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"PILATES HOME EXERCISE PROGRAM VERSUS IFT-PILATES EXERCISE PROGRAM: AN ANALYSIS OF THEIR EFFECTIVENESS IN TREATING NONSPECIFIC LOW BACK PAIN IN STUDENTS"

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Abstract

Introduction: Non-specific low back pain, lacking a specific identifiable cause, poses a significant global health burden with a high risk of long-term disability.

Methodology: This study employed an experimental design with pre- and post-test analysis **Result:** The results of intergroup comparison revealed a significant difference in post-intervention values, indicating a substantial reduction in pain severity (NPRS) and improved functional impairment based on the Oswestry Disability Index (ODI).

Conclusion: These findings highlight the benefits of incorporating modified Pilates movements as an intervention for pain relief and enhancement of functional abilities among individuals with non-specific low back pain, specifically targeting students.

Key words: Low back pain, Pilates, CLBP.

Introduction

Low back pain without a known, identifiable specific pathology (such as an infection, tumour, osteoporosis, lumbar spine fracture, structural deformity, inflammatory condition, radicular syndrome, or cauda equina syndrome) is referred to as non-specific low back pain. Long-term low back pain increases the risk of having a disability that lasts a lifetime. Global estimates suggest that up to 23% of individuals experience chronic low back discomfort, with a considerable recurrence rate of 24% to 80% within one year. Moreover, in the adult population, lifetime

prevalence estimates for low back pain reach as high as 84%. ^[1]. Low back discomfort is a prevalent condition that affects a significant portion of the population, with approximately 12% of individuals experiencing debilitating effects. Among various age groups, one particularly common and often undertreated condition is adolescent low back pain, which is frequently observed among students.

Low back pain is not a clinical illness; rather, it is a symptom that is frequently ignored and progresses through three stages as it becomes worse: impairment, disability, and chronicity. Due to technology improvements, students no longer lead the active and dynamic lifestyle they previously did, but rather a passive and inactive one. Desk jobs, lengthy online courses, and other reasons have all contributed to a rise in people's sore backs and unusual postures. This debilitating ailment has been exacerbated by long workdays and poor posture, especially among students working in the healthcare sector. Recent years of the epidemic have affected this. The illness has gotten worse as a result of these drastic lifestyle changes and a lack of basic body maintenance.

According to a Scandinavian study, the prevalence of back pain among adolescents is notable, with approximately 1% of 12-year-olds and 5% of 15-year-olds experiencing back pain at any given time. The study also revealed a cumulative incidence rate, indicating that by the age of 18, about 50% of girls and by the age of 20, 50% of boys would have experienced back pain. These findings highlight the significant burden of back pain in the adolescent population, underscoring the importance of understanding and addressing this issue to promote the well-being and healthy development of young individuals.^[3] .

A primary goal of therapy for low back pain is to reduce the associated impairment. Among the recommended treatments, a supervised exercise therapy program has shown promise, although the optimal type of exercise remains uncertain.

Pilates, a globally popular exercise method, is increasingly being utilized as a rehabilitation program. Pilates is designed to enhance physical strength, flexibility, and posture while also promoting mental clarity.^[4] There are many advantages to using the Pilates method and workout movement. Its methodical administration increases lung capacity and circulation. Additionally, it enhances bone density and joint health ^[5] .

Joseph Pilates discusses his initial 34 Matwork exercises in his book, "Return to Life." The book's initial version was released in 1945^[6,7] . The original exercises created by Joseph Pilates have been modified for Modern Pilates, and new equipment has also been introduced. Pilates is well-liked in the physiotherapy and fitness industries.

The term "modified Pilates" refers to modifications made to the traditional Pilates method, which entails strenuous exercises of high intensity and complexity ^[8] .Exercises in modified Pilates, which are customised for each patient, steadily raises the difficulty level of the workouts in accordance with the person's skills and personality traits ^[9] .

The justification is based on the notion that individuals with low back pain have impaired spinal muscle stability and control ^{[10][11]}. This includes modifications to the timing of trunk muscle activation and changes to muscle activation. Every action should be performed slowly and incorporate all six of Pilates' fundamental principles: concentration, breathing, control, precision, and centering ^[12, 13, 14, 15, 16].

