



COMPARISON OF HAND GRIP STRENGTH IN MALE VOLLEYBALL PLAYERS AND NON-ATHLETES

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Abstract : Grip strength used as an indicator of overall physical strength and as a functional index of physical performance. Handgrip strength is a physiological variable that is affected by number of factors including age, gender, training and body size. This study was done with the aim of finding the grip strength difference between male volleyball players and male non-athletes. Handgrip strength was measured using Handgrip Dynamometer in 40 male volleyball players and 40 male non-athletes. The results were analyzed using studentt test. Statistically significant difference was found in handgrip strength between male volleyball players and male non-athletes (P 0.05) and also found positive correlation between handgrip strength of male volley ball players and body mass index. This proves that athletic training influence handgrip strength.

Keyword :Handgrip strength, Male volleyball players, Handgrip Dynamometer.

INTRODUCTION

Hand grip strength is a measure of strength of the hand and the forearm muscles [1]. It can be quantified by measuring the amount of static force that the hand can squeeze around a dynamometer [2]. Many factors affect handgrip strength. Age, gender, body size, handedness, occupation, physical training affect handgrip strength to varying degree. The estimation of handgrip strength is of immense importance in sports like volleyball, wrestling, tennis, football, handball, basketball and baseball where a sufficient degree of grip strength is necessary to be successful [3]. Information regarding a person's strength is often sought in order to monitor longitudinal adaptations to training, rehabilitation and to compare strength levels between individuals or groups of individuals [4]. Volleyball is an intermittent sport. It requires players to participate in frequent short bouts of high intensity exercise, followed by periods of low intensity activity. As a result, volleyball players acquire well developed speed, agility, upper- body and lower body muscular power, and maximal aerobic power [3]. Several studies have examined the relationships between anthropometric and physiological characteristics of volleyball players [5, 6].

AIMS & OBJECTIVES:

To find the difference in handgrip strength between male volleyball players and male non-athletes.

MATERIALS & METHODS:

The study was done in the department of physiology. The study period extended between June to November 2012. 40 young male volleyball players in the age group of 20-25 years were selected and included in the study. 40 male controls in the age group of 20-25 years with no particular athletic background were selected from the same place for comparison. Body builders, manual labourers and ambidextrous [7] individuals were excluded. Those with medical disorders like diabetes mellitus, hypertension, renal failure, anemia etc and neuromuscular disorders, orthopaedic abnormalities like mallet finger, trigger finger, hand injures etc were excluded from the study. Those on performance enhancing drugs, medications, sedatives were also excluded from the study. General assessment was done. A written consent was obtained from the subjects. Hand grip strength was assessed by measuring maximum isometric tension using handgrip dynamometer. Handgrip Dynamometer (Labotech precision instruments) is a portable instrument in which the maximum isometric tension achieved can be directly read from the reading on the dial. The value is read in kilograms of force. The grip strength of dominant hand was measured using dynamometer at sitting position with the shoulder adducted and neutrally rotated and elbow flexed at 90° and forearm in neutral position. The subjects were instructed to squeeze the hand grip dynamometer for 3 seconds with maximum effort to record maximum isometric tension. Three recordings were taken. One minute gap was given between each test to avoid fatigue. The best of the three recordings was taken as maximum isometric tension for that hand. All the values were tabulated. Statistical analysis was done using student't' test. * P value < 0.05 was taken as statistically significant.

Figure:1 HANDGRIP DYNAMOMETER RESULTS:



Out of 80 participants in the study 40 were male volleyball players and 40 were male non-athletes. The mean age of male volleyball players was 22.85 (± 1.61) and the mean age of male non-athletes as 22.2 (± 1.77)

Table: 1 Descriptive statistics

parameters	Male volleyball	Male non-athletes	P value
	players (n=40)	(n=40)	
	Mean \pm SD	Mean \pm SD	
Height	165.2 \pm 5.6	157.8 \pm 3.7	0.001*
Weight	63.5 \pm 5.1	57.7 \pm 4.3	0.001*
BMI	23.2 \pm 1.4	23.2 \pm 1.3	0.75

Table 1 show male volleyball players have higher mean values in all anthropometric variables.

Table: 2 Comparison of Handgrip Strength in Male volley ball players Vs Male non-athletes

parameters	Male volleyball players	Male non-athletes	P value
	(n=40)	(n=40)	
Handgrip strength of			
Dominant hand	34.5 \pm (3.856)	23.4 \pm (4.293)	0.001*

*P value <0.05 was taken as statistically significant Handgrip strength of dominant hand in male volley players show mean value 34.5 \pm (3.856) and in male non-athletes it is 23.4 \pm (4.293) with P value 0.001 showing the differences is significant.

Figure 2: Comparison of Handgrip Strength in Male volley players Vs Male non-athletes

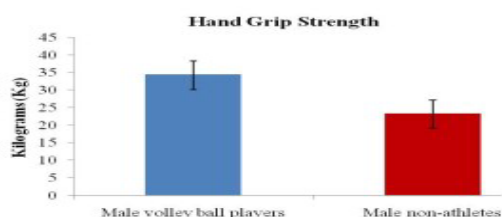
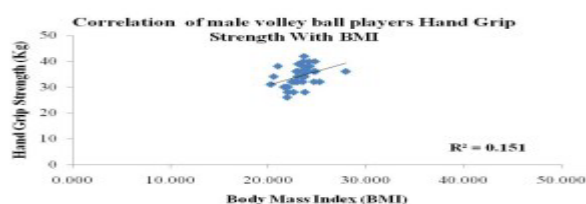


Table 3: Correlation of handgrip strength of male volley players and male non-athletes with Body mass index

Parameters	Male Volleyball Players	Male Non-athletes	P value
	R ² value	R ² value	
Correlation of handgrip Strength with BMI	0.1512	0.0096	0.001

Table 3 show positive correlation of handgrip strength of male volleyball players with BMI

Figure: 3



DISCUSSION:

The human hand is unique in being free of habitual locomotor duty and devoted entirely to functions of manipulation. Ball games require comprehensive ability including physical, technical, mental and tactical abilities. For the volleyball game, the use of the hand is essential, hand morphology and functional properties could be important for the performance [8].

There are various studies concerning the effects of sports on anthropometric measurements and physical status of the human body. The result of present study shows significant differences in handgrip strength between male volley ball players and male non-athletes.

The results of present study are consistent with those of Artis Bhargava et al [9], Shyamal koley et al, Cagatay Barut et al. The present study shows positive correlation between handgrip strength and body mass index. It was earlier reported that handgrip strength had strong correlations with various anthropometric characteristics [10, 11].

The differences in handgrip strength were, might be, due to the effect of regular physical exercise and training of the players. Moreover, the effect of neural adaptation, improved co-ordination and muscle strength seen in the athletes may have also influenced the results to some extent.

Neural adaptations play a particularly important role in the dramatic muscular strength and power improvement [12]. The basic size of a person's muscle is determined mainly by heredity plus, the level of testosterone secretion in men, causes considerably larger muscles than in women. However, with training, the muscles become hypertrophied [13]. The changes that occur in skeletal muscles with athletic training include increases in the number of mitochondria and the enzymes involved in oxidative metabolism [14].

The present study result shows the influence of athletic training and body size on handgrip strength.

CONCLUSION:

The result of present study shows significant differences in handgrip strength between male volleyball players and male non-athletes and also positive correlation between handgrip strength and body mass index. The data presented in the present study carry immense practical application and may be useful in future investigation on player selection, talent identification in volleyball and training program development.

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