Vol.03,Issue02,Dec.2014

INTERNATIONAL JOURNAL OF RESEARCH PEDAGOGY AND TECHNOLOGY IN EDUCATION AND MOVEMENT SCIENCES (IJEMS)

ISSN: 2319-3050

A COMPARATIVE STUDY ON RESPIRATORY PARAMETERS BETWEEN SHORT DISTANCE AND LONG DISTANCE SWIMMERS

Baghel Priya
PhD scholar, LNIPE, Gwalior, M.P., India

ABSTRACT

The purpose of the study was to find out the comparison of selected respiratory parameters between short distance and long distance swimmers. The subjects selected for the study was 10 male interuniversity level short distance and long distance swimmers with age ranged between 18-25 years from L.N.I.P.E. Gwalior. The respiratory Parameters Peak Expiratory Flow, Vital Capacity and Maximum Voluntary Ventilation were measured by using Mir Spirometry Pro. To determine the difference in selected respiratory parameters between short distance and long distance swimmers an independent't' test was used. All analyses were performed by SPSS version 20. The mean, S.D,'t' test estimated differences between the two groups. The mean and standard deviation of vital capacity of short distance and long distance swimmers were 2.32 ±.23 and 3.32±.44 respectively and for the peak expiratory flow were 462.00±.57.19*and* 534.00±.53.19 *respectively and for maximum voluntary ventilation were* 2.37± 0.25*and* 2.72± 0.36 *respectively. The t-value found in relation to respiratory parameters i.e. vital capacity and maximum voluntary ventilation were 4.437and 2.58 respectively. Results revealed that long distances swimmers were found significantly superior in vital capacity and maximum voluntary ventilation as compared to the short distance swimmers, but it was found that there was no significant difference occurred in Peak Expiratory flow variables of short distance and long distance swimmers.*

Key words: Respiratory parameters, short distance and long distance swimmers

INTRODUCTION:

Sport science and medicine play a very important part in the performance of a swimmer. Science can maximize potential and help fine tune the athlete, making small improvements in the swimmer's performance, which is often significant as just a few hundredths of a second can decide the result of races. The areas of the sport sciences that can be valuable to a swimmer include exercise physiology, biomechanics, sports psychology and sports medicine. An exercise physiologist is invaluable for setting appropriate training and testing programs for the swimmer. Metabolic capacity has been considered to be one of important determinants of swimming performance. Therefore, the swimming training should be designed to improve the ability to

release energy both aerobically and anaerobically. The most popular training regimens in competitive swimming are an intermittent (interval) training and a continuous (endurance) training. 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. (Bowers Fox and Foss)

Exercises are one of the best ways to increase lung capacity. Such exercises are also good for the cardiovascular system, because it is the joint effort of the heart, lungs and other parts of the circulatory system, to provide oxygen to all parts of the body. So, cardiovascular exercises are perfect for increasing lung capacity as well as to strengthen cardiovascular functioning. Apart from increasing lung capacity, these exercises are also good for the muscles. These exercises involve the consistent movement of the large muscles of the body, which triggers a strong demand for oxygen in the body. Therefore the rate of breathing increases to compensate for the oxygen demand, thereby in increasing lung capacity to a certain extent. Swimming facilitates muscle relaxation, joint range of motion, improve muscle strength. It also enhances the breath control, blowing bubbles, holding one's breath, and cardio respiratory functions. (Joseph p. winnick, 2005). 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 compare the selected respiratory parameters between short distance and long distance swimmers.

MATERIALS AND METHODS:

The study was conducted on 10 male (5 from each group) interuniversity level swimmers from both between short distance and long distance swimmers with the age of subjects in between 18-25 years, and these subjects were selected from L.N.I.P.E. Gwalior. Physiological variables were measured using Mir spirometery PRO equipment.

1. Vital capacity

2. Peak expiratory flow
3. Maximal voluntary ventilation

FINDINGS:

Findings pertaining to each of the selected physiological variables test between short distance and long distance swimmers which were subjected to the 't' ratio and mean difference method has been given in Table 1

Table 1

Descriptive statistics

Variables	Different Groups	N	Mean	Std. Deviation
Vital Capacity	Short distance	5	2.32	.23
	Long distance	5	3.32	.44
Peak Expiratory Flow	Short distance	5	462.00	57.19
	Long distance	5	534.00	53.19
MVV	Short distance	5	2.37	0.25
	Long distance	5	2.72	0.36

Table 1 show the mean and standard deviation of Short distance swimmers in Vital capacity was 2.32±.23 and in Long distance was 3.32±.44. The mean and standard deviation of Short distance swimmers in Peak flow rate was 462.00±57.19 and in Long distance was 534.00±53.19. The mean and standard deviation of Short distance swimmers in MVV was 2.37 ±0.25 and in Long distance was 2.72 ±0.36.

