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Effect of core stability training on breath holding time and respiratory rate among volleyball players

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Abstract

The purpose of the study was to find out the effect of core stability training on breath holding time and respiratory rate among volleyball players. In this study twenty (n=20) college volleyball players were randomly selected from Anand District, Gujarat, India. The age of subject's were ranged from 18 to 23 years. The selected participants were randomly divided into two groups such as Group 'I' underwent core stability training (n=10) and Group 'II' acted as control group (n=10). Group 'I' underwent core stability training for five days and one session per day and each session lasted for 60 minutes for six week period. Group 'II' was not covered to any specific training but trainees participated in regular activities. The data on breath holding time and respiratory rate collected and administering by nostril hold method (seconds) and observing the raise and fall of the chest (numbers). The pre and post-tests data collected on selected criterion variables before and immediately after the training programme. The pre and post-test scores were statistically examined using dependent-'t' test and Analysis of co-variance (ANCOVA) for each and every selected variable separately. It was concluded that the core stability training group had shown significantly improved in breath holding time and respiratory rate. However the control group had not shown any significant improvement on any of the selected variables such as breath holding time and respiratory rate.

Keywords: core stability training, breath holding time, respiratory rate, volleyball players

1. Introduction

Comprehensive preparation is that the key to success at any level of sports participation, hence the number of some time and money invested by professional players to form sure sufficient adequate technical knowledge, well-rehearsed match strategies, and highly trained physiological capacities. At the elite level, however, the difference between good and great players is typically their level of psychological preparation and therefore the way well they're going to apply their skills in high-pressure situations. an important a neighbourhood of this psychological preparation is that the event of the facility to affect the psychological stress that accompanies elite sports participation ^[1].

Core stability, simply stated, is that the functional stability of the trunk. This definition is usually extended to the facility to require care of trunk-controlled motion while there are forces attempting to vary its position ^[2]. The term, core stability, are often defined as simple or complex as needed for a personal author's purpose. Core stability are getting to be defined because the power of the trunk to require care of (stabilize) it's positioning while forces are being applied thereto ^[3].

Core stability, on the other hand, could also be a more ambiguous term. Perhaps more important than strength, core stability is that the power of passive and active stabilizers within the lumbopelvic region to require care of appropriate trunk and hip posture, balance, and control during both static and dynamic movement ^[4]. Core strength training could also be a commonly used method that we should always always well on for athletic performance. The core training method differs from weight-lifting exercises in practice and it aims to reinforce core muscle strength ^[5].

Any physical training (activity) leads to anatomical, physical, physiological, biochemical, and psychological changes. The efficiency of a physical activity results from its duration, and repetitions (volume), load and velocity (intensity), and thus the frequency of performance (density). Planning the dynamics of coaching, consider these aspects, mentioned because the variables of coaching ^[2].

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Volleyball could also be a highly competitive game and it demands high motor abilities. The prime physical qualities essential area static balance, balance, explosive power, flexibility, muscular endurance, muscular strength, and speed. In Volleyball, the performance of skills during a jump as spiking, blocking, jump-pass, or dive pass when the contact with rock bottom is lost, demands a high level of static balance and accuracy in spatial movements. Such movements depend on the training of the body systems [5].

Volleyball has some basic motor ability which plays a significant role in Explosive power which can be increased by increasing the speed of labour or by decreasing the number of sometime duration during a training session. Power, Speed, and Coordination are variety of the essential technical demand (motor abilities) which have an influence on athlete's sports performance [6].

Training could also be a scientific process of repetitive, progressive exercise or work involving learning process and acclimatization. The training loads is often increased gradually or step by step ends during a robust and faster adaptation process and simpler reaction from the organism [7].

2. Purpose of the Study

The purpose of the study was to find out the effect of core stability training on breath holding time and respiratory rate among volleyball players.

3. Methodology

3.1 Subjects

To achieve the purpose of this study, twenty (n=20) college

volleyball players were randomly selected from Anand District, Gujarat, India. The age of subject's were ranged from 18 to 23 years.

3.2 Design of the Study

The selected participants were randomly divided into two groups such as Group 'I' underwent core stability training (n=10) and Group 'II' acted as control group (n=10). Group 'I' underwent core stability training for five days and one session per day and each session lasted for 60 minutes for six week period. Group 'II' was not exposed to any specific training but they were participated in regular activities.

