



ISSN: 2456-0057  
IJPNPE 2018; 3(1): 20-22  
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www.journalofsports.com  
Received: 07-11-2017  
Accepted: 08-12-2017

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## Association of physical fitness and soccer skills in diploma college soccer players

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### Abstract

**Purpose:** To find out the relation between physical fitness components and soccer skills among diploma college soccer players.

**Methods:** Forty one diploma college soccer players were selected for the study. They were assessed through physical fitness tests on muscle strength (hand grip), Sit-up, Harvard step-up, height and weight, sit and reach. The soccer skill tests dribble, lofted-pass, shooting, short pass, and juggling were evaluated.

**Results:** The BMI was found negative correlation with dribbling ( $r = -0.309, p \leq 0.05$ ).

**Conclusion:** This study found that, there is a relation between physical fitness components with soccer skills.

**Keywords:** Soccer, fitness, endurance, BMI, dribbling, passing, correlation

### Introduction

Soccer is a multifaceted game, involve the reappearance of various contrasting actions, and quite a few tests are at present being used to evaluate the physical ability of players (Rampinini *et al.*, 2007) <sup>[1]</sup>. For example, aerobic capability can be assessed by means of the Yo-Yo test (Krustrup *et al.*, 2003) <sup>[2]</sup>, simple running tests can be used to examine speed, agility and repetitive sprint performance, and countermovement jump can be used to evaluate leg power. Previous studies found that, the players of the best group carry out more short passes in official games than players of worst teams (Rampinini *et al.*, 2007) <sup>[1]</sup>. Also it was observed that, the number of short passes reduces in the subsequent half as compare to initial. These most likely points out towards fatigue, which indicate the deficiency of fitness (Enoka *et al.*, 1992) <sup>[3]</sup>.

During the 90 minute game, players run approximately at an average intensity of 10 kilometers comes closer to the anaerobic doorstep (80-90% of maximal heart rate). Within this endurance background, frequent short-tempered activities required including tackling, turning, sprinting, jumping, kicking, heading, balancing against forceful contractions and control over the ball against defensive pressure. In this game situation, all the players are anticipated to be competent of retaining high aerobic fitness and anaerobic power all along excellent agility (Sheppard *et al.*, 2006) <sup>[5]</sup>.

Skill is 'the reliable creation of goal-oriented actions, which are cultured and specific to the task' (McMorris, 2004) <sup>[6]</sup>. The improvement of match performance is normally observed in learning strategic and scientific skills and their assimilation into the game situation (Mitchell *et al.*, 2006; Grehaigne *et al.*, 2005) <sup>[7]</sup>. The motor skillfulness required to effectively control, pass, dribble and shoot the ball at goal are basic skills of the soccer player (Ajmal Ali, 2010) <sup>[8]</sup>. In the game, the player becomes useless if he does not use proper skill at the right time even though he was a skillful player (Knapp, 1977) <sup>[9]</sup>. An additional impact on skill is the player's capability to uphold their technique as tiredness sets in during different phases of the game (Mohr *et al.*, 2003) <sup>[10]</sup>. Hence, this study was undertaken to know the correlation among fitness components and soccer skills. The previous study (Rampinini *et al.*, 2008) <sup>[11]</sup> suggests that, the greater the fitness level, the lesser the fatigue experienced by the players for a given unconditional intensity, which in turn results in less decline in technical skill ability.

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## Methods and Subjects

**Participants:** Forty one diploma college soccer players volunteered for the study. The scheduled was five days a week and about 2 hours duration. The soccer training consisted of general warm up, physical fitness, technical and tactical skills followed by cool down. The institutional Ethical committee protocol was followed and written informed consent was received. Prior to study, the detailed information about the benefits and risk of the investigation was given to the subjects. Five physical fitness tests and five soccer skill tests were included in the study.

**Handgrip Strength Test:** The subject was asked to hold the dynamometer in one hand. Then, he was instructed to squeeze the dynamometer with all out efforts. Body movements are not allowed. Tester shall record the score. This test measures the hand grip strength of forearm.

**Sits up Test:** The participant asked to lie down on the mat with the bent knees at right angles. The feet shall be hold by the partner. The fingers interlocked behind the neck. After the 'start' command, the subject raises his upper body from the trunk region towards knee and then returns back on the floor. Successful counts shall be recorded.

