

## EFFECT OF SWIMMING TRAINING PROGRAMME ON RESPIRATORY PARAMETERS OF NOVICE CHILDREN (Received on: 14 July 2014, Reviewed on: 12 Dec 2014 and Accepted on: 28 Jan 2015)

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### Abstract

The purpose of the study was to see the effect of swimming training programme on respiratory parameters of novice children. The subjects selected for the study was 20 female novice children with age ranged between 10-12 years from summer swimming coaching camp held in May-June 2014 in L.N.I.P.E. Gwalior. The respiratory Parameters Forced Vital Capacity, Breath Holding Capacity and Maximum Voluntary Ventilation were measured by using Mir Spirometry Pro. To determine the effect of swimming training programme in selected respiratory parameters of novice children Paired-'t' test was used. All analyses were performed by SPSS version 20. The Paired Samples Statistics, Paired Sample-'t' test estimated differences between the Pre and post results. The paired t-value found significant in relation to respiratory parameters i.e. Forced Vital Capacity, Breath Holding Capacity and Maximum Voluntary Ventilation were -5.73, -4.03, and -3.89 respectively. Results revealed that swimming training programmes is effective and the respiratory parameters were found significantly superior in post testing as compared to the pre test.

**Keywords:** Forced Vital capacity, Breath Holding, Maximal voluntary ventilation.

### Introduction

Swimming is the action of self support and propulsion in the water. It is reputed by physical education to be the best exercise for symmetrical development of the whole body. As an exercise it has considerable recreational qualities and virtues of swimming as a therapeutic exercise. Swimming generally is considered one of the best physical activities for developing and maintaining high levels of physical fitness and is a wholesome recreational activity in which any individual can participate throughout his life. In addition to the contributions it makes to physical fitness, motor development and physical proficiency and physiological aspects.

Exercise physiology is an aspect of sports medicine. It studies the functional changes that occur in the human body when exposed to physical activity, and how the human body reacts, adjusts and adapts when exposed to varied degree of physical activity or training.

Controlling the breath cannot come easily unless one practices and develop capacities for full utilization of available oxygen in each breath. By practicing breath control one may develop greater tolerance by checking respiratory stimulation as well as developing capacities for fuller utilization of available oxygen in each breath. Vital capacity and total lung

capacity are related to body size and vary approximately as the cube of linear dimensions such as body height, up to age of twenty five. The individual dimensions are, however, not exclusively decreased for the size of the lung volumes. Training during adolescence will eventually increase the vital capacity and the total lung capacity. Therefore the trainees and coaches of our country should give due consideration to physiological fitness variables along with the skill and techniques to improves the performance.

Hence, the purpose of the study was to see the effect of swimming training programme on respiratory parameters of novice children.

### Materials and Methods

Subject:

The subjects for this study were selected from the summer swimming coaching camp held in LNIFE Gwalior 2014. The study was conducted on 20 female novice children with the age ranged in between 10-12 years. Respiratory parameters were measured using Mir spirometry PRO equipment.

Forced Vital capacity

Breath Holding

Maximal voluntary ventilation

To determine the effect of swimming training programme on selected respiratory parameters of novice children paired -'t' test was used using SPSS version 20.

### Findings

Findings pertaining to each of the selected respiratory parameters pre and post test female novice swimmers which were subjected to the paired 't' ratio and mean difference method has been given in Table 1

Table 1  
Descriptive Statistics

Variables	Pairs	N	Mean	S. D.
Forced Vital Capacity	Pre FVC	20	1.79	.424
	Post FVC	20	2.23	.384
Breath holding capacity	Pre BH	20	21.33	9.68
	Post BH	20	30.70	9.71
Maximum voluntary ventilation	Pre MVV	20	2.37	0.25
	Post MVV	20	2.72	0.36

Table 1 Show the mean and standard deviation of female novice swimmers pre and post test result in selected physiological variables. In forced Vital capacity pre data was  $1.79 \pm .424$  and post  $2.23 \pm .384$  and in breath holding capacity pre data was  $21.33 \pm 9.68$  and post data was  $30.7 \pm 9.71$ . The mean and standard deviation in MVV pre data was  $2.37 \pm 0.25$  and post data was  $2.72 \pm 0.36$ .

TABLE 2  
COMPARISON OF SWIMMING TRAINING PROGRAMME ON  
RESPIRATORY PARAMETERS.

		Paired Differences			t' value
		Mean	Std. Deviation	Std. Error Mean	
Pair 1	Pre FVC- Post FVC	-.435	.33	.075	5.73
Pair 2	Pre BHC- Post BHC	-9.36	10.38	2.32	4.03
Pair 3	Pre MVV- post MVV	2.17	8.45	2.44	3.89

\* Significant at 0.05 level;  $t_{0.05}(19) = 2.093$

Table 2 shows the Paired Samples Test of selected respiratory parameters of novice children. In FVC the value of t-statistics is 5.73 and P-value is .000, in case of breath holding capacity calculated t-value is 4.03 and P-value is .001 and in Maximum voluntary ventilation calculated t-value is 3.89 and P-value is .002 which was found significant as the tabulated t-value us 2.093 which was smaller than the calculated t-value of all the respiratory parameters and the P-value is also less than .005.

### Discussion and Conclusion

The respiratory parameters are contributing factors to the performance in swimming. The analysis of data revealed that the swimming training programme of six weeks was effective. The respiratory parameters were found significantly superior in post testing as compared to the pre test. As the calculated t-value of selected respiratory parameters i.e. FVC, BHC & MVV was more than tabulated t-value. The results discussed above indicate that swimmers have higher values of lung functions. Thereby confirming that swimming training has a facilitative effect on ventilatory function, thus swimmers have superior lung function values by regular participating in swimming training. Regular swimming practice may tend to alter the elasticity of the lungs and chest wall which leads to

improvement in the lung function of swimmer. This was attributed to strengthening of the inspiratory muscles as they were against additional resistance caused by weight of water that compresses the thoracic cage. (Newmann et al., 1961). During swimming the external, pressure is high therefore the respiratory muscles along with diaphragm develop greater pressure for respiration which leads to improvement in the functional capacity of the respiratory muscles.

The study revealed that regular participation in swimming training leads to a significant improvement in their physiological variables same was concluded by Gregory D. Wells, Michael Plyley in his study regarding improvement of cardiovascular fitness, neuromuscular fitness as a result of swimming practice.

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