All actions begin with centering, which involves activating the core muscles (the deep abdominal muscles, including the transversus abdominis, lumbar multifidus, and pelvic floor muscles, as well as their helpers: erector spinae, oblique abdominis, rectus abdominis, gluteus maximus, and or spinae). Balance and posture can both be enhanced by centring which are termed as 'power house' of body. The 'powerhouse' or core stability is one of Pilates' main objectives ^[15]. The inclusion of these muscles enhances the lumbopelvic region's stability. Additionally, it has been demonstrated that those with back pain have considerably reduced hip and spine mobility ^[16]. Hamstring tightness and low back flexibility are also linked to low back discomfort ^[17]. Research and clinical evidence strongly support the advantages of Pilates workouts.

METHODOLOGY:

Study design: Experimental Design

Study type: Pre-test and Post-test

Sample size: 33 subjects

Sampling method: Random sampling

Study duration: 2 Weeks

Study setting: Physiotherapy Department, Institute of Health Sciences, Chandaka

INCLUSION CRITERIA:

- Age – 19 - 25 Years
- Should have a prior history of non-specific low back pain without leg pain
- Should currently be seeking care for low back pain
- Patients with at least a rating of 4 on the Visual Analogue Scale
- No previous history of Trauma or pathology in the lower back
- No signs and symptoms associated with other conditions, such as nerve root compromise (at least 2 of the following signs: Weakness, reflex changes, or sensation loss, associated with the same spinal nerve)

EXCLUSION CRITERIA:

- Patients with a rating of below 4 & above 8 on NPRS
- Prior history of any Trauma or pathology to the lower back

- Any medical contraindications to active exercise

MATERIALS USED:

- Google Forms (Annexure no 1)
- Machine – Vectrodyne100
- Mat for Exercises

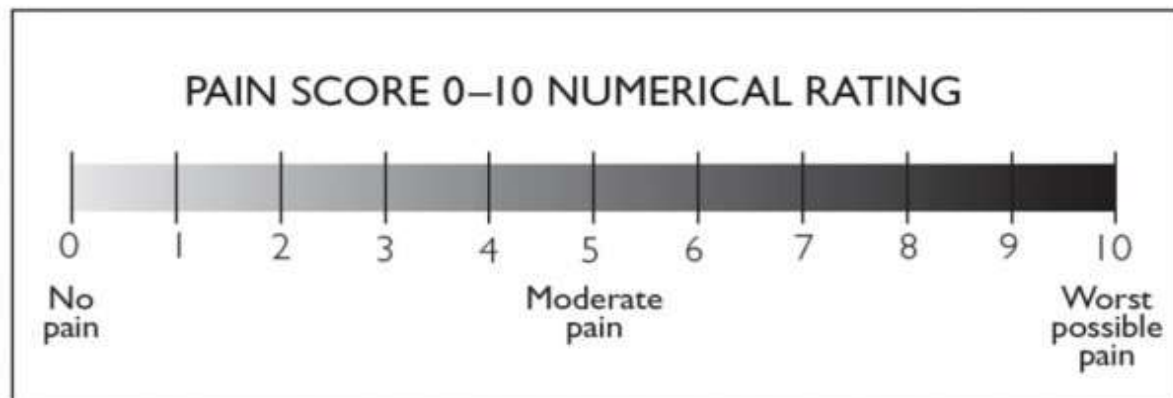
OUTCOME MEASURES

- Numeric Rating Scale
- Oswestry Disability Index

Numeric Rating Scale

The NRS has a range of 11, 21, or 101 points, with the endpoints of no pain and the most excruciating suffering. ^[18] The NRS may be communicated orally or visually. When numbers are displayed graphically, an 11- or 21-point box scale is typically utilised since they show the patient's level of discrimination.

