

## COMPARISON OF VITAL CAPACITY AND RESTING HEART RATE VARIABLES IN PHYSICALLY CHALLENGED SWIMMERS

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### ABSTRACT

*The present investigation was to find out the comparison of vital capacity and resting heart rate variables in physically challenged swimmers. 25 male (5 from each group) was selected as a subjects for the study from the five different classes i.e. S1, S2, S3, S4 & S5 classes of National level physically challenged swimmers with age ranged between 20-25 years. The physiological variables were measured with the following procedure: vital capacity with a dry spirometer and resting heart rate with stopwatch (seconds). To determine the difference of vital capacity and resting heart rate variables in physically challenged swimmers Analysis of variance (ANOVA) test was employed and the significant level was set at 0.05. Data revealed that there was no significant difference found in physically challenged swimmers in case of Vital capacity variable but in case of resting heart rate variables significant relationship was shown in physically challenged swimmers.*

*Key words: S1, S2, S3, S4 & S5 classes, physically challenged swimmers, physiological variables.*

### INTRODUCTION:

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) <sup>1</sup>. It also helps in designing and managing rehabilitative programmes for those people also who were suffering from various disorders or physically challenged.

Bringing the disabled into the mainstream of life requires offering them opportunity to play and acquire skill to improve their motor abilities. Only on their physical activities can be improved. In this regard, swimming is one of the most valuable activities for the physically challenged people with its origin in the early use of hydrotherapy in the treatment of disabilities. Probably the most important single recommendation for including swimming in a school physical

education programme is that it is the only activity in which it is possible for all children, irrespective of handicap, to move quite freely without calipers, sticks and wheelchair.

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. (Astrand and kaare Rodahl, 1986)<sup>3</sup>. 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 vital capacity and resting heart rate variables in physically challanged swimmers.

#### MATERIALS AND METHODS:

The study was conducted on 25 male (5 from each group) physically challenged swimmers from 5 National level classes of physically challenged swimmers with the age of subjects in between 18-25 years, and these subjects were selected from the 12<sup>th</sup> National Paralympics Swimming held at Chennai, 2012. Physiological variables were measured using following test items.

Physiological fitness variables	Tools of measurement
1. Vital capacity	Dry spirometer (liters)
2. Resting heart rate	Stop Watch

To determines the differences in selected physiological variables among different classes of physically challanged swimmers the one way analysis of variance (ANOVA) was applied using SPSS version 20.

#### FINDINGS:

Findings pertaining to each of the selected physiological variables test among different classes physically challenged swimmers which were subjected to the Descriptive Statistics and ANOVA test and LSD Post Hoc comparison has been given in the following Tables

TABLE-1

## DISCRIPTIVE STATISTICS

Variables	Classes	N	Mean	Std. Deviation
RHR	S1	5	61.60	1.14
	S2	5	73.20	9.73
	S3	5	73.40	9.04
	S4	5	65.00	5.70
	S5	5	52.60	8.87
VC	S1	5	2.32	0.23
	S2	5	3.30	0.62
	S3	5	3.30	0.97
	S4	5	2.76	0.43
	S5	5	3.32	0.44

Table-1 showed the mean and standard deviation of different classes of physically challenged swimmers in resting heart rate and vital capacity variable.

