CORRELATIONAL STUDY OF LEG STRENGTH AND SELECTED COORDINATIVE ABILITIES AMONG COLLEGE-LEVEL FOOTBALL PLAYERS

Taranjeet Rathee[1]

AFFILIATION:
[1]. Research scholar, Department of Exercise Physiology, LNIPE, Gwalior (M.P.)

ABSTRACT

The purpose of the study is to find out the relationship between leg strength and selected coordinative abilities among college level football players. On the basis of literature reviews, it was hypothesized that there will be a significant relationship between leg strength and selected coordinative abilities of football players. 30 male football players of age 18 to 25 years were selected as subjects from the football match-practice group of Lakshmibai National Institute of Physical Education, Gwalior. Data was collected for leg strength by using humac 2009 software for dynamometer. Reaction ability data was collected from the Sensamove's Baseline Measurement Software (BMS). Rhythm ability and orientation ability test was conducted in the field and data was collected by the researcher himself by using a stopwatch, pen and paper. To find out the relationship between leg strength and selected coordinative abilities of football players. The statistics used were descriptive and Neymann Pearson Correlation. Findings of the study revealed that there was a significant Correlation between leg strength and selected coordinative abilities among football players.

Keywords: Coordinative Abilities, Leg Strength, Male, Football players

1. INTRODUCTION

Football is a Game in which two 11-member teams try to propel a ball into the opposing team's goal, using any part of the body except the hands and arms. Only the goalkeeper, when positioned within the penalty area in front of the goal, may use hands and arms. The game's first uniform set of rules was put in place in 1863, when England's Football Association was created. In the late 1880s, professional leagues started to emerge, initially in England and subsequently in other nations. Since its founding in 1904, the Fédération Internationale de Football Association (FIFA) has hosted the World Cup every four years. 32 nations compete against one another in the FIFA Men's World Cup™. Since 1908, football has been a part of the Olympic Games. Over 250 million people play this game today across all continents in over 200 nations.

The most played ball game in the world is football (Witvrouw E,2003)in terms of both participants and viewers(Wong P, 2005).The sport may be played practically everywhere, from official football playing fields to gymnasiums, streets, school playgrounds, parks, or beaches, thanks to its basic rules and necessary equipment. A combined television audience of more than 2.6 billion people watched football's premier competition, the quadrennial month-long World Cup finals, in 2010. According to FIFA, there were approximately 250 million football players and over 1.3 billion "interested" in the sport at the turn of the twenty-first century.

Football players have been said to require the physical and physiological traits of aerobic fitness, muscle strength, high level of speed, explosive jumping power, reaction time, and agility. (Arnason A,2004). Generally, football players are divided into four categories regarding playing position. Each position—goalkeepers, defenders, midfielders, and attackers—has distinct qualities. The team's fastest players seem to be the attackers. The midfielders who serve as a bridge between defense and offence look to cover the most ground overall (Rienzi E,2000).Football motions frequently call for lower body strength. The more powerful your lower body is, the better you can run with the ball, block, tackle, and even kick. Strengthening your legs through exercise will improve your speed, explosion and endurance there is excellent evidence to support that strength training reduces lower extremity injury rates in athletes. Beautiful and graceful motions in technical sports result from highly developed technical abilities and coordinated actions. In many sports, especially those that heavily rely on technical and tactical variables, the coordinative talents establish the upper limits to which athletic performance can be increased.Coordinative abilities play an important role in quick changing of the body position during game. In some sports like football, coordinative abilities are very essential for better and effective movement for any execution of movement.Coordination skills, or a combination of several coordination skills, are crucial for carrying out any skill or action in sports. The execution of any movement or skill benefits from the blending of diverse coordinative talents.There are seven identified coordinative abilities namely, (i) Orientation ability, (ii) Differentiation ability, (iii) Coupling ability, (iv) Adaptation ability, (v) Rhythmic ability, (vi) Balance ability, (vii) Reaction ability.For the long-term training process and for the ongoing improvement and adjustment of sport tactics, all coordination skills are crucial. The degree of coordinative abilities has a significant impact on the motor learning capacity.

So, coaches need some researches for proper talent identification and how to improve the physical variables needed for football players in order to increase their performance. There is a lack of standardized evaluation of correlation among these Variables. Variables like lower extremity strength, and coordinative abilities can have a great influence on football playing skills. The researcher in this study attempt to find any correlation among these variables.

