Int J Med. Public Health. 2020; 10(3):100-103.
A Multifaceted Peer Reviewed Journal in the field of Medicine and Public Health
www.ijmedph.org | www.journalonweb.com/ijmedph

Original Article

Association of Dribbling with Linear and Non-linear Sprints in Young Soccer Players of Bangladesh

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ABSTRACT

Aim: The study was designed to examine the relationships between field-based dribbling performance [measured using the Mor-Christian general soccer ability skill test] and selected field-based short sprint test performances in Bangladeshi youth soccer players. **Materials and Methods:** The study was conducted by 60 male soccer players aged 16 to 19 years. Repeated sprint ability (RSA) and Illinois agility test evaluated for non-linear short sprints. The linear short sprint was evaluated by a 20-metre linear sprint experiment. Data was analyzed using Pearson correlation of coefficient and multiple regression equations. **Results:** The moderate positive relationship was found between the Mor-Christian dribbling performance and the selected change of direction sprinting. The results also showed that the 20m linear sprint with Mor-Christian dribbling performance had a statistically non-significant positive small correlation. Moreover, the four independent variables selected in the regression equation (RSA mean time, RSA best time, Illinois agility test, and 20m sprint test) explain 31.8% of the total dribbling performance variability. **Conclusion:** Both linear and non-linear sprinting are relevant motor fitness capabilities linked to soccer dribbling performance. Agility-based physical capacities were found to correlate more highly with dribbling. It is suggested that a proper training schedule be established and enforced in order to improve dribbling efficiency.
Key words: Dribbling, Sprint, Soccer, Agility, Fitness.

INTRODUCTION

Soccer is characterized as a repetitive high-intensity intermittent team game[1-3] that requires a variety of athletic activities with or without a ball.[4-6] Attacking and defensive soccer skills attract people. A variety of attacking skills can influence the outcome of a match,[7] and dribbling is one of them.[8] Dribbling helps the team to keep possession of the ball and beat the opponent. On average, soccer players perform more than 700 turns and swerve at different angles.[9] Physical fitness, therefore, plays a key role in improving field performance.[10,11] Quick start and stops and quick changes in direction are fundamental for good performance in athletics.[12] Alanazi (2015)[13] stated, "The Illinois agility test (IAT) was used to determine the ability to accelerate, decelerate, turn in different directions and run at different angles" (p.29). As a result, field tests can be used by the coach to determine the fitness of the athletes. Repeated sprinting capability (RSA) and Illinois agility test are validated sprint tests to assess the ability of the player to sprint linearly and to perform lateral alterations.[14] On the other hand, linear sprint helps to create the chance to score.[15] Scoring players (N=161) perform straight sprints prior to all 45% of the goals analyzed.[16] A recent study of soccer games has shown that the mean duration of sprint is between 2 and 4s[17,18] which is also comparable with 20m sprint timing. Presumably, researchers have agreed that linear sprints are the most frequent actions taken in the attacking third of the field. Without a doubt, soccer is one of the fastest games in the world and the movement of soccer is so complex and intelligible[19] that players' fitness plays a crucial role in the fluidity of the game. Agility, change of direction sprint, straight sprints are the respective fitness feature. So, the researchers want to understand which kind of sprint is closest to soccer dribbling ability.

OBJECTIVES

The objective of this study was to analyze the relationships between the dribbling tests and selected short sprint test scores.

MATERIALS AND METHODS

Participants in this study were chosen from national youth soccer players in Bangladesh. A total of 60 male outfield players (Defender=17, Midfielder, and Attacker=43) aged between 16-19 years with a mean value of 16.65, SD±1.36 years were chosen for this study. The purposive sampling technique was used to select the participants. Players had at least three years of active competitive playing experience and their Body Mass Index (BMI) in the standard range (18.5-24.9kg/m²). Participants were informed verbally and

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History
• Submission Date: 14-04-2020
• Revised Date: 08-06-2020
• Accepted Date: 16-07-2020

DOI : 10.5530/ijmedph.2020.3.21

Article Available online
http://www.ijmedph.org/v10/i3

Cite this article : Islam MS, Kundu B. Association of Dribbling with Linear and Non-linear Sprints in Young Soccer Players of Bangladesh. Int J Med Public Health. 2020;10(3):100-3.

in writing of the nature and requirements of the study. Written informed consent was obtained from all participants prior to the completion of the health questionnaire. The "Board of Studies," Department of Physical Education and Sport Science, Visva-Bharati University, carried out this study and forwarded it to the Institutional Research Board (University). Finally, the study was approved by the Research Board of the University.

