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STUDY ON RELATIONSHIP BETWEEN HAND GRIP STRENGTH AND SHOULDER POWER OF INTER COLLEGIATE CRICKET PLAYERS.

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ABSTRACT

The purpose of the study was to find the relationship between hand grip strength and shoulder power of different age group intercollegiate level Cricket players. Total 80 Male cricket players were selected from Chhattisgarh University, of age ranged between 17-25 years. Among which 40 players were in age group 17yrs, 20 players in age group 18yrs, and 20 players in age group 19 yrs. Data were statically analyzed by comparing the mean and standard deviation and co-orelation using SPSS 20.0. The results showed that there is positive correlation (moderate to strong) between grip strength and shoulder power. Result concluded that there is positive correlation between grip strength and shoulder power that grip strength can be used as a predictor of shoulder power. Also during training program, focus should be given equally on improvement of both shoulder power and grip strength.

Keyword: Hand grip, throwing skill, Strength training, Cricket, shoulder power, hand dynamometer, medicine ball test.

1.1 Introduction

Cricket is a dynamic sport that consists of throwing, catching, batting, running and pitching. Based on the skill, throwing is one of the important skills that requires great physical Strength attention in order to improve the Cricket performance since all Cricket players would have to use this skill no matter what is their positions during fielding. Basically, Cricket is a physically demanding sport comprised of several specialism requiring different skills and type of fitness. Cricket is the game of endurance as well as strength. Cricket as sport requires excellent eye to hand coordination, upper extremity power, hand grip strength and the coordinate movements of the hips, shoulders, arms and wrists. For batting, throwing ball during fielding and bowling use of forearm strength is essential [1]. In fact, entire upper extremity strength is very important. Hand grip strength, forearm strength and shoulder power are essential components contributing to upper extremity strength. Thus this study focuses on hand grip strength and shoulder power. The power of hand grip is a result of forceful flexion of all finger joints with maximum voluntary force that subject is able to exert under normal bio kinetic conditions [2, 3]. Grip strength is evaluated as a component of hand function. It is one of the best indicators of overall strength of limb [3]. It is often used as an indicator of overall physical strength [4, 5], hand and forearm muscle performances [6] and as a functional index of nutritional status [7, 8], and physical performance [9,10]. Grip strength is the integrated performances of muscles that can be produced in one muscular contraction [6,12] . It is widely accepted that grip strength provides an objective index of the functional integrity of the upper extremity. A Reliable and valid evaluation of hand strength can provide an objective index of general upper body strength (De S et. al. 2011). Hand dynamometer is the most valid and reliable tool to measure grip strength. Thus in this study hand dynamometer is used as an outcome measure for evaluation of grip strength.

Shoulder power is very essential for a cricket player to hit the ball while batting, throwing ball, bowling etc. Different activities needed to be done by cricketers involve combination of both hand grip strength and shoulder power requirement. Strength is one of the most important ingredients of playing success. Many sports require athletes to have high levels of muscular strength.[13] Assessment of strength is therefore recognized by coaches as necessary for evaluation of athletes potential. There are many test for measuring shoulder power, amongst which medicine ball put test is the most commonly used valid and reliable test to measure shoulder power in sports.[14,16] Thus in this study medicine ball put test is used as an outcome measure for assessing shoulder power. There are studies individually done on grip strength and shoulder power in different sports like hockey, handball, softball etc. but few focusing on cricket. There are few studies on grip strength and shoulder power in cricket players, but still very few on correlation between grip strength and shoulder power. Thus the study aimed at finding grip strength, shoulder power and finally assessing relation between grip strength and shoulder power in intercollegiate level cricket players.

2. Methodology

2.1 Purpose

The purpose of the study was to find the relationship between hand grip strength and shoulder power of different age group intercollegiate level Cricket players.

For this study total 80 Male cricket players were selected from Chattisgarh University, of age ranged between 17-25 years. Participants with existing or past injuries and sicknesses that would place them at risk in performing resistance training and throwing were omitted.

