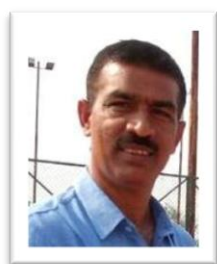


Effect of Swiss Ball Training on Breath Holding Capacity of Male Physical Education Students



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Abstract

Purpose: The Purpose of the study was to find out the effect of Swiss ball training on positive and negative breath holding capacity.

Selection of Subjects: For the present study 30 male students from Department of Physical Education, Guru Ghasidas Vishwavidyalaya Bilaspur (C.G) were selected randomly as the subjects for the study. The age of the subjects ranged between 18 - 21 years.

Selection of Variables: The variables selected for the present study were aerobic training (independent variable), Positive Breath Holding Capacity (PBHC) and Negative Breath Holding Capacity (NBHC) (dependent variables).

Methodology: For the study pre test-post test randomized group design, which consists of control group (15 students) and experimental group (15 students) was used. The data were collected through the pre test, before training and post test, after twelve weeks of Swiss ball training.

Statistical Technique: For comparing pre and post test means of experimental and control groups of selected physiological variables, descriptive analysis and Analysis of Co-Variance (ANCOVA) were used, the data analyzed with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence.

Result: The result of the study showed that there was significant difference between pre and post test (experimental group) of Positive Breath Holding Capacity (PBHC) and Negative Breath Holding Capacity (NBHC). Another hand there was insignificant difference between pre and post test of Positive Breath Holding Capacity (PBHC) and Negative Breath Holding Capacity (NBHC) of control group.

Conclusion: On the basis of the findings it was concluded that the Swiss ball training might be responsible for the improvement of Positive Breath Holding Capacity (PBHC) and Negative Breath Holding Capacity (NBHC).

Keywords: Swiss ball Training, Physiological Variables, Positive Breath Holding Capacity and Negative Breath Holding Capacity.

Introduction

The Swiss ball training was developed in 1963 by Aquilino cosani, an Italian plastics manufacturer. He perfected a process for large puncture-resistant plastic balls. Swiss ball are large, heavy-duty inflatable balls with a diameter of 45 to 75 cm (18 to 30 inches). Swiss ball offer one a fun, safe and highly effective way to exercise. Swiss ball is also know by a different names, including balance ball, body ball, fitness ball, gym ball, pilates ball, stability ball and yoga ball. Sekendiz (2010) investigated the effects of Swiss ball core strength training on trunk extensor (abdominal)/flexor (lower back) and lower limb extensor (quadriceps)/flexor (hamstring) muscular strength, abdominal, lower back and leg endurance, flexibility and dynamic balance in sedentary women and found that Swiss ball core strength training exercises can be used to provide improvement in the aforementioned measures in sedentary women.

Swiss ball is also defined as "a large inflatable ball typically used for support while performing exercises like crunches, leg lifts, hyperextensions, etc." Exercises using the Swiss ball differ from exercises using a bench because, a Swiss ball acts as a "bouncy" unstable support and therefore the trainee requires coordination and effort to keep away from either falling over or falling off the ball.

Breath Holding Time is one of the physiological variables defined "as duration of time through which one can hold his breath without inhaling or exhaling after deep inhalation". The physiology of breath holding

involves respiratory, circulatory and cardiac changes, all of which are important in the light of recent research. The most obvious changes when the breath is held are the increasing level of carbon-di-oxide and the decreasing level of oxygen in the alveolar air. These changes, of course, reflect the changes in the level of the respiratory gases in the blood, the results in continuing metabolism.

Objectives of the Study

To find out the effect of twelve weeks Swiss ball training on selected physiological variables i.e. Positive breath holding capacity (PBHC) and Negative breath holding capacity (NBHC) of college boys.

Review of Related Literature

Jwa Jun Kim, Gui Bin Song, and Eun Cho Park (2015) have completed a study on Effects of Swiss ball exercise and resistance exercise on respiratory function and trunk control ability in patients with scoliosis and they found Both Swiss ball exercise and resistance exercise are effective for improving the respiratory function and trunk control ability of patients with scoliosis. However, resistance exercise is more effective for increasing the forced expiratory volume in one second and trunk control ability.