2. MATERIALS AND METHOD

For the purpose of the research 30 male football players of Lakshmibai National Institute of Physical Education were selected through random sampling as subjects. The age of the subjects ranged from 18 to 25 years. The subjects were selected by using simple random sampling method. Leg strength, reaction ability, rhythm ability & orientation ability were the variables considered for this study. Rhythmic ability and orientation ability tests were used as instructed by Peter Hirtz(Hirtz, 1985).

In order to find out the relationship between leg strength and reaction time of football players. The statistics used were descriptive statistics and Neymann Pearson Correlation. For testing the hypothesis, the level of significance was set at 0.05. All statistical calculations were done by SPSS Software.

S.No.	Variables	Test Items	Measuring units
1.	Leg strength	Dynamometer	Newton meter (Nm)
2.	Reaction time	Sensbalance	Time in seconds(s)
3.	Rhythm ability	Sprint at given rhythm test	Time in seconds(s)
4.	Orientation ability	Numbered medicine ball run test	Time in seconds(s)

The criterion measures to test the hypothesis of the study were below:

3. ADMINISTRATION OF TEST

Leg Strength

Purpose: To measure the leg strength of football players.

Equipment: In this test, leg strength was measured by using is dynamometer with Humac 2009 software.

Procedure: Football Player sat on the chair and tester made all the necessary adjustments with the equipment and in the software. Subject had put his maximum effort in flexion and extension for generating peak torque.

Scoring: Score was generated for each leg separately in Newton meter.

Reaction Ability

Purpose: To measure the reaction ability of the football players.

Equipment: In this test, reaction ability was measured by using the Sensamove's, sensebalance mini-board and baseline measurement software

Procedure: The capacity to precisely and quickly reach the target is measured by the response time and travel time to the target disc, which appear abruptly.

Scoring: Time recorded in seconds by software was the score of respective player.

Rhythm Ability

Purpose: To determine the Rhythm Ability of the subjects.

Equipment: Eleven gymnastic hoops, each 1 m in diameter. One Stop Watch. One measuring tape.

Procedure: The subject had to run a distance of 30 m marked between two lines with maximum sprinting speed. The sprinting time of the subject was recorded by stop watch. In the second try, the subject had to run through eleven hoops that were arranged in a specific rhythm and at their maximum speed. Three hoops were kept in a row against one another at a distance of 5 m from the starting line. Similar to this, three hoops were kept five meters apart from the finish line. In the middle of the running distance, five more hoops were kept in a row. The subject has to

navigate those obstacles by stepping through each one. Each subject received one try after the expert explained the test and gave a demonstration.

Scoring: The score was determined by difference between the timing of the first and second scores.
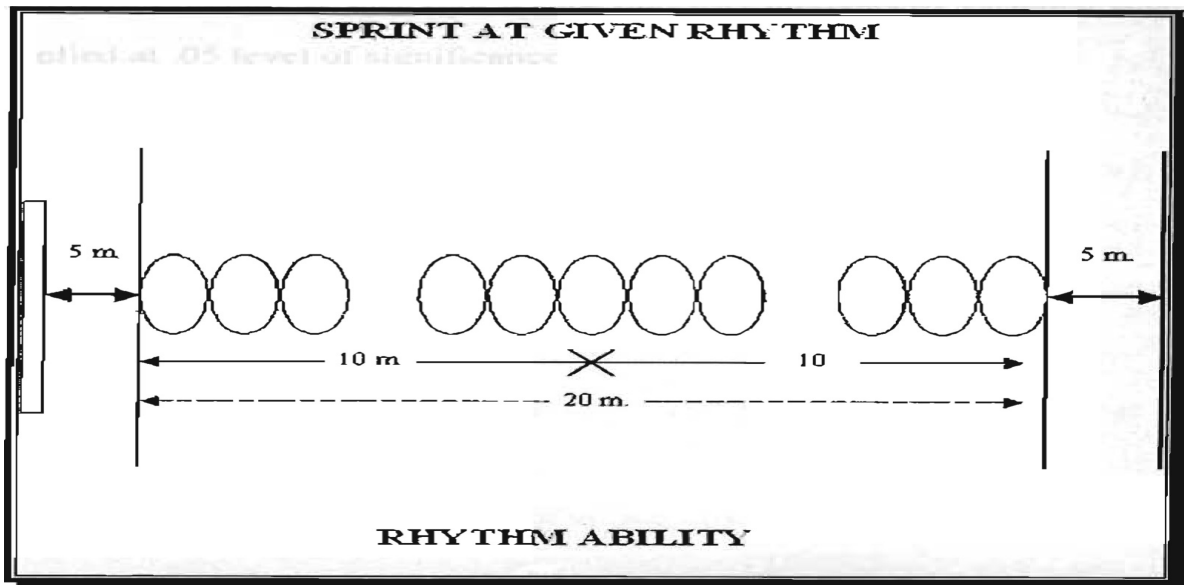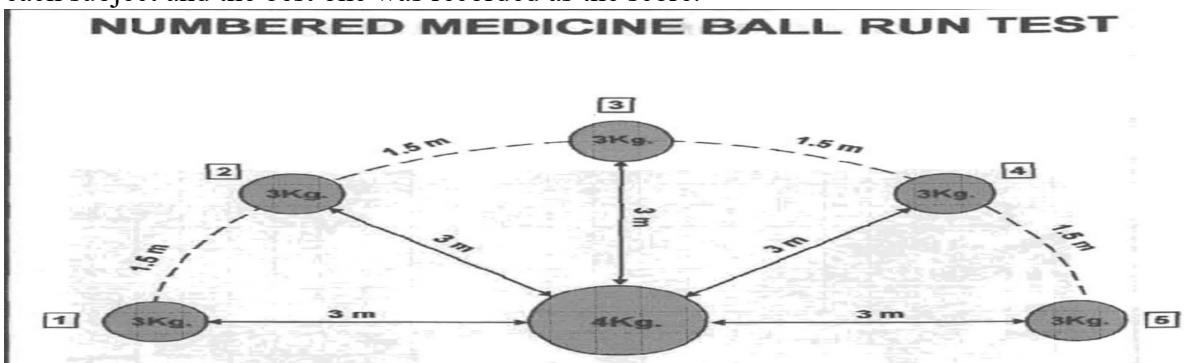