In this study, participants rated their pain on an 11-point numerical pain rating scale (NPRS), which ranges from 0 (no pain) to 10 (the worst agony imaginable) ^[21]. It has been demonstrated to have contemporaneous and predictive validity as a measure of pain intensity ^{[22][23]}



Oswestry Disability Index

The development of the Oswestry Disability Index was initiated by John O'Brien in 1976. An orthopaedic surgeon (Stephen Eisenstein) and an occupational therapist (Judith Couper) interviewed patients with back pain. Various drafts of the questionnaire were tried. The questionnaire had been published in 1980 by Fairbank and his colleagues and widely disseminated at the 1981 meeting of the International Society for the Study of the Lumbar Spine (ISSLS) in Paris.

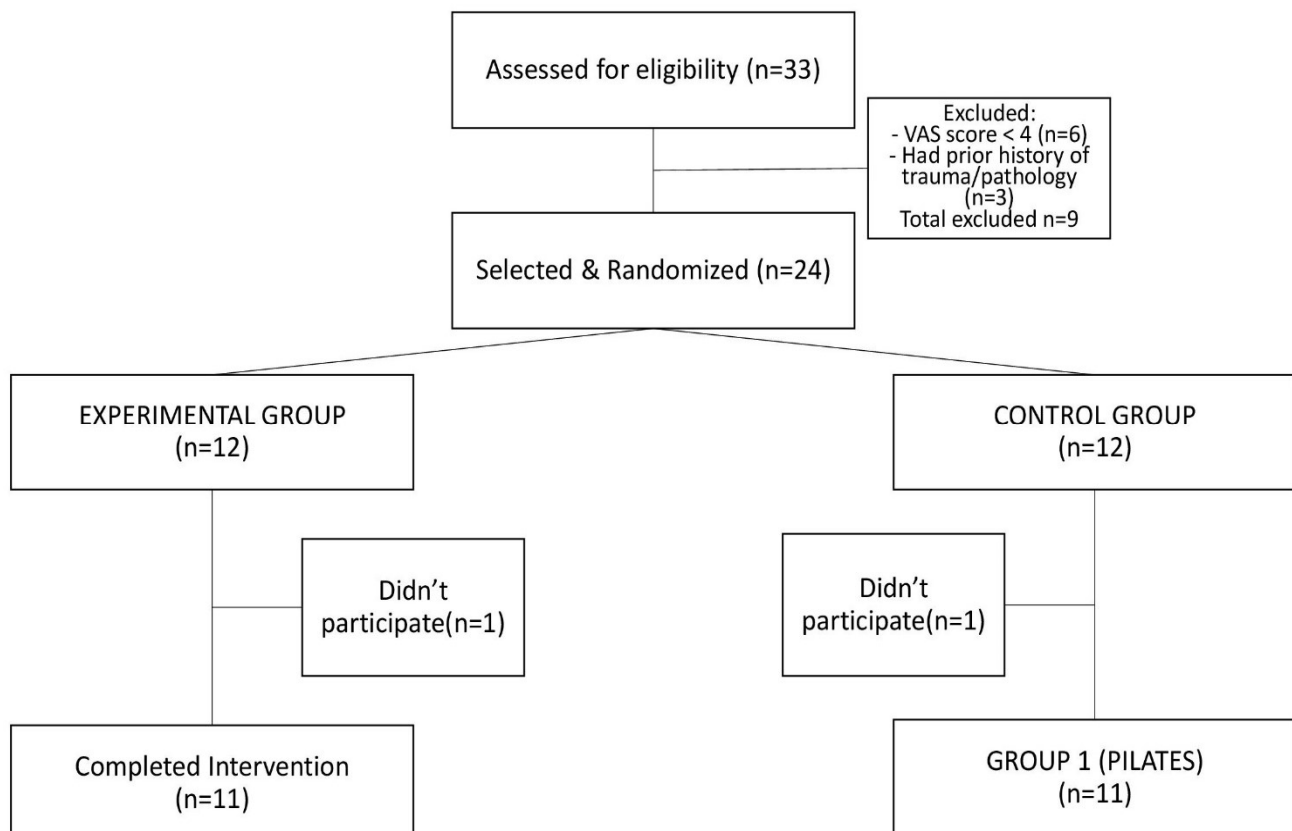
The Oswestry Disability Index (ODI) is one of the principal condition-specific outcome measures used in the management of spinal disorders. The ODI is the most common outcome measure in patients with low back pain. It has been extensively tested, showed good psychometric properties, and is applicable in a wide variety of settings. There are 10 questions (items). The questions are designed in a way that realizes how the back or leg pain is affecting the patient's ability to manage in everyday life. (Annexure no 3)

