



## ❖ SPORT AND HEALTH

### EFFECTS OF EIGHT WEEKS PILATES EXERCISES ON BODY COMPOSITION OF MIDDLE AGED SEDENTARY WOMEN

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#### Abstract

**Purpose.** The purpose of this study was to assess the effects of 8 weeks regular Pilates mat-work exercises program on body composition of sedentary middle aged women.

**Method.** The total of 20 healthy middle aged sedentary women voluntarily participated in this study. The mean age and body weight of subjects in control and experiment group were  $41,2 \pm 8,67$  years and  $67,1 \pm 16,106$  kg. ,  $38,5 \pm 3,89$  years and  $62,8 \pm 8,766$  kg respectively. While experiment group performed three exercise sessions per week and each session lasted 45 minutes at %40-60 intensity, control group did not participate in any activity during study. All subjects' height, weight, waist-hip ratio, body mass index, body fat percentage and lean body mass were measured by standardized tests and equipments before and after exercise program. The data were analyzed with Wilcoxon Signed Rank Test by using SPSS 10.0 Package Program.

**Results.** As a results of this study; significant decrements were observed in percent body fat of women in Pilates exercise group ( $p < 0,05$ ).

**Conclusions.** As conclusion it could be said that; this type of regular pilates exercises are effective on reducing percent body fat of middle aged sedentary women.

**Key words:** Pilates, sedentary women, body composition

#### Introduction

Pilates is an exercise system developed over a period of approximately 50 years, beginning in the 1920s by Joseph H. Pilates (B.D. Anderson, A. Spector, 2000) and Pilates is popular among women (Y. Chang, 2000). The Pilates method incorporates six key principles: centering, concentration, control, precision, breath, and flow (J.E. Muscolino, S. Cipriani, 2004). Pilates is a series of low impact muscle contraction exercises. The activities train the muscles in the core of the body (Y. Chang, 2000). The exercises can be carried in two different ways namely Pilates mat work and the use of Pilates apparatus. Among these apparatus are trapeze table, cadillac, wunda chair, reformer, barrel, spine corrector (A. Owsley, 2005). The Pilates exercises done on a mat on the floor are called "mat work" (M. Bryan 2003, J. Kloubec 2004).

Although Pilates exercises are lower in intensity compared to aerobic and dance exercises they have an important role for a healthy body. It decreases the cardiovascular risk, prevents osteoporosis, shapes the body and promotes balance and flexibility (L. Robinson 2003, L. Solomon 2003). Pilates are amongst the few exercises which develop balance, flexibility and muscular endurance (D.M. Cozen, 2000). The major techniques which develop flexibility are ballistic stretching, static stretching and PNF (proprioceptive neuromuscular facilitation). The techniques like Pilates are being developed as alternatives to those (F. Bertolla et al., 2007).

The major cause of mortality and morbidity in the industrialized world is cardiovascular diseases. The major parameters which can be controlled among the

risk factors causing Coronary Artery Disease are diabetes, hypertension, hyperlipidemia, smoking and lack of physical activity and these are quickly replacing the infectious diseases as the major causes of mortality in the industrialized world. (B.P. Griffin, E.J. Topol, 2004, WHO 1994). Limited number of studies on the physical benefits on Pilates exercises in literature are noticeable. The purpose of this 8-week regular prospective longitudinal study was to investigate the effects of Modern Pilates mat-work exercises program on body composition of middle aged sedentary women.

#### Methods

Twenty subjects were randomized into control ( $N=10$ ) and experimental (10) groups with each group. The experimental group completed Pilates sessions within 8-week period. While experiment group performed three exercise sessions per week and each session lasted 45 minutes at %40-60 intensity, control group did not participate in any activity during study. Control group was instructed to refrain from beginning a new exercise program. The participants in the experimental group took physical fitness report from a physician before starting the study. They also filled a personal information form. The music used during

sessions were selected according to the rhythm of exercise.

**Table 1.** Physical characteristics of subjects

	Experimental group (n=10)	Control Group (n=10)
Age (year)	38,5 ± 3,894	41,2 ± 8,676
Height (cm)	156,7 ± 5,121	160,8 ± 3,614

**Table 2.** Training program

Week	1	2	3	4	5	6	7	8
Training duration (min)	45	45	45	45	45	45	45	45
Training intensity (%)	40	45	45	50	50	55	55	60
Training frequency (day/ week)	3	3	3	3	3	3	3	3

All subjects', height, weight, waist-hip ratio, body mass index, body fat percentage, body fat weight and lean body mass were measured by standardized tests and equipments before and after exercise program at the Gazi University Athlete Performance Laboratory.