Orientation Ability

Purpose: To assess the subjects' orientation skills.

Equipment: Five medicine balls each weighing 3 Kg.,one medicine ball, 4 kg., Stop Watch, Clapper, pencil, papers, and a clipboard, together with five metallic numbered plates.

Procedure: Five medicine balls weighing 3 kg. were arranged on an even ground in a semi-circle, the sixth medicine ball weighing 4 kg. was kept 3 m, away from these medicine balls. Behind all the medicine balls of 3 kg. metallic number plates of 1 square foot size were kept from 1 to 5. Before the start of the test, the subject was asked to stand behind the sixth medicine ball facing towards the opposite direction. On the signal, .the subject turned and ran towards the particular ball number called by the tester and the subject touched the medicine ball and ran back to touch the sixth medicine ball, immediately another number was called, similarly the number was called three times by the tester and the subject performed accordingly. Before the actual test was administered, one practice trial was given to all the subjects.

Scoring: The time taken to complete the course was noted in seconds. Two trials were given to each subject and the best one was recorded as the score.

3. RESULTS

TABLE 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
LEG STRENGTH	30	222.50	444.00	285.96	42.23761
ORIENTATION ABILITY	30	6.10	7.86	7.08	.46133
RHYTHMIC ABILITY	30	.72	3.29	1.6953	.52459
REACTION ABILITY	30	.75	3.42	1.7770	.59239

From the table no.1, the observed mean and standard deviation of leg strength is 285.96±42.23, minimum value is 222.50 Nm and maximum value is 444 Nm.

Observed mean and standard deviation of orientation ability is 7.08±0.46, minimum value is 6.10 secs and maximum value is 7.86 secs. Observed mean and standard deviation of rhythmic ability is 1.69±0.52, minimum value is .72 secs and maximum value is 3.29 secs. Observed mean and standard deviation of reaction ability is 1.77±0.59, minimum value is .75 secs and maximum value is 3.42 secs.

TABLE 2
Correlation between leg strength and orientation ability

		LEG STRENGTH	ORIENTATION ABILITY
LEG STRENGTH	Pearson Correlation	1	.132
	Sig. (2-tailed)		.487
	N	30	30
ORIENTATION ABILITY	Pearson Correlation	.132	1
	Sig. (2-tailed)	.487	
	N	30	30

From table no. 2, we observed the correlation between leg strength was insignificant as the p-value is greater than 0.05.

<div align="center">

TABLE 3

Correlation between Leg Strength and Rhythmic Ability

</div>

		LEG STRENGTH	RHYTHMIC ABILITY
LEG STRENGTH	Pearson Correlation	1	.044
	Sig. (2-tailed)		.816
	N	30	30
RHYTHMIC ABILITY	Pearson Correlation	.044	1
	Sig. (2-tailed)	.816	
	N	30	30

From table no.3, we observed that the correlation between leg strength and rhythmic ability was insignificant as the p-value is greater than 0.05. And Pearson correlation is weak at .044.