2.2 Research Design

All subjects were divided into three groups among which 40 players were in age group 17 yrs (Group-I, N=40), 20 players in age group 18 yrs (Group- II, N=20), and 20 players in age group 19 yrs (Group- III, N=20)

2.3 Criterion Measure

BMI was calculated by the formula of; $\text{Body Mass Index} = \frac{\text{Weight}}{\text{Height}^2}$

Measurements were recorded in Cms and 'Kgs'.

A calibrated Hydraulic Hand Dynamometer with adjustable grip was used to measure Hand Grip Strength.

Medicine Ball Put test was used to measure the arm and shoulder girdle strength. This test was done for dominant hand only and involved throwing a 2 kg medicine ball.

2.3 Collection of Data

The data were collected through collecting demographic details like age, height, weight and BMI was calculated. During test it was assured that subject's body was fully upright and their mandible was parallel to the ground. During measurements players were on bare feet and with underwear. Initial instructions with explanation and demonstration were given to the subjects for all tests.

3. Analysis of Data

3.1 Statistical Procedure

Data were statically analyzed by comparing the mean and standard deviation and co-orelation using SPSS) program software version 20.0. In order to compare groups on the main variables of this study. In all cases the criterion for statistical significance was set at 0.05 level of confidence.

Table:1

Mean scores of Grip Strength for Strong Hand according to the group of Cricket Players

Variable	N		Mean	SD	SE	Mean Range	
						Lower	Upper
Grip Strength	17yrs Group	40	33.56	6.61	1.06	31.37	35.74
	18yrs Group	20	33.66	6.72	1.53	30.51	37.00
	19yrs Group	20	37.60	5.14	1.20	35.12	40.26

Table: 1 shows the details about number of players in groups, Standard Deviation, mean and range of grip strength in the age group 17, 18 and 19