Table 2

Significance of difference of means in Selected Respiratory Parameters between short distance and long distance swimmers

Variables	Different Classes	Means	t-Test For Equality Of Means		
			t	df	Sig.

Vital Capacity	Short distance	2.32	4.437*	8	.002
	Long distance	3.32			
Peak expiratory flow	Short distance	462.00	2.061	8	.073
	Long distance	534.00			
MVV	Short distance	2.72	2.58*	8	0.01
	Long distance	2.37			

* Significant at 0.05 level; $t_{0.05}$ (8) = 2.306

Table 2 reveals that Long distance swimmers were significantly superior in vital capacity and MVV variables as compared to the Short distance swimmers as calculated 't' value observed was 4.437 and 2.58, which was much higher than the tabulated value 2.306 at 0.05 level of significance.

Further it reveals that there was no significant difference in Peak expiratory flow between Short distance and long distance swimmers as the 't' value observes was 2.061, which was smaller than the tabulated value of 2.306 at 0.05 level of significance.

DISCUSSION AND CONCLUSION:

The physiological parameters are contributing factors to the performance in swimming. The analysis of data revealed that the long distance swimmers were significantly superior in vital capacity and maximum voluntary ventilation as compared to the short distance swimmers. The vital capacity of an individual reflects his lung capacity which was found to be better in endurance swimmers as in comparison to sprinters. As vital capacity and total lung capacity are related to body size and vary approximately as the cube of linear dimensions such as body height. (Astrand and Kaare Rodahl, 1986). And due to the water resistance the thoracic cage compresses by which the intensity and duration of the swimming training with resultant increases in the lung volume this is due to the intensity of arm pull and the trunk active during swimming may facilitate to increases the strength of respiratory musculature. So, that the swimmer may able to swim more by using the limited amount of oxygen , as they have became more adaptive to intake of air and to utilize its oxygen more efficiently and effectively resulting

in improvement of capacities of lung and cardio-vascular system and respiratory system of high performer. The study revealed that regular participation in swimming training leads to a significant improvement in their physiological variables as it was supported by the study of (Evelin jaak), his study regarding improvement of cardiovascular fitness, neuromuscular fitness as a result of swimming practice once or twice a weeks.

Many of the studies show the significant differences in the peak expiratory flow between short distance and long distance swimmers. But in this study it was found that there was no significant difference in PEF variable between short distance and long distance swimmers. PEF is the speed of the air moving out of the lungs at the beginning of the expiration, measured in L/sec. It is the force generation capacity means forceful expiration but not the amount of air in the lungs. Peak expiratory flow might not be dependent on the size of the chest cavity and strength of the intercostals muscles facilitate the force generation which was found to be similar between short distance and long distance swimmers. So, probably due to this reason there was no significant difference in peak expiratory flow variable. The study revealed that regular participation in swimming training leads to a significant improvement in their physiological variables

References

Bowers Fox, and Foss, The physiological basis of physical education and athletics, fourth edition, brown publishes Dubuque Iowa 1988.

Astrand and Rodahl Kaare, "Text Book of Work Physiology", Physiological Basic of Exercise, Singapore, Mc Graw – Hill Book Co., 1986

Joseph P. Winnick, Adapted Physical Education and Sports, Fourth Edition, State University of New York, College at Brockport, 2005, PP 439-441.

Ernest W. Maglischo, Swimming Fastest, Human Kinetics, 2003, PP 703-712

Evelin jaak jurimae, Physiological, biomechanical and anthropometrical predictors of sprint swimming performance in adolescent swimmers journal of sports science and medicine Journal Of Sports Science & Medicine, 2010(9): 398 - 404

Meckel Y, Bishop DJ, The relationship between short- and long-distance swimming performance and repeated sprint ability. US National Library of Medicine National Institutes of Health, 2012 Dec;26(12):3426-31.