

## The Comparison of the Effect of Eight Weeks of Pilates and Stabilization Exercises on Pain and Functional Disability of Women with Chronic Low Back Pain

SALIMEH MAMASHLI\*

Islamic Azad University, Borujerd Branch  
Borujerd, Iran

REZA MAHDAVINEJAD

Department of Sport Injury and Corrective Exercises  
School of Physical Education and Sport Sciences  
University of Isfahan  
Isfahan, Iran

BIJAN GOODARZI

Department of Physical Education and Sport Science  
Islamic Azad University, Borujerd Branch  
Borujerd, Iran

### Abstract:

*Low back pain is a widespread and displeased pain that disables the patient to do his daily affairs and may lead to his hospitalization. So, it can create physical and mental problems and too much medical expenditure in itself. One of the most important suggested therapies is Movement Therapy that has proven effectiveness on improvement of patient's action. The present study investigated eight weeks Pilates and stabilization exercises on pain, Functional disability, Trunk muscle endurance and Flexibility among the 25-50 years women affected by Chronic Low back pain. In this quasi-experimental study there were selected 60 women affected by Chronic Low back pain purposefully, at average age of  $37/93 \pm 8/62$  years, weight of  $64/91 \pm 10/70$  kg and  $162/03 \pm 5/26$  centimeter and divided up affirming (20 persons), Pilates (20 persons) and control (20 persons) groups randomly. The affirming and Pilate's groups received Pilates and corrective exercises for eight weeks, thrice a week for one hour. Variables of pain, Functional disability, flexor and Extensor*

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\* Corresponding author: Salimeh\_mamashli@yahoo.com

*endurance muscles, flexibility of back muscles and hamstring were measured, respectively by Visual analogue scale of Pain impact, Oswestry Disability Questionnaire, Ito and Sorenson test and Sit and rich test. To data analyses it was used Matched T test and Independent T test and Multiple Comparisons (Tukey) to identify inter correlation differences at the significant level of 0.5. This study showed that after eight weeks Pilates and stabilization exercises, the pain scale average of affirming group was in a significant statistical level and the average of Functional disability, flexor and Extensor endurance muscles, flexibility of back muscles and hamstring of affirming group was also in a similar level with the Pilates group. According to this study, stabilization exercises can be useful to reduce the pain and can generally have a better effect rather than Pilate's exercises.*

**Key words:** stabilization exercises, Low back pain, Pilates, Pain impact, Functional disability.

## **Introduction**

Low back pain is annoying and pervasive since that could stop someone from doing daily activities and put him to rest in bed. Thus, in addition to physical and psychological problems, there are also many medical costs involved (Rainville et al. 2004). Movement therapy on patients with chronic low back pain is one of the most important recommendations that have documented effect on improving performance in patient (Kellis et al. 2006). Bortzman (2003), shows that the back pain and spinal problems have the highest percentage in vertebral column diseases due to the change in lifestyle, less mobility and fitness and a lack of proper maintenance of low back. Statistical analysis about the prevalence of back pain has been reported in approximately 80% in compared to other organs. It means 80% of the world population has experienced at least one episode of back pain which began about 30 years and the trend is more rapid (Boluki et al. 2006).

Research shows that when people suffer from back pain for the first time, typically the pain after a short rest relieves,

so they can do the daily activities and exercise, but the function of the muscles that support the spine does not improve (Akuthota and Stilp 2008). If you have a history of low back pain for more than three months without any pathological cause (infection, fracture, tumors), it may be called chronic back pain (Bogduk 2004). Hemmati et al. (2011), examined the effect of intensive core stabilization exercises on the pain and functional disability in women with chronic low back pain. The results showed that the severity of pain and disability in the intervention group before and after treatment has a significant difference. In the control group, no significant differences were observed, so short core stabilization exercises, relieving pain and disability in patients with chronic low back pain. Javadiyan and colleagues (2008) investigated Stabilization training effect on pain, muscle endurance and functional disability in patients with segmental suspected lumbar instability. Results showed stabilization exercises reduce pain and increase muscle endurance and functional disability in patients suspected of lumbar segmental instability and this type of rehabilitation exercise is more effective than routine exercise. Ferreira et al. (2007) compared three types of treatment including routine exercise, and stabilization exercises and manual care on pain and functional disability in patients with chronic low back pain. Results showed that manual therapy in the short term is causing more pain relief than the two other groups, while the stabilization training showed long-term reduction in pain and disability than the other two groups. Hagggar and colleagues (2006) evaluated the effect of 6 weeks Pilates program on 20 patients with chronic low back pain. Results have shown that Pilates Experience can be an effective way to improve public health, function and pain in patients with chronic low back pain, while the control group with regular exercise has no significant difference. Alizamani (1387) investigates the effects of Pilates on pain, disability and trunk extensor- flexor endurance muscle in women with back