**Harvard step test:** This test is a type of cardiac stress test for finding cardiovascular endurance. The platform or a stool is kept in front of the subject at a height of about 50 cm or 20 inches. On the command 'start', the subject steps up and down on a platform with the rhythm for which metronome instrument was used. The subject will continue the exercise for five minutes. Immediately after exercise, the subject was asked to lie-down on back. After one minute rest, start counting the pulse from one to one and half minute, two to two and half minute and three to three and half minute. Physical efficiency Index = duration of exercise in sec.  $\times$   $100/2 \times$  sum of pulse during recovery.

**Body Composition:** The height in meter and weight in kilogram was recorded in the record sheet. The body mass index (BMI) was calculated as per the weight of a person in kilogram divided by height in meter squared.

**Sit and Reach Flexibility Test:** The subject was asked to sit on the floor with bare feet and instructed to put the feet flat against the closed end of the box through the open end of the box with the knees fully extended. The subject then extends his both arms ahead as far as possible along with the

measuring scale which was fixed on the top of the box. The distance covered is measured and recorded.

**Dribbling:** The subject was asked to dribble the ball around each cone in a zigzag manner. After clearing the final cone, the player has to run along with the ball towards end line as shown in fig. 1. The subject scores 200 points for finishing the test in 30 seconds. 10 additional points shall be scored for every second under and 10 points shall be deducted for every second over 30.

**Lofted pass:** This test is designed to develop accuracy. Every subject has 4 attempts. The subject was asked to push the ball towards designated marker as shown in the fig. 2. If the ball passes at the center without bouncing, 100 points shall be given. The subject is allowed to attempt with weaker foot and double points shall be given if the attempt is successful. Total 4 attempt scores shall be recorded.

**Shooting:** This test is useful for measuring accuracy in shooting. As shown in fig. 3, the subject was asked to push the ball towards goal post. Every subject will be given 4 attempts and score shall be recorded within 15 seconds.

**Passing:** This test promotes the subject to use his feet for passing a short distance. As shown in fig. 4, the subject starts passing the ball to the designated distance and takes next attempt with alternate leg. Each successful pass shall be given 50 points. If the subject able to pass all 4 attempts successfully, he shall be given 50 bonus points.

**Juggling:** This test measures the skill of controlling the ball off the air. The subject was asked to hold the ball in air as long as possible. If the ball was hold in air for 5 seconds, 50 points shall be given. 6-10 seconds, 100 points shall be given. Further, for each 10 seconds, 20 additional points shall be given and total scores shall be recorded.

## Statistical analysis

The data were analyzed by using Pearson product moment correlations to determine the relationship between physical fitness components and soccer skills.

## Results

The BMI was found significant negative correlation with dribbling ( $r = -0.309$ ,  $p \leq 0.05$ ). However, the results shows positively related to Juggling ( $r = .281$ ,  $p = 0.075$ ) as shown in Table 1.

**Table 1:** Correlation between physical fitness and soccer skills in Diploma football players

	Strength	Sit ups	Index	BMI	flexibility	Dribbling	Lofted Passing	Shooting	Passing
Strength									
Sit ups	.215								
Index	.094	.055							
BMI	.022	.166	-.307						
Flexibility	.100	-.273	-.049	.053					
Dribbling	.173	.174	.299	-.309*	.022				
Lofted Passing	.047	.049	.264	-.217	.114	.239			
Shooting	-.058	-.115	.254	-.248	.107	.126	.102		
Passing	.042	.017	-.221	-.103	-.029	.073	-.222	-.196	
Juggling	-.098	.084	.086	.281	-.125	-.282	-.174	.146	.221

\*  $p < 0.05$

## Discussion

In the present research, diploma college soccer players went through physical fitness and soccer skill tests. There is a

significant negative moderate correlation was found between body mass index with dribbling. Also, we found that, BMI is significant (borderline) positively correlated with juggling.

The previous findings showed that, Loughborough Soccer Passing Test total performance (LSPT TP) found significant positively correlated with various sprint distance times, Agility, dribbling and Illinois agility test and seems to be more effective factors. Negative correlations were found significantly between LSPT TP and squat jump and counter movement jump. Also, previous findings disclose that, the motor fitness components such as speed, muscular strength endurance and cardiovascular endurance were significantly associated with skill performance (Baljinder Singh *et al.*, 2016) [13]. Kicking in soccer is related to the strength and power of the kicking foot, dribbling the ball and tackling are very much associated with speed and agility of the player.

### Conclusion

BMI had significant negative correlation with dribbling. Other components showed insignificant. Hence, the further study kept open to find higher correlation in physical fitness and soccer skill tests.

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