



Study of physical fitness and technical skills on college soccer players playing positions

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Abstract

The aim of this study was to evaluate performance factors of college soccer players as per their playing position. A total of 82 college soccer players were selected and classified into goalkeeper (n=8), defender (n=20), midfielder (n=19) and forward (n=35) positions. All subjects were assessed tests on Handgrip, Sit-up, Harvard step-up, height and weight, sit and reach. The dribble, lofted-pass, shooting, short pass, and juggling tests were for soccer skills. Harvard test score was significantly differing but not in soccer's skills test score based on player position.

Further, it was found significantly greater in midfielders as compare to forward players ($P < 0.05$). Hence, we suggest that, all the players must have proper physical fitness and specific skills need to improve based on player's position to attain better performance.

Keywords: soccer, playing position, soccer skills, physical fitness components

Introduction

Soccer is the game which involves various skills, strategies, tactics and physical elements which are required for better performance. To enhance these conditions, specialized training shall be given to the players. Finding the gap in the opponent's defense and quick judgment for movement are the qualities of forward player. The midfielder requires more agility, short and long passing abilities. A defending player shall be able to jump high and be effective at heading and tackling skill^[1]. Endurance is one of the most important factors of football players. Midfielders cover maximum distance while acting as a connection between attack and defense^[2]. The somato type components and physical abilities of soccer players were found equal by playing position^[3, 4]. In contrast, the size and physical ability were differing according to player's position^[5]. This may be due to the different training program were adopted by the previous researcher, need future study to clarifying this limitation.

The previous findings report that, anaerobic exercise capacity higher in the midfielders^[6]. But in another study, forwards had significantly higher anaerobic exercise capacity^[7, 8]. Also, earlier reports states that, there was no significant difference in the performance on the physical test between the various playing positions except for squat jump among youth soccer players. The central defenders and forwards showed higher values in squat jump and counter movement jump (CMJ) than full back and mid fielders. The full back and midfielders performed well in sprint and Yo-Yo IE2 test but difference were no significant. Agility mean values were reasonably similar in all positional roles^[9]. Deepak Shendkar, Shimal H

Hamad^[10] showed that, there was significant difference between cardiovascular endurance, Explosive strength and speed among the play position of soccer players. The study revealed that there was no significant difference in flexibility and agility between the positions of the soccer players.

Overall soccer skills influence by the anaerobic capacity based on the above finding. This controversial issue has greater implications on soccer performance. Dribbling, shooting, passing and juggling had similar score based on playing position^[11]. Another study shows that, defender had stronger long distance kick power (Lee *et al.* (2013)^[12]. The recent study found that, dribbling skill was significantly differ compare to other players (Joo & Seo, 2016)^[7].

These variations recommend that, the influencing element shall not be only the degree of difference in physical training based on position. Earlier findings have no significant difference in bodily trained ability by position. The soccer players usually follow regular workout schedule to a certain extent without proper practice of specific exercises for particular positions. In this regard, additional investigation shall be useful to develop considerable bodily skills in soccer player's classification by their playing positions.

Methods

Subjects

The study was incorporated for 82 college football players; eight goalkeepers, twenty defenders, nineteen midfielders, and thirty five forwards selected for the study. Table 1 shows the physical characteristics of subjects.

Table 1: The physical fitness components and related tests

Sl. No	Variable	Training	Test	Criterion Measures
1	Muscular strength	Push-ups /Sand Training	Hand Grip Dynamometer	Kilograms
2	Muscular Endurance	Pull ups / Squat thrust	Sit ups (Bent knees)	Counts
3	Cardiovascular Endurance	Circuit training	Harvard step test	Fitness Index ($T_e * 100 / H_b * 2$)
4	Body Composition		BMI	Formula
5	Flexibility	Rhythmic exercise	Sit and reach	Centimeters

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. x 100/2 x 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.

Bobby Charlton soccer skill tests were used for the present soccer skill analysis as shown in Table-2.

Table 2: Football skills and Bobby Charlton’s soccer sports tests.

Sl. No	Variable	Test	Criterion Measures
1	Dribbling	Ball control at pace	Seconds
2	Lofted Pass	Accuracy pass	Scores
3	Shooting	Shooting accuracy	Scores
4	Short Passing	Passing over short distance	Scores
5	Juggling	Ball control in air	Seconds

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.