pain. The results showed that after six weeks of treatment, the pain and disability in the experimental group decreases as compared to the control group. Metale (1384) studied the impact of three methods of endurance training, coordinator training, and combining the two methods in patients with chronic low back pain and disability. The results showed that all three methods are effective in reducing pain and disability. However, the third method is more effective than the first and second method. Cairns and colleagues (2006) designed a study to compare the physical stability and physical therapy exercise on women with low back pain. Results showed that there is no significant reducing pain intensity on physical stability exercises. Studies show that people who have a history of back pain, associate it with abdominal and spine muscle weakness. As a result designing of the training program must be strengthening these groups of muscles to reduce current and future pain.

The effect of Pilates training exercise as well as the stability exercises are easy and cheap and also applicable to all persons. The present study aims to compare Pilates and stability exercises and to determine which of these approaches in women with chronic low back pain and functional disability is most effective to improve the chronic low back pain.

## **Methodology**

### **Subject**

This is a quasi-experimental study so all patients admitted to the Fatima Al Zahra of Minoodasht hospital for back pain of which comprised 60 women with chronic low back pain were randomly divided into three groups: control (n = 20), Pilates group (n = 20) and Stability group (n = 20). All participants in the research were qualified by orthopedic surgeon for training. Conditions to select of subject were more than three months pain experience, no history of surgery or other diseases that

may affect the variables studied. Firstly, to collect information a consenting form was given to participate and after they accepted the consent, they were enrolled. Pain, functional disability, were assessed by visual and functional disability questionnaire (Mousavi et al. 2006).

### **Exercise protocol**

The Pilates group (group 1) training protocol was executed three times per week for 8 weeks (24 sessions). At the beginning of each session about 5 minutes checking posture pelvis and spine, controlled breathing and instructors began the warm up for 10 minutes. About 40 minutes were dedicated for specific training sessions (Stott 2006). At the end of class cooling and recovery was done in about 5 minutes. Exercise intensity for each subject according to threshold and pain tolerance was monitored. That selected Pilates exercises with 8 replicates were started and ended with 16 replications. The Stability group (group2) was doing the exercises over 24 sessions every other day for 8 weeks and for about 40 minutes per session. At the beginning of each session, a 10-minute warm-up period (including walking fast, smooth running and stretching) was performed, 3 sets of each exercise was repeated. Gradual increase in overload and the proper execution were done for each exercise. The goal was to reach the 15-20 repetitions of each exercise per set. Major emphasis was on multifidus and transverse abdominal muscle. Static contraction of the muscle during primary objective was to 3x. In this group, dynamic and static spine stabilization exercises were used. The control group (group3) received no training during 8 weeks.

### **Measure of pain intensity**

This measure was used to assess pain intensity. A horizontal bar where length of 10 cm - zero means no pain at one end and the other end, 10, indicates the worst pain possible – was used. The patient was asked to look at the continuum below and

determine the amount of pain. The points earned percent was recorded. Internal reliability of the test has been reported 0.91. Pre-and post-test in all experimental group with chronic low back pain was used (Rajabi et al. 1987).

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Severe pain    10   9   8   7   6   5   4   3   2   1   0   No pain

### **Functional Oswestry Disability Questionnaire**

This questionnaire was used to assess the severity of functional disability subjects. The questionnaire contains 10 Section and each Section 6 options that determine how people function in everyday activities. Overall Disability Index value is between zero and 100. On how to interpret the results of the scale, there are also two methods. A) total scores as the severity of the disability to be considered and b) percentage ranked as follows: zero to 20%, mild disability, moderate disability in 20 to 40%, 40 to 60%, severe disability, 60 to 80% failure very severe, 80 to 100% of patients who are lying or malingering is considered. This test was used as pre-and post-test in both experimental groups with chronic low back pain (Rajabi et al. 1987).

