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## Effect of swiss ball training on cardiovascular endurance and abdominal strength of physical education students

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### Abstract

This study was undertaken to analyse the effect of Swiss ball training on selected variables among the physical education students. It had the purpose of comparing and analysing the data collection from each variables during pre-test and post-test. For the purpose of the study, twenty boys of 22 to 28 years old were selected as subjects for the investigation. These students were given Swiss ball training in department of physical education, Sree Sankaracharya University of Sanskrit Kalady. The pre-test was administrated before training and post-test was administrated after four weeks of training. The selected variables for the study were cardiovascular endurance and abdominal strength were 5 minute harvard step test and 1 minute sit ups. A pre-test and post-test score of the experimental group and controlled group were analysed by employing the T-test. To find out the significance difference between pre-test and post-test score of the experimental group and controlled group, the T-ratio was employed.

**Keywords:** effect, swiss ball training, cardiovascular, abdominal strength, physical education students

### Introduction

Sports have a very important role in modern society. It is important for an individual, a group, a nation and indeed the world. Sports performance is the result and expression of the total personality of a sports man. The development of a sports man enabling him to achieve high level of performance is usually concerned in four areas namely physical power, social adjustment, psychological development and physiological efficiency. Different activities make different demands on the organism with respect to circulatory, respiratory, metabolic, and neurological temperature regulating functions [1]. The concept of sports has been changed now a day. Due to the innovations brought by different sports sciences in the field of sports, now there are a number of scientific methods to improve each and every quality, which determines the performance in each games and sports. The same time development is according to the rate of demand of each games and sports. This is the main reason why the performance standards are going higher day by day [2]. Sports is an institutionalized competitive activity that involves physical exertion or the use of relative complex physical skills by individuals whose participation is motivated by a combination of the intrinsic satisfaction associated with the activity itself and the external rewards earned through participation [3]. Swiss ball were used primarily by individuals with low back problems in physical therapy clinics. However Swiss ball and now more commonly used in orthopedic rehabilitation programs, with the physically active in fitness centers, in physical education classes, and with special needs populations and the elderly much fitness and the use of Swiss ball has expended in to sport conditioning program. The primary motivation for the use of Swiss balls in these application is the belief that not unstable surface will provide a greater dynamic balance and possibly help to stabilize the spine in order to prevent injuries, additionally, while primary emphasis with Swiss balls has been and continues to be trunk training, it is now common to see Swiss balls used in conjunction with strength training for multiple muscle groups, not just the trunk.

### Statement of the Problem

The purpose of the study was to find out the effect of Swiss ball training on cardiovascular

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endurance and abdominal strength of physical education students.

### Limitations

- Heredity and environmental factors.
- Mood of the subject, living condition, lifestyle and family conditions, habits.
- Subjects routine time

### Delimitation

The study was delimited to twenty (N=20) physical education students from Sree Sankaracharya University, Kalady.

- Only male subject were selected for the study
- Subject were randomly selected
- The subject's age ranged from 22 to 28 years

### Hypothesis

It was hypothesized that there may be significant difference in cardiovascular endurance and abdominal strength due to Swiss ball training.

### Significance of the Study

- The study may be helpful for physical education teachers and coaches to evaluate their students
- The finding of the study may provide a great valuable feedback to improve upon the coaching program

### Definitions of the terms

#### Cardiovascular endurance

Cardiovascular endurance is the body's ability to deliver oxygen to muscles while they are working. Essentially, it is the heart and lungs delivering energy to a body in motion without undue fatigue, according to the Department of Health and Human Services.

#### Abdominal Strength

Abdominal muscle exercises are known to increase the strength and endurance of the abdominal muscles. It has been highly disputed whether or not abdominal exercises have any reducing effect on abdominal fat.

#### Physical Fitness

Physical fitness is your ability to carry out tasks without undue fatigue. Learn about the components of physical fitness: cardiorespiratory endurance, muscle strength, muscle endurance, flexibility and body composition and why they are important.

#### Methodology

This chapter describes the methodology and procedure adopted for the selection of the subjects, selection of variables, administration of test, collection of data and statistical technique employed for the analysis of data.

#### Selection of Subjects

The purpose of the study was to examine the effect on cardiovascular endurance and abdominal strength of physical education students. To achieve this purpose, twenty male subjects from Sree Sankaracharya University Kalady were selected as subjects. The investigator explained to them about the purpose and nature of the study and sought the willingness of the subjects to volunteer for the study. Only male subject

aged between 22 and 28 years were contacted and around twenty subjects gave their volunteer consent to work as subjects for the study. Only twenty of them, as Swiss ball training (N=10) and control group (n=10) were selected as subjects. They were also informed that they were free to opt out of the study at any time if they felt any discomfort or difficulty in continuing with the training programme. The selected twenty subjects are divided into two.

#### Selection of Variables

Variables are the conditions or characteristics that the researcher manipulates or observe.

- Dependent variable-cardio vascular endurance and abdomen strength
- Independent variable-Swiss ball training.

#### Experimental Design

The experimental design used in this study was used the purposive random group design, in which twenty male subjects were divided into two equal groups. Group 1 (experimental group) and Group 2 (control group) underwent their regular practice.

#### Reliability of Data

The reliability of data was measured by ensuring instrument reliability and tester reliability. To ensure that the investigator was well versed with the techniques of conducting the test, the investigator had a number of practice sessions in testing procedure, under the guidance of an expert.

#### Orientation of the Subjects

An orientation session was conducted for the selected subjects and they were given a detailed account of the whole study and test which they had to undergo.

