

The Effect Of Stretching Exercises Applied Following 6 Week Aerobic Exercise On Women In Various Age Groups

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Abstract

Objective: This study was carried out to determine the differences between exercises of women in different age groups. **Material and Methods:** Aerobic exercise was administered to 20 exercise and control groups each at ages ranging between 17-24 and 30-45. Before and after the study, Sit and Reach Test, Shuttle test, BMI measure were carried out. **Results:** In terms of BMI, there was a significant difference between pre-test and post-test and there was no difference in BMI between middle-age exercise and young age exercise and young age control group. When all age groups were evaluated in terms of shuttle movement, no difference was found between exercise groups, and there was a significant difference between exercise and control groups. It was observed that there was a significant difference between pre-test and post-test in terms of the length of the long jump and double leg sit length test and there was a significant increase in the elasticity values of the exercise groups in the scale score. **Conclusion:** This study showed that the flexibility of joint to movement of the individuals can be improved with the appropriate stretching exercises after warming, and that these exercises can be applied in every age group.

Key words: Aerobic Exercise, Flexibility, Women

INTRODUCTION

As the age increases the loss of muscle strength occurs and this affects physical performance negatively. The flexibility feature is at the top of the physical fitness components that are wanted to be developed by athletes and many methods are used for the development of this feature. These methods are PNF (Proprioceptive neuromuscular facilitation) that includes athletes' use of contraction and stretching together, ballistic stretching involving rhythmic springing after a short stretch and stretching methods consisting of dynamic movements at a slow pace, similar to the movement to be made (5,6,17,19).

Flexibility is defined as the maximum possible joint movement width taking place in one or more joints (14). Body composition, muscle strength and flexibility are among the health-related physical fitness parameters, and insufficiency in these parameters can be experienced with age. In this sense, maintaining and increasing the level of

physical activity is the most important criterion of healthy aging (18). Energy expenditure decreases with advancing age and the metabolic rate slows down, and the biggest reason of that is the decrease in physical activity level with age as well as an inactive and sedentary lifestyle (2).

It is stated that warm-up and stretching exercises are considered as a means of preparing musculoskeletal systems for activity before physical activity, and this is also an important part of fitness and exercise warming due to their possible effects on injury and performance (3, 13).

It has been stated in many studies that flexibility studies have numerous benefits on human body in many aspects such as biological, physiological, psychological and philosophical aspects (1).

Stretch types are examined in 5 groups: passive stretching, active stretching, static stretching, pnf stretching, and dynamic stretching. Passive

Stretching occurs when a person is being stretched by an assistant while active stretching is the situation during which a person stretches him/herself without an assistant (10). Static Stretching; static flexibility is determined by direct or indirect measurement of joint range of motion. The static flexing requires waiting at the point where you cannot extend further after stretching as much as possible and (11). PNF Stretching; the main principle of the PNF technique is a technique in which a muscle will relax to maximum after contraction to a maximum and can be used in exercises that mobilize muscles in the shortened position. Dynamic Stretching is a measure of resistance to movement. There are few studies on the determination of dynamic flexibility. It includes controlled movements to increase the movement angle of a certain part of the body (11).

This study was conducted to determine the level of flexibility difference between the sedentary women in different age groups of stretching movements after six weeks of warming.

MATERIALS AND METHODS

A six-week aerobic exercise program was applied to the exercise group of women who are risk free related to exercise and with no experience of menopause with age ranges of 17-24 and 30-45, and 20 control groups in the same age ranges. Eight different stretching movements were performed in sets of three. Each set was conducted by waiting for 10 seconds in each movement. Sit and Reach Test, Shuttle Test, Long Jump and BMI were measured before and after the study.

Sit-Reach Test; It involves sitting on the floor with feet extended straight forward. Both knees are locked and pressed flat on the floor. With the palms facing down and hands on top of each other or side by side, the hands are extended as far as possible along the measuring line. After making sure that the hands remain at the same level, one hand should not be extended further than the other, and this position is held for one to two seconds while the distance is recorded and the measurement is taken after making sure that there is no jerky movement (15).

Shuttle Test; the person is placed in the supine position on the cushion, the knees are placed at an angle of about 140 degrees and the arms are bent and the hands are placed on the nape. It is evaluated as one point when the person's elbows are raised with their legs parallel. The number of movements performed in 60 seconds was considered as the highest number of repetitions.

Long Jump; the measurement was made by measuring the distance between the toe at the starting line on a non-slippery surface and the heel of the subject.