3.3 Data Collection

The data on breath holding time and respiratory rate were collected and administering by nostril hold method (seconds) and observing the raise and fall of the chest (numbers). The pre and post-tests data were collected on selected criterion variables prior to and immediately after the training programme.

3.4 Statistical Procedure

The pre and post-test scores were statistically examined by the dependent-'t' test and Analysis of co-variance (ANCOVA) for each and every selected variable separately.

4. Result and Findings

The influence of effect of core stability training on a breath holding time and respiratory rate were analyzed and presented below.

Table 1: Computation of 'T' - Ratio between Pre and Post-Test Means of Experimental and Control Groups on Breath Holding Time and Respiratory Rate

Criterion Variables	Test	Experimental Group	Control Group
Breath Holding Time	Pre test	31.71	30.31
	Post test	40.25	31.37
	't'test	7.90*	1.08
Respiratory Rate	Pre test	17.63	17.58
	Post test	15.22	17.51
	't'test	10.91*	1.43

*Significant at 0.05 level. (Table value required for significance at .05 level for 't'-test with df 9 is 2.26)

The table-I shows that the pre-test mean value on a breath holding time and respiratory rate among experimental and control groups were 31.71 & 30.31 and 17.63 & 17.58 respectively and the post-test means are 40.25 & 31.37 and 15.22 & 17.51 respectively. The obtained dependent t-ratio values between the pre and post-test means of experimental and control groups are 7.90 & 1.08 and 10.91 & 1.43 respectively. The table value required for significant

difference with df 9 at 0.05 level is 2.26. Since, the obtained-'t' ratio value of experimental group was greater than the table value, it was understood that experimental group had significantly improved the breath holding time and respiratory rate. However, the control group has not improved significantly. The 'obtained t' value is less than the table value, as they were not subjected to any specific training.

Table 2: Analysis of Covariance on Selected Breath Holding Time and Respiratory Rate of Experimental & Control Groups

Test	Experimental Group	Control Group	SOV	SS	Df	MS	F-ratio
Adjusted Post-Test Mean							
Breath Holding Time	40.34	31.41	B.M	718.62	1	718.62	24.04*
			W.G	508.20	17	29.89	
Respiratory Rate	15.25	17.53	B.M	80.72	1	80.72	34.64*
			W.G	39.63	17	2.33	

* Significant at 0.05 level. Table value for df 1, 17 was 4.45.

From the table-2 shows that the adjusted post-test means values on breath holding time and respiratory rate. The obtained f- ratio for variables was 24.04 and 34.64 but the required table value of df 1 and 17 was 4.45. It shows that experimental groups of obtained value were greater than the

required table value at 0.05 level of confidence. This results of the study indicated that there was a significant mean difference exist between the experimental and control groups on breath holding time and respiratory rate.

