Research Paper Physical Education

Analysis of Anaerobic Capacity of Different Age Groups of Tennis Players

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ABSTRACT

The purpose of the study was to analyze the anaerobic capacity of Tennis players. To achieve the purpose of the study, five hundred men Tennis players who have participated in the district level tennis matches from Tamilnadu, India, during the year 2012-2013, were selected as subjects for this study at random. Based on the ages of the Tennis players they were divided into four groups (each group consists of one hundred and twenty five). Anaerobic Capacity was selected as criterion variable and it was measured by administering Margaria – Kalamen Anaerobic power test. All the subjects were tested on the selected variables. The collected data were statistically analyzed for significance using analysis of variance (ANOVA). Whenever the 'F' ratio found to be significant, the Scheffe's post hoc test was used to find out the significant difference if any, among the paired means. In all the cases 0.05 level of significance was used to test the hypothesis. There was a significant difference on Anaerobic Capacity among different age groups of Tennis players (16-20 years, 21-25 years, 26-30 years and 31-36 years). The age group 31-36 year tennis players is better in Anaerobic Capacity than other age groups of 16-20 years, 21-25 years and 26-30 years.

Keywords : Anaerobic Capacity, Tennis

INTRODUCTION

Anaerobic means "without oxygen". During anaerobic work, involving maximum effort, the body is working so hard that the demands for oxygen and fuel exceed the rate of supply and the muscles have to rely on the stored reserves of fuel. In this case waste products accumulate, the chief one being lactic acid.

The muscles, being starved of oxygen, take the body into a state known as oxygen debt. The body's stored fuel soon runs out and activity ceases - painfully. This point is often measured as the lactic threshold or anaerobic threshold or onset of blood lactate accumulation (OBLA). Activity cannot be resumed until the lactic acid is removed and the oxygen debt repaid.

Anaerobic power is the power produced without the requirement for oxygen to be present. Sprinting, mainly at the end of a race, is predominately an anaerobic activity. Anaerobic literally means without oxygen. It relates to short-term high-energy production where the predominant fuels are produced without the necessity of oxygen. Tests for anaerobic performance aim to assess relatively short duration exercise bouts.

Anaerobic power or capacity is an expression used for the maximal exercise up to a maximum of two minutes and the energy used during the workload is provided in large measure without necessitating oxygen, since the stored phosphagenes and glycogen in the muscles would be enough up to two minutes. At the onset of the exercise, since ready energy materials are used, lactate is not formed.

Anaerobic power is exhibited in many sports as highly explosive movements lasting from the fraction of sports of a second to approximately 5 sec. ***(Astrand et al 1986)*** and energetically fuelled by immediate ATP and creatine phosphate sources without significant contribution from glycolyic pathway ***(Di Pamero 1981).***

Anaerobic capacity is the ability to keep violent muscle contraction that depends genuinely on anaerobic mechanism in providing energy ***(Allawy, & Radhwan,1989).*** The oxygen debt, defined as the recovery oxygen uptake above resting metabolic rates, has been discredited as a valid and reliable measure of the anaerobic capacity power as it is generally acknowledged that mechanisms other than the metabolism of lactate also contribute to the post-exercise oxygen uptake ***(Medbo, & Tabata 1989).***

METHODOLOGY

The purpose of the study was to analyze the anaerobic capacity of Tennis players. To achieve the purpose of the study, five hundred men Tennis players who have participated in the District level tennis matches from Tamilnadu, India, during the year 2012-2013, were selected as subjects for this study at random. Based on the ages of the Tennis players they were divided into four groups (each group consists of one hundred and twenty five). Anaerobic Capacity was selected as criterion variable and it was measured by administering Margaria – Kalamen Anaerobic power test. All the subjects were tested on the selected variables.

The collected data were statistically analyzed for significance using analysis of variance (ANOVA). Whenever the 'F' ratio found to be significant, the Scheffe's post hoc test was used to find out the significant difference if any, among the paired means. In all the cases .05 level of significance was used to test the hypothesis.

RESULTS AND DISCUSSION

The analysis of variance on Anaerobic Capacity of 16-20 years tennis players, 21-25 years tennis players, 26-30 years tennis players and 31-36 years tennis players have been analyzed and presented in Table I.

TABLE I
ANALYSIS OF VARIANCE ON ANAEROBIC CAPACITY OF DIFFERENT AGE GROUPS OF TENNIS PLAYERS

Mean				Sources of Variance	Sum of Square	df	Mean Squares	F-ratio
Group-I 16-20 years Tennis Players	Group-II 21-25 years Tennis Players	Group-III 26-30 years Tennis Players	Group-IV 31-36 years Tennis Players					
87.53	**89.33**	**98.03**	**110.73**	**Between**	**42071.60**	**3**	**14023.87**	197.33
				Within	35250.65	496	71.07	

(Anaerobic Capacity scores in Seconds)

(The table value required for significance at 0.05 level with df 3 and 496 is 2.62).