#### Collection of Data

After four weeks of training, cardio vascular endurance and abdomen strength was measured by using Harvard step test and sit up test respectively.

#### Test Administration

The nature and importance of study was explained to the subjects for their optimum participation. The researcher verbally explained the Swiss ball exercise to the experimental group was given four weeks of Swiss ball exercise training.

- Harvard step test and sit up test

#### Statistical Technique

In order to find the significance of different among the pre-test and post-test on selected variables the t-ratio was applied. To compare the significance of difference the level of significance chosen was 0.05.

#### Analysis of Data and Results of the Study

The present study was formulated to determine the difference among experimental and control group. The result and discussion of statistical analysis are presented in this chapter. The level of significance chosen was 0.05 level confidence throughout the study to determine the significant different with 19 degree freedom. The mean difference between the initial and final scores of the group was compared by using dependant 't' test are as follows:

## Cardiovascular Endurance

**Table 1:** Mean Comparison of Experimental and Control group on Cardiovascular Endurance

Control Factors	Pre test			Post test			t-ratio
	N	Mean	SD	N	Mean	SD	
Experimental	20	87.695	9.342	20	91.670	9.572	9.76
Control	20	88.07	9.01	20	89.12	8.995	1.29

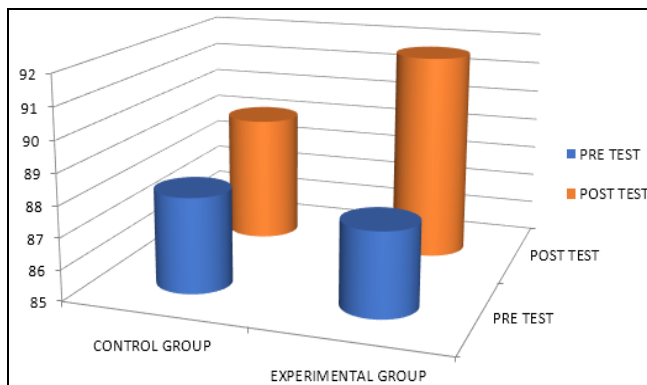
\*Significance at  $t_{0.05}(19, 1) = 2.09$

## Abdominal Strength

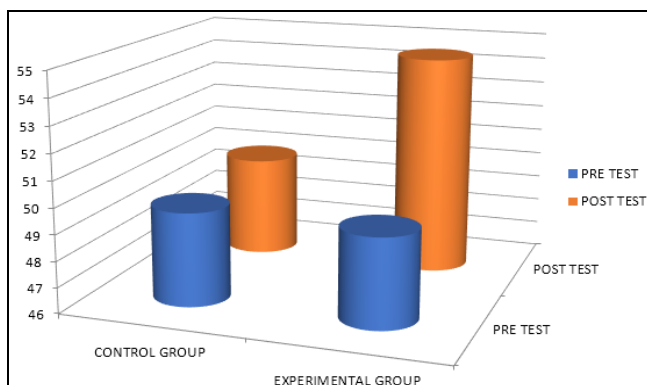
**Table 2:** Mean Comparison of Experimental and Control group on abdominal strength

Control Factors	Pre test			Post test			t-ratio
	N	Mean	SD	N	Mean	SD	
Experimental	20	49.45	7.08	20	54.50	5.15	6.91
Control	20	49.61	7.00	20	49.90	6.69	1.83

\*Significance at  $t_{0.05}(19, 1) = 2.09$



**Fig 4.1:** pre and post mean score of Cardiovascular Endurance



**Fig 4.2:** Pre and Post Mean Score of Abdominal Strength

### Discussion on Findings

Four weeks of Swiss ball exercise had improved the cardiovascular endurance and abdominal strength of physical education students of Sree Sankaracharya University Kalady. Swiss ball training for improvement of cardiovascular endurance and abdominal strength.

The result shows that there was a significant difference found among the two variable of Experimental group.

- Due to Swiss ball training cardiovascular endurance was improved.
- Static and dynamic contraction due to Swiss ball training results in hypertrophy of abdominal muscles might be a reason for the improvement of muscular endurance.

### Summary

This study was undertaken to analyse the effect of Swiss ball training on selected variables among the physical education

students. It had the purpose of comparing and analysing the data collection from each variables during pre-test and post-test.

For the purpose of the study, twenty boys of 22 to 28 years old were selected as subjects for the investigation. These students were given Swiss ball training in department of physical education, Sree Sankaracharya University of Sanskrit Kalady. The pre-test was administrated before training and post-test was administrated after four weeks of training. The selected variables for the study were cardiovascular endurance and abdominal strength were 5 minute Harvard step test and 1 minute sit ups. A pre-test and post-test score of the experimental group and controlled group were analysed by employing the T-test. To find out the significance difference between pre-test and post-test score of the experimental group and controlled group, the T-ratio was employed.

### Conclusions

Within the limits and limitations of the present study and on the basis of the results, the following conclusions may be drawn.

- Four weeks of Swiss ball training program improved the cardiovascular endurance of physical education students of Sree Sankaracharya University Kalady.
- Four weeks of Swiss ball training program improved the abdominal strength of physical education students of Sree Sankaracharya University Kalady.

### Recommendations

In the light of conclusions drawn, the following recommendations are made.

- A study of similar nature may be conducted for different age groups
- Similar study may be undertaken with female subjects.
- Elite sports persons can be chosen as subjects for a similar study.
- Similar study may be conducted to different sports and games.

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