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Effect Of Pilates Exercise on Agility, Body Fat Percentage, Core Endurance in Non-Athletic Adult Population

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Abstract
Pilates method is employed for physical and mental conditioning. Elderly people could be benefited from a patterned and regulated conditioning work based on Pilates method. The core muscles with the largest moment arms, and thus most capable of stabilizing the vertebral column, include the erector spinae, quadratus lumborum, and the rectus abdominis. A total of 40 people were taken andrandomly divided into two groups; each group consists of 20 players. 40 individuals in two groups had undergone a baseline assessment of the taken fitness components such as sprint, agility, core endurance and body fat percentage by using the tests as mentioned. Design of the study Is Experimental study design. After coming across the results of all variables it was clearly observed that the experimental group, who were trained with pilates exercises showed better results than the control group, who were trained with normal exercises. So, we can say that pilates exercises are better than the normal exercises and can be carried out for the better results of an individual.

Keywords: Pilates, Body fat percentage, core endurance.

Introduction:

Over the last century, the number and proportion of older adults in the world's population have largely increased due to the socio-economic development and the provision of better medical services. Pilates method is employed for physical and mental conditioning. Elderly people could be benefited from a patterned and regulated conditioning work based on Pilates method [1]. Fitness exercises such as pilates, yoga, tai-chi mostly work based on core force principles. Static and dynamic core training applied to football players is thought to contribute to the improvement of performance. In terms of performance, it is observed that in many sports branches, coaches include core exercises in their training programs. In this regard, it may be beneficial for core exercises to be included in football training due to the positive effects on protective and functional capacity, or for strength training to increase the stimulation and use of core muscle [2].

The core muscles with the largest moment arms, and thus most capable of stabilizing the vertebral column, include the erector spinae, quadratus lumborum, and the rectus abdominis. The parallel alignment of these muscles allows for the generation of large compressive forces, which stiffens the spinal column [3]. Pilates as an effective intervention to improve fitness in both healthy people and individuals with disorders related to aerobic capacity. Despite this, further studies should be conducted, including short- and long-term measurements to determine the intensity level reached by VO2 max during Pilates intervention and whether fitness improvement is preserved over time [4]. A 12-week ballet fitness program is an effective and safe exercise program for middle-aged women in order to help prevent falls in the middle and later stages of life [5].

A study related positive changes in parameters such as functionality, stability, mobility, dynamic and static balance, muscle strength, and flexibility, among others, with improved self-confidence, and a decrease in fear of falling and in the number of falls in the elderly [6]. The roll-out and pike were the most effective exercises in activating upper and lower rectus abdominis, external and internal obliques, and latissimus dorsi muscles, while minimizing lumbar paraspinals and rectus femoris [7]. Core trainings were very effective on performance-based features especially on strength and core stability. So, these exercises should be included in the training programs of female handball players [8]. Pilates exercise can be efficient for preventing falls, increasing muscle strength and dynamic balance, flexibility, reaction time and decreasing anxiety while increasing quality of life. In the long term, Pilates exercise may have very positive effects on bone mineral density [9].

The Pilates method can offer significant improvement in personal flexibility, agility, power, balance, and muscle endurance & can improve their Fitness Factors related to motor performance using Pilates exercises that do not require equipment or a high degree of skill [10]. Pilates may be beneficial for the health of the elderly, contributing to Healthy Ageing that may slow down and fight the degenerative processes associated with senescence [11]. While the footballers had a better balance on their right feet in terms of anterior/posterior balance, there was no significant difference between the right and left feet of the footballers in terms of Overall Stability and Medial Lateral balances [12].

the effects of core training with unstable surfaces by gender on the physical fitness parameters. The results showed that gender does influence dynamic balance parameter but not body composition, flexibility, strength and muscular endurance parameters for 8 weeks of core training [13]. The training method specific to badminton sport improved the flexibility, reaction, vertical jump and agility performances of individuals compared to pre-training. Specifically, these results revealed that the training-performance relationship clearly affects each other positively [14].

METHODS: A total of 40 people were taken andrandomly divided into two groups; each group consists of 20 players. 40 individuals in two groups had undergone a baseline assessment of thetaken fitness components such as sprint, agility, core endurance and body fat percentage by using the tests as mentioned. Design of the study Is Experimental study design. The variables are hexagonal ring test, Body fat percentage and Trunk endurance level. The measurements and instruments

- -Stopwatch and hexagonal ring were used for measurement of hexagonal ring test.
- -Trunk endurance level was measured by prone plank and side plank with the help of stopwatch.
- Body fat percentage was calculated

Inclusion Criteria

- Non-athlete, Both male and females, Age group 30-50 years and BMI above 24.9.