PROCEDURE:

Patients were selected using the predetermined criteria. Before being admitted, the candidates were screened to decide who would be invited to participate in the study using the inclusion and exclusion criteria, the patients were informed of the study's objectives and procedures and written consent was taken from them. A Google Forms-created questionnaire was used for the enrolment process. A statistician who was unaware of the goals of the study created the randomization sequence and maintained it off-site using the chit-picking approach.

The intervention groups were then divided into 2 groups as shown. Group 1 that received Pilates Mat Exercises as a Home Exercise Program and Group 2 that received treatment with IFT for 3 days followed by Pilates Mat exercises for 14 days.

Before the interventions were started, outcomes such as VAS & ODI scores were taken to assess the pain & disability.



INTERVENTION:

The first group received Pilates Mat Exercises as a home exercise program for 14 days whereas the second group received IFT for 1st 3 days followed by Pilates mat exercises for 14 days. The Exercises were taught by an experienced therapist and were derived from the book Pilates for Beginners - Core Pilates Exercises and Easy Sequences to Practice at Home by Katherine Corp & Kimberly Corp.

The exercises consist of:

Warm Up	Beginner Lower Back Exercises Level 0 (WEEK 1)	Advanced beginner Lower Back Exercises Level 1 (WEEK 2)	Cool Down
Cat Stretch	Spine Stretch Forward Twist Level 0	Spine Stretch forward Level 1	Hip Flexor Stretch
Half Swan	Spine Twist Level 0	Spine Twist Level 1	Side Hip Stretch
	Swan Dive Level 0	Swan Dive Level 1	
	Shoulder bridge	Sidekicks	
	Criss Cross to the left & Criss Cross to the right Level 0	Criss Cross Bilateral Level 1	
	Roll Over	Up & Down	

The Pilates Mat Exercises were performed **five days a week**, followed by a **rest of 2 days in between**. The exercises were performed in **sets of three**, with a **rest period of five seconds in between each set** and **each set including seven to ten repetitions**.

The following week, the exercises were **advanced to one level**. The lower back exercises were upped by another Level following the conclusion of Week 1, with exercises depending on the strength attained during the introduction programme. The Advanced beginner Lower Back Exercises Level 1 was then repeated with the same protocols. The Warm Up & Cool down exercises were kept the same. The exercises were adequately explained to the patients, and they were continually urged to perform them at home for two weeks. The second group received IFT for 3 days to control the pain. The Waveform was Triangular, duration of 12 minutes & Intensity

according to the Patients tolerance, which was then followed by the 2 Week protocol of Pilates Mat Exercises and was performed under the supervision of a therapist.



