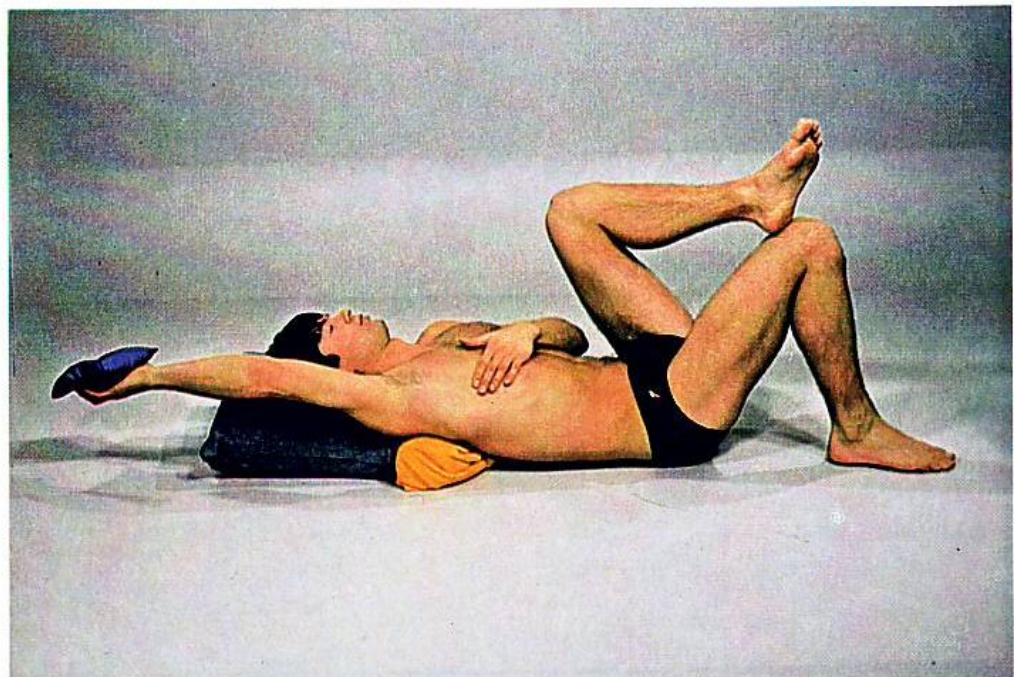
Your difficulty is:	Breathing in.
Tight Muscles:	Muscles between ribs.
Equipment:	Firm cushion or large, tightly rolled towel; comfortable cushion for head; small sandbag or other weight to aid stretching.
Starting Position:	Lie on your back on floor, knees bent; head and neck (but not right shoulder) resting on larger cushion, smaller cushion just below the stiff ribs, and left heel placed on right knee. This position prevents arching and protects lower back. (This exercise may also be done with feet and buttocks against a wall). With right arm straight and touching right ear, hold sandbag with right hand. Place left hand on rib cage, below the stiff rib. (Skip larger pillow if you're comfortable without it.)
Stretching:	1. Draw chin back; inhale. Let right arm down to right ear and press left hand against ribs and toward pelvis, so that stretch is felt in front of chest. 2. Exhale and tense muscles in rib cage as if to lift sandbag/weight upward; hold for 5 seconds. 3. Relax; draw chin back; inhale; press left hand against ribs and toward pelvis; let right arm down to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip; draw chin back. 2. Inhale and press right arm down against floor, left hand down against ribs. 3. Hold position a few seconds.
Common Errors:	* Left hand slides off ribs. * Chin juts forward. * Lower back not pressed against floor. * Right arm moves to side.
Normal Mobility:	You should be able to inhale deeply without any pain.



Starting Position:

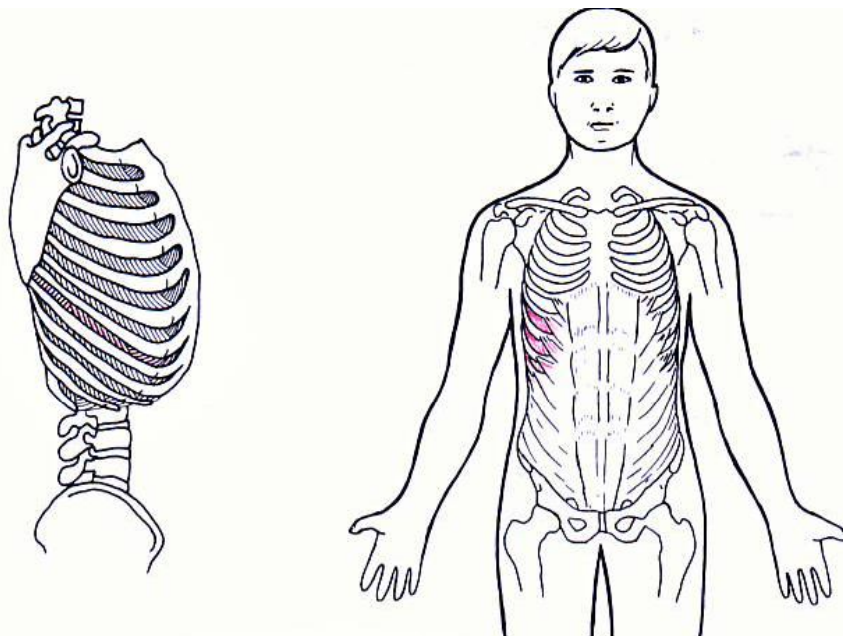


Stretching:

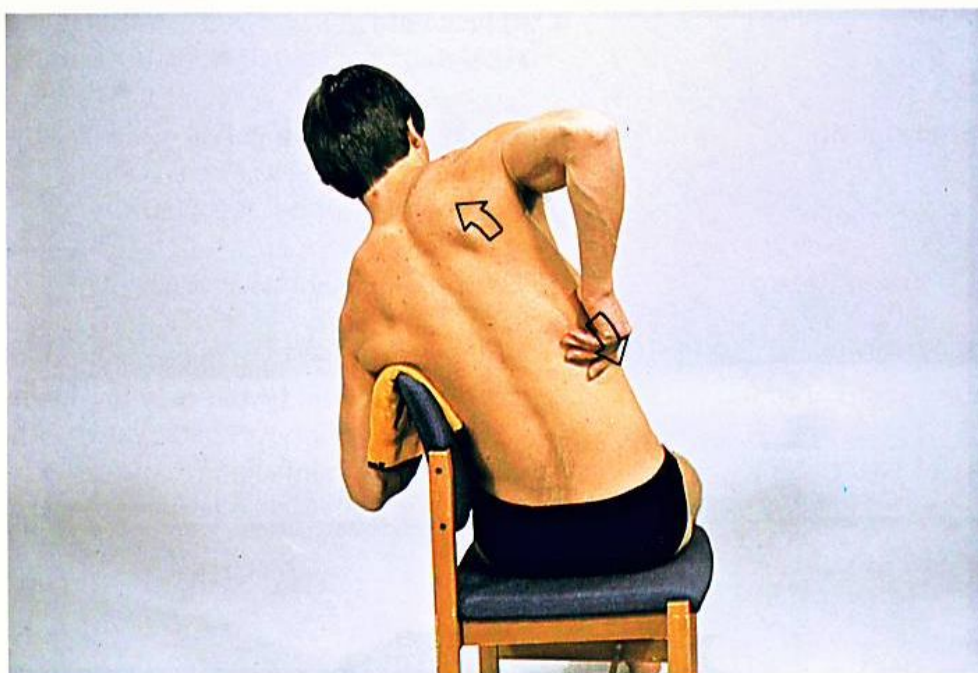


THE UPPER BACK 8.

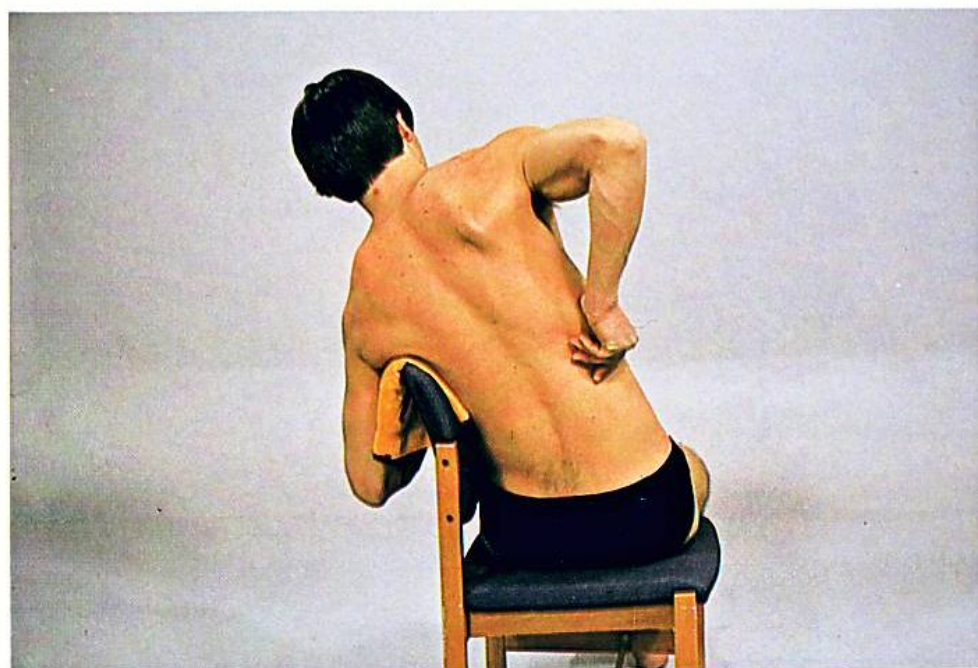
Your difficulty is:	Breathing out.
Tight Muscles:	Muscles between ribs.
Equipment:	Chair with firm back; maybe an extra cushion to adjust height of chair back.
Starting Position:	Sit sideways on chair with left side of rib cage against chair back, stiff area level with top. Place ball of right thumb against the rib that feels stiff when you exhale. Left arm relaxed, in comfortable position.
Stretching:	1. Exhale and press rib down with right thumb, so that stretch is felt in muscles between stiff ribs. 2. Inhale and resist with right thumb; hold for 5 seconds. 3. Relax; exhale. With right thumb press rib down to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Place right thumb on underside of rib. 2. Exhale as much as you can. 3. Resist rib movement with thumb. 4. Hold position a few seconds.
Common Error:	* Right thumb slides off rib.
Normal Mobility:	You should be able to exhale all the way without any pain.



Starting Position:

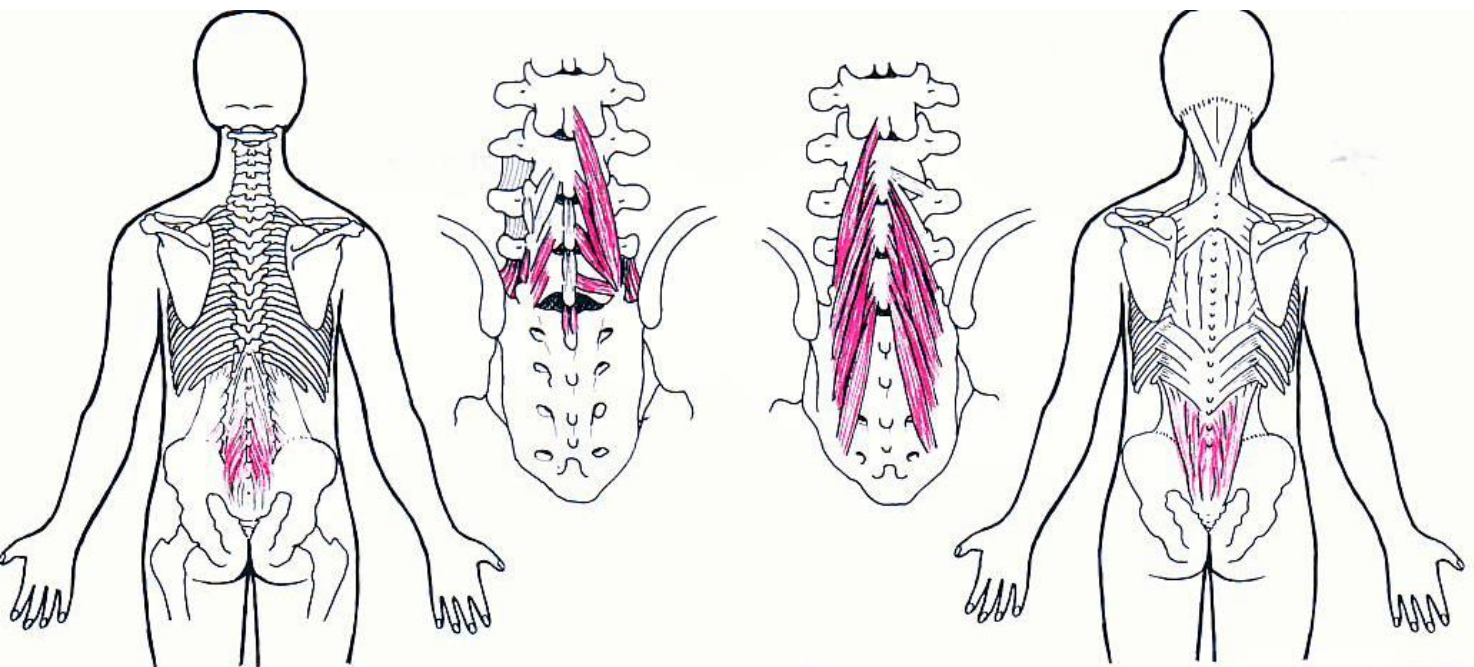


Stretching:

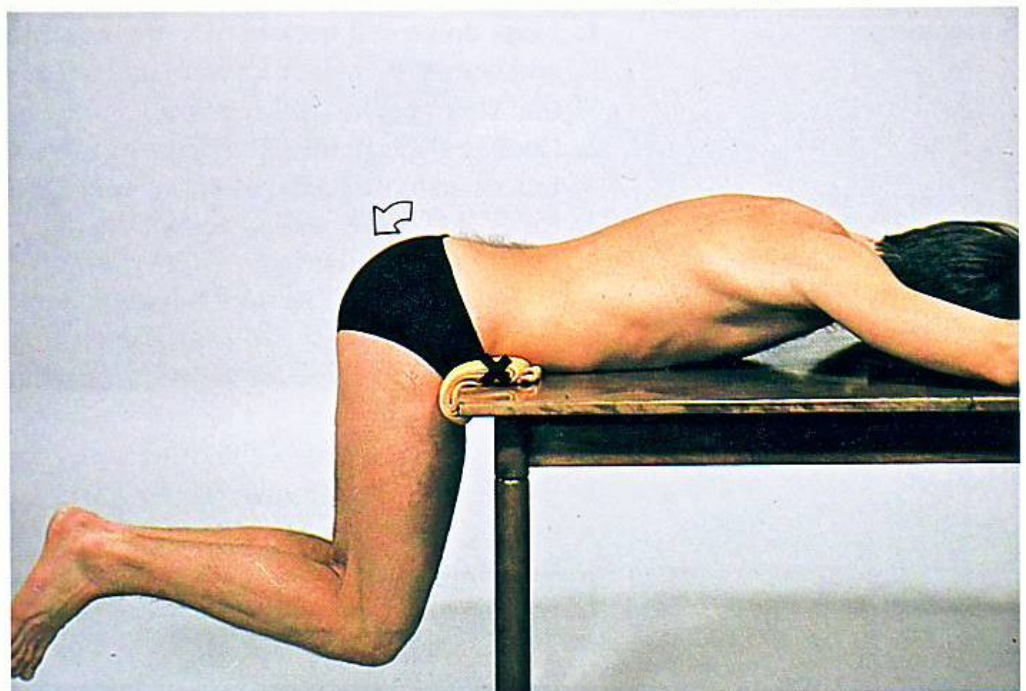


THE LOWER BACK 1.