### **Statistical methods**

For data analysis, descriptive statistics of mean and standard deviation were used. To determine data normality test of Kolmogorov - Simonov test was used. After determining the normality of the data, independent t-test to obtain the relationship between the data and their significance and Tukey test (with a probability of error variability  $\alpha = 0/05$ ) was used. Data analysis using Spss16 software at a significant level ( $p < 0.05$ ) were performed.

## Results

significant	degrees of freedom (df)	t Test-statistic	Post Test	Pre Test	Group	
0/019*	19	2/557	50/00±14/90	51/95±16/18	Control Group	Pain Intensity
0/001*	19	11/283	42/85±11/71	53/50±10/58	pilates group	
0/001*	19	11/557	38/70±7/82	52/95±10/42	Stable group	
0/022*	19	2/491	48/65±11/37	49/45±11/33	Control Group	Functional disability
0/001*	19	13/454	40/20±11/84	50/15±8/09	pilates group	
0/001*	19	12/526	33/25±8/84	47/05±9/54	Stable group	
* Level of significance (p<0/05)						

**Table 1 - Paired t-test results related to pain intensity and functional disability in, control, stability and pilates groups**

The results in Table 1 indicate the severity of pain and functional disability in the control, Pilates and stability groups before and after eight weeks, a statistically significant difference being observed. It can be concluded that eight weeks Pilates and stability significantly reduce the pain and functional disability (functional capacity) in both groups.

significant level	F-statistic	mean squares	degrees of freedom (df)	Sum of squares	
0/013	4/665	653/450	2	1306/900	Between Groups
		140/083	57	7984/750	Within groups
			59	9291/650	Total

**Table 2 - ANOVA test results related to pain**

According to Table 2, the significance level of p =0/013, pain

between the three groups (control and stability Pilates) - after eight weeks, there was a significant difference.

Also according to the Tukey test results, it can be seen that the stability and control of a significant difference between groups exists, but between Pilates and control group ( $p=0/145$ ) and between the Group stability and Pilates ( $p= 0/513$ ) is not a significant difference. In other words, there were significant differences only between the control group and stability after 8 weeks of training.

significant level	F-statistic	mean squares	degrees of freedom (df)	Sum of squares	
<b>0/001*</b>	<b>10/268</b>	<b>1189/550</b>	<b>2</b>	<b>2379/100</b>	Between Groups
		<b>115/851</b>	<b>57</b>	<b>6603/500</b>	Within groups
			<b>59</b>	<b>8982/600</b>	Total

**Table 3 - ANOVA test results related to functional disability**

According to Table 3 functional disability among the three groups (control and stability Pilates) was observed. After eight weeks, there was a statistically significant difference. Also, according to the Tukey test, results can be observed between the control and stability, there was no significant difference between the control group and Pilates. Also between Pilates and stability groups there was no statistical significance. In other words, the exercise increased functional ability in both groups but no significant difference between the groups involved.

## **Discussion**

In the present study, we compared the pain intensity before and after eight weeks but only between control and stability

group there was a significant difference. Also between functional disability in all three groups before and after eight weeks, there was a statistically difference. There was not a statistically significant difference between Pilates and stability groups. According to research findings, both Pilates and instability exercises are effective in reducing pain and functional disability. Outcome research with Alizamani (2009), Haggar and colleagues (2006), Gagnon (2005), Quinn and colleagues (2005), Hemmati et al (2011), Karimi et al (2008), are consistent. Increased exercise performance and muscle activity due to stabilization exercise are the reasons of increased muscle endurance levels and decreased pain in patients (Eyigor 2009). The results obtained in this study are that the stabilizing exercise increases muscle strength of central part of the trunk and decreases tension between the vertebrae, ligaments around. The reduction of the amount of pain and increases satisfaction and confidence of patient practice are considered the positive effects of exercise on pain variables. Results of this research can be used by many peoples who stand or sit for long time or have repetitive motion. Also these types of exercise can be used by physiotherapists and Occupational Therapy Centers for treating lower back pain.

## **Conclusions**

The results show that Pilates and stabilization exercise can affect pain and functional disability and satisfy patients with chronic low back pain. Also the two groups experienced the same effect on pain and functional disability in patients with chronic low back pain.

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