Figure 1



Figure 2



Figure 3



Figure 4

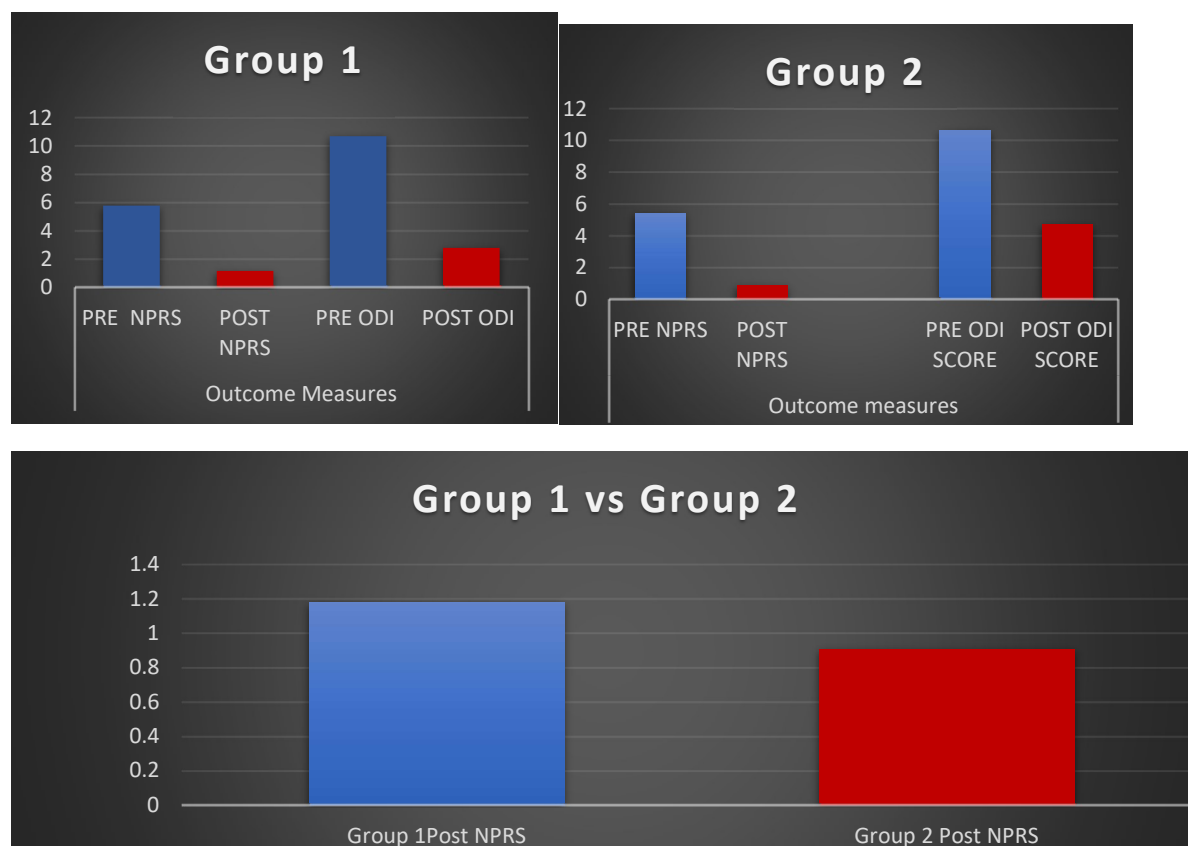
PARTICIPANTS DESCRIPTIVE STATISTICS

Participants(n=24)

Mean Age	21.20±3.20
Gender N (%)	
Male	50%
Female	50%
Mean Height (In Feet)	5.34±0.653 Ft
Mean Weight (In Kg)	64.20±30.8 Kg
Mean BMI(Kg/m ²)	24.52603866

DATA ANALYSIS:

This study was designed to gather data on the feasibility & effectiveness of Pilates mat exercises as a home exercise program over 2 weeks. Participants' descriptive statuses, which included the means of their age, height, weight and BMI were used in the data analysis. Student t- test was done for Post NPRS for both groups. The t-value for Post NPRS for both groups was 1.79284. The p-value was 0.044069. The result is significant as $p < 0.05$. The Pre & Post mean values for NPRS show the marginal difference between both groups but there was a significant difference found in the Student t-test suggesting that Pilates as a Home Exercise Program is effective in Adolescents with Non-Specific Low Back Pain.



RESULTS

Thirty three Non-Specific LBP subjects were recruited for this study out of which 24 met the inclusion criteria out of which there were 12 Males & 12 Females. Both groups exhibited similar characteristics. The mean age of participants was 21.20 ± 3.20 , height was 5.34 ± 0.653 & weight of 64.20 ± 30.8 Kg.

The main aim of the study is to find out the to compare the efficiency of Pilates Mat Exercise as a Home Exercise Program against the effect of IFT with Pilates as a clinical treatment for Non-Specific Adolescent low back pain. In this study, the measures used in this study were the

Numerical rating scale & Oswestry Disability Index which were compared with values before & after the intervention.

The results demonstrated that there was not any significant difference between both groups in terms of the intended variables. That is, the mean values of pain severity (NPRS) & functional disability were normalized in the patients of both treatment groups. There were no significant between-group differences in the outcome measures at baseline.

