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Effect of aerobic and swiss ball exercise on vital capacity of untrained collegiate men

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Abstract
The purpose of the study was to find out the effect of aerobic and swiss ball exercise on vital capacity of untrained collegiate men. In this study fourty five (45) untrained college men were randomly selected from Pt. Kundan Lal Shukla Mahavidyalaya, Kanpur Dehat, Uttar Pradesh, India. The subject's age ranged between 18 to 25 years. The subjects were divided into three equal groups of fifteen subjects each and name of the groups as aerobic exercise group, swiss ball exercise group and control group. The training period was 12 weeks and training 5 days in a week. Vital capacity was measured by Spirometer. The pre-test and post-test data were collected before and after 12 weeks aerobic and swiss ball exercise training program. In statistical method ANCOVA was used to find out the significant difference between groups and level of significance was set at 0.05 levels. The study confirmed that Vital capacity has significant improved in experimental groups when compared with control group.

Keywords: aerobic exercise, swiss ball exercise, vital capacity, college men

Introduction

Aerobic fitness is defined as the ability of the lungs, heart, and blood vessels to pass needed amount of oxygen and other things as nutrients to the cells to meet the demands of sustained activity. Aerobic capacity is usually assessed by measuring maximal oxygen consumption (www.Medicinenet.Com). Aerobics refers to a variety of activities like walking, jogging and running for a measured time. This is sufficient for a short distance runner and yet in short time helps to produce beneficial changes in the body, especially in the action of the lungs, heart and blood circulation (Mitchell and Daka, 1980). Training to improve aerobic endurance capacity involves four basic elements. Mode, intensity, duration, and frequency of exercise, a training program which does not contain all four to an adequate degree is not likely to be effective.

This exercise is designed to produce a sustained increase in heart rate and whose energy cost can be met by the body from aerobic sources i.e. from increased oxygen consumption (Yadav and Rachna, 1998). A Swiss ball is strengthening programs for injury rehabilitation and performance conditioning. It is often assumed that the use of a Swiss ball increases muscular strength, abdominal strength and trunk muscle activity. Strength is the single dominant factor in predicting and also improving speed. Strength is required before power training and it helps to lay the foundation for overall body conditioning. Swiss ball exercises are that they are very effective at targeting core muscles. Swiss balls are one of today's top fitness tools - and for good reason. Using a Swiss ball will improve the muscular strength, muscular flexibility, abdominal strength, balance and also strength of the abs and the lower back.

In recent years, fitness practitioners have increasingly recommended core stability in sports conditioning programs. Greater core stability may benefit sports performance by providing a foundation for greater force production in the upper and lower extremities. Swiss ball exercise also involving isometric muscle actions, small loads, and long tension times are recommended for increase in strength and endurance. Core muscles must produce sufficient and well-coordinated muscle contraction to both support and stabilize the lumbar spine during a variety human movement tasks

The physical object known as a "Swiss Ball" was developed in 1963 by Aquilino Cosani an Italian plastics manufacturer. He perfected a process for molding large puncture-resistant plastic balls. Swiss balls are large, heavy-duty inflatable balls offer you a fun, safe and highly effective way to exercise. Swissball is a ball constructed of soft elastic with a diameter of approximately 35 to 85 centimeters (14 to 34 inches) and filled with air. The air pressure is changed by removing a valve stem and either filling with air or letting the ball deflate. It is most often used in rehabilitation, physical therapy, athletic training, joints movements and core exercise. It can also be used for weight training. Most exercises in both healthcare and fitness modalities use the ball as nothing more than an unstable base for traditional linear movements to increase core strength and balance. The real benefit of these balls is that they allow for complete multidimensional movement which allows the body to be stretched and worked in ways not possible without the ball.