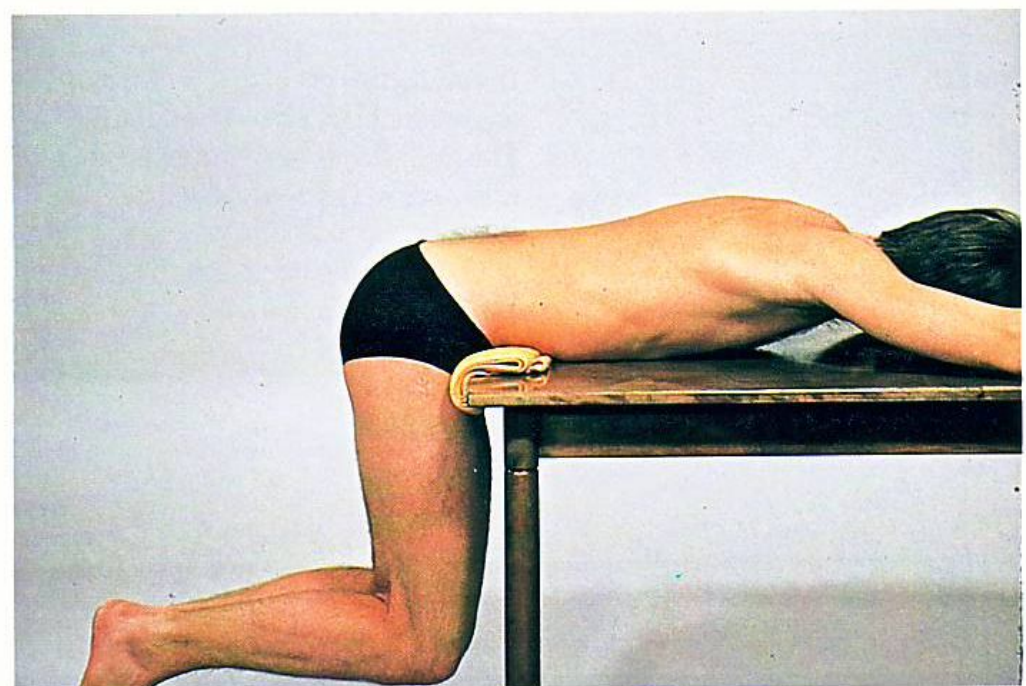
Your difficulty is:	Bending the lowest part of your back forward.
Tight Muscles:	Muscles that bend lower back.
Equipment:	Table or bench, edge padded with a pillow or folded towel.
Starting Position:	Lie face down on table with pelvis slightly outside padded edge, toes touching floor, knees and hips bent.
Stretching:	1. Let buttocks sink down toward floor so that stretch is felt in lower back. Lift toes from floor if you want extra effect. 2. Tense muscles as if to arch back; hold for 5 seconds. 3. Relax. Tense buttocks and bend knees to lift toes from floor; let buttocks down toward floor to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position; tilt pelvis backward by 'pulling tail between legs' and pulling belly up toward navel. 2. Hold position a few seconds.
Common Error:	* Pelvis not outside table edge.
Notes:	1. For extra effect, do this exercise with knees and hips straight. 2. Stretch should be felt only far down in lower back. If you feel pain or discomfort in lower back, down either leg, or in any other place, stop stretching immediately. 3. Stretch with care, otherwise this exercise may be bad for any existing injury. 4. To move effect of stretch further up in back, move pelvis further out from table.
Normal Mobility:	When bending forward, you should be able to curve lower back slightly.



Starting Position:

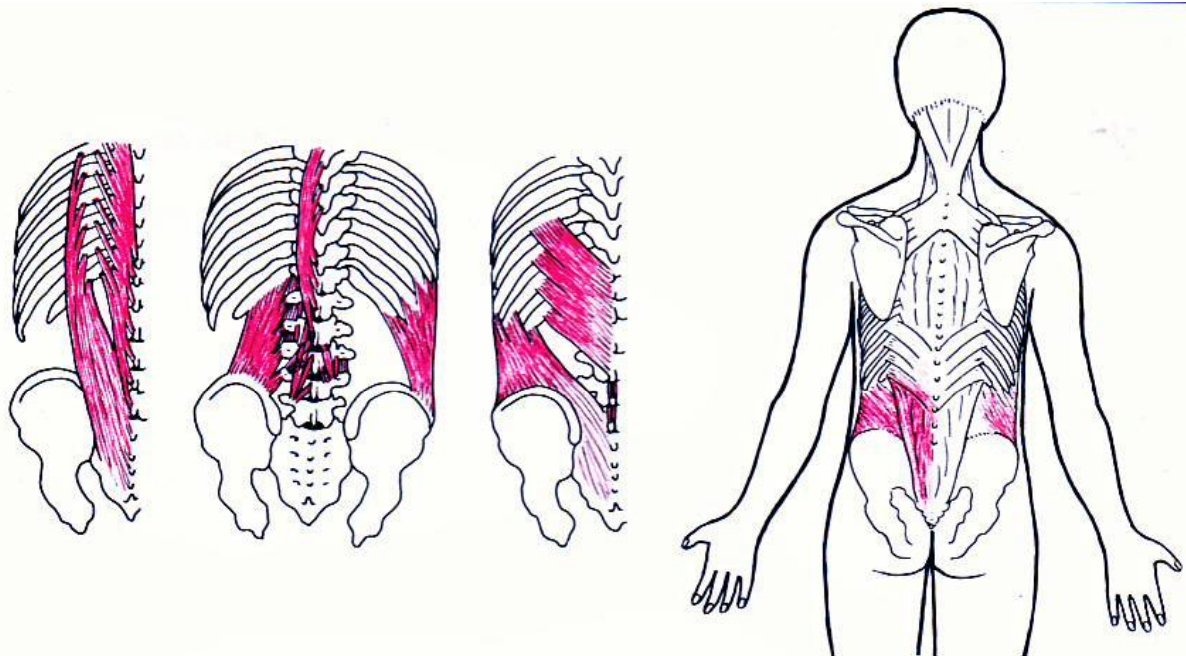


Stretching:



THE LOWER BACK 2.

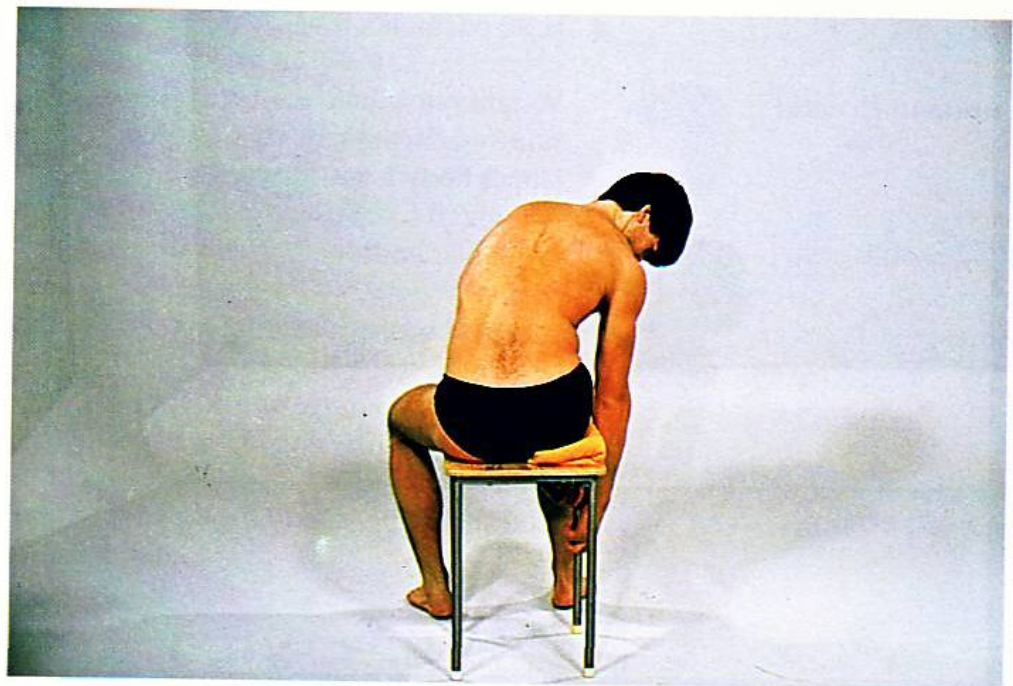
Your difficulty is:	Bending forward while turning and bending to the right at waist level. CAUTION: If you overdo this exercise, or do it wrong, you may injure your back!
Tight Muscles:	Muscles that turn lower back and bend it backward and sideways.
Equipment:	Chair or stool; small cushion or folded towel.
Starting Position:	Sit on chair, bend slightly forward, cushion under right buttock and thigh (this bends lower back sideways), with lower back bent forward and turned to the right. Grip seat or leg of chair with both hands outside right thigh.
Stretching:	1. Look down and backward to the right; let right shoulder down. Exhale and bend lower back forward and to the right, while turning it right, so that stretch is felt in lower back. 2. Look to the left; inhale. Try to straighten up and turn lower back to the left against resistance of arms; hold for 5 seconds. 3. Relax. Look down and backward to the right; exhale. Bend lower back forward and to the right while turning it right. Aid movement gently with pull of arms, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip; look down and backward to the right. 2. Exhale; let right shoulder down and bend forward and to the right while turning right to limit. 3. Resist that movement with arms, palms against chair seat. 4. Hold position a few seconds.
Common Errors:	* Feet slide on floor. * Too much force used.
Notes:	1. If you feel pain or discomfort in lower back, down either leg, or anywhere else, stop stretching immediately. 2. This exercise is very rarely needed. It must be done with great care, as mistakes may injure your back.
Normal Mobility:	While bending forward and to the right, you should be able to turn right until your shoulders are almost at a right angle to your pelvis.



Starting Position:



Stretching:



THE LOWER BACK 3.

Your difficulty is:

Bending forward while turning right and bending sideways to the right just above waist level.

CAUTION: If you overdo this exercise, or do it wrong, you may injure your back!

Tight Muscles:

Muscles that turn lower back and bend it backward and sideways.

Equipment:

Chair or stool; small cushion or folded towel.

Starting Position:

Sit on chair corner; bend slightly forward, legs wide apart on either side of chair leg, cushion under left buttock and thigh (this bends lower back to the left), weight equal on both buttocks. Let right shoulder down. Bend sideways to the right and turn to the right at waist level. The lowest part of your back is now bent sideways to the left; this makes exercise more effective at waist level, as this part of your back can't turn in the same direction as the stretch. Now reach between legs and grasp chair leg with left hand; let right arm hang free.

Stretching:

1. Look down, backward and to the right. Exhale, bend forward and slightly to the right while turning right at waist level, so that stretch is felt there.
2. Retain grip. Inhale and try to pull left shoulder up and backward against resistance of left arm and hand; hold for 5 seconds.
3. Relax. Look down, backward and to the right; exhale. Bend forward and to the right while turning right at waist level; move right shoulder forward and down, aiding slightly with pull of left arm, to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Retain left-hand grip; look down and backward to the right.
2. Exhale; let right shoulder down, bend forward and to the right while turning right at waist level, to limit.
3. Resist that movement with left arm and hand.
4. Hold position a few seconds.

Common Errors:

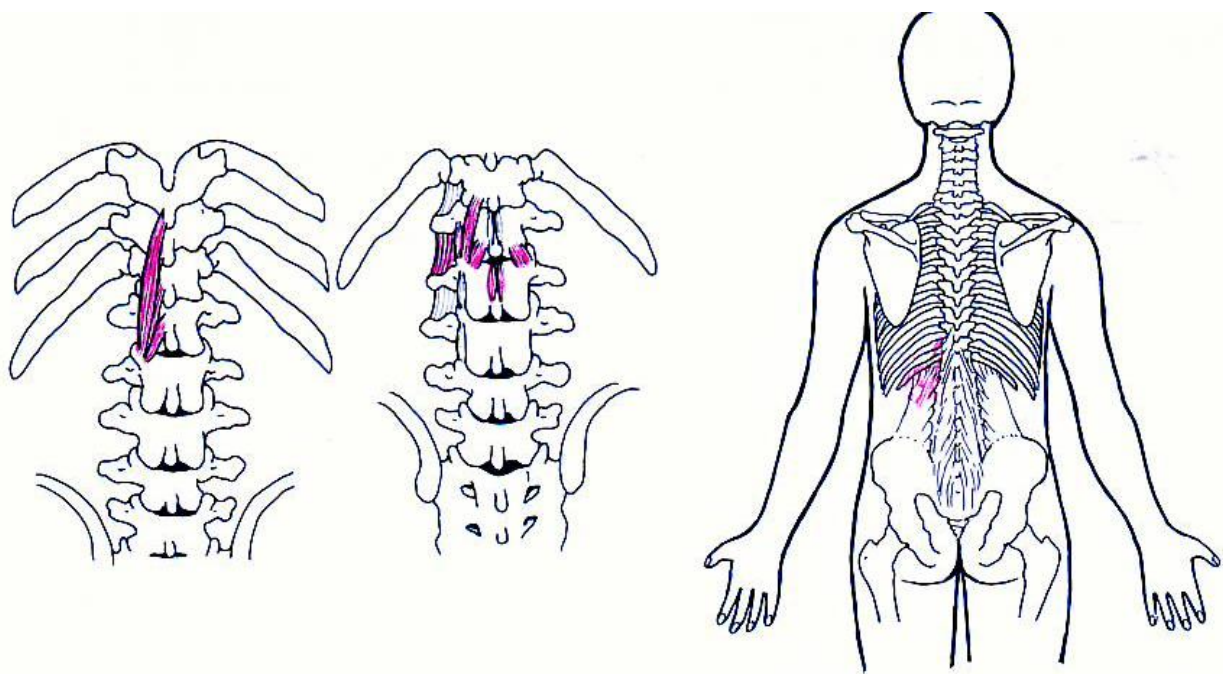
- * Weight not equal on both buttocks, so that lower back is not bent sideways to the left.
- * Upper body leans forward.
- * Too much force used.
- * Feet slide on floor.

Notes:

1. This exercise can injure your back if used carelessly. Tense muscles gently, using little force.
2. Use this exercise *only* to limber up at waist level – and then *only* as recommended by doctor or therapist.

Normal Mobility:

You should be able to bend and turn easily at waist level.



