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Effect of weight training on breath holding capacity among sedentary students

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Abstract

Objective: The objective of the study was to find out the effect of weight training on breath holding capacity of male sedentary students after 6 weeks training.

Methodology: For the present study sixty (50) male sedentary students (doing little or no physical exercise) receiving education in different fields i.e., medical, engineering, science and humanities of Nanded district were selected as subjects in this study and were randomly placed in experimental group (n=25) and control group (n=25). The age of selected subjects' range between 21-30 years. The subjects were tested before and after completion of 6 weeks of weight training programme. The variables selected for the present study were weight training (independent variable), Breath Holding Capacity (dependent variables). For this study pretest-posttest randomized group design, which consists of control group and experimental group was used. The data was collected from subjects before and after six weeks of Weight Training. For comparing pre and post-test means of experimental and control groups in relation to breath holding capacity, the descriptive statistics i.e., mean standard deviation. Standard error and t test were used and level of significance was kept at 0.05.

Result: The result of the present study showed that there was significant difference between pre and post-test means of (experimental group) Breath Holding Capacity. On the other hand, there was less improvement in criterion variable of control group.

Conclusion: On the basis of the findings it was concluded that weight training might be responsible for the improvement of Breath Holding Capacity.

Keywords: breath holding capacity, sedentary students, weight training

Introduction

Breathing, and in particular breath-holding, is a natural process. When someone attempts to lift a heavy weight, he/she naturally hold his/her breath. Referred to as the Valsalva manoeuvre, it basically means a person holds his breath while attempting to apply force (Venes 2009) [7]. The safety and effectiveness of the situational Valsalva is backed by authentic research, in 2010 study was published in the Journal of Strength and Conditioning Research determined that one-maxes lifted by subjects at their will during training produced minor and temporary rise in blood pressure. During strength training intra-abdominal is maximized by breathing deeply about 75 percent of maximum and hold that breath into belly if possible, during a repetition and exhale at the completion of repetition. This makes you stronger structurally and provides optimum support for the spine.

There has been debate on how to breathe properly during exercise, particularly when lifting weights. One advice mentions exhaling through the most difficult point stated as the "sticking point" in the repetition and inhale during the easiest point (Baechle *et al.* 2008) [1]. Breathing pattern has been examined by the fitness industry at rest or doing any physical activity and tried to interpret those procedure into strength training. Lifting weight is an anaerobic activity and at rest and aerobic work rely on oxygen that is way one has to breathe differently during lifting exercise than cardio workout. The strength training is controlled breath-holding to a certain degree. The time taken by the person to hold his/her breath as long as he/she can is breath holding time. Tissues continuously utilize O₂ and liberate CO₂ during while holding breath voluntary. Consequently, arterial pCO₂ rises and on the other hand pO₂ falls. Both are powerful respiratory stimulants and the point is touched where the respiratory drive develops so strong that an individual cannot hold his/her breath any longer.

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There are only few studies completed on breath holding capacity of sedentary people particularly in our country. Hence the present study was undertaken to determine the effect of weight training on breath holding capacity in sedentary people. This study was conducted on 50 sedentary students of Nanded district in Maharashtra.

2. Materials and Methods

2.1 Type of study

The study was conducted as experimental study.

2.2 Population and sample group of study

The population of this study comprised of sedentary students (doing little or no physical exercise) receiving education in different fields i.e., medical, engineering, science and humanities of various institutions of Nanded. The 50 sedentary students were selected by using purposive sampling method and age of selected subjects ranged from 21-30 years in this study.

2.3 Selection of variable

On the basis of Expert opinion, research scholar's own understanding, availability of facilities and review of literature, the breath holding capacity was selected as dependent variable and weight training as independent variable.

2.4 Data collection

The required data on breath holding capacity was collected by the researcher from the subject of both experimental group and control group before and after 6 weeks of weight training, nose clip and stopwatch were used to collect the data and scores were recorded in seconds.

2.5 Weight training programme

This 3day a week workout for the duration of 6 weeks was performed by the subjects of experimental group on Monday, Wednesday and Friday and control group received no training in this study. Before starting the exercising the subjects performed warming up by doing 5-10 minutes cardio followed by stretching. The training equipment were free weights and machines. The number of sets per exercise was 3 and the numbers of repetitions for each exercise were different in various exercises. The weight used for each set was 60% to 70% of 1-repetition maximum comfortably lifted by the subjects.