The data were analyzed with Wilcoxon Signed Rank Test by using SPSS 10.0 Package Program.

- *Height* was measured to the nearest 0.1 cm on a stadiometer,
- *Body weight* was measured to the nearest 0.1 kg SECA electronic scale,
- *Waist and hip ratio* was recorded to the nearest 0.1cm by Gullick strip,
- *Body mass index (BMI)* was calculated (kg/m<sup>2</sup>),

- *Body composition;*

Subjects' skinfold thickness were measured by Holtain skinfold caliper in millimetres. The measurements were taken from two regions of the body (suprailiac, triceps) and right side.

- *Body fat percentage* was calculated by Sloan Weir Formula as follows;

- Body density(gm/ml) = 1,0764 – 0,00081 (suprailiac) - 0,00088 (triceps)

- Body Percent body fat (%) = (4,57 / Density – 4,142) x 100

- *Lean body mass* was calculated as; *body weight (kg) - body fat weight (kg)*.

**- Pilates Matwork Exercises**

**Table 3.** Exercises

Warm-up Exercises	Exercises
1. Breathing	8. The Hundred
	9. The Shoulder Bridge
	10. Single Leg Circle
2. Imprint and release	11. Swimming
	12. One Leg Stretch
	13. Double Leg Stretch
3. Hip rolls	14. Rolling Like a Ball
	15. The Saw
4. Spinal rotation	16. Roll Up
	17. Spine Stretch
5. Cat stretch	18. Leg Pull Down
	19. Leg Pull Up
6. Scapula isolation	20. Push Up
	21. Pelvic Curl
7. Arm circle	22. Side Bend
	23. Side Kick Front
	24. Side Kick Back

**Results**

**Table 4.** Pre-test results of experimental and control group

Variables	Group	Pre-test	Difference	P
Body weight (kg)	Experimental	62,8 ± 8,76	-4,3	0,444
	Control	67,10 ± 16,10		
Waist-hip ratio	Experimental	0,74 ± 6,54	-0,036	0,397
	Control	0,77 ± 9,60		
BMI (Kg / cm <sup>2</sup> )	Experimental	25,54 ± 3,05	-0,462	0,799
	Control	26,00 ± 6,54		
Body fat percentage %	Experimental	22,65 ± 2,28	-2,416	0,285
	Control	25,06 ± 4,05		
Lean body mass (kg)	Experimental	48,46 ± 5,93	-1,245	0,721
	Control	49,71 ± 9,03		

\* p<0,05

According to the results of pre-test, there were no differences in any variables.

**Table 5.** Post-test results of experimental and control group

Variables	Group	Post-test	Difference	P
Body weight (kg)	Experimental	62,4 ± 8,47	-6,3	0,386
	Control	68,7 ± 16,76		
Waist-hip ratio	Experimental	0,732 ± 6,98	-0,06	0,332
	Control	0,799 ± 9,75		
BMI (Kg / cm <sup>2</sup> )	Experimental	25,380 ± 2,91	-1,23	0,508
	Control	26,615 ± 6,73		
Body fat percentage %	Experimental	22,045 ± 2,05	-3,47	0,050 *
	Control	25,519 ± 4,26		
Lean body mass (kg)	Experimental	48,563 ± 5,96	-1,97	0,646
	Control	50,541 ± 9,20		

\* p<0,05

Significant decrements were observed in percent body fat of women in Pilates exercise group (Table 5).

**Discussion**

R. Jago et al. (2006) observed significant decreases in BMI after 4 week pilates exercises in young girls. In another study, B. Sekendiz et al. (2007) studied on the effects of 5 weeks Pilates training on sedentary women. They did not find any changes in BMI and body fat percentage of subjects. N.A. Segal et al. (2004), have examined the effect of pilates body composition, muscle endurance and flexibility. (K. Rogers, A.L. Gibson, 2009). Physical exercises such as Pilates have positive benefits of on body composition. As conclusion it could be said that; this type of regular pilates exercises has positive effect on reducing body fat percentage of middle aged sedentary women.

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