

# Relationship Between Selected Performance Oriented Fitness Variables and Basal Serum Testosterone in University Level Basketball Players

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## Abstract

The purpose of the study was to find out the relationship between fitness variables and basal serum testosterone level of university basketball players. To achieve the purpose fifteen basketball players who have represented university were selected as subjects. They were tested on the selected fitness variables namely speed, Explosive Power and Cardiovascular endurance. In addition Serum Testosterone was assessed in the laboratory using standard procedure. The collected data were analyzed using the correlation coefficient. The result showed that the Serum Testosterone had moderate relationship with explosive power and speed and it was negatively correlated with cardiovascular endurance.

**Keywords:** Endurance, Speed, Explosive power, Testosterone.

## Introduction

Testosterone (T) is an anabolic and androgenic steroid hormone and its serum concentration is a limiting factor to muscular growth. Through a better understanding of Physiology and the factors that affect serum concentrations athletes can naturally optimize the latter and hence improve performance.

Testosterone is a powerful anabolic hormone that increases and limits muscle protein synthesis by increasing transport of amino acid across cell membranes and by increasing RNA and DNA synthesis. It is also an anti-catabolic hormone that inhibits cortisol by competing for receptor sites. In addition to these anabolic effects, Testosterone enhances strength and power performance and also contributes to the conversion of type II-A muscle fiber into faster type II-B.

## Purpose of Study

The purpose of the Study was to investigate the relationship between selected performances oriented fitness variables and basal serum testosterone of basketball players.

## Review of Related Literature

Bosco (1996) conducted a study on the relationship between field fitness variables and basal serum testosterone and cortisol levels in soccer players. To achieve the purpose 32 professionals' soccer players were selected and they were tested on the following selected variables namely explosive power, preparatory counter movement, cardiovascular endurance, serum testosterone and cortisol with standard field and laboratory tests. The collected data were analyzed statistically and correlation coefficients were computed. The results of the study showed that

serum testosterone was positively related to preparatory counter movement, however, serum testosterone and cortisol were negatively correlated with cardiovascular endurance.

Gopinath (2007) conducted a study on relationship between selected physical and haematological variables of hockey players. To achieve the purpose 20 inter collegiate hockey players were selected and they were tested on the following variables namely speed, leg power, endurance, flexibility agility, haemoglobin, Red blood cells with standard field and laboratory tests. The collected data were subjected to statistical analysis and the correlation coefficient was computed. The results of the study showed that there were significant relationship among physical fitness variables and the relationship between haematological variables and fitness variables were not significant.

Bosco & Komi (1993) through their findings proved a positive relationship between testosterone and maximal explosive power measured during jumping performance or double knee extension exercises. It was found that the explosive jumping performance was positively related to the percentage of high level of serum testosterone for People with fast twitch muscle fibers.

Dux et al (1982) conducted animal experiments to assess the relationship among the significance of testosterone, explosive power and maximal speed. They found casual relationships between fast twitch fibres and testosterone concentration.

### Methodology

Fifteen university level basketball players were selected for this study. The selected subjects were tested on explosive power, speed and cardiovascular endurance by administering standing broad jump, 30 meters sprint, 12 minutes run/walk. Serum testosterone was assessed in the laboratory by taking blood samples at 7.00 hours after 12 hours of fasting from the antecubital vein before jumping and speed tests were executed, while Cooper's test was performed in the afternoon. Serum samples were frozen at  $-20^{\circ}$  until analysed. Serum Testosterone (T) was analysed by Electro-chemi luminescence Immunoassay (ECLIA). The collected data were analysed using the Pearson's product moment correlation and the results are given in Table 1.

### Results and Discussion

**Table - I**  
**Correlation among the Selected Variables**

	<b>Explosive power</b>	<b>Speed</b>	<b>Cardiovascular endurance</b>	<b>Serum testosterone</b>
Explosive Power	-	-0.68	0.54	0.78
Speed	-	-	-0.48	-0.73
Cardio Vascular Endurance	-	-	-	-0.52

The table value required for significance for df 13 is 0.514.

The inter correlation matrix presented in table I shows that there were significant inter correlation between serum testosterone with explosive power ( $r=0.78$   $n=15$ ) and speed ( $r = -0.73$   $n= 15$ ). It is understood that power and speed are positively related to the percentage of fast twitch fibres in leg extensor muscles. The results of the present study led to an assumption that comparatively a high level of serum Testosterone may be common among people with fast twitch muscles.

The prevalence of fast twitch fibres favours performance which involves fibres explosive power and maximal speed. The results indicated negative correlation between serum testosterone with cardio vascular endurance. ( $r=-0.52$ ,  $n=15$ ). It may be attributed that those who have greater concentration of testosterone may have higher percentage of fast twitch muscle fibre and consequently better explosive power and speed. It is understood that they will have less percentage of slow twitch muscle fiber and as a result the relationship between testosterone and cardiovascular endurance is low. The results of the study were in line with the study conducted by Bosco, (1996).

Katch and Weltmann, 1979; and Bosco, 1993 also showed a negative relationship between testosterone with explosive power and cardio vascular endurance performances.

### Conclusion

Basketball game demands greater explosive power and speed which ultimately require higher level of Testosterone. The results suggest that there is a strong relationship between Testosterone and activities that depend upon fast twitch muscle fibers.

Thus it is concluded that Serum testosterone is having high association with explosive power and speed and low correlation with cardio vascular endurance. However further studies are required to identify the percentage of fast twitch fibers and performance of basketball players in speed and explosive power.

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