Starting Position:

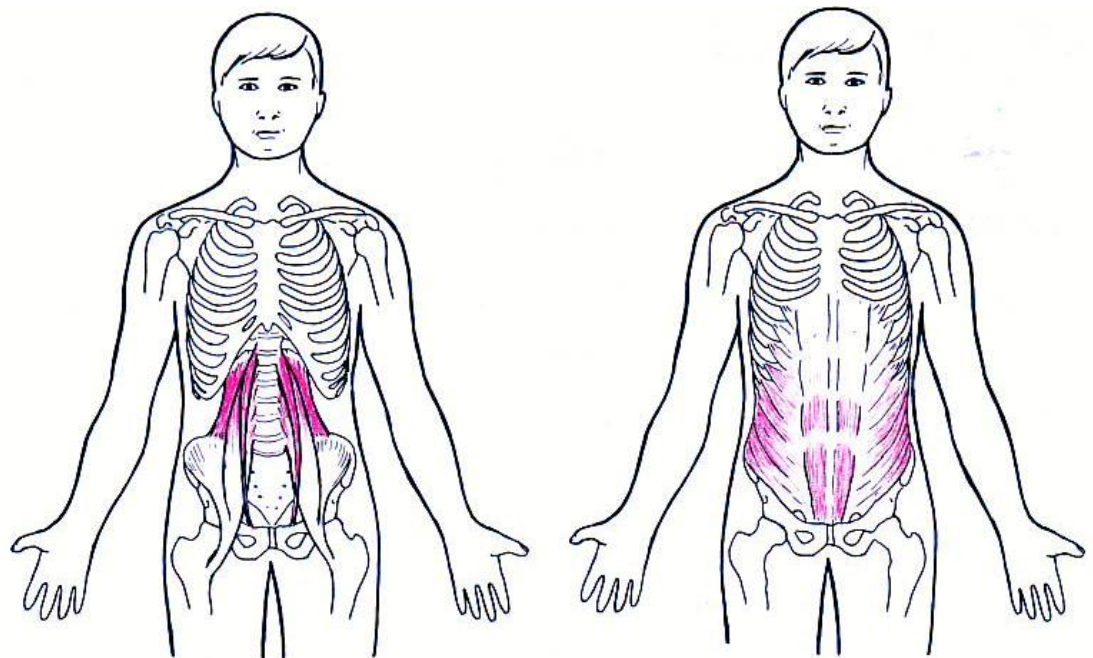


Stretching:

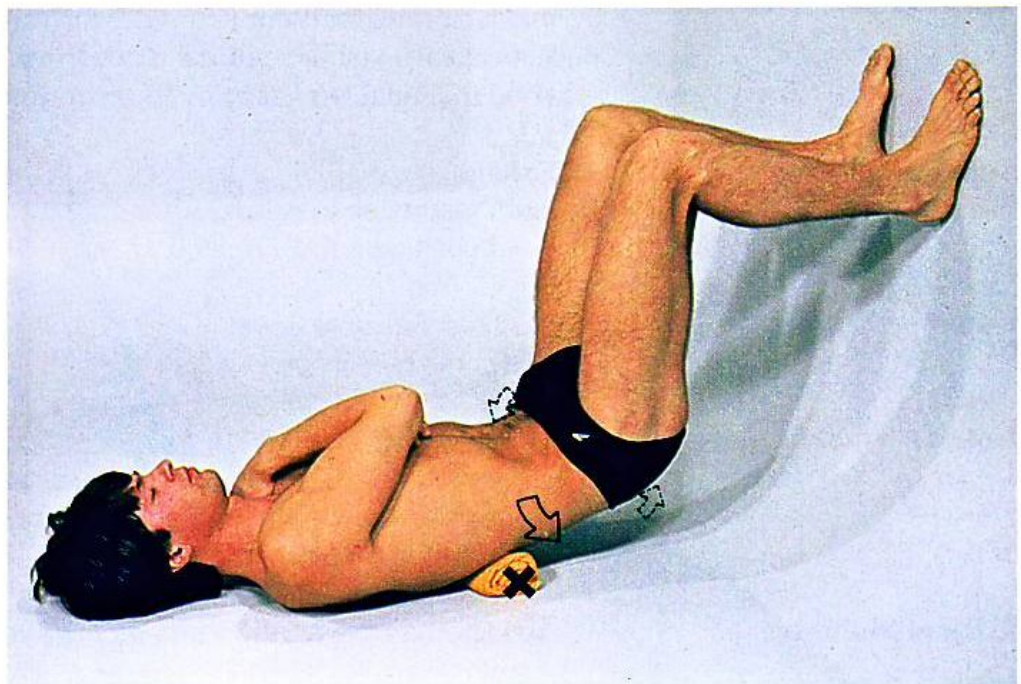


THE LOWER BACK 4.

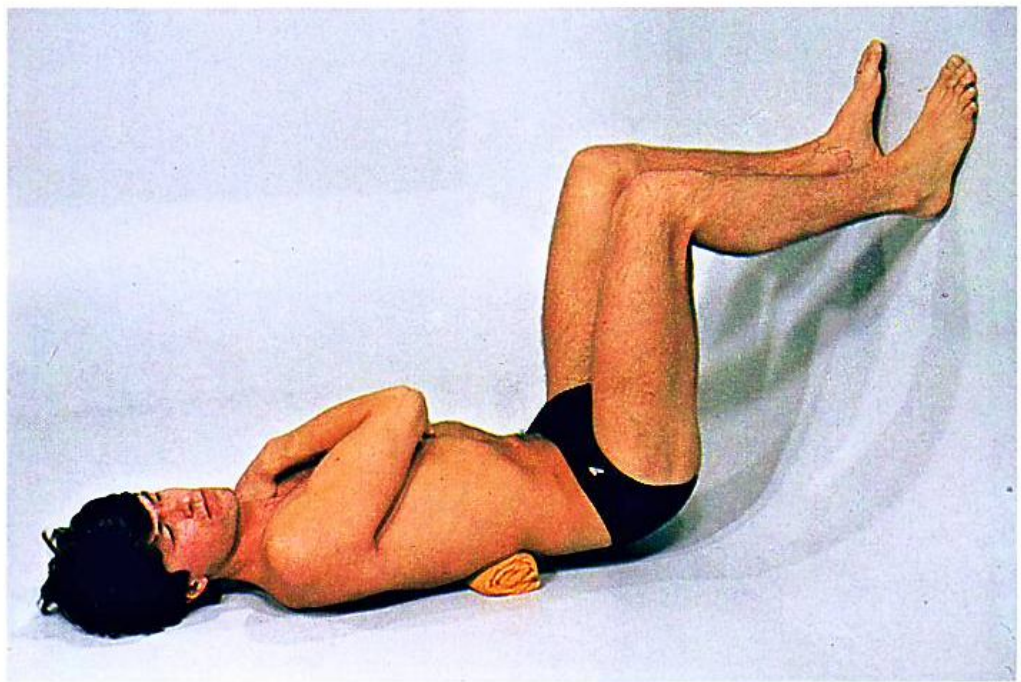
Your difficulty is:	Bending backward just above waist level.
Tight Muscles:	Muscles that bend lower back forward.
Equipment:	Firm, comfortable surface to lie on. Firm, round cushion, or rolled blanket or large towel.
Starting Position:	Lie on your back on floor, buttocks close to wall, knees bent and feet on wall. Place cushion where you want stretch to take effect, but always so that pelvis and lower back stay raised from floor.
Stretching:	1. Exhale and let pelvis sink down toward floor so that stretch is felt in belly. Tilt pelvis backward to 'pull tail between legs' and tense lower belly up toward navel. This prevents arching of lower back. 2. Inhale and tense belly muscles without raising pelvis; hold for 5 seconds. 3. Relax. Exhale and let pelvis sink further down toward floor; tilt pelvis backward and tense lower belly up toward navel, to prevent arching of back. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Exhale. 2. Arch back as much as you can at waist level. 3. Hold position a few seconds.
Common Errors:	* Cushion slides on floor. * Back arched too far down.
Notes:	1. Stretch should be felt only in chest and belly. If you feel pain or discomfort in back, down either leg, or in any other place, stop stretching immediately. 2. You can use your hands to feel position and movement of pelvis and check that your back isn't arched too far down. 3. Effect of stretch may be increased by doing this exercise with legs straight, heels against wall.
Normal Mobility:	You should be able to arch your lower back evenly up to waist level.



Starting Position:



Stretching:



THE LOWER BACK 5.

Your difficulty is:

Bending backward at waist level.

Tight Muscles:

Muscles that bend lower back forward.

Equipment:

Firm, comfortable surface to lie on. Firm, round cushion, or rolled blanket or large towel.

Starting Position:

Lie on your back on floor, knees bent and legs apart, soles of feet resting on floor, cushion raising lower back and pelvis from floor.

Stretching:

1. Exhale and let pelvis sink down toward floor so that stretch is felt in chest and belly.
2. Inhale and tense belly muscles without raising pelvis; hold for 5 seconds.
3. Relax. Exhale and let pelvis sink further down toward floor to limit – maybe a little bit more.
4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.

Stimulation:

1. Exhale.
2. Arch your back as much as you can.
3. Hold position a few seconds.

Common Errors:

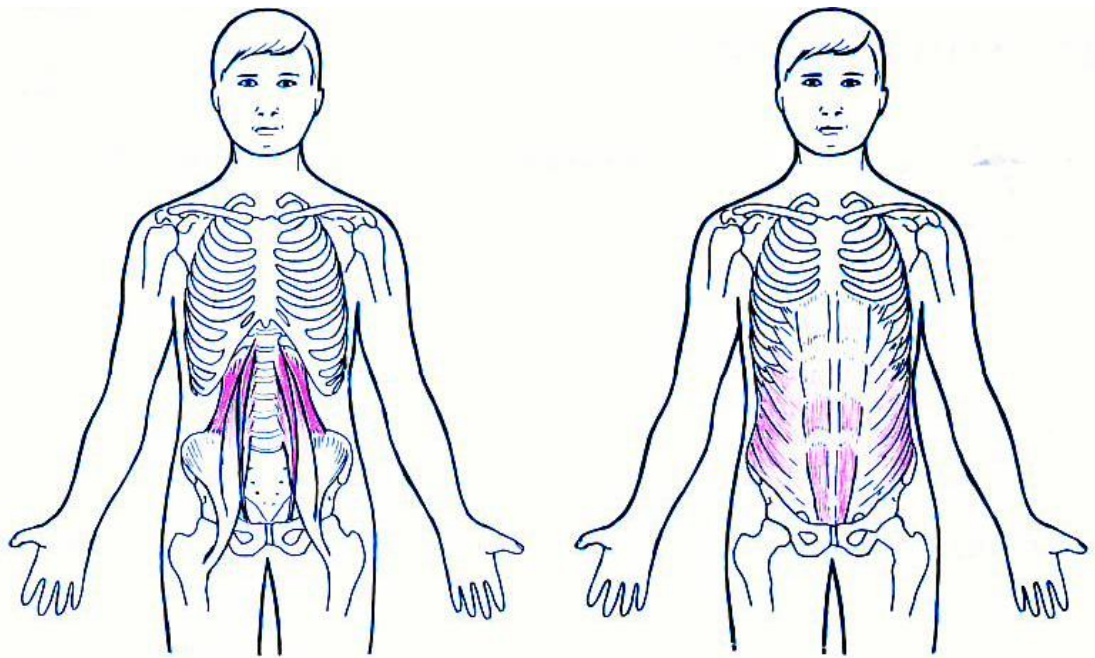
- * Cushion slides on floor.
- * Pelvis raised.

Notes:

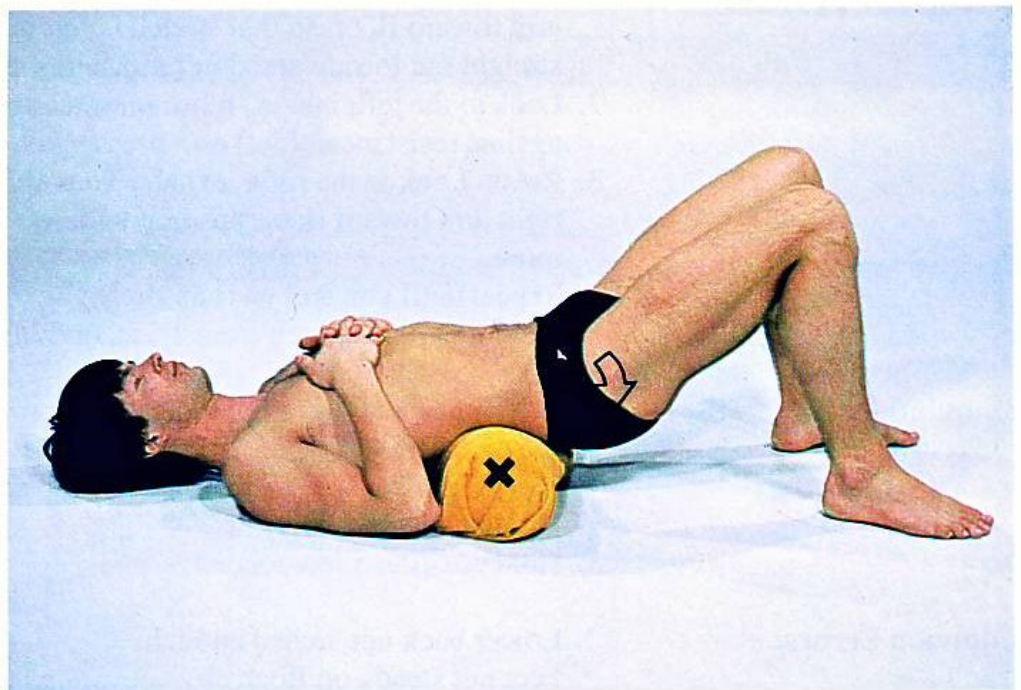
1. This is one of the most important back exercises.
2. Stretch should be felt only in lower back, chest and belly. If you feel pain in your back, down your legs or anywhere else while stretching, then stop immediately.

Normal Mobility:

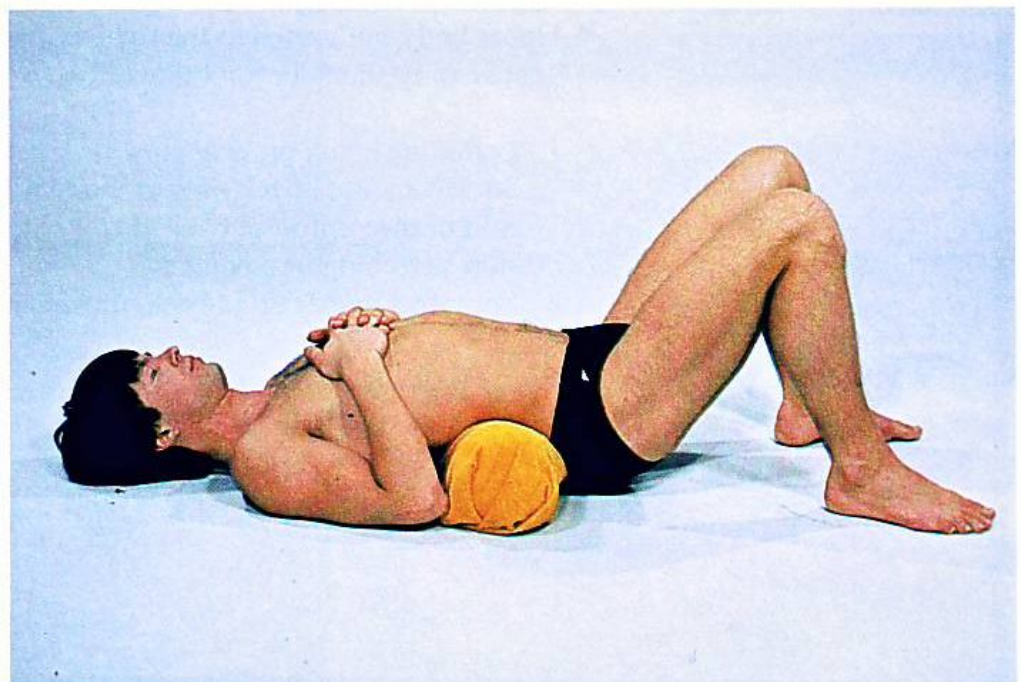
You should have no difficulty arching your back.