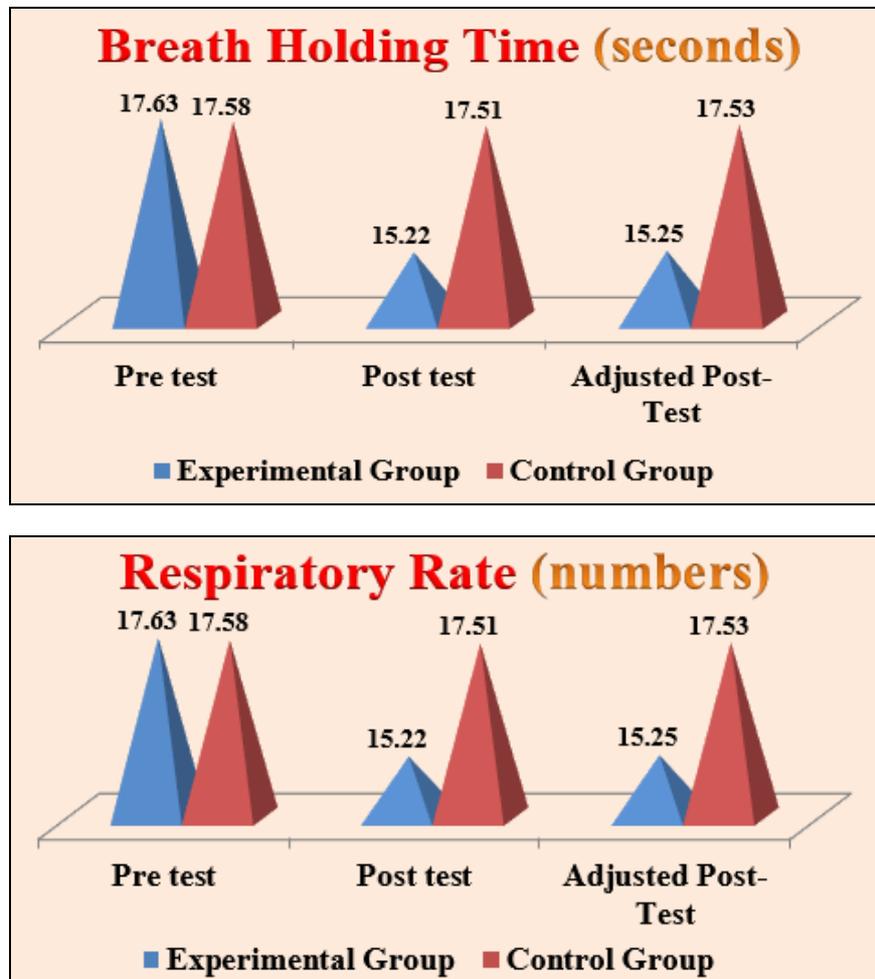


Fig 1: Pre, post and adjusted post-test mean value of experimental and control groups on breath holding time and respiratory rate.

5. Discussion on Findings

The results of the study reveals that core stability training had brought out significant positive changes in breath-holding time and rate of respiration. Regular core stability training increases the quantity of oxygen delivered to the tissues and therefore the removal of CO₂ from the body. It enhances respiratory efficiency by increasing the strength of the diaphragm and intercostal muscles, and by increasing the amount of alveoli. Breath-holding training is beneficial in athletes to enhance their respiratory endurance and their performance. It increases the capacity and prolongs the rate of respiration. the amount of times one takes inspiration or expiration in each minute. The below findings are in accordance with observations made by the subsequent renowned experts were Razia N *et al.* (2011), The study thus proves that there's a linear correlation between breath holding time and core strength. Hence, the core strength will improve the efficiency of the diaphragm ^[6]. Luca Cavaggioni, Lucio Ongaro *et al.*, (2015), Experimental Group exercises that incorporate correct breathing patterns and body flexibility offer an alternate to traditional abdominal exercises. As such, they'll be useful for coaches or physical therapists when selecting core exercises to enhance overall abdominal fitness and pulmonary function and to retrain correct diaphragmatic breathing and whole-body movements. Further research is required to match breathing with other core exercises so as to clarify the mixture of breath and abdominal exercises in treating painful disorders (low back pain, neck pain) and improving control in fitness and rehabilitation programs ^[7]. Bhagavad Geetha, Roopa et. al. (2014), regular physical training increases the quantity of oxygen delivered to the

tissues and removal of CO₂ from the body. Physical training enhances respiratory efficiency by increasing the strength of the diaphragm and intercostal muscles, and by increasing the amount of alveoli. It increases the capacity and prolongs the breath-holding time. Breath-holding training is beneficial in athletes to enhance their respiratory endurance and their performance. The breath-holding test is employed as a rough index of the cardiopulmonary reserve. BHT of but 20 seconds indicates diminished cardiac or reserve. Measures should be taken to extend physical activity among non-athletes to enhance the ventilatory function and vital functions of the body to steer an honest quality of life ^[8]. Suriya, & Arumugam, (2018) conducted a study on the influence of various breathing exercises on capacity and breath-holding time among kabaddi players. This study reveals that breath-holding time and capacity was positively increased thanks to the influence of various breathing exercise ^[12]. Arumugam, S & Kumar, (2019) conducted a study on the effect of game-specific training on breath holding time and resting pulse among kabaddi players ^[13].

6. Conclusions

1. There was significant improvement on breath holding time due to the effect of core stability training among college volleyball players.
2. There was significant improvement respiratory rate due to the effect of core stability training among college volleyball players.
3. There was significant difference exists between experimental and control groups on breath holding time and respiratory rate due to the effect of core stability

training among college volleyball players.

4. However the control group had not shown any significant improvement on any of the selected variables

7. References

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