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## Muscular strength and muscular endurance among national level male players

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### Abstract

The purpose of present study was to compare the muscular strength and muscular endurance among national level male players of different selected games. To achieve the purpose of the study, eighty (n=80) national level male players of different games (20 for each game i.e., football, hockey, basketball and volleyball) from Chandigarh between 19-26 years were selected as subjects of the study by using purposive sampling technique. To assess the muscular strength (left hand and right hand) of the subjects, Hand Grip Dynamometer was used. To assess the muscular endurance of the subjects, one minute sit-up test was used. To find out the significance difference among national level players on muscular strength and muscular endurance, Analysis of Variance (ANOVA) was applied with the help of SPSS software. For testing hypothesis, the level of significance was set at 0.05. Results of the study revealed that there were no significant differences found among national level male players of different games i.e. football, hockey, basketball and volleyball on muscular strength (right hand grip and left hand grip). On the other hand, significant difference was found among national level male players of different selected games on muscular endurance.

**Keywords:** Muscular strength, muscular endurance, right hand grip, left hand grip

### Introduction

Motor fitness refers to the efficiency of basic movements in addition to the physical fitness (Kansal, 1996) [3]. There are so many factors that affect athletics performance. Muscular strength and Muscular endurance are the important motor fitness components that affect the motor performance or athletics performance. Muscular endurance is the ability of a muscular, or a group of muscles, to keep working against a resistance (Bizley, 2002) [1].

Muscular strength is the ability to produce force against an external resistance. On the demand of sports or athletic task, athletes have to exert force against gravity in order to manipulate their own body mass with regard to external objects like to tackle opponent athlete in football, rugby, wrestling, etc. or to execute projectiles in baseball, weightlifting, shot-put etc. Jumping, sprinting, and rapid change of direction (COD) are the most common movements in sports that are highly influence by muscular strength and the outcome of any sports depend on the effectiveness of these movements (Suchome *et al.* 2016) [5].

### Objectives of the study

The objective of the study was to compare the muscular strength and muscular endurance among national level male players of different selected games.

### Method and procedure

For the purpose of the study, eighty (n=80) national level male players of different selected games (20 for each game i.e., football, hockey, basketball and volleyball) from Chandigarh between 19-26 years were selected as subjects of the study by using purposive sampling technique. To assess the muscular strength of the subjects Hand Grip Dynamometer was used. To assess the muscular endurance of the subjects 1 minute sit-up test was used. To find out the significance difference among national level players on muscular strength and muscular endurance, Analysis of Variance (ANOVA) was applied with the help of SPSS software. For testing hypothesis, the level of significance was set at 0.05.

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**Results and findings**

Descriptive analysis of muscular strength (right hand grip and left hand grip) among different games is presented in table-1.

**Table 1:** Descriptive analysis of muscular strength (right hand grip and left hand grip) among national level male players of different games

Variable	Group	N	Mean	Std. Deviation	Std. Error
Muscular Strength (Right Hand Grip)	Football	20	43.0050	4.67282	1.04487
	Hockey	20	44.8550	4.89172	1.09382
	Basketball	20	46.3570	6.85445	1.53270
	Volleyball	20	47.3935	5.96082	1.33288
Muscular Strength (Left Hand Grip)	Football	20	41.7200	5.29872	1.18483
	Hockey	20	44.1900	6.03803	1.35014
	Basketball	20	44.2190	6.31252	1.41152
	Volleyball	20	44.5115	5.85260	1.30868

Analysis of variance (ANOVA) among national level male players of different selected games on muscular strength (right hand grip and left hand grip) is presented in table-2.

