

## **The Effect of Eight Weeks Pilates and Stabilization Exercises on Pain and Flexibility of Back Muscles and Hamstring of Women with Chronic Low Back Pain**

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**Abstract** The present study investigated eight weeks Pilates and stabilization exercises on pain, flexibility of back muscles and hamstring, among the 25-50 years women affected by Chronic Low back pain. In this quasiexperimental 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, flexibility of back muscles and hamstring were measured, respectively by Visual analogue scale of Pain 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 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 and pilates can be useful to reduce the pain and increase flexibility of back muscles and hamstring.

Key words: Stabilization exercises. Low back pain, Pilates, Pain impact, Flexibility

### **Introduction**

In this century, mankind has managed the advancement of science, including the pharmaceutical industry and the invention of vaccines for infectious overcome the disease, but lifestyle changes and industrialization of societies and adminis it into doing the intellectual work, the increase of hours of employment, working during physical conditions, poor diet, lack of adequate rest, mental stress, environmental pollution and has caused mankind is faced with a new problem. Such that Facts cardiovascular disease, arthritis, cancer, accidents and impacts arising from it, and the world has increased in the past (farahpour et al, 2009). Major structural backbone of the performance variety. The most important function of protecting the spinal cord split weight posture and skeletal abnormalities implemented all of which confirms the high prevalence rate of vertebral deformities, among women, and even athletes, national workers have been (Habibi, 1997). World Health Organization statistics indicate a high incidence of chronic low back pain among social classes (Hosseini 2009). (One of the main reasons for their occurrence is likely to change the curvature of the spine, especially in the absence of proper balance shy at the hip and lower back muscles are (sobhani, et al, 2009).

According to research, the prevalence of chronic low back pain 35/1% in Finland, 31/4% in Sweden, 23/4% in Spain, 40% of men and 60% of Danish women and 45% men and 55% women in Australia. Lack of treatment This time, many problems such as pain, discomfort, muscle spasm, lack of required performance at work and in life, insomnia and bad gait to walk along. they all motor deficiency and lack of knowledge of correct practices in the conduct of public life. including methods of lifting off and even sleeping Is (Ali Beigi, 2009).

Studies show that people who have a history of back pain, the pain associated with muscle weakness abdominal lateral spine and. Quadratus lumborum. As a result of the training program is designed to address this group of muscles that can significantly reduce current and future pain. As can be effective in postural problems. Many research results have shown that the elasticity and flexibility of the hamstring muscles during exercise correction treatment is necessary (Daneels 2000). Pelvic rotation will prevent stiffness and muscle stiffness and increases the risk of low back pain (Raid 2000). Exercise stabilization of small muscles, they try to re-focus and deep posterior spine and increase muscular endurance, physical good condition to maintain stability and stabilization of the spine in

patients who have a role in pain and functionality and flexibility (sung 2003). Pilates is an exercise program as a core stability approach to augment the neuromuscular system to control and protect the core body or spine. This method is a comprehensive body-mind conditioning, which coordinates core stabilizing exercise with mind and breath control challenging by flowing movement of the whole body(Muscolino 2004). Flexibility is a crucial element of fitness to gain optimal musculoskeletal function enhancing peak( ACSM 2010). Skeletal problems muscle and postural abnormalities Usually due to a lack of coordination, muscle weakness, muscle failure on the one hand and on the other is natural lack of flexibility can cause a phenomenon commonly referred to as short as a result of muscle weakness and twitching, called(Green 1999) . People who have this problem in their daily work activities performed in a specific pattern exercise are not enough, more frequently (Watkins 2009).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 and flexibility 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, flexibility of back muscles and hamstring ,were assessed by visual and sit and rich test(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 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).

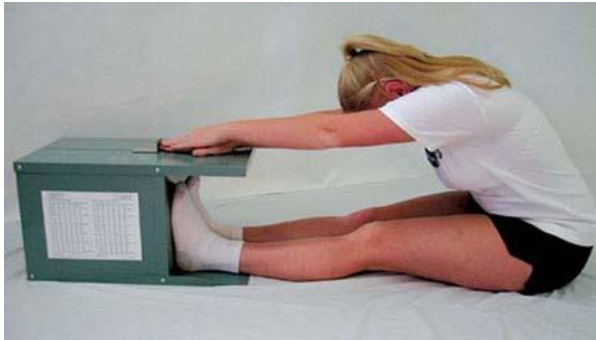
No pain      0      1      2      3      4      5      6      7      8      9      10      Severe pain

### Sit and Rich Test

This test involves sitting on the floor with legs out straight ahead. Feet (shoes off) are placed with the soles flat against the box, shoulder-width apart. Both knees are held flat against the floor by the tester, if required. With hands on top of each other and palms facing down, the subject reaches

forward along the measuring line as far as possible. After three practice reaches, the fourth reach is held for at least two seconds while the distance is recorded. Make sure there are no jerky movements, and that the fingertips remain level and the legs flat. The score is recorded to the nearest centimeter or half inch as the distance reached by the tip of the fingers. The usual scale used for the Presidents

Challenge testing has the zero mark at 9 inches (23 cm) before the feet, therefore if the subject can reach their toes, their score is 9 inches( Wells and Dillon 1952).



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 = 0/05) was used. Data analysis using Spss16 software at a significant level ( $p < 0.05$ ) were performed.

### Statistical methods

### Results

significant	degrees of freedom (df)	t Teststatistic	Post Test	Pre Test	Group	
0/019*	19	2/557	50/00±14/90	51/19±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	
0/102*	19	-1/718	28/75±4/94	28/20±5/51	Control Group	Flexibility Back and hamstring muscles
0/000*	19	-16/796	38/80±4/71	31/75±5/22	pilates group	
0/000*	19	-8/225	35/45±5/39	29/10±6/50	Stable group	
* Level of significance		(p<0/05)				

Table 1 - Paired t-test results related to pain intensity and Flexibility Back and hamstring muscles in, control, stability and pilates groups.

The results in Table 1 indicate the severity of pain and flexibility back and hamstring muscles 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 increase flexibility back and hamstring muscles in 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 ( $p = 0/001$ ) and between the Group stability and Pilates ( $p = 0/097$ ) 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	
0/000	29/790	523/717	2	1047/433	Between Groups
		25/191	57	1435/900	Within groups
			59	2483/333	Total

Table 3 - ANOVA test results related to flexibility

According to Table 3, the significance level of  $p = 0/000$ , flexibility 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.

### 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. 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. Outcome research with Alizamani (2009), Hagggar 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).

Also between eight weeks Pilates and stability exercise back and hamstring muscle flexibility on the rate of subjects there is a difference. According to research findings on resilience training eight

weeks back and hamstring muscles before and after eight weeks, a statistically significant difference existed. However, the uncertainty in the results between groups pilates and statistically significant ( $p = 0/097$ ) was missing. In other words pilates and stability exercises both pain reduction and increase flexibility of hamstring muscles are back and that when studies Ali zamani (2009), Gagnon (2006), Segal (2004), Farhi (2009), are consistent .

Based on the results of the study can be concluded that short hamstring muscles in people with low back pain is one of the most common causes (Hultman, 1993). Hamstring muscle length changes due to its connection with pelvic spine is effective and can be stated that the loss of these muscles can be deviations of the condition associated (AliZadeh 2000). Flexibility implementation of the not only Special skills are important, but recent advances in sports medicine confirms that flexibility is important for general health and fitness, is thought to increase flexibility, many complications such as pain in the lumbar spine, stress General and muscles and reduce pain caused by aging, and even in some cases be removed (Thygerson, 2006).

### Conclusions

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

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