Starting Position:

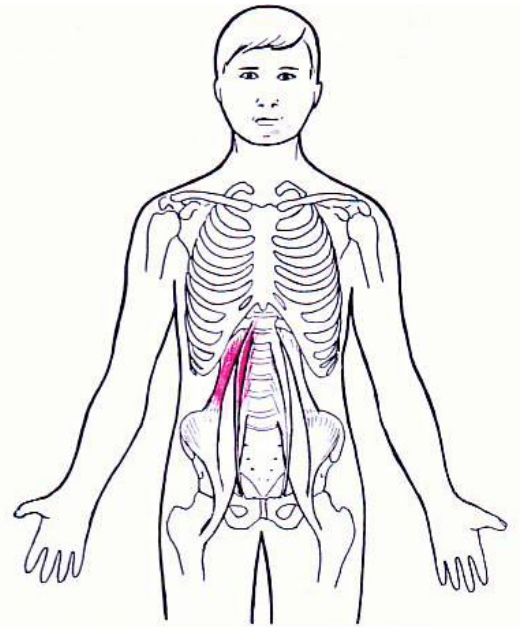
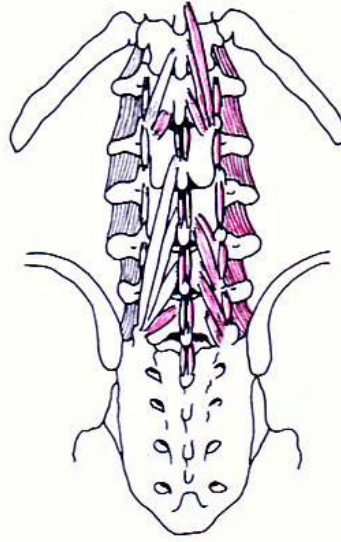
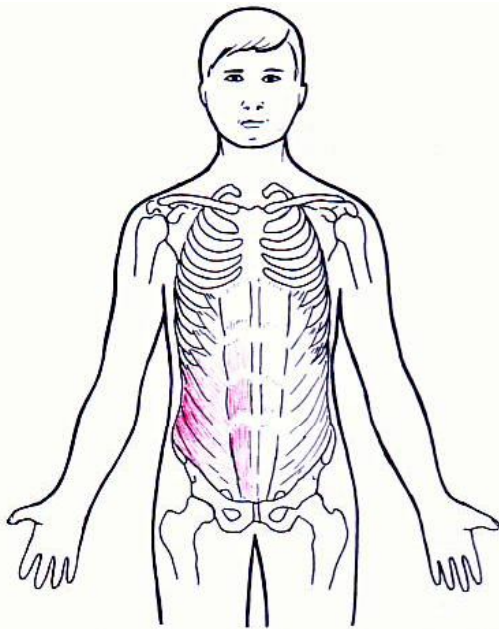


Stretching:

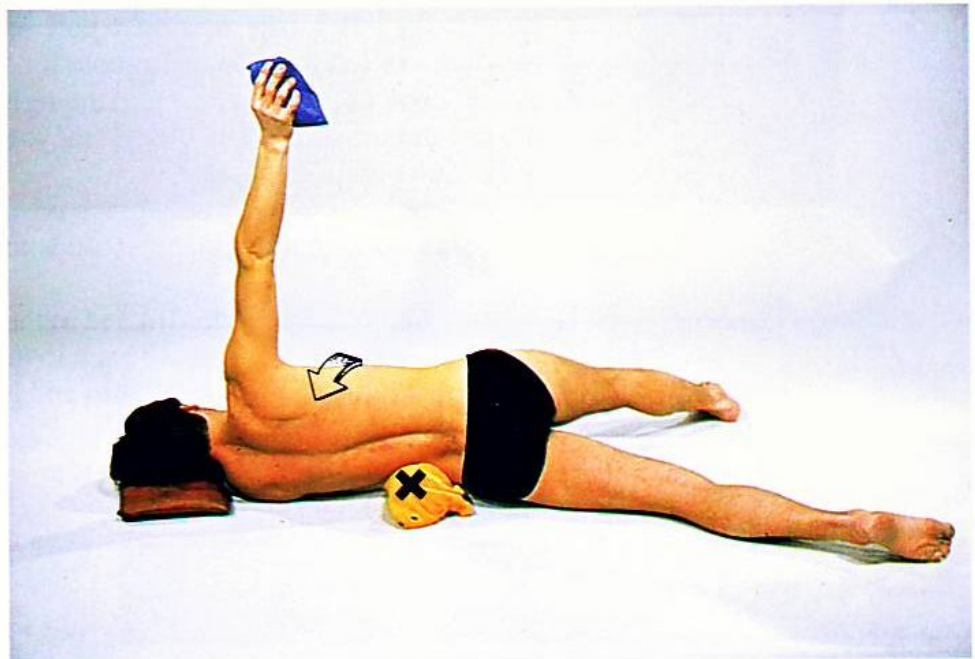


THE LOWER BACK 6 A.

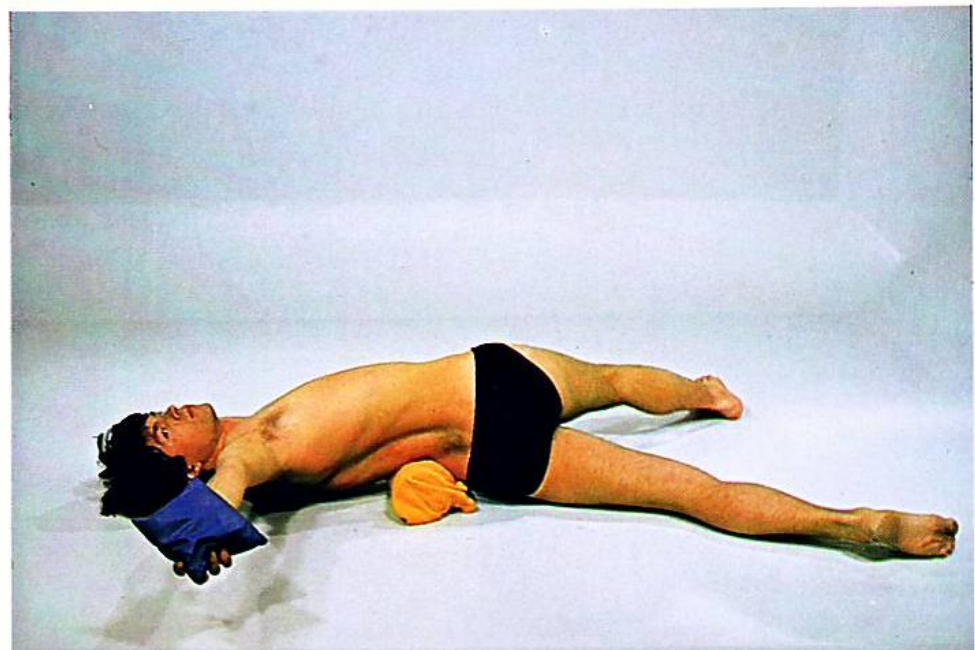
Your difficulty is:	Bending backward while turning right and bending sideways to the left at waist level. Lying on your side, back arched.
Tight Muscles:	Muscles that turn lower back and bend it forward and sideways.
Equipment:	Firm cushion or rolled towel; sandbag or other weight to aid stretch.
Starting Position:	Lie on left side with cushion under waist. Straighten left leg at hip and move it slightly backward, so that lower back is arched. Bend right hip, but not enough to straighten arched back. Straighten right knee. (This position stabilizes pelvis.) Left arm straight out to side; sandbag or weight in right hand, arm pointing straight up toward ceiling.
Stretching:	1. Look to the right; exhale. Turn upper body to the right, lowering right arm toward floor, so that stretch is felt in lower back. Keep right arm straight out to side and don't move in shoulder joint. 2. Look to the left; inhale. Tense muscles as if to turn upper body to the left against resistance of left arm pressing on floor; hold for 5 seconds. 3. Relax. Look to the right; exhale. Turn upper body to the right, lowering right arm toward floor, pushing with left arm to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position and grip; look to the right. 2. Exhale; push with left arm and turn upper body to the right, so that right shoulder is lowered as far toward floor as possible without any movement in shoulder joint. 3. Hold position a few seconds.
Common Errors:	* Lower back not arched enough. * Feet not steady on floor. * Legs not held straight. * Upper body not turned to the right as right arm is lowered toward floor; that is, only shoulder joint moves.
Notes:	1. Left arm should press against floor and push to increase turn. 2. Stretch should be felt only around lower back and belly. If you feel pain or discomfort in back, down either leg, or in any other place, stop stretching immediately. 3. For effect higher up in back, move cushion higher.
Normal Mobility:	While bending your lower back backward and to the left, you should be able to turn right until your shoulders are almost at a right angle to your pelvis.



Starting Position:

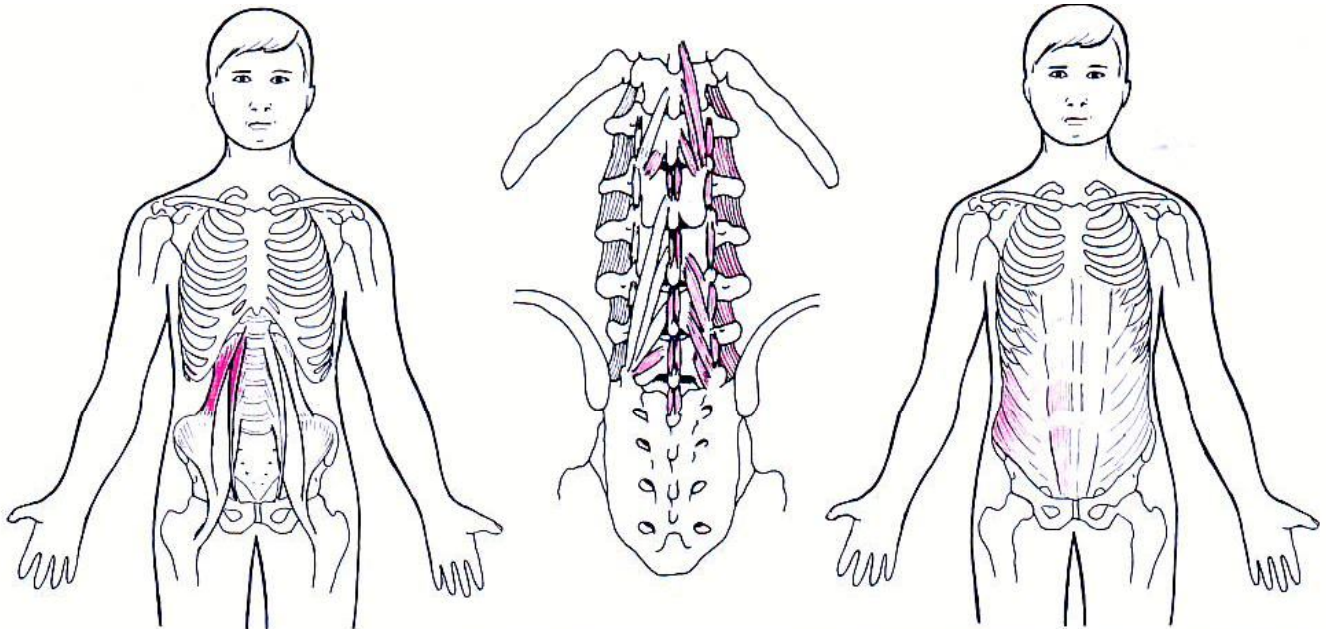


Stretching:

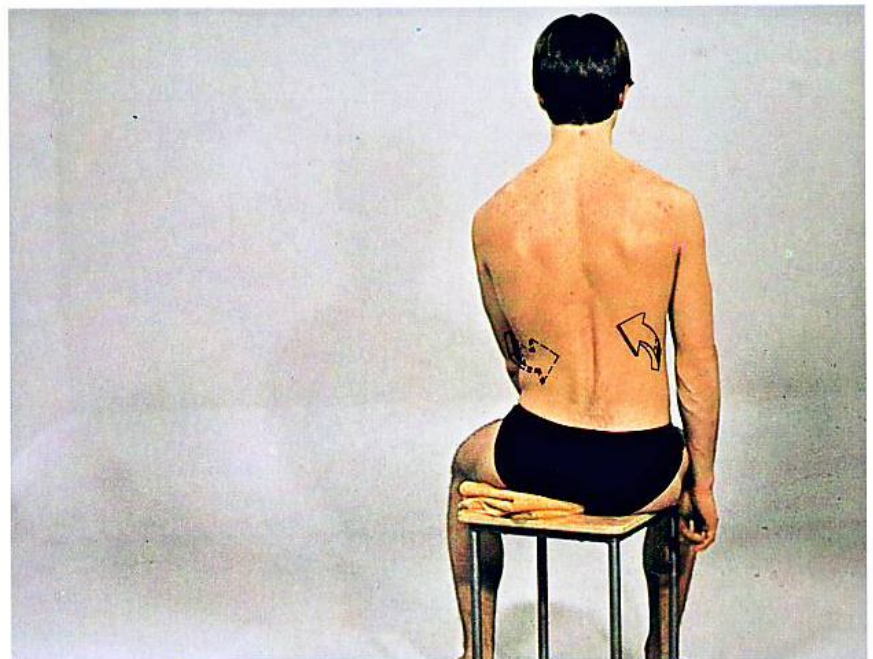


THE LOWER BACK 6 B.

