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A Study on Anaerobic Power in Athletes of Different Type of Sport

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Abstract: *The success and good performance in any sports depends on several characteristics, such as, physical fitness level of the athletes, aerobic capacity, anaerobic capacity, psychological factors, training level, skill level, techniques, tactics and etc. And each sport requires some specific characteristics to gain the success.*

The aim of this study was to investigate the anaerobic capacity in athletes engaged in different type of sport and compare them in relation to specific demands of each sport by using RAST method. To accomplish the aim of the study 51 athletes of volleyball (17), Football (17) and handball (17) were selected as subjects from Christ PU Junior Residential College, Bangalore. The running-based anaerobic capacity test (RAST) was used to examine the anaerobic capacity of selected subjects. The statistical techniques mean, SD and one way ANOVA was used to analyze the data (SPSS 16.0 was used). The probability level accepted for statistical significance was set at $p \leq 0.05$.

Keywords: *Anaerobic power, RAST, Fatigue Index, Volleyball, Football and Handball.*

1. INTRODUCTION

The success and good performance in any sports depends on several characteristics, such as, physical fitness level of the athletes, aerobic capacity, anaerobic capacity, psychological factors, training level, skill level, techniques, tactics and etc. And each sport requires some specific characteristics to gain the success.

The athletes who pursue a sport will take part in training according to the character of the sport for longer duration. The regular training for longer duration causes the change in specific condition, which will become the psychological and psychomotor character of the athlete (1).

Every sport discipline must be observed individually, Because of the different influences that each characteristic has on sport results. For example, the most important part in rowing will be aerobic capacity, anaerobic capacity in sprint, volleyball, basketball, and hockey, technique in jumping, and other components in soccer, with the advantage of anaerobic capacity (2).

The preparation of anaerobic capacity level is one of the basic monitored parameters in high-speed-forced competitions (3). Anaerobic capacity is the ability of the athlete to maintain anaerobic movements (4).These anaerobic capacity measurements help to the sports man in attaining the desired results in their sporting event. RAST is one of the tests which in natural field conditions, can be used for the estimation of the power of anaerobic capacity and the calculation of the fatigue index (3).

2. OBJECTIVE OF THE STUDY

The aim of this study was to investigate the anaerobic capacity of athletes engaged in different type of sports and compare them in relation to specific demands of each sport by using RAST method.

3. HYPOTHESIS

It was hypothesized that there was no significant difference between selected groups related to anaerobic power.

4. METHODOLOGY

4.1. Selection of Sample

A total 51 athletes of volleyball, football and handball were selected to participate in this study, each sport consists 17 subjects. The selected subjects were 16-18 years old, healthy and practicing regularly.

Table1. *The anthropometric characters of the athletes*

Groups	Mean value of			
	Age (in Years)	Height(in centimeters)	Weight (in kgs)	Athletic Experience (in Years)
Volleyball	16.24	171.35	58.72	1.88
Football	17.12	172.76	63.82	3.17
Handball	16.89	173.59	60.19	2.58

4.2. Data Collection

The orientation about the test and the research was given to the participants. Running-based anaerobic sprint test (RAST) was used to collect the data. Participants' height, weight was measured and 10-15 minutes warm up was done by the athletes before conducting the test. Athletes performed 6 sprints 35 meters distance at their maximal pace with the 10 second interval between each sprint. The power in each sprint was then calculated by the formulas as the following;

Power= (Body mass x Distance2)/Time3

Maximum power=the highest value

Minimum power=the lowest value

Average power=sum of all six value/6

Fatigue index= (maximum power-minimum power)/total time for the 6 sprints

5. ANALYSIS AND RESULT

The statistical techniques mean, SD and one way Analysis of Variance was used to analyse the date.

Table2. *Mean, SD of Maximum Power, Minimum Power, Average Power and Fatigue Index of Volleyball, Football and Handball*

Anaerobic Power Varibales	Volleyball		Football		Handball	
	Mean	SD	Mean	SD	Mean	SD
Maximum Power (in Watts)	524.65	138.56	467.18	90.65	526.94	107.36
Minimum Power (in Watts)	230.41	33.65	238.52	42.31	227.64	65.67
Average Power (in Watts)	346.17	63.48	333.53	52.22	347.41	65.67
Fatigue Index(Watts/Sec)	8.17	3.52	6.14	2.56	8.16	2.79

Table3. *Analysis of Variance of Maximum Power among Volleyball, Football and Handball players*

Source of Variation	Sum of Squares	df	Mean Square	F	P-value	F crit
Between Groups	38986.39	2	19493.19	1.50	0.23	3.19
Within Groups	623129.29	48	12981.86			
Total	662115.69	50				

Significant level 0.05

The table number 3 shows that the f value is 1.50 is lesser than the f Critical value 3.19 and the p value 0.23 is greater than the significant level 0.05, it was clearly shows that there was no significant difference found between selected groups related to the maximum power at 0.05 significant level. Hence, the null hypothesis was accepted.

Table4. *Analysis of Variance of Minimum Power among Volleyball, Football and Handball players*

Source of Variation	Sum of Squares	df	Mean Square	F	P-value	F crit
Between Groups	1087.80	2	543.90	0.25	0.78	3.19
Within Groups	102814.24	48	2141.96			
Total	103902	50				

Significant level 0.05

The table number 4 shows that the f value is 0.25 is lesser than the f Critical value 3.19 and the p value 0.78 is greater than the significant level 0.05, it was clearly shows that there was no significant difference found between selected groups related to the minimum power at 0.05 significant level. Hence, the null hypothesis was accepted.

Table5. *Analysis of Variance of Average Power among Volleyball, Football and Handball players*

Source of Variation	Sum of Squares	df	Mean Square	F	P-value	F crit
Between Groups	2006.76	2	1003.38	0.27	0.76	3.19
Within Groups	177130.19	48	3690.21			
Total	179136.95	50				

Significant level 0.05

The table number 5 shows that the f value is 0.27 is lesser than the f Critical value 3.19 and the p value 0.76 is greater than the significant level 0.05, it was clearly shows that there was no significant difference found between selected groups related to the average power at 0.05 significant level. Hence, the null hypothesis was accepted.

Table6. *Analysis of Variance of Fatigue Index among Volleyball, Football and Handball players*

Source of Variation	Sum of Squares	df	Mean Square	F	P-value	F crit
Between Groups	46.42	2	23.21	2.60	0.08	3.19
Within Groups	428.69	48	8.93			
Total	475.11	50				

Significant level 0.05

The table number 6 shows that the f value is 2.60 is lesser than the f Critical value 3.19 and the p value 0.08 is greater than the significant level 0.05, it was clearly shows that there was no significant difference found between selected groups related to the fatigue index at 0.05 significant level. Hence, the null hypothesis was accepted.

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