Variables

The following variables were chosen for the present study, taking into consideration the feasibility criterion. All variables were tested by three skilled Asian Football Confederation (AFC) licensed coaches.

Independent Variables

Selected Short Sprints with Changing Direction Tests (Non-linear)

- Repeated sprint ability (RSA) mean time was taken as the score.
- Repeated sprint ability (RSA) best time was taken as the score.
- Illinois agility test (IAT).

Selected Short Sprint with Linear Direction Test

20 meter sprint test.

Dependent Variable

Mor-Christian dribbling ability test.

Repeated Sprint Ability (RSA) Test

The present study administers the Repeated Sprint Ability (RSA) test as proposed by Rampinini and his team.[20] Only two scores; RSA_{mean}, RSA_{best}, were calculated from the RSA test and these scores were counted as different variables in the study. Before the RSA test, all participants had a dynamic warm-up of 10 min of low-intensity running with some acceleration run. The test consisted of six 40m (20+20 m) shuttle sprints separated by 20s of passive recovery. The participants started from a line 'A' and sprinted for 20m then touched a line 'B' marked on the other side with a foot of the player and returned to the starting line 'A' as fast as possible to cross the line. After 20s of passive recovery, the players had to perform the same for six times.[20,21]

Illinois Agility Test

The Illinois agility test was evaluated to measure acceleration, deceleration, turn in different directions, and run at different angles.[22] On the "go" command, the participants sprinted 10m and turned back to the starting line. After returning to the starting line, they swerved in and out of four cones, completing two 10m sprints to finish the agility course. The fastest value obtained from two trials with 5 min recovery in-between was used as the agility score. The time taken to complete agility run was measured using a Casio digital stopwatch (HS-70W-1DF, Casio Electronics Co, Ltd, China).

20 Meter Sprint Test

Players began each test sprint from a static starting position with their front foot placed on the starting line. They were instructed to sprint across the 20-meter range as quickly as possible in a linear way. Timing was recorded at the closest $1/100^{th}$ of a second. The time taken to complete each sprint was measured using a Casio digital stopwatch (HS-70W-1DF, Casio Electronics Co, Ltd, China).

Mor-Christian Dribbling Test

To evaluate the soccer dribbling ability, the Mor and Christian General Soccer Ability Skill Test (dribbling) was applied.[23] The participant dribbles a ball in a round course with a diameter of 20 yards on the 'Go' command. The participant dribbles as quickly as possible between the 12 cones placed around the circle. The time taken to complete each Mor-Christian dribbling course was measured using the Casio digital stopwatch (HS-70W-1DF, Casio Electronics Co, Ltd, China).

Statistical Procedure

The data is expressed as a mean and SD. The state of normal variation was confirmed using the Shapiro-Wilk W-test prior to the use of the parametric tests. To find out a correlation between independent variables that are RSA_{mean} time, RSA_{best} time, Illinois agility test, 20m sprint and dependent variable that was Mor-Christian dribbling ability test, the product moment method of correlation was used. Secondly to study the joint contribution of independent variables and dependent variable multiple correlations were used. Finally for predicting independent variables and dependent variable a multiple regression equation was formulated.

RESULTS

The procedure was completed by 60 male soccer players (Mean age=16.65, SD ±1.36 years) and used for statistical analysis of their outcomes (Table 1).