Statistical analyses were evaluated in SPSS program. In order to evaluate the changes in the responses of the exercise group to the pre-test and post-test exercises over time, ancova analysis in repeated measures were conducted and Bonferroni control method showing the difference between the study groups was applied and the results which emerged were shown on the figures and tables. Results were evaluated by 95% confidence interval but significance was evaluated at $p < 0.001$ and $p < 0.05$ level.

FINDINGS

Table 1. Summary Ancova Main Effect of Groups of Dependent Variables on Shuttle, BMI, Long Jump and Double Leg Sit extend.

Summary Ancova Main Effect of Shuttle Dependent Variable based on Groups					
Source of variance	Df	SS	MS	F	p*
Shuttle Pre-tests	1	3946.264	3946.264	451.612	0.000
Group	4	505.872	126.468	14.473	0.000
Error	35	305.836	8.738		
Summary Ancova Main Effect of BMI Dependent Variable based on Groups					
BMI Pre-test	1	491.174	491.174	2518.826	0.000
Group	4	7.720	1.930	9.898	0.000
Error	35	6.825	0.195		
Summary Ancova Main Effect based on Long Jump Groups					
Long Jump Prediction Pre-test	1	7265.854	7265.854	742.619	0.000
Group	4	389.046	97.262	9.941	0.000
Long Jump Prediction + Group	3	300.759	100.253	10.247	0.000
Error	32	313.091	9.784		
Double Leg Sit Extend Test Summary Ancova Main Effect based on Groups					
Double leg (Sit extend) Pre-test	1	1936.885	1936.885	3241.327	0.000
Group	4	74.550	18.637	31.189	0.000
Error	35	20.915	0.598		

***p<0.001

Table 2. Shuttle, BMI, Double Leg Sit Extend Dependent Variable Pairwise Comparison based on Groups.

Pairwise Comparison of Shuttle Dependent Variable based on Groups				
Group	Prediction	Standard Error	p*	95% Confidence Interval
Middle Age Exercise - Middle Age Check	7.513	1.330	0.000	(3.793, 11.232)
Young Age Exercise - Young Age Check	6.374	1.357	0.000	(2.578, 10.169)
Middle Age Exercise - Young Age Exercise	1.048	1.435	1.000	(-2.965, 5.060)
Middle Age Exercise - Young Age Check	7.421	1.345	0.000	(3.659, 11.184)
Pairwise Comparison of BMI Dependent Variable based on Groups				
Middle Age Exercise - Middle Age Check	-0.860	0.214	0.002	(-1.460,-0.261)
Young Age Exercise - Young Age Check	-0.762	0.200	0.003	(-1.320,-0.203)
Middle Age Exercise - Young Age Exercise	0.080	0.275	1.000	(-0.687, 0.848)
Middle Age Exercise - Young Age Check	-0.681	0.255	0.068	(-1.394, 0.031)
Double Leg Sit Extend Test Pairwise Comparison Between Groups				
Middle Age Exercise - Middle Age Check	2.117*	0.346	0.000	(1.149,3.084)
Young Age Exercise - Young Age Check	3.154*	0.626	0.000	(1.405,4.903)
Middle Age Exercise - Young Age Exercise	-0.683	0.346	0.337	(-1.651,0.284)
Middle Age Exercise - Young Age Check	2.081*	0.346	0.000	(1.113,3.048)