Your difficulty is:	Bending backward while turning right and bending sideways to the left at waist level. Sitting down, back arched.
Tight Muscles:	Muscles that turn lower back and bend it forward and sideways.
Equipment:	Chair or stool; small cushion or folded towel.
Starting Position:	Sit on chair corner, back arched, legs wide apart on either side of chair leg, cushion under left buttock and thigh (increases bend to the left). Grasp under chair seat with left hand, just inside right thigh. Let right arm hang free.
Stretching:	1. Look up, backward and to the right. Exhale and bend lower back to the left and turn it right so that stretch is felt in lower back. 2. Look to the left; inhale and try to pull left shoulder backward, against resistance of left hand and arm; hold for 5 seconds. 3. Relax. Look up, backward and to the right; exhale. Bend lower back to the left and turn it right, to limit – maybe a little bit more. Aid movement with pull of left hand. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain grip; look up, backward and to the right. 2. Exhale; arch back. Bend lower back to the left and turn it right, to limit. 3. Resist that movement with left arm and hand. 4. Hold position a few seconds.
Common Errors:	* Lower back not arched enough. * Weight not equal on both buttocks, so that lower back is not bent sideways to the left. * Too much force used.
Notes:	1. Stretch should be felt only in lower back. If you feel pain or discomfort in back, down either leg, or elsewhere, stop stretching immediately. 2. For greater effect, see exercise 6A.
Normal Mobility:	While bending backward and to the left, you should be able to turn your shoulders to the right until they are almost at a right angle to your pelvis.



Starting Position:

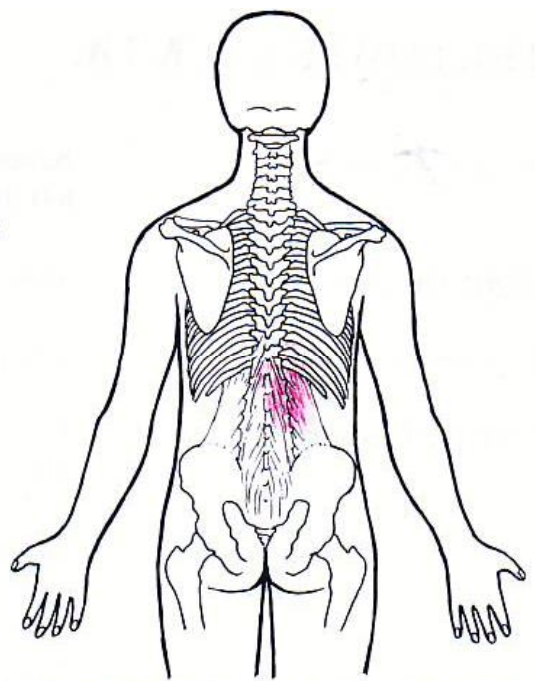
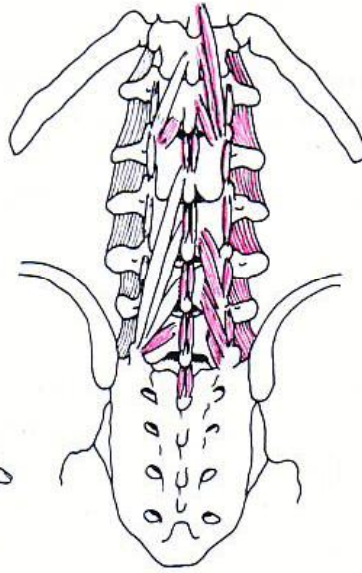
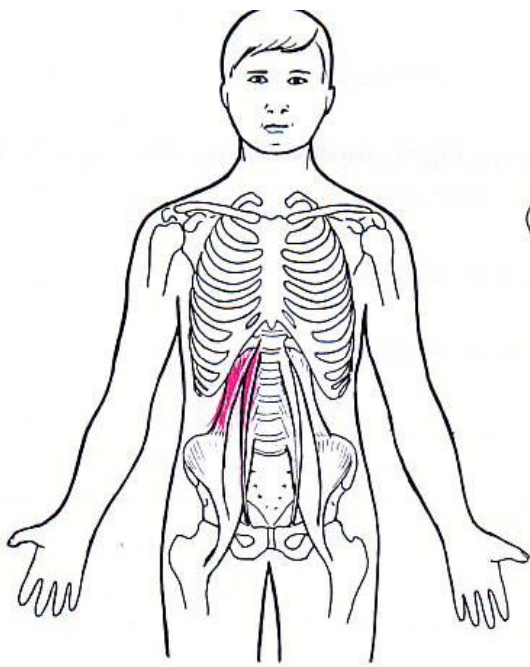


Stretching:

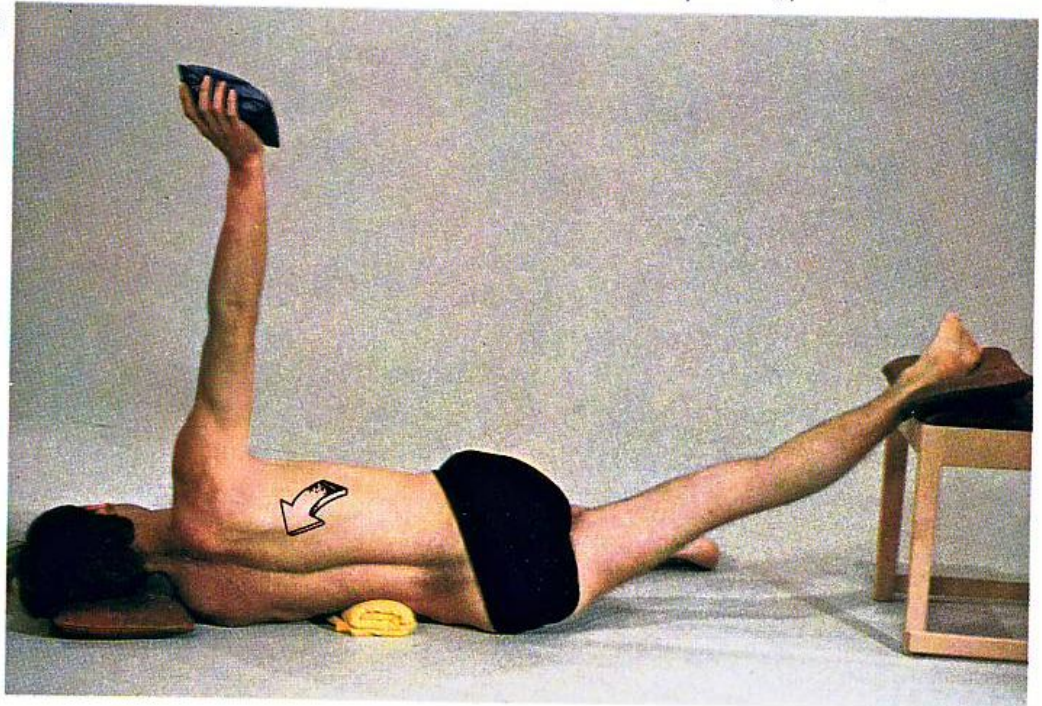


THE LOWER BACK 7 A.

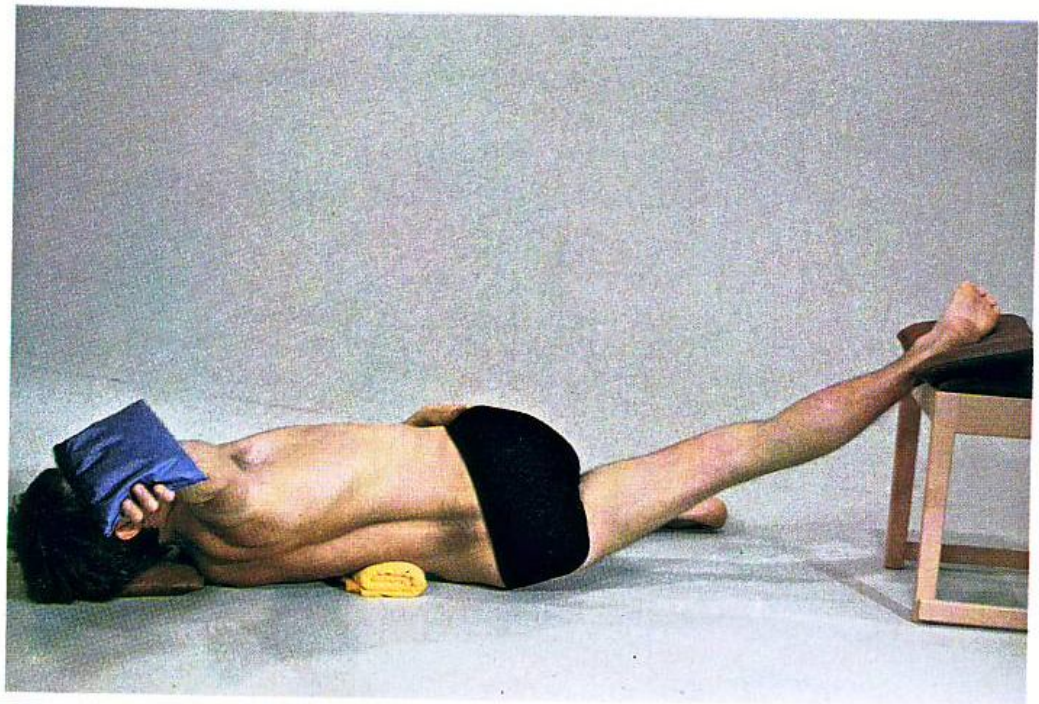
Your difficulty is:	Bending backward while turning right and bending sideways to the left just above waist level. Lying on your side, back arched.
Tight Muscles:	Muscles that turn and bend back at waist level.
Equipment:	Chair; firm cushion or rolled towel; sandbag or other weight.
Starting Position:	Lie on left side with cushion under waist. (This bends upper back to the left). Rest outer side of left lower leg on chair; straighten left leg backward, so that lower back is arched. Bend right hip and let right leg rest on floor. This position keeps back arched and lower back bent sideways to the right, while turning it to the left so that it can't follow a turn to the right. Now, take sandbag in right hand and point right arm straight up toward ceiling; left hand on outside of right thigh.
Stretching:	1. Look to the right; exhale. Turn upper body to the right, lowering right arm toward floor so that stretch is felt at waist level. Keep right arm straight out to side so that shoulder joint does not move. 2. Look to the left; inhale. Press left hand against thigh; hold for 5 seconds. 3. Relax. Look to the right; exhale. Turn upper body to the right, and push with left arm while lowering right arm toward floor to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position and grip; look to the right. 2. Exhale; push against thigh with left hand and turn upper body to the right, so that right shoulder goes down as far toward floor as possible without movement in shoulder joint. 3. Hold position a few seconds.
Common Errors:	* Lower back not arched enough. * Legs not held straight. * Trunk not turned to the right as right arm sinks toward floor; that is, arm turns at shoulder.
Notes:	1. Left hand should press against thigh and push to increase turn. 2. Stretch should be felt around lower back and belly. If you feel pain or discomfort in back, down either leg, or in any other place, stop stretching immediately.
Normal Mobility:	While bending your lower back backward and to the left, you should be able to turn right until your shoulders are almost at a right angle to your pelvis.



Starting Position:

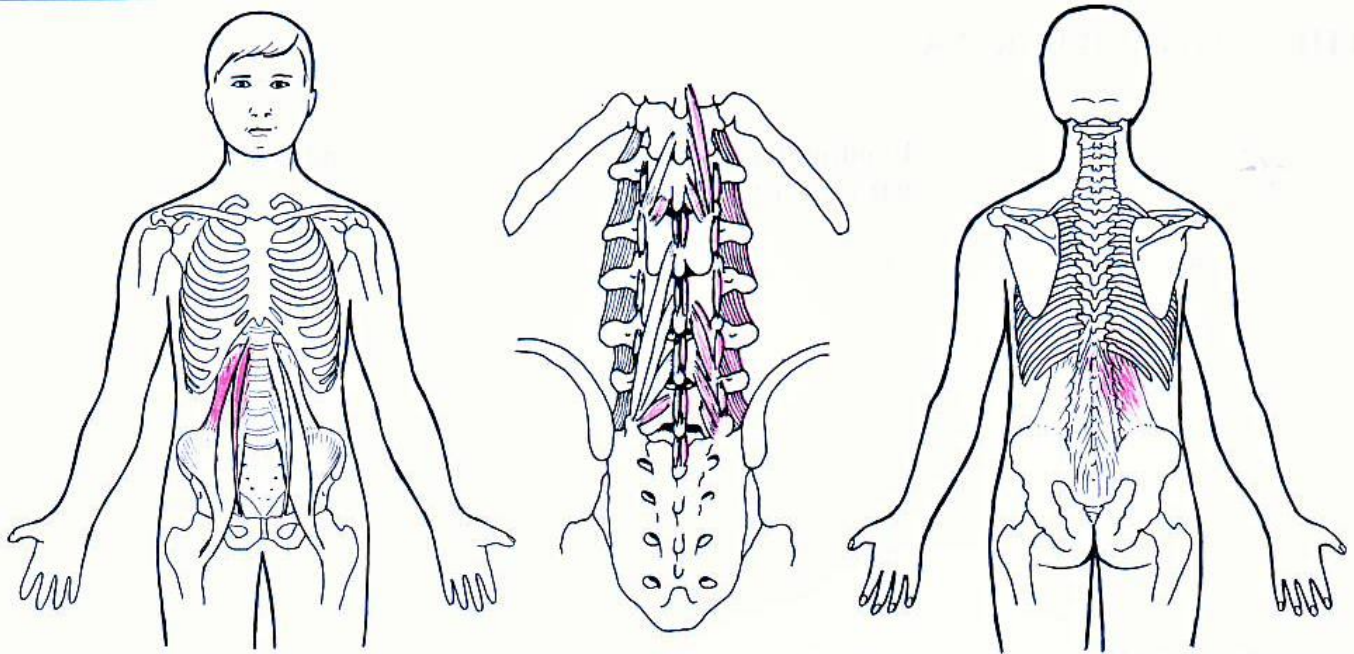


Stretching:



THE LOWER BACK 7 B.

Your difficulty is:	Bending backward while turning right and bending sideways to the left at waist level. Sitting down, back arched.
Tight Muscles:	Muscles that bend back forward and sideways, and turn it, at waist level.
Equipment:	Chair or stool; small cushion or folded towel.
Starting Position:	Sit on chair corner, back arched, legs wide apart on either side of chair leg, cushion under right buttock (this bends lower back to the right so that it can't turn right). Grip under seat with left hand, just inside right thigh. Let right arm hang free.
Stretching:	1. Look up, backward and to the right. Exhale; bend to the left and turn right at waist level, so that stretch is felt there. Aid movement with pull of left hand. 2. Look to the left; inhale and try to pull left shoulder backward against resistance of left hand and arm; hold for 5 seconds. 3. Relax. Look up, backward and to the right; exhale. Bend to the left and turn right to limit – maybe a little bit more. Aid movement with pull of left hand. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position and grip; look up, backward and to the right. 2. Exhale; arch back. Bend to the left and turn to the right to limit. 3. Resist that movement with left arm and hand. 4. Hold position a few seconds.
Common Errors:	* Lower back not arched enough. * Weight not equal on both buttocks, so that lower back is not bent sideways to the right. * Too much force used.
Note:	Stretch should be felt at waist level. If you feel pain or discomfort in back, down either leg, or elsewhere, stop stretching immediately.
Normal Mobility:	While bending backward and to the left, you should be able to turn your shoulders to the right until they are almost at a right angle to your pelvis.