**Table 2:** Comparison of muscular strength (right hand grip and left hand grip) among national level male players of selected games

Variable		Sum of Squares	df	Mean Square	F	Sig.
Right Hand Grip	Between Groups	218.458	3	72.819	2.271	.087
	Within Groups	2437.302	76	32.070		
	Total	2655.760	79			
Left Hand Grip	Between Groups	101.641	3	33.880	.978	.408
	Within Groups	2634.065	76	34.659		
	Total	2735.706	79			

\*Significant at .05 level  
 $F_{.05}(3, 76) = 2.73$

Table-2 clearly indicates that there were no significant differences among national level male players of different selected games (Football, Basketball, Volleyball and Hockey) on muscular strength (right hand grip and left hand grip),

since the obtained 'F' values at 0.05 level were 2.271 (right hand grip) and .978 (left hand grip) whereas, value needed to be significant was 2.73. Descriptive analysis of muscular endurance among different selected games is presented in table-3.

**Table 3:** Descriptive analysis of muscular endurance among national level male players of different games

Group	N	Mean	Std. Deviation	Std. Error
Football	20	49.6500	7.42170	1.65954
Hockey	20	44.6000	10.60486	2.37132
Basketball	20	39.5500	12.77116	2.85572
Volleyball	20	45.2500	8.52164	1.90550

Analysis of variance (ANOVA) among national level male players of different selected games on muscular endurance is presented in table-2.

**Table 4:** Comparison of muscular endurance among national level male players of different selected games

Variable		Sum of Squares	df	Mean Square	F	Sig.
Muscular Endurance	Between Groups	1026.438	3	342.146	3.394*	.022
	Within Groups	7662.050	76	100.816		
	Total	8688.488	79			

\*Significant at .05 level  
 $F_{.05}(3, 76) = 2.73$

Table 4 clearly indicates that there was significant difference found among national level male players of different selected games (football, basketball and hockey) since the F obtained at .05 level was 3.394 whereas, the value needed to be

significant was 2.73 for 3 and 76 degree of freedom at .05. Since the F ratio value (ANOVA) was found significant, the Scheffe's Post-hoc test was applied to find out the paired mean differences among the groups is presented in Table-5.

**Table 5:** Significant differences between the paired means of muscular endurance among national level male football, basketball, volleyball and hockey players

Group				MD	Sig.
Football	Hockey	Basketball	Volleyball		
49.65	44.60			5.050	.474
	44.60	39.55		5.050	.474
49.65		39.55		10.100*	.023
49.65			45.25	4.400	.592
	44.60		45.25	.650	.998
		39.55	45.25	5.700	.365

From the description presented in table-5, it has been found that there was significant difference existed between football players and basketball players on muscular strength, since the value obtained was 10.100. Further no significant differences existed between football players and hockey players, football players and volleyball players, hockey players and basketball players, volleyball players and basketball players.

### **Discussion of findings**

The findings of study confirmed that there was significant difference obtained on muscular endurance among national level male players of different selected games. Further, it has been found that there was significant difference existed between football players and basketball players on muscular strength. No significant difference existed between football players and hockey players, football players and volleyball players, hockey players and basketball players, volleyball players and basketball players. On the other hand, there was no significant difference obtained on muscular strength (right hand grip and left hand grip) among national level male players of different selected games. Muralirajan and Sudarsan (2015) <sup>[4]</sup>, there was significant difference found among the different match group i.e. hockey, football, basketball, volleyball, and handball in relation to their muscular endurance and agility (accept hockey and handball), when the subjects were involved in similar type of daily routine. A study conducted by Das and Sharma (2016) <sup>[2]</sup> on female players has also been revealed the similar results that no significant differences were observed in flexibility, body composition, muscle strength and muscular endurance among football, basketball and volleyball female players.

### **Conclusions**

On the basis of the findings of the study, the following conclusions were framed:

1. No significant difference was found on muscular strength (Right hand grip and Left hand grip) among national level male players of different selected games.
2. Significant difference was found on muscular endurance among national level male players of different selected games. Further, it has been found that there was significant difference existed between football players and basketball players on muscular strength.
3. National level male football players performed significantly better than national level male basketball players on muscular endurance.

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