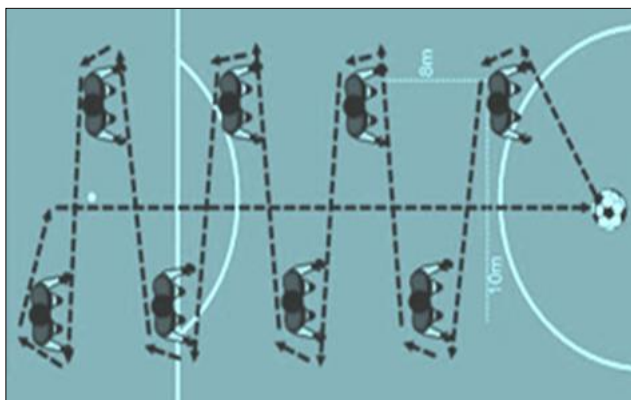


Fig 1: Dribbling test

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.

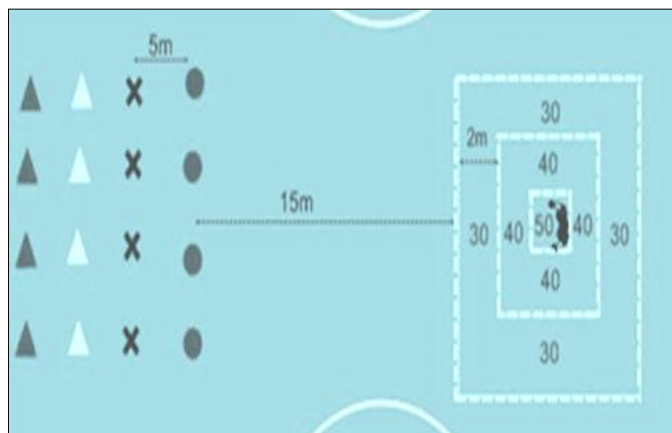


Fig 2: Lofted pass test

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.

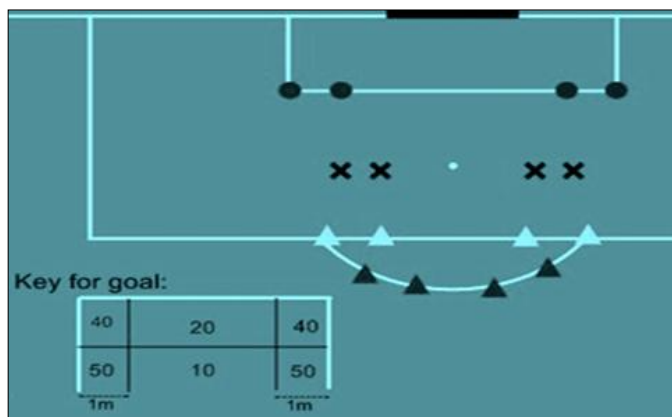


Fig 3: Shooting test

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.

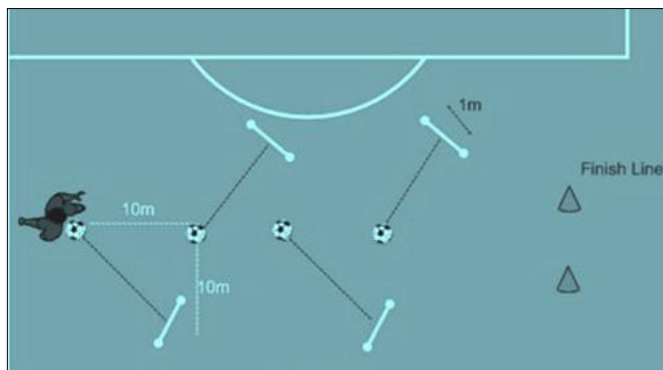


Fig 4: Passing (short) test

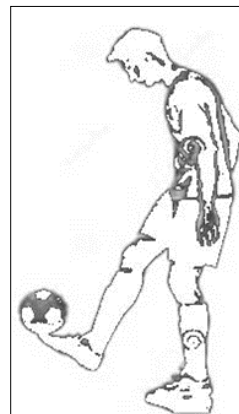


Fig 5: Juggling or ball control test

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

Data were analyzed using a one-way analysis of variance to evaluate significant differences in the measures of physical fitness and soccer skills among the playing positions of soccer players. The post hoc Tukey test was administered to evaluate pair wise differences. The $P < 0.05$ norm was used to designate statistical significance.