Starting Position:

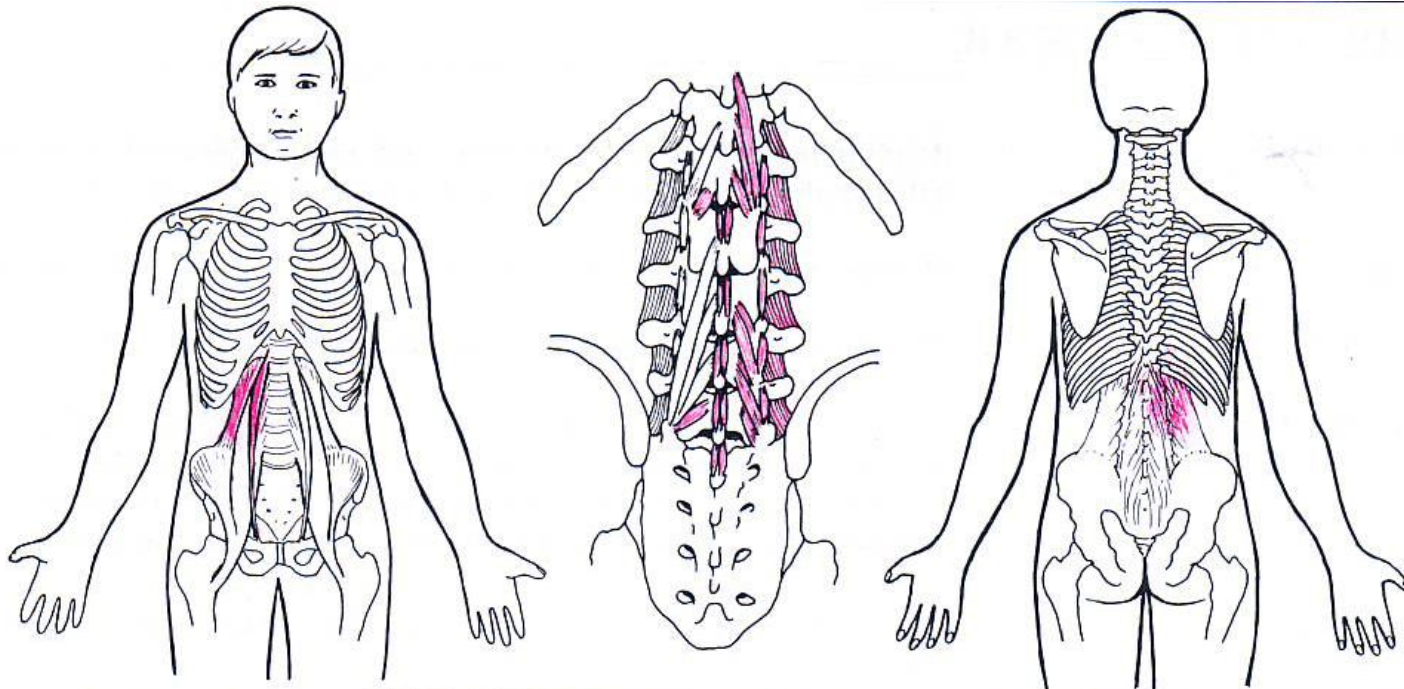


Stretching:

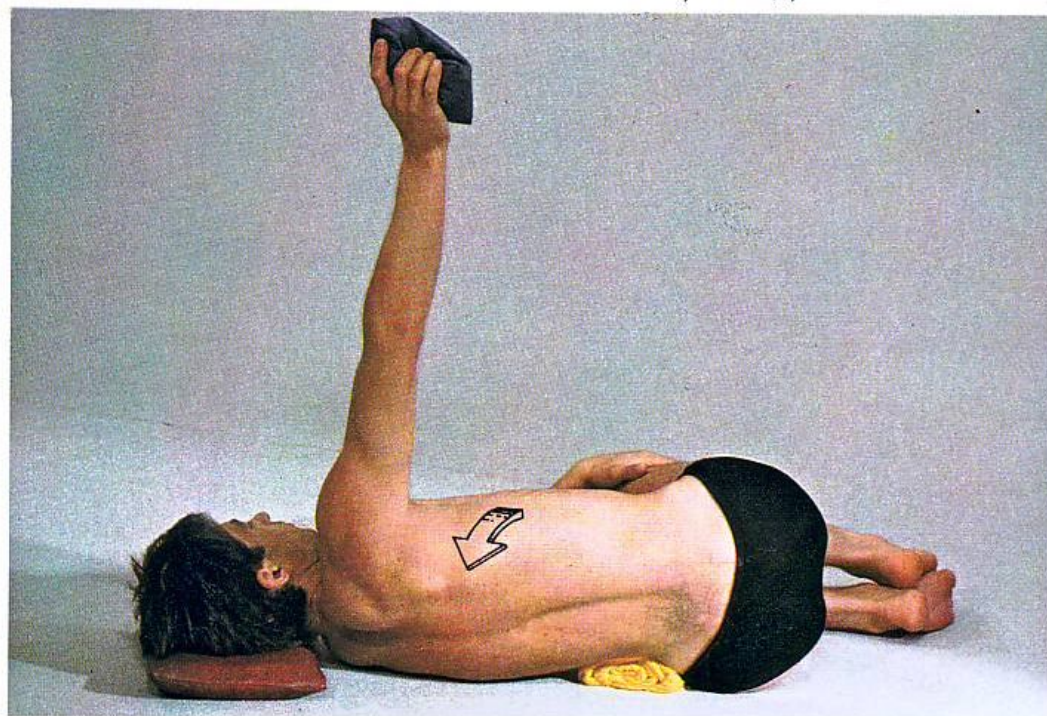


THE LOWER BACK 8 A.

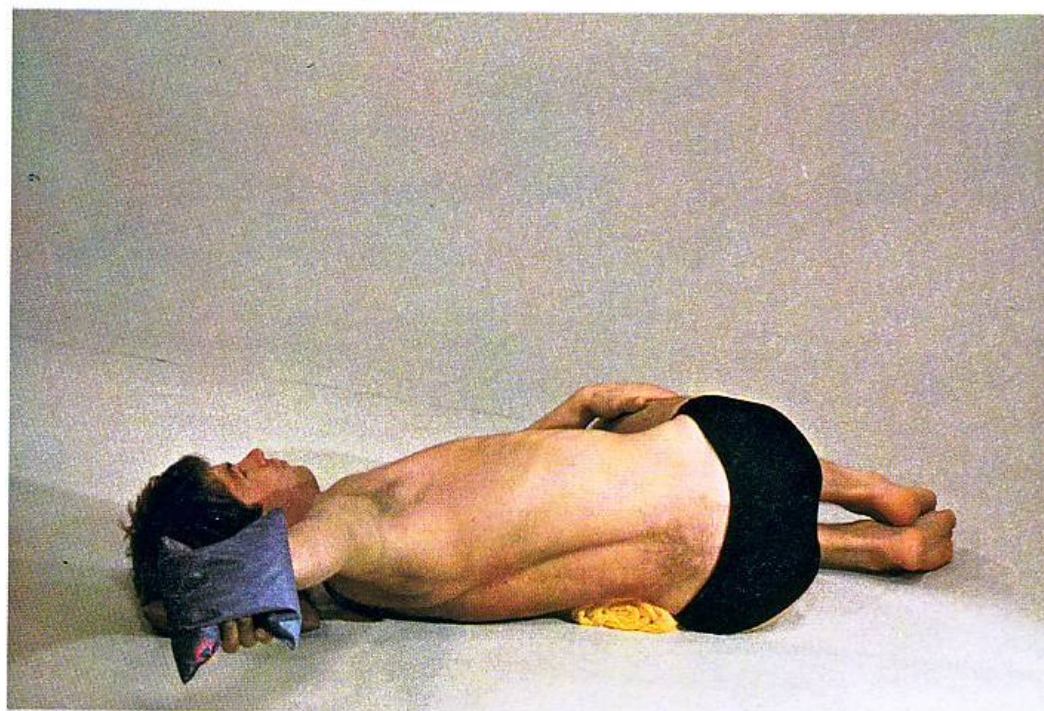
Your difficulty is:	Bending backward while turning right and bending sideways to the left just above waist level. Lying on your side, lower back bent forward.
Tight Muscles:	Muscles that bend back forward and sideways, and turn it, at waist level.
Equipment:	Firm cushion, rolled blanket or large towel; sandbag or other weight.
Starting Position:	Lie on left side with cushion under waist as far down toward pelvis as possible. (This bends lower back so that the lowest part of it bends in an outward curve. Bend at hip so that your lower back is pushed out. Now, this part of your back can't turn to the right.) Arch upper back; bend to the left by moving left shoulder forward. Take sandbag in right hand, arm pointing straight up toward ceiling. Place left hand on outer side of right thigh.
Stretching:	1. Look to the right; exhale. Turn upper body to the right, lowering right arm toward floor, so that stretch is felt at waist level. Keep right arm straight out to side and don't move in shoulder joint. 2. Look to the left; inhale. Press left arm down against thigh; hold for 5 seconds. 3. Look to the right; exhale. Turn upper body to the right, pushing with left arm and lowering right arm toward floor, to limit – maybe a little bit more. 4. Repeat until you feel you can stretch no more and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position and grip; look to the right. 2. Exhale; push with left arm and turn upper body to the right, so that right shoulder turns as far toward floor as possible without movement in shoulder joint. 3. Hold position a few seconds.
Common Errors:	* Upper back not arched enough. * Upper body not turned right as right arm is lowered toward floor, so that arm turns at shoulder joint.
Notes:	1. Left arm should press against thigh and push to increase turn. 2. Stretch should be felt at waist level. If you feel pain or discomfort in back, down either leg, or in any other place, stop stretching immediately.
Normal Mobility:	While bending your lower back backward and to the left, you should be able to turn right until your shoulders are almost at a right angle to your pelvis.



Starting Position:

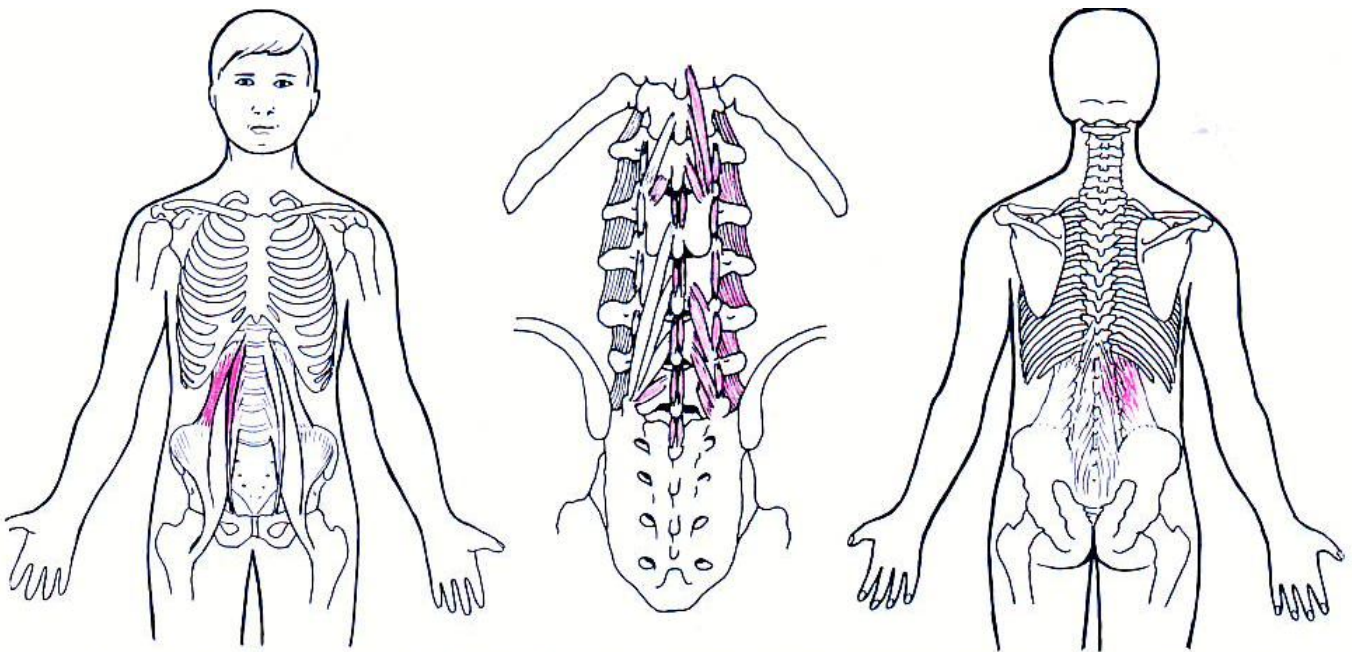


Stretching:

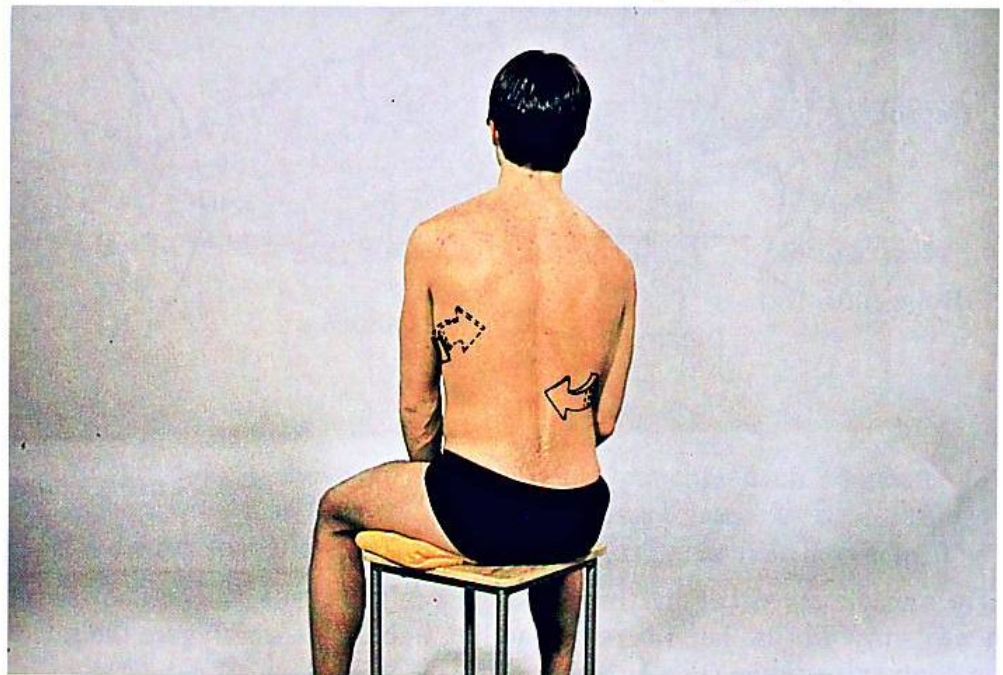


THE LOWER BACK 8 B.