The results of the intergroup comparison displayed that there was a significant difference between the values of pain severity (NPRS) & functional disability in daily living in post-intervention based on ODI.

DISCUSSION:

The purpose of the present study was to determine whether the Pilates Mat Exercises can be used as a home exercise program for treating adolescents with Non-Specific Low Back Pain and find its effectiveness when compared with IFT & Pilates as a clinical treatment.

According to the present findings, there was a significant improvement in the pain severity & functional disability in each group of patients in the post-intervention & our Pilates intervention was safe and well tolerated by all study participants as the exercises were modified which allowed patients to adapt the exercise throughout the entire program.

The values state that there was a 28% improvement in the functional disability of Group 1 as compared to 24% of Group 2 in functional disability in the Oswestry Disability Index.

The majority of Pilates programmes for LBP focus on developing or activating the core muscle group, sometimes known as the "powerhouse"^[18]. It entails the isometric contraction of the multifidus, gluteus maximus, pelvic floor muscles, and deep abdominal muscles ^[19].

As a result of these exercises, our intervention may have a training impact, strengthening the deep abdominal and spinal muscles that support the body's alignment and posture. They aid in increasing awareness of the spine's front and back muscles. Over time, it aids in developing a flexible spine and better posture. By extending the front of the body, it counteracts the negative consequences of prolonged sitting. Additionally, it tones the muscles in the back.

Back problems can be detected keeping an eye to improper activation and inadequate regulation of deep trunk muscles, which have been observed to be incapable of controlling lumbopelvic stability ^[21]. Since a Pilates approach concentrates on core body training and breath control, it facilitates activation of the transversus abdominis, diaphragm, multifidus, and pelvic floor muscles, which have been found to operate as modulators of functionality in patients with low back pain ^[20].

According to a study, those who had low lumbopelvic motor control function were more likely to have chronic low back pain (CLBP) than those who did not. Patients with CLBP also had lower lumbopelvic motor control function.^[22]

Early management of non-specific low back pain can reduce the risk of developing recurrent back pain in later life. Pilates Mat movements should be useful as a home exercise programme for reducing pain and enhancing the quality of life.

CONCLUSION:

The findings of the current study predominantly support the advantages of modified Pilates movements in reducing pain and enhancing functional impairment. Consequently, individuals suffering from nonspecific low back pain are recommended to incorporate Pilates as a home exercise program.

LIMITATION:

It is crucial to acknowledge certain limitations in the study. Specifically, patient satisfaction was not evaluated, despite observing noteworthy enhancements in measures of disability and pain. Furthermore, a follow-up assessment is necessary to assess the potential long-term effects of the program. To comprehensively determine its efficacy in preventing non-specific low back pain among adults, particularly in later stages of life, future research should prioritize larger sample sizes.

REFERENCE

1. Balagué, Federico, et al. "Non-specific low back pain." *The Lancet* 379.9814 (2012): 482-491. Level of evidence 1A
2. Kovacs, F.M.; Gestoso, M.; Gil del Real, M.T.; Lopez, J.; Mufraggi, N.; Mendez, J.I. Risk factors for non-specific low back pain in schoolchildren and their parents: A population-based study. *Pain* 2003, 103, 259–268
3. Leboeuf-Yde C, Kyvik KO. At what age does low back pain become a common problem? A study of 29,424 individuals aged 12-41 years. *Spine (Phila Pa 1976)*. 1998 Jan 15;23(2):228-34
4. Oxford Dictionaries, Definition of Pilates in English. Available from: <http://oxforddictionaries.com/definition/english/Pilates> (accessed 20 Oct 2013)
5. Pilates Method Alliance, An Exercise in Balance: The Pilates Phenomenon. Available from: <https://archive.ph/vMhiR> (accessed 20 Oct 2013).
6. Joseph Pilates Original 34 poses from Return to Life. Available from: http://www.easyvigour.net.nz/pilates/h_pilates_classic.htm (accessed 4 Sept 2013).
7. Charles Kenner. Joseph Pilates Classical Mat Exercises. Available from: <http://www.youtube.com/watch?v=5ShtfZp3Mwg> (accessed 20 Oct 2013)

