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## IMPACT OF PILATES EXERCISE ON SELECTED INDICES AFFECTING POSTURAL CONTROL IN ELDERLY

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**Abstract:-** This study examined the effects of Pilates exercises on static and dynamic balance in elderly women. The research method was Quasi-experimental in which 32 healthy aged women over 52 years were selected. Among them, 7 subjects withdrew during rehearsals and 25 accompanied the investigator to finish his project. Both static and dynamic balance of Biodex balance system was used to gauge the balance tests. Level 2 was used for static test and level 12 was used for dynamic level. Pretest data were collected and compare with post test information and then T dependent statistical method was used. Comparison of means showed that the difference in (p=.05) level is significant. P-value obtained from the fluctuation levels in static level is 0.001 and in dynamic level was 0.0001. Based on the evidence the difference is significant and Pilates exercises reduce the fluctuations in dynamic and static balance level. In other words , these exercises improve static and dynamic balance in elderly women.

**Keywords:** Pilates exercises , dynamic balance , static balance.

### INTRODUCTION

It seems essential to consider elderly and its associated factors, one of the most important economic , health, and social challenges in 21st century (1). Although getting old is one of the main advancement of human , but unfortunately most people who get old suffer from a number of serious health problems (2). Among them, falling down is known as a common problem that affects all aspects of the elder (3). By increasing age and gradual loss of function in different organ systems, many changes occur in health related factors of elderly and provide conditions for falling (4). Review studies suggest that loss of balance and falling are the sixth leading cause of death in elderly population , which are typically associated with certain diseases and disabilities ; so that elderly who fall down are hospitalized 10 times more than normal people (5). Researchers have reported the beneficial effects of exercise therapy on decreasing falls and increasing the balance in the elderly. A meta analysis study by Gardner and colleagues showed that exercise therapy is effective for reducing the risk of falls in elderly , and prevent injuries from falls and reduces health care costs (6). Due to the positive effects of exercise therapy on motor function in elderly , we introduce a new form of body mental exercise called Pilates , where the focus is on movement control (Pilates), body position and breathing (7). Pilates contrology means perfect harmony between body, mind, and spirit. In Pilates, the individual first takes control of her own body by contrology with targeted manner and then they get to a normal coordinate by repeating the movements with gradual but progression manner (8). For example, in a comprehensive review of research , Kristin suggested that Pilates exercises may reduce the risk of falling by improving balance , muscle strength and coordination (9). Most empirical research on effects of Pilates is limited to youth and adult (10). Also, few studies were done on effects

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of Pilates exercise on motor function rehabilitation of elderly outside the country (11). So the experimental research on elderly is necessary.

**RESEARCH METHODOLOGY**

This is a quasi-experimental research in which the effect of Pilates on static and dynamic balance exercises was measured with pre-test and post-test in elderly women. The target population formed by healthy women aged older than 52 years who were members of elderly sports association. 32 students were chosen through accessible and voluntary, 7 person withdrew during exercises and 25 person continued until the end of study. Biodex balance gauge system was used to measure static and dynamic balance. This device is used for balance assessment in addition to the assessment of the risk. Both statistic and dynamic levels were used to measure balance tests. Level 2 was used for dynamic , and level 12 was used for static test. The device has a moveable screen. When the subject is placed on it , the page rocked under person’s foot depending on the type of test and the subject must try to maintain stability on the page. The lines drawn on the facing page, by the device with displacements of page. These lines record person’s stand oscillations , when the plate moves beneath his feet. Data from pre-test and post-test were collected , compared and concluded. Pilates exercises began for 12 weeks (three one- hour sessions per week) , after measuring the fluctuations level in dynamic and static balance by the machine. Pilates exercises were guided under the supervision of an instructor in the morning. All of the exercises that were used in this study , were consistent with training programs which were obtained from the books review and articles (12). Each session was divided into 3 parts. The first was heating phase, Pilates exercises was the second phase and the third was returning to previous state. Exercises were performed in different positions such as lying ,sitting and standing. These exercise was divided into first part of training exercises on the mat (6 weeks), and the second section exercises using bands ( the next 6 weeks ). Exercises started from simple and continued by increasing the intensity and complexity. Exercises were guided in sleep mode initially, then sitting and finally standing mode. There was a 30 seconds rest period between movements. After completion of exercises for analyzing training effects, the post-test was performed. Statistical data were collected and analyzed by using T-dependant statistical method.