Another study titled as Effects of Stabilization Exercise Using a Ball on Multifidus Cross-Sectional Area in Patients with Chronic Low Back Pain have been conducted by SinHo Chung, JuSang Lee, and JangSoon Yoon (2013) and they also found These results suggests that stabilization exercises using ball can increases in the CSA of the MF segments, improvement in weight bearing, pain relief, and recovery from functional disorders, and the increases in the CSA of the MF of the L4 and L5 segments for patients with low back pain.

Santoshi (2011) studied the effects of breathing exercises on selected physiological variables of school going children. She concluded that the significance effect of twelve weeks breathing exercises on breath holding capacity.

Methodology

Selection of Subjects

For the present study 30 male students from Department of Physical Education, Guru Ghasidas Vishwavidyalaya Bilaspur were selected as subjects. The age of the subjects ranged from 18-21 years. The subjects were divided into two groups i.e. one experimental (Swiss ball training group, 15 students) and one control group (15 students).

Selection of Variables

Keeping the feasibility criterion in mind, the researcher selected the following variables for the present study:

1. Swiss ball training (Independent variables)
2. Breath holding capacity (Dependent variables)
 - i. Positive breath holding capacity (PBHC)
 - ii. Negative breath holding capacity (NBHC)

Criterion Measure and Administration

Breath holding capacity was measured by manually and recorded in Minutes. A stopwatch is used to record the breath holding time. For the measurement of breath holding, the tester holds the nose of the subject tightly, sing his left hand especially with thumb and index finger. After holding the nose, they can breathe only through mouth. As soon as the subject look a deep breath to the full capacity of his lungs. The mouth is closed and the stop watch is started. When the capacity to hold the breath is over, the subject opens his lips, simultaneously the watch is stopped, and the time is taken.

Experimental Design

For the study pre test & post test randomized group design, which consists of one control group (n=15) and one experimental group (n=15) was used. Equal numbers of subjects were assigned randomly to the group. One group served as experimental group (Swiss ball training group) on which treatment was assigned and the second group served as the control group.

Table 1

Pre Test & Post Test Randomized Group Design

Swiss ball training group	O₁	T	O₂
Control group	O₁		O₂

Where- O₁ = Pre Observation, O₂= Post Observation and T= Treatment (training).

Collection of data

Before the administration of Swiss ball training, the selected tests for selected physiological variables were administered on both the experimental and control groups to collect pre test data. After the completion training again the same tests were conducted to collect the post training data. Necessary instructions were given to the subjects before administration of the tests.

Administration of training

The training for experimental group was administered at Department of Physical Education, Guru Ghasidas Vishwavidyalaya Bilaspur. Selected Swiss ball exercises (Balanced sitting, Elbow bridge, Lateral Elbow bridge, Crunch, Reverse hyper extension, Pikes, Prone Jackknife position, Core Ball Transfer, Back Extension , Leg Raises, etc,) were given to experimental group on five days i.e. (Monday to Friday) sessions per week for twelve Weeks. Each training session consisted of 60-90 minutes included 10-15 minutes of warming up and 10-15 minutes for cooling down. Remaining minutes allotted for Swiss ball training programme.

Statistical Procedure

The data were analyzed by applying descriptive statistical and Analysis of Co-Variance (ANCOVA). The data analyzed with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence.

Result and Findings of The Study

Table 2

Analysis of co-variance of the mean of experimental group and control group in relation to PBHC and NBHC

variables	Test	Mean & SD		ANCOVA table					
		Experimental	Control	Source of variance	SS	df	MS	F	Sig.
PBHC	Pre	27.416±8.686	28.586±5.341	B	10.267	1	10.267	.197	.660
				W	1455.796	28	51.993		
	Post	34.750±8.785	28.359±5.437	B	306.369	1	306.369	5.741*	.024
				W	1494.350	28	53.370		
	Adjusted	35.328	27.782	B	424.065	1	424.065	149.324*	.000
				W	76.677	27	2.840		
NBHC	Pre	23.824±7.280	22.606±5.604	B	11.126	1	11.126	.264	.612
				W	1181.732	28	42.205		
	Post	26.86±7.031	22.474±4.199	B	144.234	1	144.234	4.300*	.047
				W	939.091	28	33.539		
	Adjusted	26.362	22.973	B	85.344	1	85.344	15.508*	.001
				W	148.591	27	5.503		

*significant at 0.05 level, B=between group variance, W= within group variance.