8. Penelope L. Updating the principles of the Pilates method: part 2. *J Bodyw Mov Ther.* 2002;6:94–101
9. La Touche R, Escalante K, Linares MT. Treating non-specific chronic low back pain through the Pilates Method. *J Bodyw Mov Ther.* 2008;12:364–370.
10. Hodges PW and Richardson CA. Inefficient muscular stabilization of the lumbar spine associated with low back pain. A motor control evaluation of transversus abdominis. *Spine* 1996; 21: 2640–2650.
11. Hungerford B, Gilleard W and Hodges PW. Evidence of altered lumbopelvic muscle recruitment in the presence of sacroiliac joint pain. *Spine* 2003; 28: 1593–1600. Musculino JE and Cipriani S. Pilates and the “powerhouse”- I. *J Bodyw Mov Ther* 2004; 8: 15–24.
12. Wells C, Kolt GS, Bialocerkowski A. Defining Pilates exercise: a systematic review. *Complementary therapies in medicine.* 2012 Aug 1;20(4):253–62.
13. Powers S. Stefanie Powers, Guide to Longevity and Well-being through Pilates. London: Gaia Books Ltd. 2005.
14. Ackland L. Body Power, a unique system of exercise developed from the work of Joseph H Pilates. London: Thorsons, 2001.
15. Muscolino, J.E. and Cipriani, S., 2004. Pilates and the “powerhouse”—I. *Journal of bodywork and movement therapies*, 8(1), pp.15–24.
16. Shum GL, Crosbie J and Lee RY. Effect of low back pain on the kinematics and joint coordination of the lumbar spine and hip during sit-to-stand and stand-to-sit. *Spine* 2005; 30: 1998–2004.
17. Battie M, Bigos S and Fisher L. Anthropometric and clinical measures as predictors of back pain complaints in industry: a prospective study. *J Spinal Dis* 1990; 3: 195–204
18. Williamson A. Pain: a review of three commonly used pain rating scales. *ISSUES IN CLINICAL NURSING* 2005; 14: 798–804
19. Downie WW, Leatham PA, Rhind VM, et al. Studies with pain rating scales. *Ann Rheum Dis* 1978;37:378–81.
20. Jensen MP, Turner JA, Romano JM. What is the maximum number of levels needed in pain intensity measurement? *Pain* 1994;58:387–92.
21. Price DD, Bush FM, Long S, et al. A comparison of pain measurement characteristics of mechanical visual analogue and simple numerical rating scales. *Pain* 1994;56:217–26.
22. Katz J, Melzack R. Measurement of pain. *Surg Clin North Am* 1999;79: 231–52.
23. Jensen MP, Turner JA, Romano JM, et al. Comparative reliability and validity of chronic pain intensity measures. *Pain* 1999;83:157–62.
24. Miyamoto GC, Franco KFM, van Dongen JM, et al Different doses of Pilates-based exercise therapy for chronic low back pain: a randomised controlled trial with economic evaluation *Br J Sports Med* Published Online First: 10 March 2018. doi:10.1136/bjsports-2017-098825

25. Yamato, T.P., Maher, C.G., Saragiotto, B.T., Hancock, M.J., Ostelo, R.W., Cabral, C., Costa, L.C.M. and Costa, L.O., 2016. Pilates for low back pain. *Sao Paulo Medical Journal*, 134(4), pp.366-367
26. Zielinski KA, Henry SM, Ouellette-Morton RH and DeSarno MJ. Lumbar multifidus muscle thickness does not predict patients with low back pain who improve with trunk stabilization exercises. *Arch Phys Med Rehabil* 2013; 94: 1132–1138
27. Tulloch E, Phillips C, Sole G, Carman A and Abbott JH. DMA Clinical Pilates directional-bias assessment: Reliability and predictive validity. *J Orthop Sports PhysTher* 2012; 42: 676–687
28. Lumbopelvic motor control function between patients with chronic low back pain and healthy controls: a useful distinguishing tool