**The research findings**

After receiving the descriptive statistics of the characteristics of 32 volunteers with a mean 36.158 cm in height and standard deviation of 18.8, age is with a mean 48. 64 years and standard deviation of 92.84. The results of T dependant test are presented in table 1. Comparison showed that it’s difference in level (p=.05) is significant and P-value obtained from the fluctuations level in static balance is .001 and in dynamic level is .0001. Based on these evidence the difference is significant and Pilates exercises helped to reduce fluctuations in static and dynamic balance , in other words these exercises could improve static and dynamic balance in elderly women.

Comparison of fluctuations in static balance, dynamic balance and subjects before and after Pilates exercises

Type of test		mean	SD	Degree of freedom	t	d
Static balance	Pre-test	4.72	1.90			
	Post-test	1.80	0.75	16	4.477	0.001
Dynamic balance	Pre-test	6.686	2.118	16	5.277	0.0001
	Post-test	4.196	1.543			

**DISCUSSION AND CONCLUSIONS**

the results show that motor function on balance, which plays an important role in elderly falls, improved after a course of Pilates. So perhaps the Pilates exercises decrease falling , due to the improvement of motor function particularly the balance. previous studies also have reported that Pilates exercises help to improve balance in elderly (13). Irez determine the effect of 12 weeks Pilates exercises on women over 65 years for a year in his study. The research showed that 12 weeks of

Pilates exercises can help to prevent falls , increase the muscle strength , dynamic balance, reaction time , and decreasing depression and enhancing the quality of life of elderly women over 65 years(14). In this study, a 12 week course of Pilates is used and the findings showed that a course of Pilates exercises improve motor function specially dynamic balance in elderly .Improvement of balance was achieved due to the improvement in muscle strength , and mental factors , because the muscle weakness of the lower extremities leads to exposure of gravity center in front of ankle joint , which in turn can cause imbalance and falling. On the other hand improvement in muscle strength can shift the center of gravity to the ankle joint and improve the balance (15). Also Siqueira Rodrigues et al., investigated the effects of Pilates exercises on 52 elderly women in their study. Research results , showed significant improvements in personal autonomy, static balance and quality of life of elderly people (16). In another study, Hall et al investigated the effects of Pilates exercises on balance and walking pattern in elderly . Research results showed that exercises based on Pilates principles is an effective model for improving static and dynamic balance in elderly (17). Kaesler et al also examined the effects of Pilates-inspired exercise program to improve balance in standing position. Research results indicated significant improvements in some aspects of static and dynamic postural fluctuations. Based on these results, a Pilates-inspired exercise program during a brief period could lead to improved postural stability(18). Since Pilates exercises require activation and coordination of several muscle groups at a time, it is considered in order to improve flexibility and general body health. It's emphasis is on strengthening the core of the body, coordination of breath and movement, and body position (19). Results of this experiment showed that Pilates exercise program improve motor function especially static and dynamic balance in older women. Findings show that Pilates exercises may be a useful tool in helping to reduce falls in older people. Pilates is a new, low-cost, safe , non-invasive, and far from quick and exclusive movements, in such a way that it's basis is on controlled and calm movements. So we can reduce falls in the elderly and consequently reduce treatment costs by the assist of this sport. It's a great help to restore the population of senior citizens to their daily living activities , Because the presence of loved ones in a more active social participation contributes to the healthy and fresh society.

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