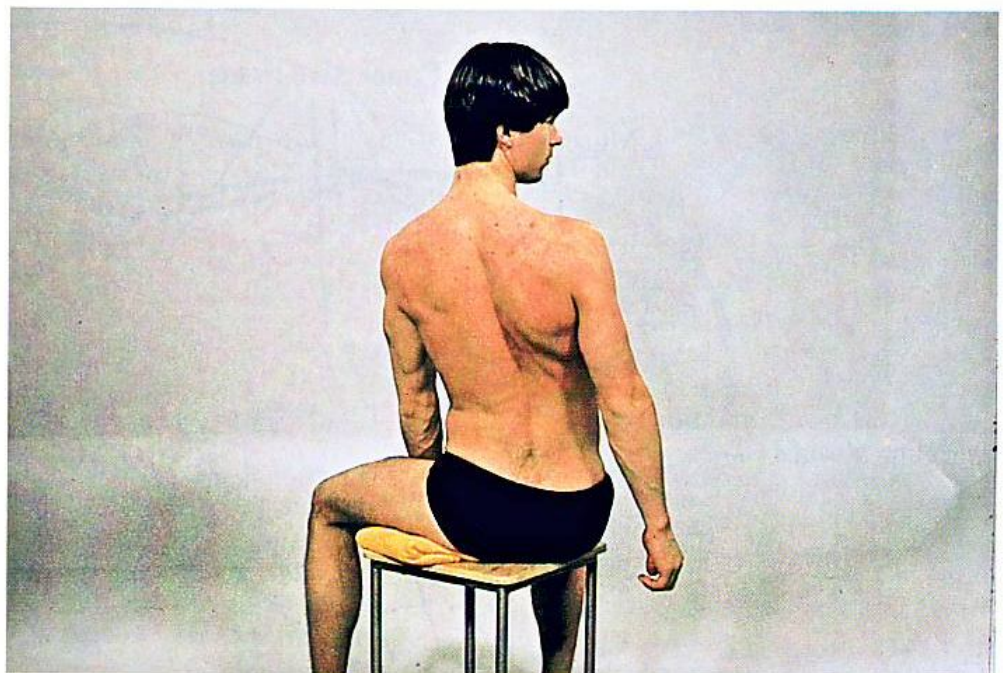
Your difficulty is:	Bending backward while turning right and bending sideways to the left just above waist level. Sitting down, lower back bent forward.
Tight Muscles:	Muscles that bend back forward and sideways, and turn it, at waist level.
Equipment:	Chair or stool; small cushion or folded towel.
Starting Position:	Sit on chair corner, lower back bent forward, legs wide apart on either side of chair leg, cushion under left buttock (this increases bend to the left and prevents lower back from turning to the right). Grip under chair seat with left hand, just inside right thigh; let right arm hang free.
Stretching:	1. Look up, backward and to the right. Exhale; bend to the left and turn right at waist level, so that stretch is felt there. Aid movement with pull of left hand. 2. Retain grip. Look to the left; inhale and try to pull left shoulder up and backward, against resistance of left hand and arm; hold for 5 seconds. 3. Relax. Look up, backward and to the right; exhale. Bend to the left and turn right, to limit – maybe a little bit more. Aid by pulling with left arm. 4. Repeat until you feel you can stretch no further and muscles feel tight. Hold this final stretch from 15 seconds to a minute or more.
Stimulation:	1. Retain position and grip; look up, backward and to the right. 2. Exhale; bend to the left and backward at waist level and turn right to limit. 3. Resist movement with left arm and hand. 4. Hold position a few seconds.
Common Errors:	* Lower back arched. * Weight not equal on both buttocks, so that lower back is not bent sideways to the left. * Too much force used.
Note:	Stretch should be felt only at waist level. If you feel pain or discomfort in back, down either leg, or elsewhere, stop stretching immediately.
Normal Mobility:	While bending your lower back backward and to the left, you should be able to turn right until your shoulders are almost at a right angle to your pelvis.



Starting Position:



Stretching:



MUSCLES AND JOINTS – HOW THEY'RE MADE AND HOW THEY WORK

To help you understand why you should stretch, you should know a few things about the way the body is constructed. Here we give a short description of the parts that power movements.

In your body you have about 200 bones. They meet at some 180 joints. At least 430 muscles help you move in various ways.

A joint consists of two bone ends covered in cartilage, a softer and smoother tissue which lets surfaces glide easily against each other. The joint is surrounded by capsules and ligaments. These keep the bone ends together and contain various sensory elements. The sensors report every movement to the brain by sending signals through fine nerve fibers, so that the brain is always kept informed about the movements and position of each joint (Fig 1).

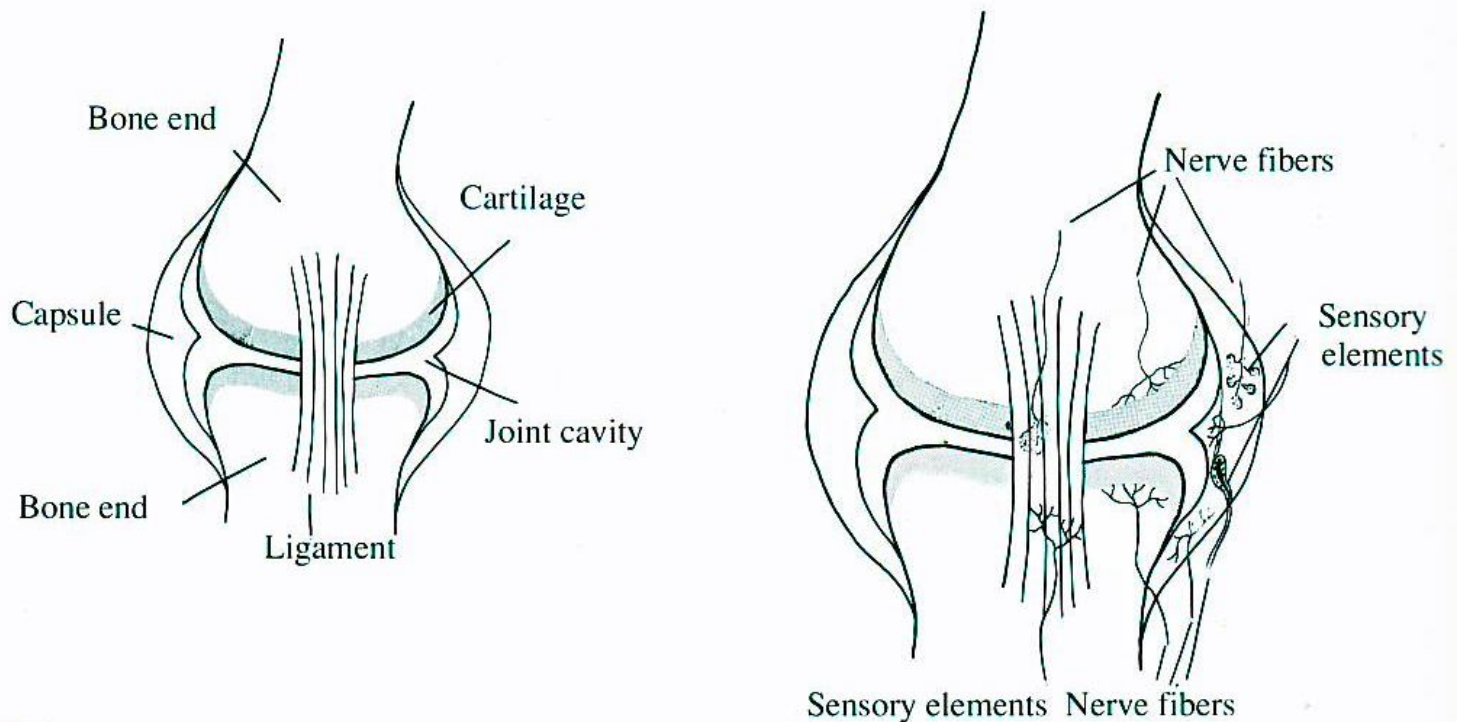


Fig 1.

The muscles consist of tiny threadlike cells called muscle fibers. The fibers contain elements that can contract them – myofibrils. The fibers lie parallel, in bundles which give the muscle its shape. Muscles are incased in connective tissue (Fig 2).

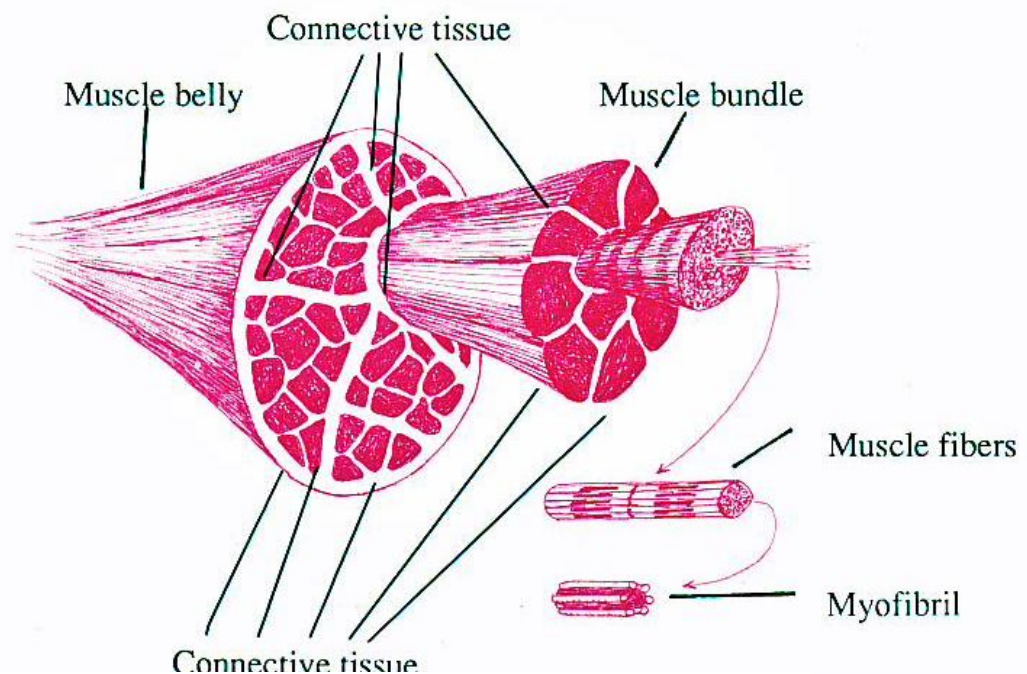


Fig 2.

The muscles are protected from injury by two kinds of nerve cells, 'muscle spindles' and 'tendon spindles' (Fig 3).

Muscle spindles prevent muscle cells from stretching too much when an unexpected movement occurs. They do this by making the muscle contract – pull itself tight. This happens automatically and protects the muscle from overstretching. Slow, intentional stretching of the muscles is not prevented by the muscle spindles.

Tendon spindles tell the brain, via nerve fibers, how tense the muscle is. If tension gets too high, tendon spindles send signals to stop the muscle contracting. These signals make the muscle relax.

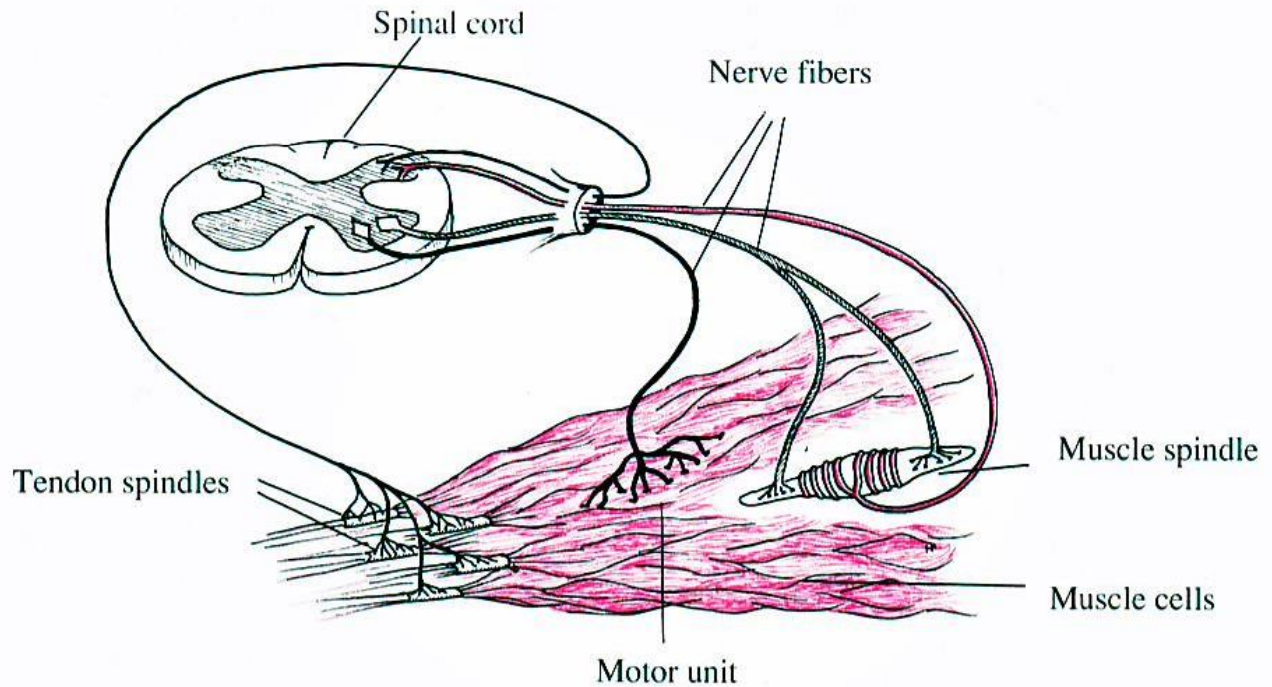


Fig 3.

Where nerve fibers from the brain reach the muscle, they split into many fine branches, each connected to one or more muscle cells. Such a connection forms a motor unit. When the unit is activated, its muscle cell(s) will contract with maximum force. If the work load increases, more motor units are activated to help. The strength of a muscle depends directly on the number of motor units activated (Fig 4).

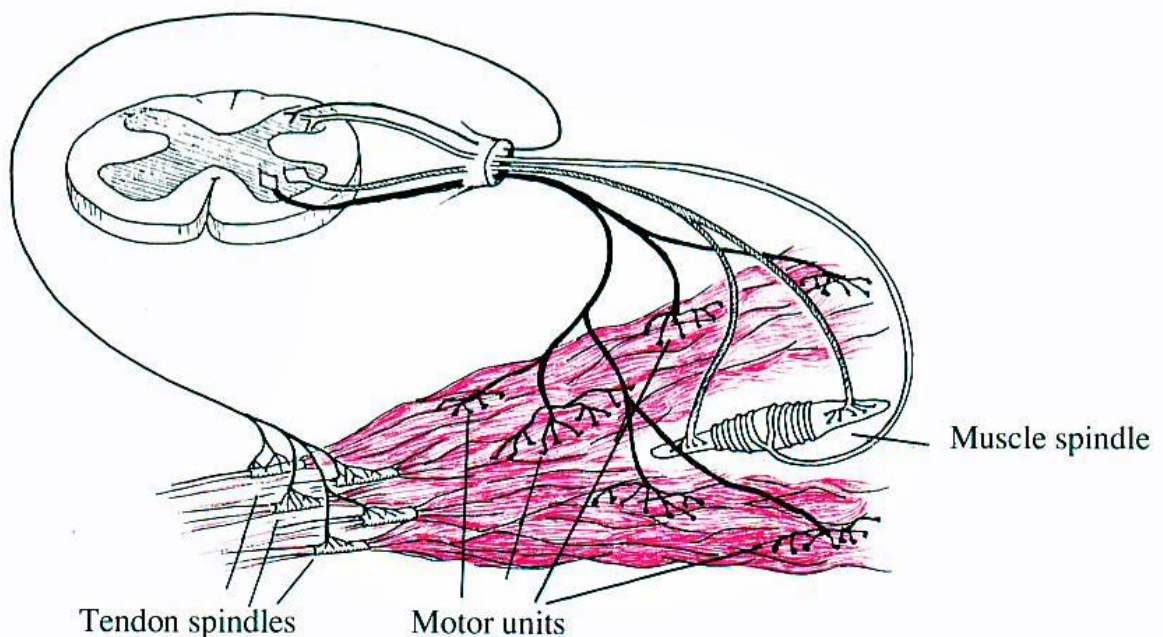


Fig 4.