Results

Fitness

Physical fitness abilities of each position (Table 3), cardiovascular endurance measured by the Harvard step up test showed significant differences ($P < 0.05$) in terms of midfielders as compare to forward players ($P < 0.05$) as shown in Table-3. The results reveal similar outcome in other component of physical fitness in play position of college soccer (football) players.

Table 3: Comparison of the physical fitness components and football skills among player's position by using SPSS software analysis.

	Defenders 20	Forward 35	Goal Keepers 8	Mid Fielders 19	F test	P value
Hand grip Strength	59.45±12.20	60.91±11.75	58.50±14.08	60.11±13.51	0.111	0.953
Muscular endurance (sit up)	24.65±10.09	24.37±8.44	18.38±3.29	24.32±7.46	1.275	0.289
Cardio-vascular endurance	119.11±24.73	110.00±18.09	117.75±14.23	127.44±24.20	2.906	0.04*
BMI	21.22±2.62	20.96±2.19	21.31±1.89	21.30±2.06	0.133	0.94
Flexibility	3.90±2.81	5.06±3.13	6.88±4.32	6.47±5.92	1.822	0.15
Dribbling	39.20±4.20	38.06±4.28	40.25±3.49	38.58±3.55	0.795	0.5
Lofted Passing	144.50±45.13	155.14±62.75	146.25±37.39	149.47±50.16	0.187	0.905
Shooting	108.50±44.28	102.29±36.55	102.50±31.51	95.79±34.85	0.367	0.777
Passing	75.00±57.35	80.00±50.29	75.00±59.76	78.95±34.62	0.054	0.983
Juggling pre	109.50±30.17	99.14±29.44	106.25±24.46	100.00±41.77	0.674	0.513

Skills

There were no significant differences in terms of dribbling, lofted pass, shooting, short passing and juggling in different playing position. Particularly, goal keepers showed better dribbling skill than other positional players which was not anticipated. Forward players showed lower shooting skill and grater lofted passing skill as compare to defenders. Defenders and goal keepers showed higher juggling skill as compared to other positional players.

Discussion

In the present study, 82 college soccer players of different positions were evaluated in terms of their physical fitness ability and technical personality. There was no significant variation in aerobic exercise. Other studies reported that, midfielders have greater aerobic abilities than others [13, 14, 15, 16]. The present outcome varies from earlier [17] in which defenders run faster than others in the Yo-Yo test. As per the above mentioned results, irrespective of playing position, each player need to have better physical fitness to perform well. To fulfill these criteria, different kinds of fitness program need to introduce to improve their physical fitness in terms of aerobic and anaerobic power. But, the drawback of the study is less number of goal keepers, similar fitness and skills with other positional players.

In the present case, midfielders showed significantly higher cardiovascular endurance as compared to the forward players [1]. Whereas, different studies showed different kind of playing position in their exercises test e.g. peak power exercise test. A study showed that, peak power of forwards highest followed by defender and mid fielders. Other studies found that, center defender have greater than mid fielder [18]. In this respect, different playing position player need to have specific kind of fitness. For example, Goal keepers and defender must be able to execute explosive power. Midfielders trained to improve aerobic power and agility. Forwarders shall improve anaerobic capacity.

Soccer skills

No significant differences in terms of dribbling, lofted pass, shooting, short passing and juggling in different playing position. Whereas, similar results were observed in terms of passing, shooting [7]. But, the results of dribbling differ as compare to other playing position which is quite opposite of our findings though the number of goal keepers were almost similar [7].

Every positional player requires unlike specific fitness and skillful qualities because, every position plays an important role in the game. To get success in the match, suitable players have to be placed by the proper players. Implementation of systematic conditioning and fitness programs will be more effective relatively than regular inadequate fitness and techniques. The practice of stills, strategies and tactics shall be more useful if it is executed in the game effectively.

Conclusion

This study found certain differences in physical fitness abilities and skills by playing position in college soccer players. First, there were no significant differences in physical fitness components like muscular strength, muscular endurance, BMI and flexibility. Second, cardio-vascular endurance was significantly greater in midfielders as compare to forward players ($P<0.05$). Third, greater dribbling skill than other position such as defenders, midfielders, and forwards which was not anticipated. Forth, forward players showed lower shooting skill and grater lofted passing skill as compare to defenders. Hence, a variety of conditioning, training programs shall be useful for college soccer players to enhance their physical fitness, technical and tactical skills to become successful in the game.

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