<div align="center">

TABLE 4

Correlation between Leg Strength and Reaction Ability

</div>

		LEG STRENGTH	REACTION ABILITY
LEG STRENGTH	Pearson Correlation	1	.365[*]
	Sig. (2-tailed)		.047
	N	30	30
REACTION ABILITY	Pearson Correlation	.365[*]	1
	Sig. (2-tailed)	.047	
	N	30	30

[*]. Correlation is significant at the 0.05 level (2-tailed).

From table no.4, we observed that the correlation between leg strength and reaction ability was significant as the p-value is greater than 0.05. And Pearson correlation was strong at .365.
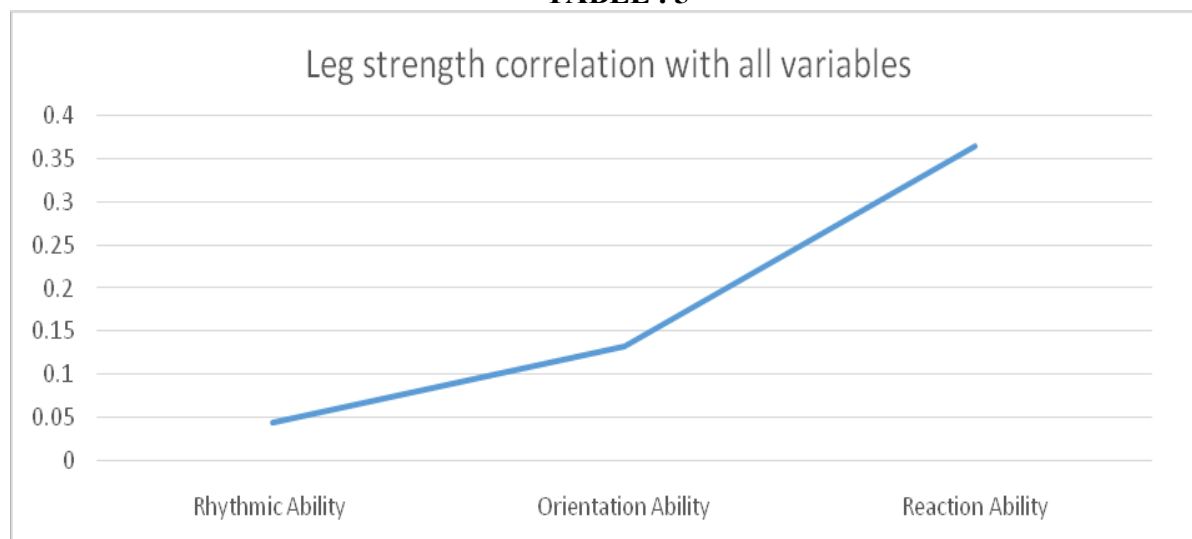
<div align="center">

TABLE . 5

</div>

Table no.5, represents the graphical representation of correlational value of leg strength with variables.

4. DISCUSSION

Results of the study revealed that significant correlation was not found between leg strength and two variables (rhythmic ability & orientation ability). Reason for that can be limited number of participants, higher number of participants can so show significant correlation between the variables. Weather & temperature can be a factor in reduced performance during the field tests. Psychological factors like lack of motivation can be a factor for insignificant correlation to on field tests. But significant correlation was found between leg strength and reaction time.

5. CONCLUSION

Based on the analysis and within the limitations of the present study, the following conclusions can be drawn -

1.   Significant correlation was found between leg strength and reaction ability.
2.   Insignificant correlation was found between leg strength and orientation ability.
3.   Insignificant correlation was found between leg strength and rhythmic ability.

REFERENCES

Arnason A, Sigurdsson SB, Gudmundsson A. Holme I. Engebretsen L. Bahr R. (2004). Physical fitness, Injuries, and Team performance in soccer. Med.Sci. Sport Exerc, 36 (2): 278- 285.

Peter Hirtz,   (1985). Koordinative Faehigkeiten in Schulsport, (Berlin Volk and Wissen Valkseigener Verlag, 1 27.

Witvrouw E, Danneels L , Asselman P , D"Have T, Cambier D. (2003). Muscle flexibility as a risk factor for developing muscle injuries in male professional soccer players a prospective study. The American Journal of Sports Medicine, 31(1), 41-46.

Wong P, Hong Y. (2005). Soccer injury in the lower extremities. Br J Sports Med, 39(8), 473- 82.