$F_{0.05}(1,28)=4.20, F_{0.05}(1,27)=4.21$

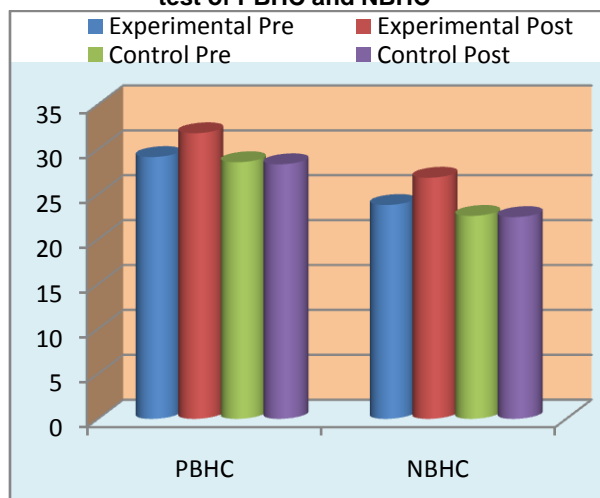
Table 3 shows the analysis of co-variance for PBHC and NBHC indicated that the resultant F-ratio of PBHC (.197) and NBHC (.264) was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the experimental groups was quite successful. The post-test means of all the two groups yielded an F-ratio of PBHC (5.741) and NBHC (4.30) which were significant at 0.05 level of significance. The F-ratio needed for significance is 4.20 at 0.05 level of significance with 1, 28 degree of freedom. The difference between the adjusted posts means was found significant as the obtained F-ratio was 149.324 and 15.508 of PBHC and NBHC respectively. The F-ratio needed for significance is 4.21 at 0.05 level of significance with 1, 27 degree of freedom. Thus, mean significant difference exists between experimental and control group in relation to PBHC and NBHC.

PBHC and NBHC due to Aerobic training on the selected group of male students. Because there was no significant difference found between pre and post of control group in relation to PBHC and NBHC. Similar study conducted by Ahmad Azad et. al. in 2011, Effects of Aerobic Exercise on Lung Function in Overweight and Obese Students, he concluded that the Aerobic exercise training can partly improve lung function by strengthening the muscles of respiration.

Another study conducted by M. Muralikrishna and P.V. Shelvam in 2014 had conducted a study, Effect of different intensities of aerobic training on vital capacity of middle aged obese men; The results showed that High intensity aerobic training positively influences the cardiopulmonary (vital capacity). These studies are supporting to the result of VC. The results of this investigation are also supported by the following studies of Bhuyan & Kumar (2013), Choi, et. al. (2012), Dharmendrakumar & Sakthignanavel (2014), Qiang (2011), Sekendiz, Cug and Korkusuz (2010) and Seo, et. al. (2012).

Fig. 1

Graphical Representation of Mean Values of experimental and control groups, pre and post test of PBHC and NBHC



Discussion of Findings

The result of the study revealed significant improvements in the variables such as RHR, VC,

Conclusion

On the basis of findings of the study, the following conclusions may be drawn:

1. The results of the study indicate that the significant difference was found in pre and post test of (experimental group) positive breath holding capacity (PBHC), ($p < 0.05$).
2. The results of the study indicate that the insignificant difference was found in pre and post test of (control group) positive breath holding capacity (PBHC), ($p > 0.05$).
3. The results of the study indicate that the significant difference was found in pre and post test of (experimental group) negative breath holding capacity (NBHC), ($p < 0.05$).
4. The results of the study indicate that the insignificant difference was found in pre and post test of (control group) negative breath holding capacity (NBHC), ($p > 0.05$).

On the basis of the findings it was concluded that the twelve weeks Swiss ball training is responsible for the improvement of Positive Breath

Holding Capacity (PBHC) and Negative Breath Holding Capacity (NBHC) of college level boys.

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