***p<0.005

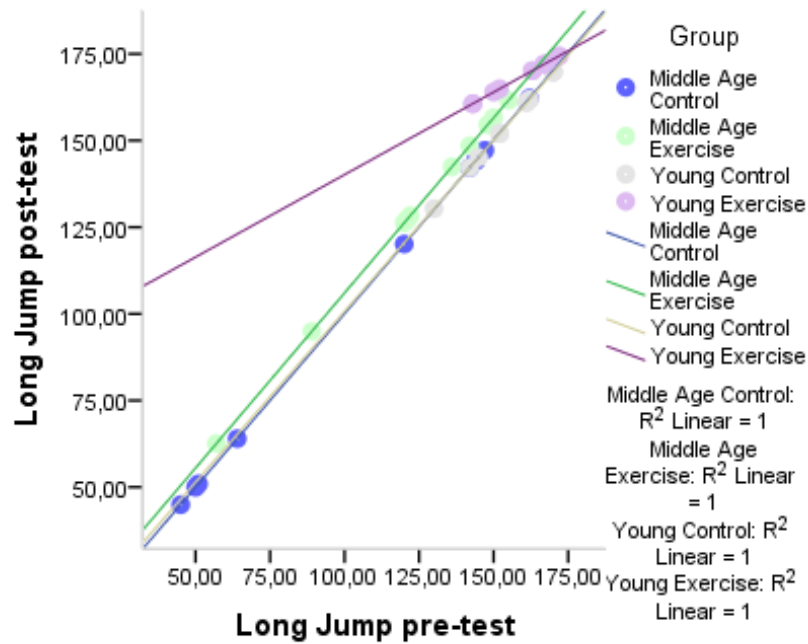


Figure 1. Long Jump

It was found that there was a significant difference between pre-test and post-test in the main ancova effect of shuttle, BMI and double leg sit extend test based on group summary $F(1.35 = 451.612, p < .0001)$, $F(1.35 = 2518.826, p < .0001)$, $F(1.35 = 3241.327, p < .0001)$. It was also revealed that the working group variable was significant in terms of post-test $F(4.35 = 14.473, p < .0001)$, $F(4.35 = 9.898, p < .0001)$, $F(4.35 = 31.189, p < .0001)$.

It was found that there was a significant difference between the pre-test and post-test $F(1.32 = 742.619, p < .0001)$ in the summary ancova main effect table based on groups of long jump variable. The post-test $F(4.32 = 9.941, p < .0001)$ was also significant based on study group variable. In addition, at the beginning of the test, it was found that the prediction and group total in terms of post-test $F(1.32 = 10.247)$ was significant (Table 1).

When the average of the post test of the participants were compared in terms of shuttle and double leg sit extend test, shuttle difference between middle age exercise and control group was 7.513 ($p < .0001$). For young age exercise and young age control 6.374, double leg- sit extend differences in same age groups is 2.117-3.154. When all age groups were evaluated, there was no difference between the exercise groups but there was a significant difference ($p < .0001$) between the exercise and control groups in terms of shuttle movement and double leg extend test (Table 2).

When compared in terms of BMI, the difference between middle age exercise and control group was -0.860 ($p < .0005$) and the difference between young age exercise and young age control was -0.762. There was no difference between middle age exercise with young age exercise and young age control group in terms of BMI (Table 2).

In the comparison graph between the groups, it was observed that there was a similarity between the pre-test and post-test in the exercise age groups and there was a significant increase in the scale score. Also when the exercise group Bonferroni control method was compared with the control group, the difference was seen to be significant (Figure 1).

DISCUSSION

In many studies, it is argued that warming up movements have a positive effect on flexibility performance and provide an opportunity to prepare the person for the psychological and physiological activity. When the studies examining the relationships between flexibility and performance are analysed, it is seen that there are many short-term studies on this issue (12).

Studies conducted in the dynamic and static stretching are said to create similar effects. However, it is clearly mentioned in the books and articles that chronically applied studies have controversial results and that chronic studies have negative effects on muscle structure (16).

It was observed that Kokkonen and et. al. (7) achieved 16% increase in the sit-extend flexibility test after 6 repetitive static stretching exercises applied to the athletes with an average age of 22 for a period of 15 sec. This study supports the results of our research. In another study conducted, it was found that there was a slight increase in the range of motion of the hamstring exercises applied statically for six weeks and that this did not have a positive effect on power competence (4). As a result of the different warm-up exercises performed for six weeks, the stretching exercises were examined in the young and middle age sedentary women categories. Sit extend test, long jump and shuttle pre-test and post-test significant differences were observed and sit-extend test pre-test results showed that the flexibility levels of young women were better than those of middle-aged women. This result shows and supports the general idea of loss of the flexibility at the elderly age. Considering the pre-test and post-test evaluation of the shuttle test conducted, it was determined that the exercises performed had an effect on endurance performance.

O'Sullivan and et. al. (9) examined the effect of general warming on hamstring flexibility and argued that general warming have a significant positive effect on hamstring flexibility on individuals even after regional injuries. They also stated that a jogging type warming positively affects muscle stiffness and movement angle (8,9).

Significant differences were found between the young and middle age group after long jump pre-test and post-test results were evaluated, which is another research experiment. It was found out that there is more progress in the young age group. It was also discovered that the effect of body mass index on long jump test and the exercises performed as a result of research had a positive effect on plosive force.

RESULT

In this study, it was found that flexibility is a feature that should exist at any age in order to facilitate the works in our daily lives and that the flexibility which disappears for some age groups can be regained after some warm ups. It can be said that for a healthy body such programs should be regularly applied and repeated in middle and older aged women. It has been concluded that exercise has a significant effect in all age groups, and if there is no harm medically, a person can exercise regardless

of age. Exercise has many positive as well as physiological effects. Intense tempo, stress, and anxiety level affect people physically and spiritually and decrease one's quality of life. It is thought that it would be effective to carry out studies including home programs in addition to salon exercises with holistic approach to improve the quality of life of a person by doing exercise to maintain health and reduce stress and anxiety levels.

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