



# EFFECT OF E-PILATES EXERCISE PROGRAM ON PAIN IN YOUNG ADULTS WITH NON SPECIFIC LOW BACK PAIN

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## ABSTRACT

**AIM & OBJECTIVE:** To study the effect of E-Pilates exercise program on pain in young adults with Non-Specific Low Back Pain.

**METHODOLOGY:** An experimental study was conducted on 50 subjects with non specific low back pain in age group of 18-25 years using a E-Pilates Group Exercise program for 7 days daily through an online platform and the pain levels were assessed using another E-tool displaying pain scale before and after exercise protocol.

**RESULT:** Following E-Pilates exercise program, significant difference was found in pre and post intervention values for NPRS ( $p < 0.0001$ ) by using Wilcoxon signed rank test. Therefore, it can be stated that E-Pilates Exercise therapy protocol helps to reduce pain.

**CONCLUSION:** E- Pilates Exercise Program comprising of 5 Exercises performed for 7 days daily leads to a significant decrease in pain levels in 78%, i.e 41/50 patients and can be used as an integrated approach for Non-Specific low back pain patients in E-consultations & Exercise sessions.

**Keywords:** E-Pilates, Non-specific low back pain, core.

## INTRODUCTION

One of the most major health problems which is also the leading cause of disability in young adults is Non Specific Lower Back Pain.<sup>(1)</sup> This represents 90-95% cases of LBP in general population.<sup>(2)</sup> This accounts for a total financial burden of US \$100 Billion in USA<sup>(3)</sup>, the prevalence rate being as high as 70-80% in the age of 20 year old. LBP is equally risky in school going population and adults.<sup>(4)</sup> As most of the studies have been focused on working aged population even after knowing the high prevalence rates, NSLBP in young adults have not been understood well.<sup>(4)</sup> The causes of NSLBP is not known yet as it does not has a specific patho-anatomical cause, is still under discussion, but the major factors are change in movement patterns and spine stability deficits.<sup>(5,6,7)</sup> Several studies have shown that there is late activation, weakness, diminished resistance of the deep muscles of the trunk mainly the Transverse abdominis and Multifidus during episodes of Lower back pain as found by Hodges P et al.<sup>(5)</sup> The duration/severity of recurrent episodes of pain can be reduced with the help of therapeutic exercise interventions such as Pilates exercise which addresses the underlying motor control impairments.<sup>(8,9)</sup> Vogt Let al suggested that there is dysfunctioning of gluteus maximus as well as changes in the hip extensor recruitment pattern.<sup>(10)</sup>

Pilates is a mind-body exercise approach that can be considered a complementary and alternative medicine therapy that focuses on improving static, dynamic stability, strength, core stability and muscle control aiming on improving co-ordination, control of core muscles leading to optimal lumbo-pelvic stabilisation.<sup>(9,11,12,13)</sup> It improves coordination and control of core muscles which in turn contribute to optimal lumbo-pelvic stabilisation needed for optimal balance requirement and function during daily activities.<sup>(8,14)</sup> Covid-19 has led to a number of changes in the medical field leading to an increased number of “E” studies coming up which led to the idea of E-Pilates as an interventional program for online consultation and exercise sessions.

## RESEARCH DESIGN & METHODOLOGY

The current study is an Experimental study. All the patients signed an online consent form before beginning E-assessment form.

After the sample size calculation using Kohn MA calculator<sup>(21)</sup>, Fifty young patients with Non specific low back pain for at least 3 months<sup>(16)</sup> as per the inclusion criteria of 18-25 age group with no history of Trauma, Infection.<sup>(16)</sup>

Exclusion was done for patients with Neurological dysfunction, Spine surgery, Medications, Regular Pilates/any other specific exercise program in the last 3 months, History for Vestibular dysfunction.<sup>(26)</sup> Recruitment for the study was done using social media, verbal advertisements. Participants were not paid for the study.

All the patients were given 5 E-Pilates exercises in groups of 10 for 7 days daily on an E-platform, the pain levels were assessed using E-assessment form using Numerical pain rating scale (NPRS) after completion of the 7 day protocol.

Institutional Ethical clearance was obtained for the same.

## PROCEDURE FOR E-PILATES

The Exercise program<sup>(17)</sup> was composed of:-

1. The single leg stretch (Level 1)
2. The Pelvic press (Level 1)
3. Swimming (Level 1)
4. Opposite arm and leg reach, Bird Dog (Level 1)
5. Side to side (Level 1)

Before the exercises, the key principles (alignment, breathing and hollowing) were taught and followed.

### 1. THE SINGLE LEG STRETCH:-

The patient was asked to extend his left leg away from the body and pull his right leg towards the chest by clasping his hands over the knee and decompressing the spine which would mobilize the hip and knee joints and control the abdominals and increase the co-ordination.

3 set of 10 repetitions, alternating legs were instructed.



Image 1: The Single Leg Stretch

### 2. THE PELVIC PRESS

The patient was instructed to take the position as same in the pelvic curl and lift up the spine from the floor and pelvis higher and when releasing the position it should be one vertebra at a time. 3 set of 10 repetitions were instructed to perform.



Image 2: The Pelvic Press

### 3. SWIMMING:-

The Patient was instructed to lie prone position with legs and shoulder distanced apart and raising his right leg off the ground tightening his buttocks and head resting on his hands. 3 set of 10 breaths in and out.