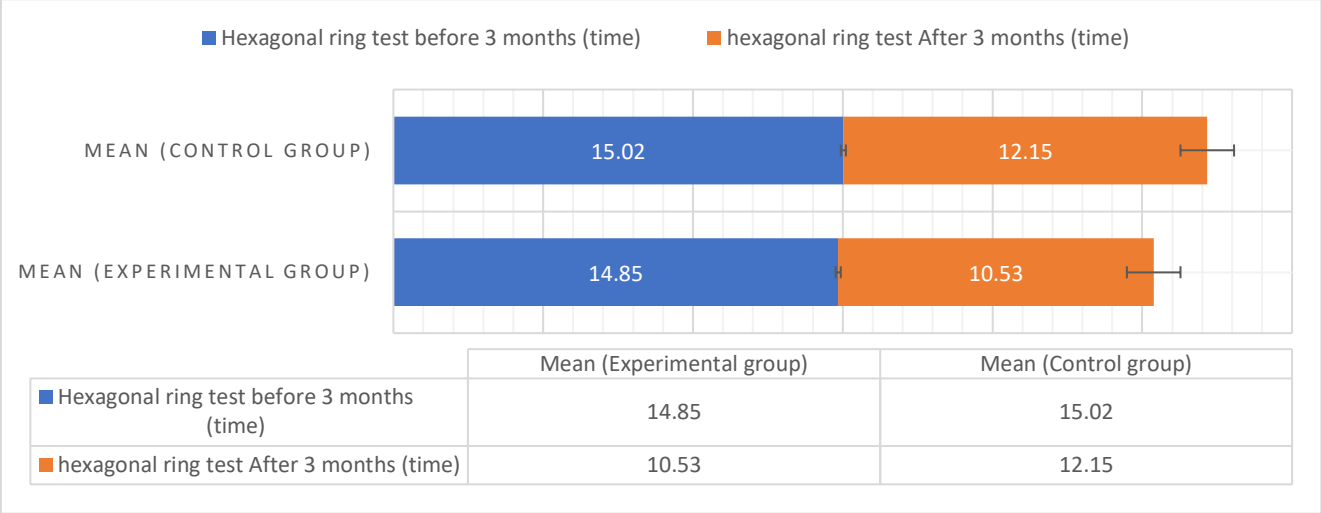
Exclusion Criteria

- Any neurological deficit, any musculoskeletal deformity or disability, any cardio pulmonary tumor, BMI below 25, Any cardio pulmonary surgery in between 6 months before study and Involved in any strength training program between 6 months of training from the date of Pilates training.

RESULT

Table 1: Showing Hexagonal Ring test value Before and after 3 months Pilate's mat exercise Program in Group 1 (Experimental group) and group 2 (Control group).

	Hexagonal ring test before 3 months	Hexagonal ring test after 3 months	T value
Mean (Experimental group)	14.85	10.53	11.01
Mean (Control group)	15.02	12.15	12.15



	Mean (Experimental group)	Mean (Control group)
Hexagonal ring test before 3 months (time)	14.85	15.02
hexagonal ring test After 3 months (time)	10.53	12.15

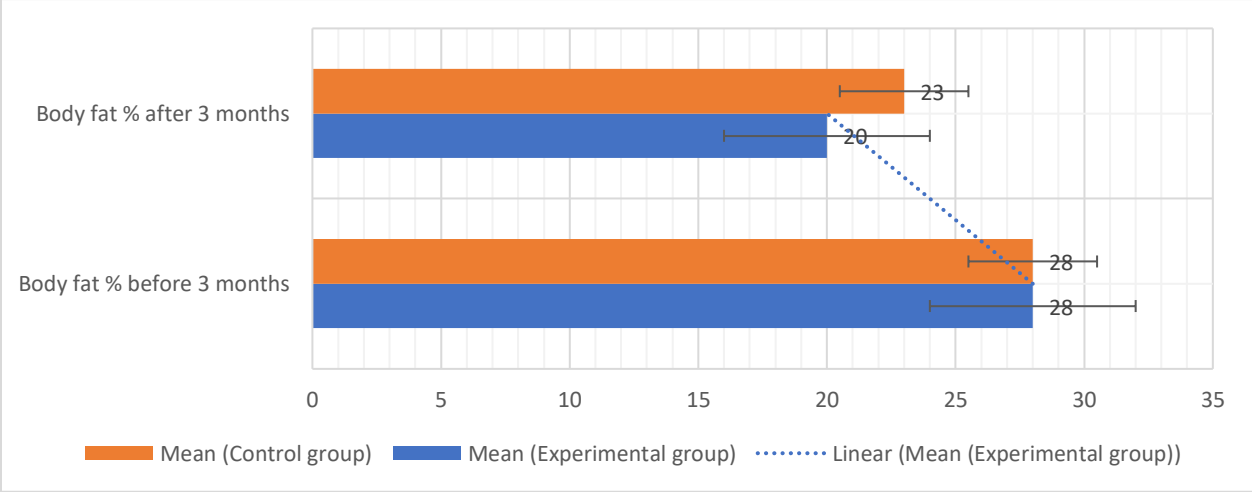
Graph 1: Represent that the hexagonal ring value before 3 Months and after 3 months readings.