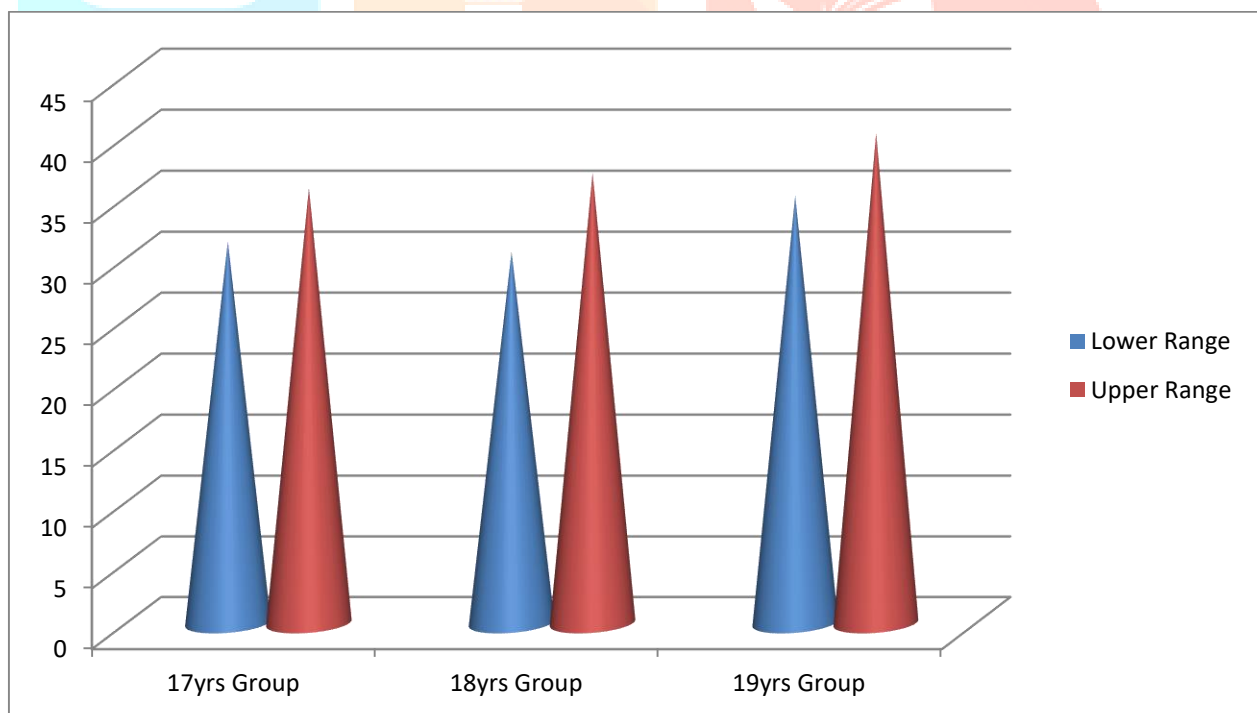


Fig 1 shows the Graphical Representation of upper and lower limit of Range of Grip Strength for Strong Hand according to the group of Cricket Players

Table:2**Mean scores of Grip Strength for Non Strong Hand according to the group of Cricket Players**

Variable	N		Mean	SD	SE	Mean Range	
						Lower	Upper
Grip Strength	17yrs Group	40	32.30	6.66	1.08	31.07	34.52
	18yrs Group	20	31.88	6.20	1.41	28.86	34.86
	19yrs Group	20	37.20	5.14	1.20	34.55	39.68

Table: 2 shows the details about number of players in groups, Standard Deviation, mean and range of grip strength in the age group 17, 18 and 19

Table:3**Mean scores of Shoulder Strength for Strong Hand according to the group of Cricket Players**

Variable	N		Mean	SD	SE	Mean Range	
						Lower	Upper
Shoulder Strength	17yrs Group	40	30.50	4.52	.65	29.06	32.11
	18yrs Group	20	30.48	5.40	1.16	27.84	33.13
	19yrs Group	20	33.71	4.20	.96	31.56	35.85

Table: 3 shows the details about number of players in groups, Standard Deviation, mean and range of Shoulder strength in the age group 17, 18 and 19