Dribbling Skill and Change of Direction (COD) Sprints

Researchers found connections between Mor-Christian dribbling test performance and selected COD sprints. The results show that the correlation of RSA_{mean} time with Mor-Christian dribbling performance has a statistically significant positive moderate correlation (status determined using the modified scale by Hopkins, n.d.) with '*r*' value of 0.561* and *p*-value of 3.1E-06. The result also showed that correlation of RSA best time with Mor-Christian dribbling performance has a statistically significant positive moderate correlation with '*r*' value of 0.516* and *p*-value of 2.4E-05. The result moreover, showed that correlation of Illinois agility test with Mor-Christian dribbling performance has a statistically significant positive moderate correlation with '*r*' value of 0.391* and *p*-value of 0.00. Further, researchers revealed joint contribution of COD sprints (RSA_{mean} time, RSA_{best} time, Illinois agility test) in determining soccer dribbling skill performance (Table 2). Table 2 indicates a moderate level relationship was found between Mor-Christian dribbling performance and selected COD sprints as a coefficient of multiple correlations was found 0.598* which is higher than the tabulated value $r0.05=0.25$, $d_f=58$.

Dribbling Skill and Linear Sprint

To showed connection between Mor-christian dribbling test performance and selected linear sprint researchers used product moment method of

Table 1: Test protocol characteristics of the soccer players.

Test Protocol	Mean ± SD and Unit=Sec.
Age (years)	16.65, SD± 1.36
Stature (cm)	169.1, SD±4.9
Body Mass (kg)	58.5, SD±4.52
RSA_{mean} time	7.587, SD±0.255
RSA_{best} time	7.205, SD±0.277
Illinois Agility Test	16.529, SD±0.970
20 Meter Sprint	3.406, SD±0.268
Mor-Christian Dribbling Test	15.132, SD±1.709

correlation. The results display that the correlation of 20m linear sprint with Mor-Christian dribbling performance has a statistically non-significant positive small correlation with '*r*' value of 0.208 and *p*-value of 0.109 (Table 3).

Joint Contribution of Various Sprints in Determining Dribbling Skill

Present researchers revealed joint contribution of various sprints (RSA_{mean} time, RSA_{best} time, Illinois agility test, and 20m sprint test) in determining soccer dribbling skill performance (Table 4). Table 4 indicates a high-level relationship was found between Mor-Christian dribbling performance and various sprints as coefficient of multiple correlations was found 0.604* which is higher than the tabulated value r0.05=0.25, d_f=58.

The researchers also found 'R' square value is 0.365 and R^2 adj value is 0.318. The regression coefficients developed which is as follows:

Dribbling Ability = -16.685+2.294 × (RSA_{mean}) + 1.015 × (RSA_{best}) + 0.304 × (Illinois agility) + 0.604 × (20m sprint)

The above regression equation is the value of the R^2 adj is 0.318. In other words, the selected four Variables (RSA_{mean} time, RSA_{best} time, Illinois agility test, and 20m sprint) in this regression equation explain 31.8% of the total variability in the dribbling performance.