A primary benefit of exercising with an exercise ball as opposed to exercising directly on a hard flat surface is that the body responds to the instability of the ball to remain balanced, engaging many more muscles those muscles become stronger over time to keep balance. Most frequently, the core body muscles as the abdominal muscles and back muscles are the focus of exercise ball fitness programs. (http://en.wikipedia.org/wiki/Exercise_ball)

The use of physioballs/Swiss balls in strength and conditioning programs has become ubiquitous. Swiss balls have been incorporated into strength training regimes and touted as a means to more effectively train the musculoskeletal system. Performing strength exercises on Swiss balls has been advocated on the belief that a labile surface will provide a greater challenge to the trunk musculature, increase the dynamic balance of the user and possibly train users to stabilize their spines to prevent and treat injury.(http://www.sportsinjuryclinic.net)

Methodology

Subjects

The main purpose of the study was to determine the effect of aerobic and swiss ball exercise on vital capacity of untrained college male students. There are 45 college male students randomly selected from Pt. Kundanlal Shukla Mahavidyalya, Kanpur-Dehat (U.P), who were volunteered participated to conduct the study and the purpose of the study was explained. The study was formulated as a random group design consisting of a pre-test and post-test. The randomly selected subjects were divided in three groups. In each groups 15 subjects are and groups were named Group A, Group B and Group C. In which Group A was aerobic exercise group, Group B was swiss ball group and Group C was control group. The control group was not allowed to participate in any of the training programs, except their daily work. The training period was 12 weeks and training 5 days a week Monday to Friday (except Saturday and Sunday) for the duration of forty five minutes daily. The method of performing the test on vital capacity was explained to the subjects before the test. The age ranged of the subjects between 18 to 25 years as per their admission record.

Tools and Instruments

The test of vital capacity measured with the help of spirometer test. The vital capacity of the subjects was determined by the spirometer in sitting position. The subjects were allowed to inspire the maximum amount of air voluntarily and then he was asked to blow into dry spirometer to the maximum extent while taking the test the nose of the subjects was clipped using a nose clip.

Procedure

Aerobic and Swiss ball exercise training given as per scheduled. The duration of the training program was 45 minute per day and frequency of the training was five days in a week.

Statistical Technique

The treatment difference between the pre and post-test scored in selected variables were to statistical work by using Analysis of Covariance (ANCOVA) to find out whether the mean difference were significant or not. The obtained 'F' ratio was tested for significance at 0.05 and 0.01 level of confidence. Scheffe's post-hoc test of significance was employed in order to test the significant difference between paired adjusted means.

Analysis of Covariance for Pre Test and Post Test

Table 1: Data on Vital Capacity of Experimental Groups and Control Group

	Aerobic exercise	Swisball exercise	Control Group	Source of Variance	Sum of Squares	Df.	Mean Square	'F' Ratio
Pre-test Mean	2.673	2.606	2.633	B	33777.778	2	16888.889	1.088
S.D.	122.279	127.988	123.442	W	652000.000	42	15523.810	
Post-test Mean	3.073	2.886	2.686	B	1121777.778	2	560888.889	26.649*
S.D.	103.279	176.743	145.732	W	884000.000	42	21047.619	
Adjusted Post-test Mean	3.042	2.914	2.691	B	938299.758	2	469149.879	51.599*
				W	372782.549	41	9092.257	

* Significant at 0.05 level. Required table value at 0.05 level of significance for 2 & 42, 41 degrees of freedom = 3.22 & 3.23

From the table – I it shows that the pre-test means scores on vital capacity of the experimental and control group are 2.673, 2.606 and 2.633 respectively. The calculated 'F' ratio value 1.088 and it is lesser than the table value 3.22 for 2 & 42 Df. at 0.05 level of significance. It is meant no statistically significant difference between the control and the experimental groups on vital capacity.

From the table of post-test means scores on vital capacity of the experimental and control group are 3.073, 2.886 and 2.686 respectively. The calculated 'F' ratio value 26.649 and it is higher than the table value 3.22 for 2 & 42 Df. at 0.05 levels of significance. It is meant statistically significant difference between the control and the experimental groups on vital capacity.

From the table of adjusted post-test means scores on vital capacity of the experimental and control group are 3.042, 2.914 and 2.691 respectively. The calculated 'F' ratio value of 51.599 and it is higher than the table value 3.22 for 2 & 41 Df. at 0.05 level of significance. It is meant significant change on vital capacity as a result of the experimental training. Since the result has revealed that there is a significance difference, the hypothesis is accepted.