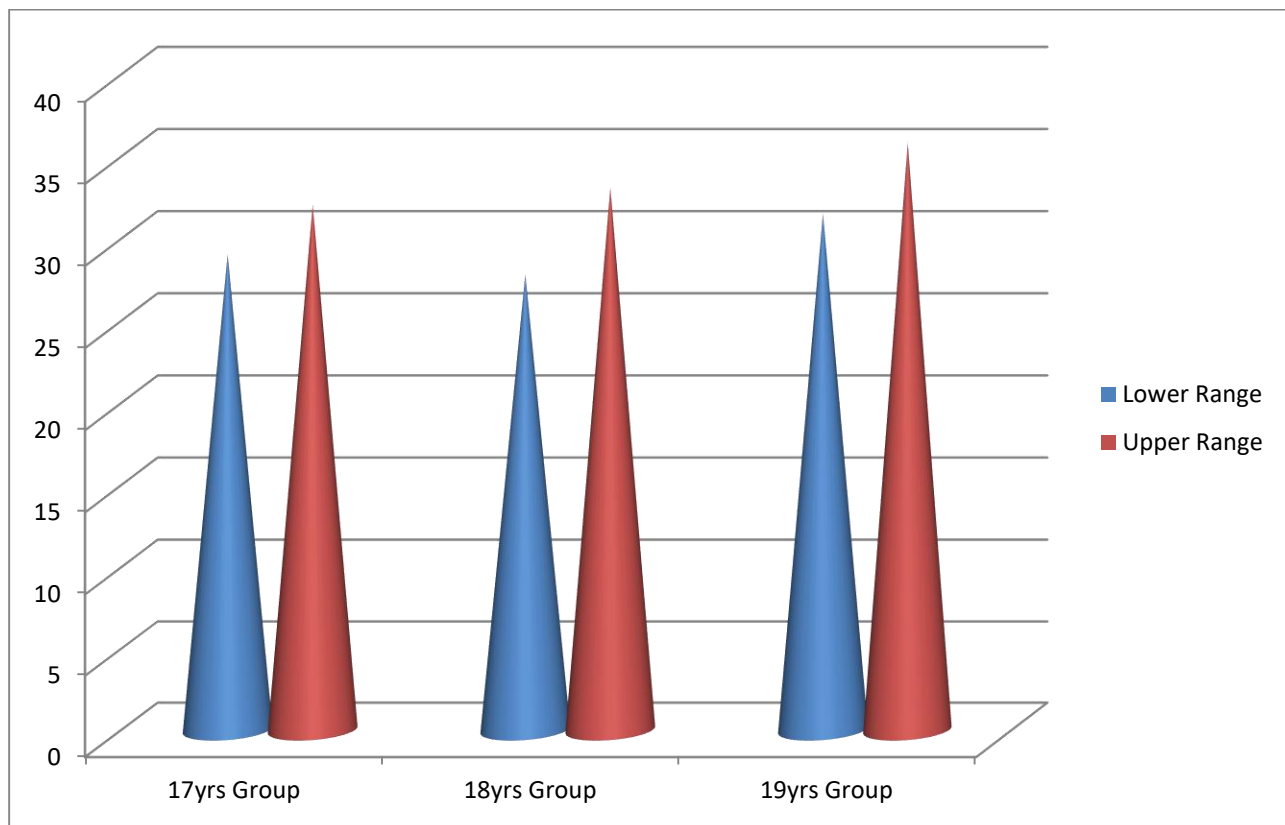


Fig 2 shows the Graphical Representation of upper and lower limit of Range of Shoulder Strength for Strong Hand according to the group of Cricket Players

3.2 Discussion of Findings

Table I reveals the mean range for grip strength of strong (dominant) hand for age group 17 years lie in range 31.37 - 35.74, for age group 18 years lie in range 30.51-37.00 and for age group of 19 years lie in range 35.12-40.26. The mean range gradually increases from age group 17, 18 and 19 years. This shows that grip strength increases with age.

In this study the mean range for grip strength for non-dominant hand for age group 17 years lie in range 30.07-34.52, for age group 18 years lie in range 28.86-34.86 and for age group of 19 years lie in range 34.55-39.68. The mean range were consistently higher for age group 17, 18 and 19 years. This shows that grip strength increases with age.

3.3 Result

On the basis of findings it was found that there probable reason could few studies suggested that the age effect may be evident at different speeds of contraction depending upon the fiber type distribution characteristics of muscle involved. Type 2 muscle fibers display faster shortening velocity than type 1 muscle fibers. Higher proportion of type 2 muscle fibers may be therefore beneficial for strength and power sports [31]. And the cross

sectional area of type 2 fibers increases 30 fold before age 20 [28]. There is a strong correlation between strength and type2 muscle fibers below age 20[39]. Thus to summarize all, as age increases there is increase in muscle mass, thus increase in number of muscle fibers which leads to increased strength with age. Also the cross section area of type 2 fibers which contribute majorly to strength increases 30 fold before age of 20years [28] this is also one of the strong reason for increase in strength.

When compared grip strength of dominant hand with non-dominant hand, it was found that dominant hand had higher values of grip strength mean range than the non-dominant hand. This supports the findings of 10% rule. The 10% rule states that the dominant hand possesses a 10% greater grip strength than the non-dominant hand [30]. Most tools and daily appliance are designed for the right hand. As a result, the right hand of both right and left handed people is exercised more often than left on a daily basis.

The study also revealed moderate to strong positive correlation between grip strength and shoulder power. It means that subjects having less grip strength had lesser shoulder power and more grip strength had more shoulder power and vice versa. There are very few studies done on correlation between grip strength and shoulder strength. The result of the study is consistent with Lan Horsley et al who have done study on correlation of grip strength and shoulder strength to rule out shoulder pathology and found that there is positive correlation between both[35]. As there is positive correlation between hand grip and shoulder power, hand grip strength can be used as predictor of shoulder power.

4. Conclusion

It was concluded that there is strong correlation exists between grip strength and shoulder power in cricket players. Less grip strength would lead to lessening in shoulder power and vice versa. Consequently throughout training program of cricket players, identical importance should be given on enhancement of both shoulder power and grip strength. Hand grip strength can also be used as predictor and shoulder power.

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