DISCUSSION

The present study investigated the relationship between soccer dribbling ability and selected short sprint timing in a group of national youth soccer players. The key finding from this study was that the selected COD of the sprint was more significantly correlated with the dribbling performance. This may be due to the fact that the movement nature of the dribbling is close to the changing direction of the sprinting process. Therefore, in the actual soccer world as we have experienced, the degree of that relationship can also have an impact on precise ball control and beating the opponent. In our study, we also found that the correlation between linear directions of sprinting and dribbling performance was low. Such disparity in the study findings may be due to the fact that the participants mix (attacker and defender). However, dribbling a ball is performed by moving it with the feet and the moving action with every step helps a player to control the ball more.[24] A player often performs this activity during a match, which requires rapid force development, such as sprinting or rapidly changing direction.[1] Similarly, Pauole *et al.* (2000)[25] found significant associations between success in an agility t-test and a sprint time of 40 yards in both men and women. However, the performance of the Loughborough Soccer Passing Test (LSPT) assists the multifaceted aspects of soccer ability that include precise ball control in a dynamic context.[26] With this in mind, the points of contact with the ball may change continuously at any time during the ball control process.[24] Thus, agility in team sports can be described as essential movements that require the player to make immediate changes in the direction of the body and move quickly.[27] BenOunis *et al.*(2013)[28] found a positive moderate/large correlation between total performance of LSPT and linear short sprints time (5m sprint time=0.60*; 20m sprint time =0.58*; 30m sprint time=0.49*). The findings have shown that distance can have an effect on the relationship. Therefore, 5m sprint time significantly associated with soccer skill performance (LSPT). We assumed that a linear short sprint distance could lead to soccer dribbling better than a linear higher sprint distance. The researchers also showed a very large positive correlation between the LSPT and the COD of short sprints (Agility-15m=0.75*), (Illinois agility test=0.72*). Although previous research has shown that the change in direction of the sprint is highly correlated with the successful performance of team sports.[29,30] Research carried out by Loturco *et al.* (2019)[31] found that, soccer players with higher maximum acceleration rates can jump higher, sprint quicker (over short distances) and achieve higher COD of short sprints than their slower counterparts. Likewise, the present study also identified the relationship between field-based linear and COD of short sprints with field-based dribbling performance in soccer. Thus, when developing dribbling performance, coaches may give priority to work based on a change in direction short sprint. Similarly, repeated sprint ability (RSA) is another significant COD of sprint that is moderately associated with dribbling performance. Present study has shown that both RSA_{mean} and RSA_{best} sprint can have an effect on soccer dribbling performance. In addition, multiple correlations was computed in order to assess the combined contribution of RSA_{mean} time, RSA_{best} time, Illinois agility test and 20m sprint timing in relation to dribbling ability in soccer. A high-level relationship '*r*' value of 0.604*, *p*-value of 0.00, at 0.05 level of confidence with 58 degrees of freedom was observed. It can, therefore, be inferred from the above analysis that the variables listed above, taken together, contribute to the soccer dribbling ability.

Table 2: Joint contribution of Independent variables in determining Dependent variable.

Criterion Variable	Independent variables	Coefficient of multiple correlation
Mor-Christian dribbling performance	RSA_{mean} time RSA_{best} time Illinois agility test	0.598*

* significant at 0.05 level, $_{r0.05}(58)=0.25$

Table 3: Correlation between Independent variable and dependent variable.

Independent Variable	Correlation coefficient
20m linear sprint	0.208

* significant at 0.05 level, $_{r0.05}(58)=0.25$

Table 4: Joint contribution of Independent variables in determining Dependent variable.

Criterion Variable	Independent variables	Coefficient of multiple correlation
Mor-Christian dribbling performance	RSA_{mean} time RSA_{best} time Illinois agility test 20m sprint test	0.604*

* significant at 0.05 level, $_{r0.05}(58)=0.25$

CONCLUSION

Sprinting has two main components-acceleration and maximum velocity. There can be no doubt that both components are very crucial for performance of dribbling. Linear, non-linear all types of short sprint have acceleration and maximum velocity. The present study showed that there would be linear and non-linear short sprints both are important to perform better dribbling in soccer. For all counts and with proven results, the emphasis should be on agility work first along with linear short sprint to increase the performance of dribbling in scientific training. It is

believed that further research is needed to develop similar theories that included elite professional soccer players with larger sample size.

Limitation

In the absence of opponents during the Mor-Christian dribbling test, players seem to feel mental comfort, while impersonal time pressure is the only motivation for their action. This does not seem to reflect the actual actions taken by the players in the field in a match.

ACKNOWLEDGEMENT

The researchers are grateful to the soccer players who have participated in this study on a voluntary basis and to the club authorities for providing time to collect data.

CONFLICT OF INTEREST

No conflicts of interest are declared by the authors.

ABBREVIATIONS

IAT: Illinois Agility Test; **RSA:** Repeated Sprint Ability; **BMI:** Body Mass Index; **SD:** Standard Deviation; **COD:** Change of Direction; **LSPT:** Loughborough Soccer Passing Test.

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Cite this article : Islam MS, Kundu B. Association of Dribbling with Linear and Non-linear Sprints in Young Soccer Players of Bangladesh. Int J Med Public Health. 2020;10(3):100-3.