Your muscles contain a great number of tiny blood vessels or capillaries. Normally there are some 3000 of them in a cross-section measuring just one square millimeter. When the muscle is at rest, most of the capillaries are closed. As muscles start working, they open wider and wider (Fig 5). The harder the work, the more blood flows through the capillaries. More motor units are activated, the muscles work with greater force, and in time they get stronger.

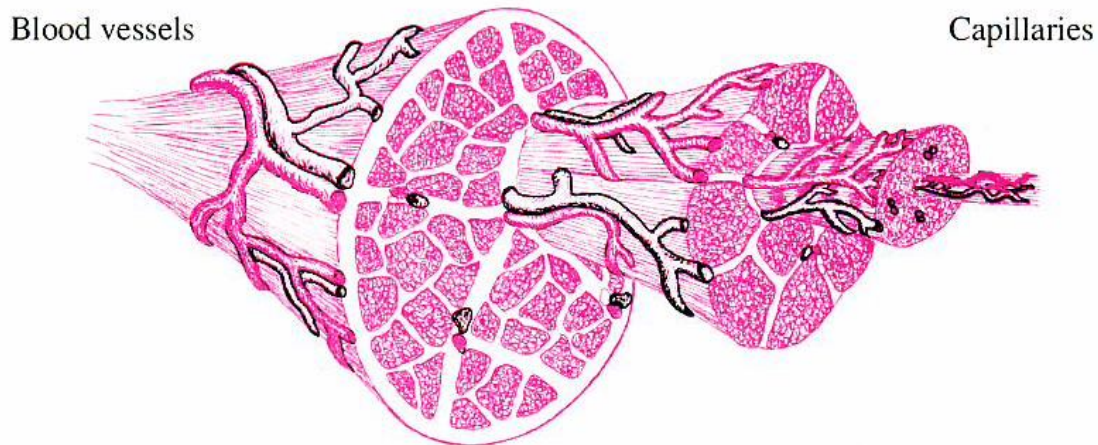


Fig 5.

Each muscle is connected to the skeleton by an origin and an insertion (in some cases more than one). (Fig 6).

Muscles have two basic ways of working (Fig 7):

- *Concentrically*, when the muscle fibers *contract (shorten)* so that origin and insertion come closer to each other.
 - *Eccentrically*, when the muscle fibers *lengthen* so that origin and insertion move away from each other.
- When a muscle contracts without changing its length we call it *isometric contraction*.

The muscle at work is called *the agonist*. Other muscles cooperating with it are known as *synergists*. On the other side of the joint you find a muscle with the opposite function to the agonist, logically called the *antagonist*. Agonist and antagonist take turns working: when the agonist contracts, the antagonist gets longer, and vice versa.

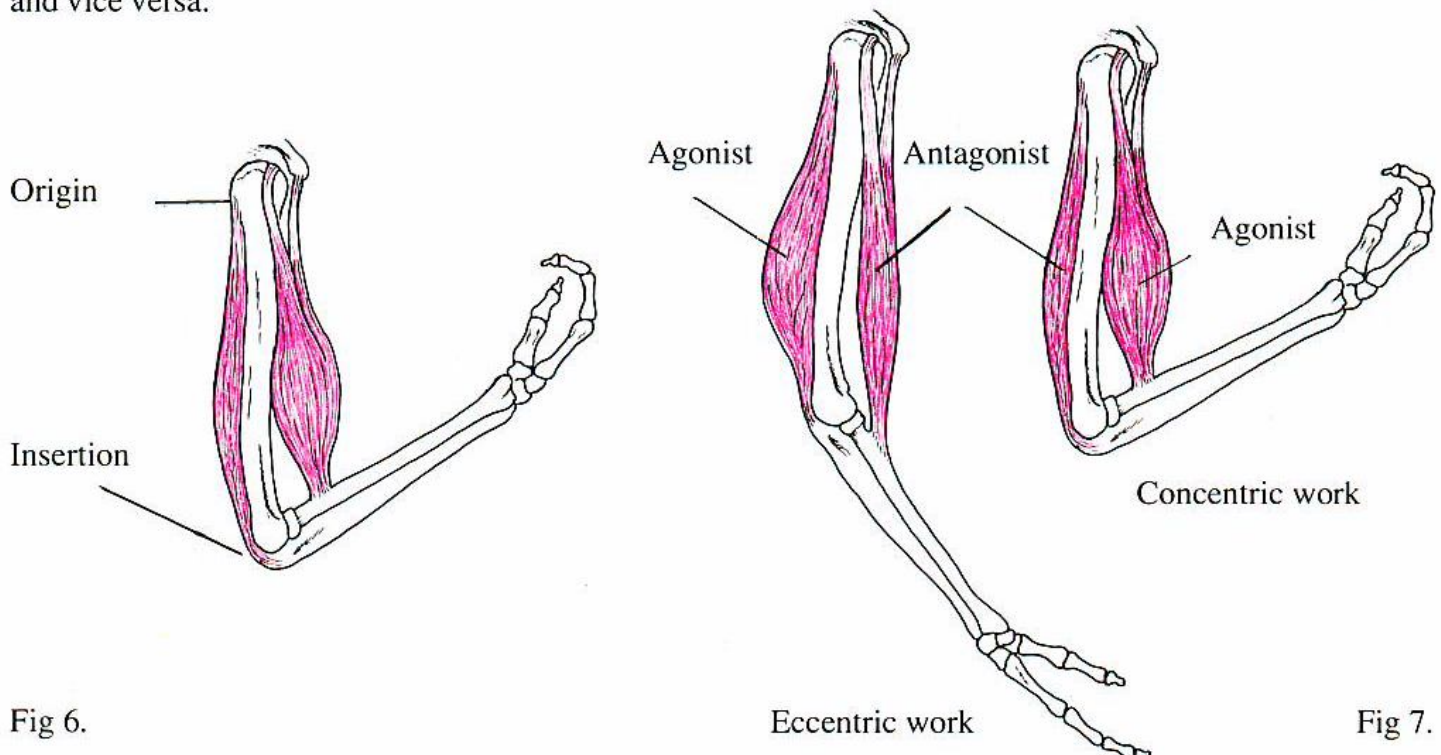


Fig 6.

Fig 7.

If the muscle work is too hard, the agonist may stay partly contracted afterwards. The muscle is left too short and stiff. As yet, science hasn't come up with the physiological explanation for this, but you experience it yourself every time you overdo it and get stiff.

OTHER WRITINGS ABOUT THE VALUE OF STRETCHING

The knowledge that some muscle groups get stiff and other get weak has been around for a long time (16). Stiff muscles are prone to injury (4, 7, 25). Testing for stiff muscles has been described (17), and these tests are generally accepted (9).

The type and amount of training determine the way muscles work, and correct stretching can improve movement patterns and results (14). Stretching improves suppleness and thus lessens the risk of injury during various physical activities (1). Stiff muscles are common among athletes; this limits their capacity and increases the risk of injury (22). One study showed stiff muscles – and hence more frequent injuries – in 67 percent of soccer players tested (8).

Over the last 20 years, various stretching techniques have been introduced (1, 2, 17, 26, 29, 30) with exercises that are fairly easy to do, but often lack a stable starting position. Also, these methods don't achieve maximum lengthening of muscles. The exercises can be unsteady and of little use and sometimes even dangerous. There are, however, modern clinical manuals with detailed descriptions of safe and stable techniques as an aid for physical therapists and physicians (10).

'Controlled, gradual stretching' has been compared to ballistic stretching and proven a better technique (31). It has also been found that 'contract-relax-stretch' is superior to other tested methods of improving mobility (5, 15, 18, 20, 21, 22, 24, 31, 32).

Various studies have shown that the increased mobility remains from 90 minutes up to 24 hours after a stretching exercise (22).

Exercises aimed solely at increasing strength have been shown to make the body less mobile. After 48 hours, only

5 to 10 percent had returned to normal mobility (32). But stretching exercises at the end of a workout session showed better mobility immediately after the session (23). Noticeable improvement of mobility after two and five weeks was recorded for stretching exercises both in groups and individually; most participants also felt gradually less soreness (12) as an after-effect of exercising (22).

Patients suffering from worn-out hip joints and resulting restricted mobility have been treated with stretching of muscles around the hip joints, and mobility was markedly improved (19). The proven reason for this improvement was that stretching lengthened, enlarged and strengthened muscles, regardless of the condition of the joint. Shortened muscles restrict hip movement and can be treated with stretching exercises.

Many studies show that muscle stretching

- prevents and relieves soreness due to exercising and training (23), injuries to muscles and tendons (27), cramps (6) and also painful menstrual periods, stress, and tension (1)
- lessens the risk, intensity and duration of injuries to muscles, tendons, and joints (1, 13), lumbar back ache (11), fatigue and vague aches and pains (1)
- strengthens muscles (3) and tendons (27) and works well as a treatment for tendonitis (28)
- enlarges range of motion by increasing length, volume and quality of muscles (13, 19)
- helps keep the body in shape for physical activity, improves technique in athletes, and thus makes physical activity more enjoyable (1).

Studies have also shown the importance of preventing muscle stiffness and of recommending suppleness exercises generally and individually (22).

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AUTOSTRETCHING means that

- you stretch your muscles the right way to prevent or relieve stiffness and other discomforts due to tight muscles
- all muscles and muscle groups are stretched in the best manner with proper regard to their functions
- stretching exercises are complete, and therefore act on all muscles that restrict movement
- stretching exercises are fully controlled, for safety and stability.

Autostretching exercises are described in detail for most muscles and muscle groups. Color photos and anatomical drawings of the muscles stretched make it easy to follow the instructions. Autostretching exercises may be performed anywhere, anytime, with the aid of only a few commonly available objects.

Everyone should stretch, so this book is a guide for self-stretching as well as a reference work for medical doctors and physical therapists when instructing patients. It is a useful companion text to the two-volume clinical manual, *Muscle Stretching in Manual Therapy*, by the same authors.

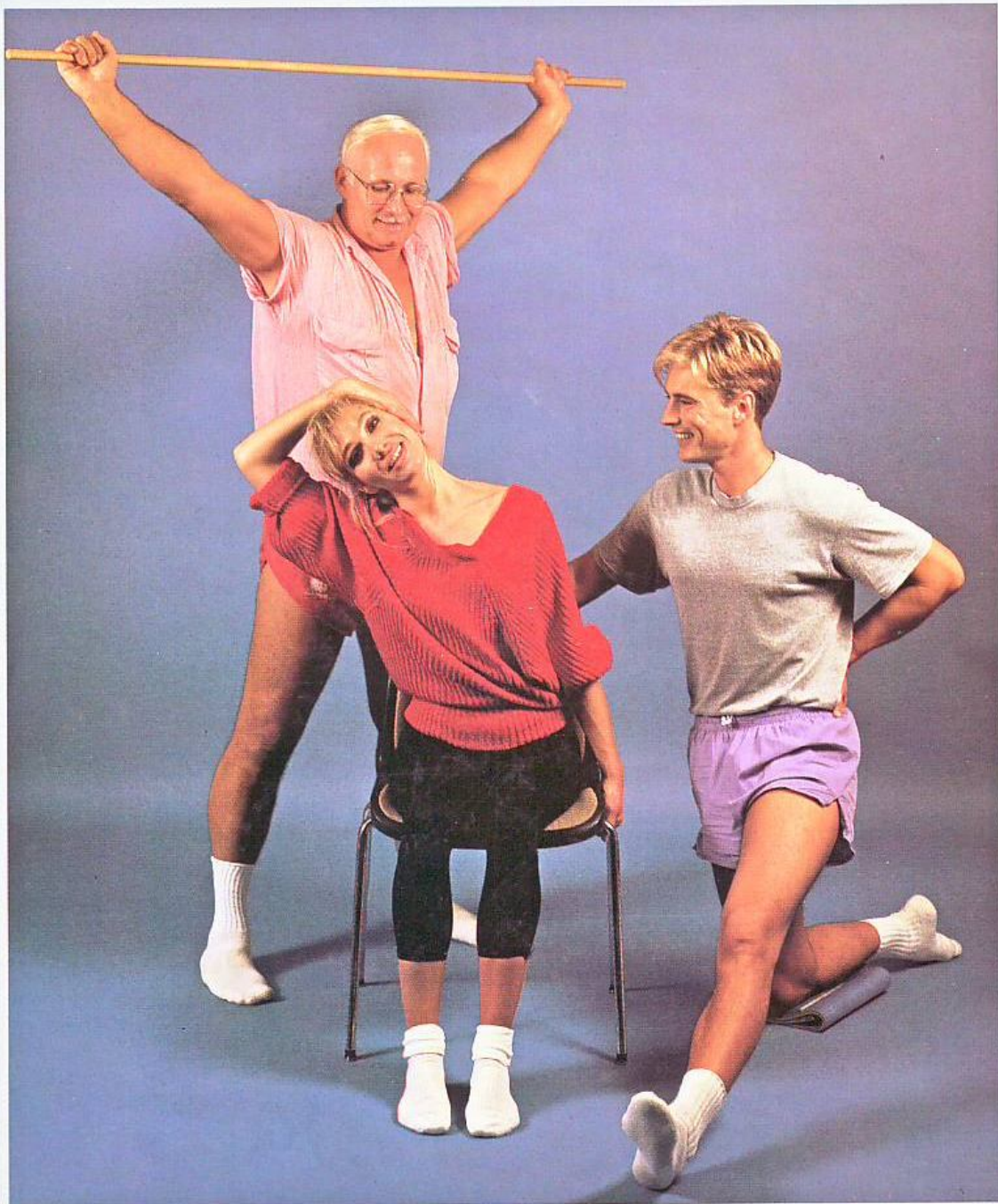
Olaf Evjenth is a physical therapist and lecturer in manual therapy at the Hans & Olaf Institute in Oslo, Norway, and a coach with 25 years of experience in track and field athletics.

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Both have more than 30 years' experience of treating problems concerning muscles and bones.

AUTO STRETCHING

The Complete Manual of Specific Stretching
by Olaf Evjenth and Jern Hamberg



ALFA BEHAR FÖRLAG