Group 1 (Experimental group) Clients, prior exercise program hexagonal **ring value** was 14.85 and which was reduced to 10.53 after the Pilates mat exercise program.

Group 2 (Control group) Clients, prior exercise program **hexagonal ring value** 15.02 and which was reduced to 12.15 after the normal exercises.

Table 2: Showing value Body Fat Percentage Before and after 3 months Pilate's mat exercise Program with the help of Body fat formula in Group 1 (Experimental group) and group 2 (Control group).

	Body fat % before 3 months	Body fat % after 3 months	T value
Mean (Experimental group)	28	20	0.000000063
Mean (Control group)	28	23	0.000000092



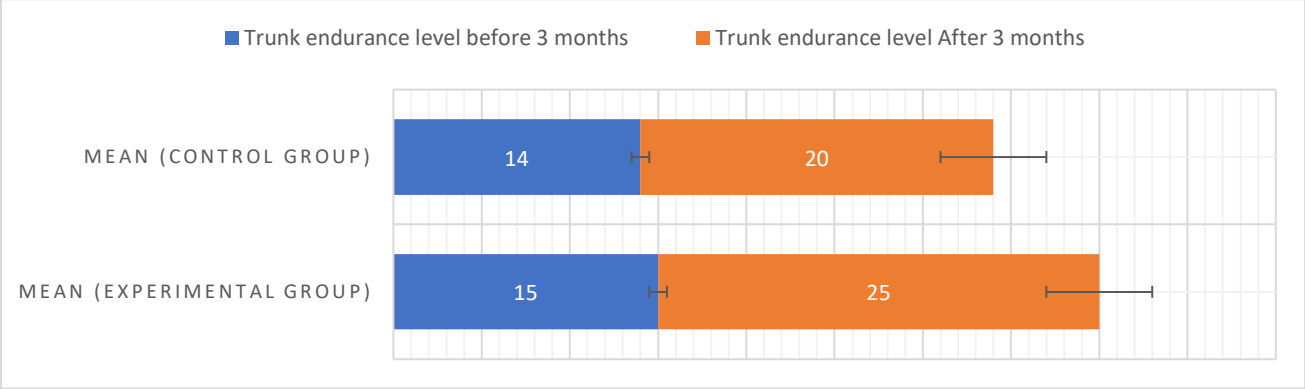
Graph 2: Represent that the Body Fat Percentage before 3 Months and after 3 months readings.

Group 1 (Experimental group) Clients, prior exercise program Body Fat Percentage was 28 and which was reduced to 20 after the Pilates mat exercise program.

Group 2 (Control group) Clients, prior exercise program Body Fat Percentage was 28 and which was reduced to 23 after the normal exercises.

Table 3 Showing value Trunk endurance level Before and after 3 months Pilate's mat exercise Program with the help of inch tape in Group 1 (Experimental group) and group 2 (Control group).

	Trunk endurance level before 3 months (cm)	Trunk endurance level after 3 months (cm)	T value
Mean (Experimental group)	15	25	15.05
Mean (Control group)	14	20	13.25



Graph 3: Represent that the Trunk endurance level before 3 Months and Trunk endurance level after 3 months readings.

Group 1 (Experimental group) Clients, prior exercise program **Trunk endurance level** was 15 and which was increased to 25 after the Pilates mat exercise program.

Group 2 (Control group) Clients, prior exercise program **Trunk endurance level** was 14 and which was increased to 20 after the normal exercises.

DISCUSION

The main aim of the study is to compare the various exercises in the improvement of the performance among the patients. The major components of fitness assessed in the study was strength, flexibility, speed and agility, because there are the most important components to be trained for the patients. The total no of patients is 40, who satisfied the inclusion and exclusion criteria and was divided into two equal groups. All the players were assessed with fitness tests mentioned above for pre-training and the post training measurements. Agility plays a key role in the patients since it helps in immediate turn and recovery in short duration. It seems to be related to athletic abilities like strength, power, speed, and balance. After the training of the pilates and other exercises this study shows and suggest that the pilates training has significant improvement than the other training in agility. The same effect in their study and suggested that pilates movements are components that can help in improving agility because it exploits the adaptation of stretch-shortening cycles through the neuromuscular system in helping to increase leg muscles power so agility improvement can be achieved. After the training of pilates and other exercises it suggests that pilates has better improvement than the other training in flexibility test.

CONCLUSION

After coming across the results of all variables it was clearly observed that the experimental group, who were trained with pilates exercises showed better results than the control group, who were trained with normal exercises. So, we can say that pilates exercises are better than the normal exercises and can be carried out for the better results of an individual.

LIMITATIONS

- Included BMI is not in the specified range.
- Age group was set very wide.
- More variables can be added further for better specification.
- No. of subjects can be increased for better results.

Ethical Clearance: IAMR/22/4073, reference no of the clearance letter.

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