From the table I, the mean values on Anaerobic Capacity for Group-I(16-20 years tennis players), Group-II(21-25 years tennis players), Group-III(26-30 years tennis players) and Group-IV (31-36 years tennis players) are 87.53, 89.33, 98.03 and 110.73 respectively. The obtained F-ratio of 197.33 for paired means is less than the table value of 2.62 with df 3 and 496 required for significance at 0.05 level of confidence.

The results of the study indicate that there is a significant difference among the means of Group-I (16-20 years tennis players), Group-II (21-25 years tennis players), Group-III (26-30 years tennis players) and Group-IV (31-36 years tennis players) on Anaerobic Capacity. However, it may be concluded that Group-IV (31-36 years tennis players) is higher than Group-I(16-20 years tennis players), Group-II(21-25 years tennis players) and Group-III(26-30 years tennis players) in Anaerobic Capacity.

As the F-ration was found significant in case of Anaerobic Capacity the Scheffe's post-hoc test was applied to test the significance of differences between paired means separately among Tennis players belonging to different age group which is presented in Table-II.

TABLE-II
SIGNIFICANCE DIFFERENCES BETWEEN THE PAIRED MEANS OF ANAEROBIC CAPACITY PERFORMANCE AMONG TENNIS PLAYERS BELONGING TO DIFFERENT AGE GROUPS

Means				Mean Difference	Confidence Interval
Group-I 16-20 years Tennis Players	Group-II 21-25 years Tennis Players	Group-III 26-30 years Tennis Players	Group-IV 31-36 years Tennis Players		
87.53	89.33	--	--	1.80	2.99
87.53	--	98.03	--	10.50*	2.99
87.53	--	--	110.73	23.20*	2.99
--	89.33	98.03	--	8.70*	2.99
--	89.33	--	110.73	21.40*	2.99
--	--	98.03	110.73	12.70*	2.99

**** Significant at.05 level of confidence***

From the above Table II shows that the mean differences on Group-I (16-20 years tennis players) and Group-III (26-30 years tennis players), Group-I (16-20 years tennis players) and Group-IV (31-36 years tennis players), Group-II (21-25 years tennis players) and Group-III (26-30 years tennis players), Group-II (21-25 years tennis players) and Group-IV (31-36 years tennis players) and Group-III (26-30 years tennis players) and Group-IV (31-36 years tennis players) are 10.50, 23.20, 8.70, 21.40 and 12.70 respectively and they are greater than the confidence interval value 2.99, which shows significant differences at 0.05 level of confidence. The mean differences Group-I (16-20 years tennis players) and Group-II (21-25 years tennis players) was 1.80 lesser than the confidence interval value 2.99, which shows insignificant differences at 0.05 level of confidence.

The results of the study further have revealed that there is a significant difference in Anaerobic Capacity between the means of Group-I (16-20 years tennis players) and Group-III (26-30 years tennis players), Group-I (16-20 years tennis players) and Group-IV (31-36 years tennis players), Group-II (21-25 years tennis players) and Group-III (26-30 years tennis players), Group-II (21-25 years tennis players) and Group-IV (31-36 years tennis players) and Group-III (26-30 years tennis players) and Group-IV (31-36 years tennis players). The mean difference between Group-I (16-20 years tennis players) and Group-II (21-25 years tennis players) showed insignificant differences.

However, the improvement in Anaerobic Capacity was significantly higher for Group-IV (31-36 years tennis players) than other age Groups.

The mean values of Group-I(16-20 years tennis players), Group-II(21-25 years tennis players), Group-III(26-30 years tennis players) and Group-IV (31-36 years tennis players) on Anaerobic Capacity are graphically represented in the figure I.

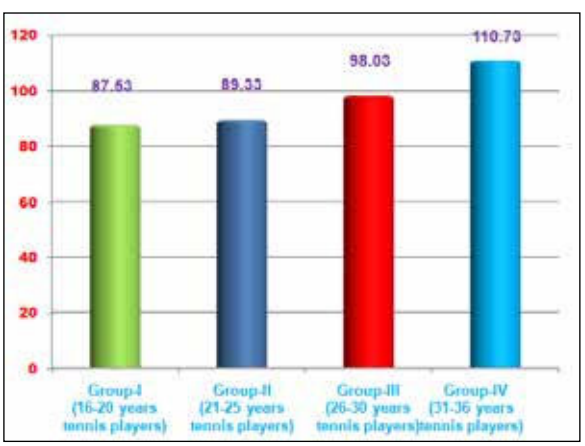

FIGURE-I: MEAN VALUES OF GROUP-I(16-20 YEARS TENNIS PLAYERS), GROUP-II(21-25 YEARS TENNIS PLAYERS), GROUP-III(26-30 YEARS TENNIS PLAYERS) AND GROUP-IV (31-36 YEARS TENNIS PLAYERS) ON ANAEROBIC CAPACITY

CONCLUSION

From the results of the study the following conclusions were drawn.

1. There was a significant difference on Anaerobic Capacity among different age groups of Tennis players (16-20 years, 21-25 years, 26-30 years and 31-36 years).
2. The age group 31-36 year tennis players is better in Anaerobic Capacity than other age groups of 16-20 years, 21-25 years and 26-30 years.

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