Table 2: ordered adjusted vital capacity means and difference between means for experimental groups and control group in Analysis of covariance problem

Aerobic group	Swiss ball group	Control Group	Mean Differences	C.I
3.042	2.914	-	0.128*	0.088
3.042	-	2.691	0.351*	
-	2.914	2.691	0.223*	

* Significant at 0.05 level. Scheffe's confidence interval at 0.05 level is 0.088

From the table - II shows that the Scheffe's post-hoc method of testing the significance for the differences between the paired means. The adjusted vital capacity efficiency means in order of magnitude and the difference between this means for the control and experimental groups is given in the table. The mean differences between the aerobic exercise group, Swiss ball group is 0.128, aerobic exercise group and the control group the difference is 0.351, and Swiss ball group and control group is 0.223, which is significant at 0.05 level of confidence interval. The results indicate that the aerobic exercise group and Swiss ball had a better improvement when compared with the control group.

The means differences of aerobic exercise group, Swiss ball group and control group are presented in bar diagram for better understanding of the results in figure- 1.

Graphical Representation on Pre-Test, Post-Test and Adjusted

Post-Test Means on Vital Capacity of Experimental Groups and Control Group

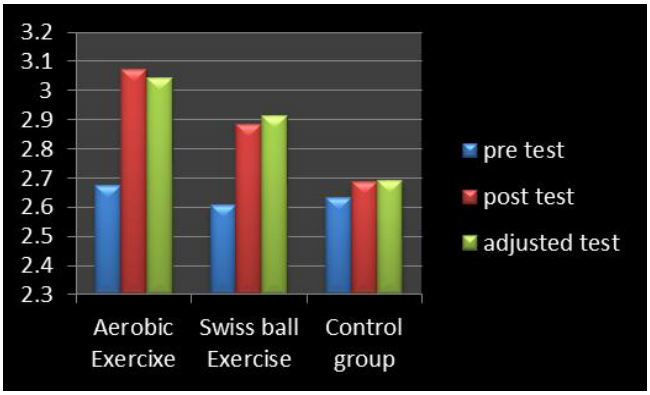

Fig 1

Discussion

The results support the theory and effectiveness of that aerobic and swiss ball exercise has play role of significant effects on vital capacity of untrained college male students. It was found that the experimental groups gained significantly which is finding between pre-test to post-test in comparison to control group and Finally, the results indicates that the which participants followed the aerobic exercise and swiss ball exercise for 12 weeks have significant impact on vital capacity.

The result shows, it observed that there was significant difference between pre and post-test mean score of vital capacity. The aerobic exercise on vital capacity was improved, its means it significantly increased.

The findings of this study are in agreement with the findings of Khosravi. M, Seyed Morteza and Hamed Safari (2013) [5] In this research the study show that the sufficient evidences of effect of resistance training and combine resistance and endurance training on respiratory system and further work for pulmonary functions. In this study 37 healthy sedentary women randomly divided in 4 groups; control group (C), endurance training (ET), (RT), and (ERT) groups. The training were given as per scheduled (3 sessions/ week for 8 weeks). The data analysis by ANCOVA, it showed that ET and ERT gained significantly vital capacity. Dilek Sevimli and Fuat Kocyigit (2009) [4] In this research the study show that the changes in pulmonary system by aerobic exercise in different age group of children. In this research 76 participants and their age between 11to 17 years of the children. The test administered for EKG, spirometer, blood pressure, heart rate, PWC 170 test of the subjects. Researcher considers that the aerobic exercises easy, safe and interesting to use and it was encourage the children.

Conclusion

The researcher felt that the significant impact on vital capacity, In case of experimental groups may be due to the aerobic exercise and swiss ball exercise of 12 weeks programme apart from the regular work.

On the basis of findings it was evident that the aerobic and Swiss ball exercise given to experimental groups and it was found significant impact on vital capacity. It was observed that effect of aerobic and Swiss ball training program increased the vital capacity of untrained college male students.

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