Image 3: Swimming

#### 4. OPPOSITE ARM AND LEG REACH:-

The patient was instructed to take the kneeling position with knees and hips wide apart and also the hands placed on the ground, then lifting his one leg(knee) above the ground and putting weight on the other knee and hands, the weight was centred. Holding for 10 secs and repeat this for 10 times on the other side too doing 3 sets each.



Image 4: Opposite Arm and Leg Stretch

#### 5. SIDE TO SIDE:-

The patient was instructed to lie flat on the back by pulling his knees towards the chest and rotating the knees throughout the length of the spine and extending the opposite arm. Hips should be twisted taking the legs sideways. 10 Repetitions and 3 sets each in both sides were instructed.



Image 5: Side to Side

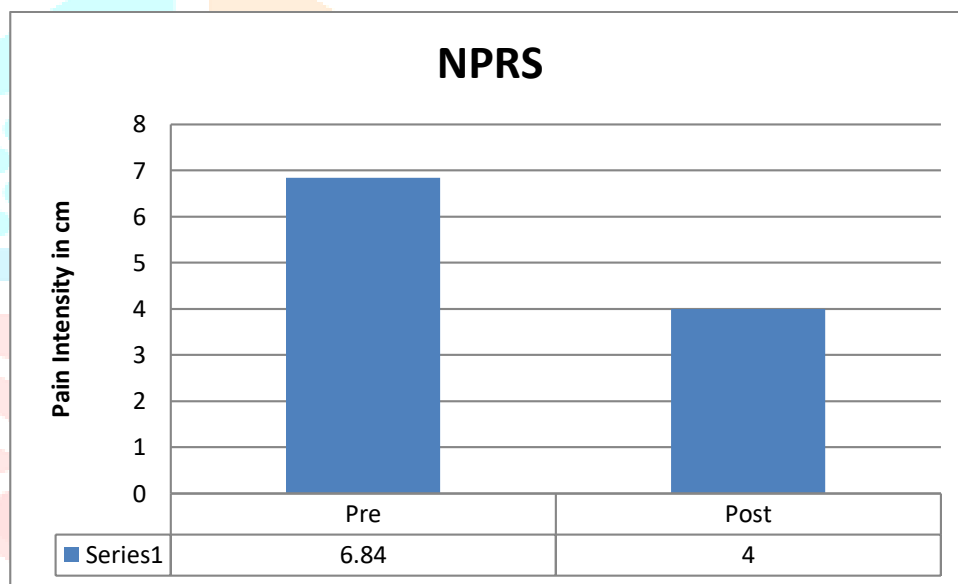
## DATA ANALYSIS & RESULTS

The entire data of the study was entered in MS Excel 2007 before it was statistically analyzed in “GraphPad Instat version 3.05” which revealed the p-value for pre and post NPRS to be <0.0001, Extremely significant using the Wilcoxon signed ranked test. Normality was assessed using the one-sample Kolmogorov-Smirnov test.

The gender wise distribution of the subjects showed 32 Females (64%), 18 Males (36%) of total 50 subjects with a mean age of  $22.6 \pm 1.860$  years.

**Table 1: E-Pilates Exercise Program (Intra-Group Comparison)**

	Pre	Post	Test Used	P-Value	Significance
	Mean±SD	Mean±SD	WILCOXON SIGNED RANK TEST	<0.0001	Extremely Significant
<b>NPRS</b>	6.84±1.037	4±1.979			



**Graph 1: E-Pilates Exercise Program NPRS (Intra-Group Comparison)**

## DISCUSSION

The current study was conducted to find out the Effect of E-Pilates on pain in young adults with Non-Specific Low back pain. Result analysis revealed a significant decrease in pain levels post E-pilates exercise protocol performed daily for 7 days consisting of 5 exercises as described in the procedure. Kienbacher T et al. found that the deep musculature in the trunk namely Transversus abdominis and Multifidus presented a delayed activation, weakness in patients experiencing low back pain. This was accompanied with a dysfunction in Gluteus Maximus activation.<sup>(15)</sup>

Susana Lopez et al. suggested Pilates is a form of mind body exercise approach being used as an alternative and complementary therapy for pain.<sup>(16,17)</sup> Pilates exercise program leads to improvements in static as well as dynamic stability, strengthening core, muscle control, flexibility and posture. Pilates induces both physical and mental changes focusing on the core, specifically improvising recruitment and control in Paraspinal muscles, Abdominals and Glutes.<sup>(16,17)</sup> Pilates induced muscles recruitment in the trunk leads to improved

proprioceptive impulse causing pain relief in Non specific low back pain sufferers as suggested by Forster et al.<sup>(18)</sup>

As found by Miyake Y et al. Pelvic Press exercise helps in mobilizing the spine, strengthening of hamstring, glutes, back i.e. posterior kinetic chain providing stability to the spine, in the similar way, the Swimming, Opposite Leg & Arm stretch also provides recruitments of the above defined spinal stabilizers.<sup>(18)</sup> Side to side rotations would have induced rotational mobility in the spine as found by Taulaniemi A et al.<sup>(20)</sup> The exercises program designed in this study would have lead to improvisations in muscle activity and trunkal muscles activation patterns also providing proprioception via the dorsal column.<sup>(19)</sup>

## CONCLUSION

The Pilates exercises induced a significant improvement in pain in young adults with Non-specific low back pain and can be used as an integrative protocol for E-Consultation and Exercise sessions for the same.

## FUNDING SOURCE

No funding source was received.

## CONFLICT OF INTEREST

No conflict of interest.

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