2.6 Data assessment

The data of present study were calculated and analysed in the computer environment by using descriptive statistics i.e., mean, standard deviation, standard error and t test. The level of significance was kept at 0.05.

Results

When the mean score of experimental group and control group before and after the 6-week weight exercise program were examined, statistically significant difference was observed in the breath holding capacity values ($p < 0.05$).

Table 1: Presents the baseline characteristics of the subjects

Variables	Mean ± SD	Minimum	Maximum
Age	23.56±1.4	21	26
Weight	60.33±10.15	44	85
Height	1.678±0.056	1.59	1.79

Age, weight and height of subjects are shown as mean ± sd and minimum-maximum in table-1.

Table 2: Descriptive statistics of experimental group and control group in relation to breath holding capacity

Group		N	Mean ± SD	Standard Error	T value
Experimental	Pre	30	29.36 ± 2.32	0.43	3.8
	Post	30	49.85 ± 4.84	0.88	
Control	Pre	30	30.39 ± 2.38	0.45	1.57
	Post	30	33.55 ± 3.46	0.64	

Table-2 shows the results of experimental group and control group with regard to breath holding capacity. The descriptive statistics displays the mean and standard deviation values of body composition of pre and post-test of experimental group was 29.36±2.32 and 49.85±4.84 respectively, whereas mean score and standard deviation of pre- and post-test of control group with regards to body composition was 30.39±2.38 and 33.55±3.46. There was significant difference in the mean values of experimental group and control group in breath holding capacity of sedentary students as the obtained t-value was 3.8, which was higher than the tabulated t-value 2.00 with (59) degree of freedom at 0.05 level of significance.

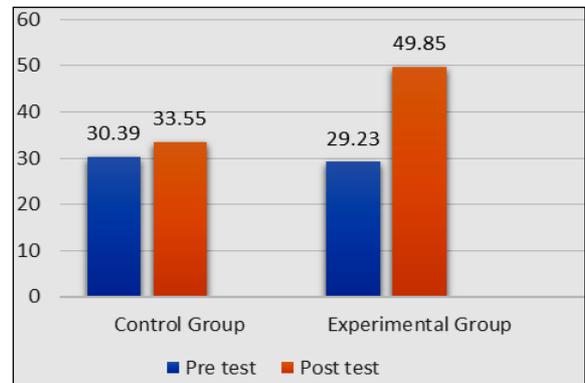


Fig 1: Graphical Representation of Mean Scores and Standard Deviation in relation to breath holding capacity of sedentary students

Discussion on findings

The main purpose of this study was to examine the effects of weight training exercise on breath holding capacity in sedentary students. The results of study determined that there was a significance difference between experimental and control group in relation to breath hold time of male sedentary students, that might be due to the participating in weight Training. Breath holding capacity is a physiological variable defined as duration of time through which one holds his/her breath without inhaling and exhaling after deep inhalation at will. 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 dioxide 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. This has been reported in some studies, that exercising is important for increasing lung capacity, which also include the breath hold capacity. (Kumar 2015) [4] determined that due to the effect of high intensity circuit resistance training on selected strength (muscular strength and back strength), and physiological parameters (breathe holding time, resting pulse rate and vo2max) have significantly altered. The findings of present study are in line with the

findings of (Santoshi 2011) ^[6] examined the effects of breathing exercises on selected physiological variables of school going children. There was significant effect of twelve (12) weeks breathing exercises on breath holding capacity. (Dasarathan and Saroja 2018) find breath holding time was better in circuit training group than the plyometric training group. The control group did not produce any improvement breath holding time after 6 weeks of plyometric training and circuit training. (Rathore and Mishra 2017) ^[5] Conducted study on male students with age range of 18-21 years to find out the effect of Swiss ball training on breath holding capacity. Examining the result of Swiss ball training, significant effect was found on positive breath holding capacity and negative breath holding capacity.

Conclusion

On the basis of findings, it was concluded that there was significant effect of 6 weeks of weight training on breath hold capacity of sedentary students. For this reason, this type of weight training can be recommended to sedentary male students for improving their breath hold time.

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