FIGURE.1 GRAPHICAL REPRESENTATION OF DISCRIPTIVE STATISTICS

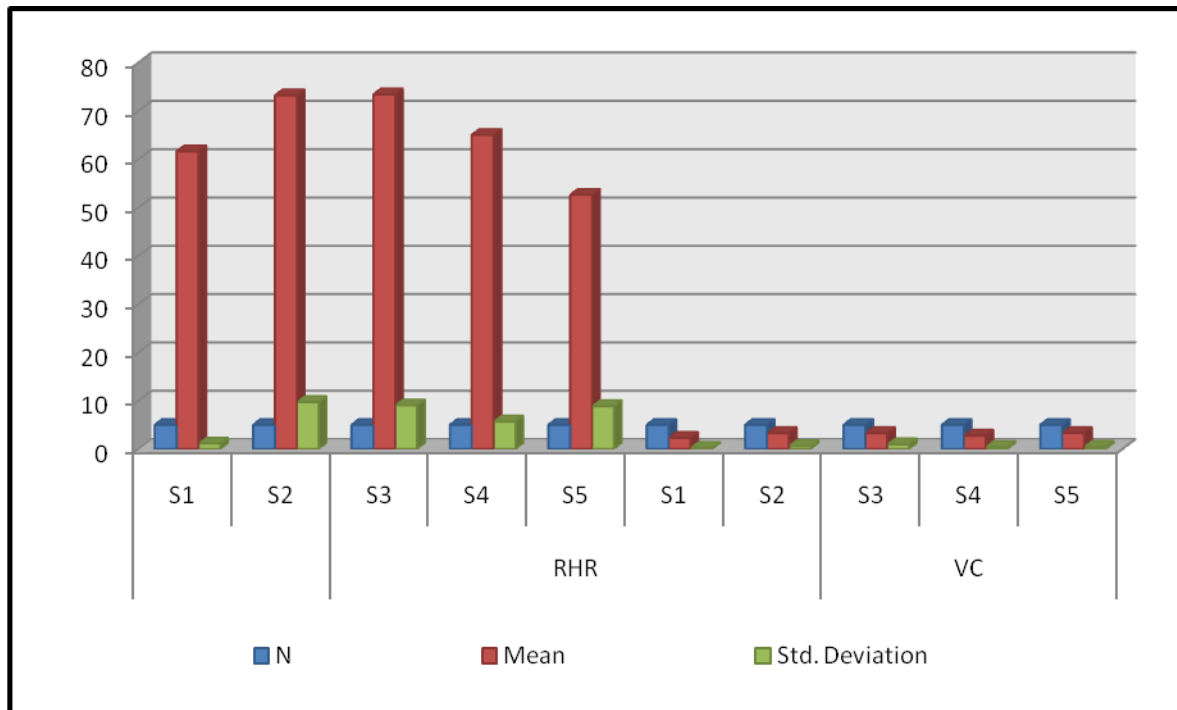


TABLE-2

## ANALYSIS OF VARIANCE

Variables	Source Of Variance	Sum of Squares	df	Mean Square	F	Sig.
RHR	Between Groups	1514.96	4	378.740	6.55*	.002
	Within Groups	1156.40	20	57.820		
	Total	2671.36	24			
VC	Between Groups	4.012	4	1.003	2.783	.055
	Within Groups	7.208	20	.360		

	Total	11.220	24			
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\*Significant at 0.05 Level

$$F_{0.05} (4, 20) = 2.87$$

Table 2 Revealed that there was no significant difference found in physically challenged swimmers in case of Vital capacity variable as the calculated value of F- value 2.783 which was lesser than the tabulated value of (F= 2.87 ) at .05 level of significance, with (4,20) degree of freedom.

Data revealed that the significant difference exist in the different classes of physically challenged swimmers in Resting heart rate as the calculated F-value was 6.55 which was much higher than the tabulated value of (F= 2.87 ) at .05 level of significance, with (4,20) degree of freedom.

TABLE-3

#### LSD POST HOC COMPARISON OF MEANS OF DIFFERENT CLASSES FOR RESTING HEART RATE

VARIABLES	S1	S2	S3	S4	S5	Mean Difference	Significant Difference
RESTING HEART RATE	61.60	73.20				11.60	.026
	61.60		73.40			11.80	.023
	61.60			65.00		3.40	.488

	61.60				52.60	9.00	.076
		73.2 0	73.4 0			0.20	.967
		73.2 0		65.00		8.20	.104
		73.2 0			52.60	20.6	.000
			73.4 0	65.00		8.4	.096
			73.4 0		52.60	20.8	.000
				65.00	52.60	12.4	.018

\*The mean difference is significant at the 0.05 level.

In Table 3 It can be seen that mean difference in Resting Heart Rate variable of physically challenged swimmers is found to be significant in between S1 and S2, S1 and S3, S2 and S5, S3 and S5, S4 and S5 as the p-value for these mean difference is less than 0.05 which are .026, .023, .000, .000, .018 respectively. However, there is no significant difference found in between S1 and S4, S1 and S5, S2 and S3, S2 and S4, S3 and S4, because the p-value is more than 0.05 which are .488, .076, .967, .104, .096 respectively.

#### DISCUSSION OF FINDINGS:

The purpose of the problem was to compare the vital capacity and resting heart rate variables in physically challenged swimmers. The physiological parameters are contributing factors to the performance in swimming.

The analysis of data revealed that there was no significant difference found in the different classes of physically challenged swimmers in case of Vital capacity variable as the value of F-

value (2.783), 'F' was lesser than the tabulated value of ( $F= 2.87$ ) at .05 level of significance, with (4,20) degree of freedom.

Whereas, the analysis of data revealed that the significant difference exist in the different classes of physically challenged swimmers of Resting heart rate (RHR) as the calculated F-value was (6.55), which was much higher than the tabulated value of ( $F= 2.87$ ) at .05 level of significance, with (4,20) degree of freedom. S1 class physically challenged swimmers have limited and severely restricted movement of upper and lower limbs with poor head and trunk control in comparison to different classes of physically challenged swimmers. So, there is the difference in the training of these classes according to their disability level and the less challenged swimmers are able to take more workload and they may be trained for multiple events like short and long distance events of swimming, than the severe class of physically challenged swimmers. So, RHR is often a measure of fitness – if the person is more fit, then RHR will decrease as the heart becomes more efficient. So, may be due to these reasons there was significant differences found and the less challenged swimmers are more physically fit.

So, the study revealed that regular participation in swimming training leads to a significant improvement in their physiological variables same was concluded by Ralph Saphira in his study regarding improvement of cardiovascular fitness, neuromuscular fitness as a result of swimming practice.

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