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Relationship between Reactive Agility and Playing Positions in Amateur Football Players

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ABSTRACT

Background: Reactive Agility is an important skill and a determinant in soccer success. Hence it is a key performance indicator. A soccer player develops a certain set of skills by playing at a particular position because of the demands that are placed by that position. Hence this study aimed to verify if Reactive Agility is influenced by amateur football players playing positions.
Methods: 42 Amateur football players between the age group of 11-21 years were selected for this study. The participants included 14 attackers, 14 midfielders and 14 defenders. A soccer specific Reactive agility test was performed by all the players. The significance of differences between the groups was calculated using Analysis of variance (Anova) test.
Results: Anova shows significant statistical difference in Reactive Agility among the different playing positions in amateur football players ($p<0.001$) When multiple comparisons between the groups were analysed it showed that midfielders performed significantly better than attackers and defenders.
Conclusion: On the basis of the result obtained, we can say that Reactive Agility differs in different playing positions in Amateur football players and it can be used as an indicator to assign positional roles in Amateur football teams.

Keywords: Soccer, Reactive Agility, Playing positions, Soccer specific Reactive agility test.

INTRODUCTION

Football also known as soccer is a game in which two teams of eleven players each play whose objective is to invade the opposition's area and try to maneuver the ball into the opponent team's goal**.** The different playing positions in soccer can be divided into three categories: forwards, mid-fielders and defenders. [1]

In a soccer match, the position of the player, the game strategies and the plan of action determine the successful outcomes of the team. Position of a player is influenced by genetic predispositions such as the anthropometric characteristics, physical capability and mental confidence. [2] Similarly, physiological characteristics also vary in relation to the rate of physical exertion, endurance and balance for each position. [3]

The selection of a player for a particular position based on their anthropometric, physical capabilities, mental confidence and physiological characteristics is not appropriate as it may favour the average and early maturing boys. [4]

Moreover, cognitive skills and tactics may be a more suitable indicator for assigning a player for different roles. As cognitive skills are an important aspect of the capabilities required in soccer and a

player develops the ability to 'read and react' to a stimulus playing at a certain position that is the definition of Reactive Agility. [2]

Reactive Agility has been defined as "a rapid whole-body movement with change of speed or direction in response to a stimulus". [5] This definition is based on a model that separates agility into two components, pre-planned agility (closed skill agility, change of direction speed – CODS) and non-planned agility (open skill agility, reactive agility – RA). [6]

Initially, agility was defined as change in direction with speed. [7] However now agility is considered as an open skill and is defined as a change in velocity or direction in response to a stimulus that cannot be pre-planned. [8] The stimulus may be the movement of the ball or the movement in response to the actions of an opposing player. [9] RA is "a multi-planar or multidirectional skill" which includes acceleration, explosiveness, and reactiveness. This definition suggests that Reactive agility consists of both cognitive and physical abilities.

RA skill is essential for attackers, as it enables them to evade their opponents' game tactic and to gain and maintain possession of the ball. It is also beneficial for defenders to reduce space on the play area and to reduce the attacking movements and to prevent from conceding a goal. [10] Amateur football players are those who have been practicing for up to 3 times a week or 6 hours a week for up to 2 years. Soccer being an invasion sport, Reactive Agility becomes an important skill to be tested among players. Hence this study aims to find the relationship between reactive agility and playing positions in Amateur football players using Soccer specific Reactive agility test.

METHODOLOGY

Objective: To find reactive agility using soccer specific reactive agility test and to study the findings of reactive agility test with respective playing positions.

Study Design: Cross-sectional Observational study

Study Population: 42 Amateur football players from Pune volunteered for this study. Male football players between age group of 11-21 years and undergoing routine coaching and practices at the same position for 2 years were selected. Players with any previous injury, ligament tears or sprains or recent fractures within 6 months or any systemic illness were excluded from this study.

Procedure:

The subjects were recruited based on inclusion and exclusion criteria and demographic parameters were taken.

The subjects were divided in 3 groups namely attackers, midfielders and defenders with 14 in each group.

Soccer specific reactive agility test was conducted outdoors on an artificial grass ground.

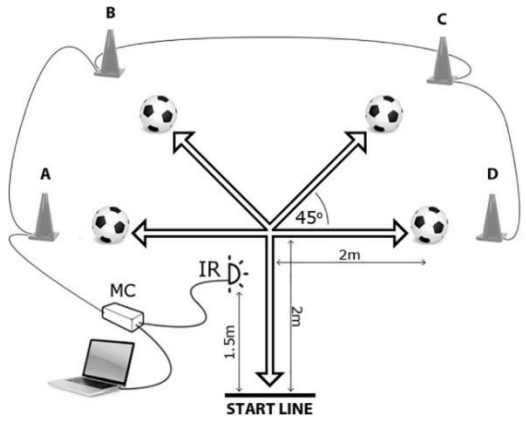
Testing was performed on a non-training day and subjects were requested to refrain from any strenuous physical activity on these days. Agility trials using a light-based reactive agility test was performed.

Research personnel demonstrated the proper form for the execution of the tests.

Subjects were instructed to sprint 2 meters forward and the timing were initiated when the player crossed the IR signal. At this point, one of the four LED lights placed on the cones situated at lateral and diagonal positions light up and the subject had to assess and sprint towards the light and kick the ball placed in front of it and return back to the original position. The timing was recorded as the player crosses the IR signal again.

The participants subsequently underwent three trials for the test in the study. The averages of the three trials were considered as the final result for each player. The rest period between the trials was 10-15s. The participant had no advanced knowledge of the testing scenarios.

Measurements were recorded using a hardware device system – ATMEL based ARDUINO micro-controller. A photoelectric infrared (IR) sensor was used as a time triggering input and LEDs were used as controlled outputs. This device was connected to a laptop PC on Windows 10. This device has previously been used and is proved to be both reliable and valid for reactive agility. [6]



RESULT AND ANALYSIS

In this study, 42 football players, 14 in each group were studied. The data were reported as mean ± standard deviation. The significance of difference of Reactive Agility between the 3 groups was analysed by using ANOVA test. The data was analysed using the Epi Info software.
The detailed results are reported in Table 1.

Table 1- Results of Reactive Agility test of the 3 groups

Group	Number	Mean	Std. Dev.
1-Attackers (A)	14	4.03	0.31
2-Midfielders (B)	14	3.77	0.23
3-Defenders (C)	14	4.25	0.27

Table 1 shows the values of the means of the attackers, midfielders and defenders. When the results were compared, ANOVA showed a significant difference in Reactive Agility between the 3 groups. ($p<0.001$).
Games Howell post hoc test was used to calculate multiple comparisons between the groups.
The results showed that midfielders had a significantly lower test time compared to defenders ($p<0.01$) and attackers ($p<0.05$).
The detailed results are reported in Table 2.

Table 2 – Comparison of means:

Groups	Means	P value
A, B	(4.03 vs 3.77)	<0.05
A, C	(4.03 vs 4.25)	>0.05
B, C	(3.77 vs 4.25)	<0.01

DISCUSSION

This study was conducted to find out if there was a relationship between Reactive Agility and playing positions in amateur football players.

Successful performance in team sports, such as soccer, requires change-of-direction skill, but also well-developed perceptual and decision-making skills. [11] Thus, it has been suggested that reactive agility is one of the key performance indicators and therefore it is a fitness skill-related component that should be a part of standard physiological testing for soccer players. [12] From literature overview, it is evident that Reactive agility should be considered as an important component for successful performance in team sports such as soccer. [5]

The playing positions in soccer are well defined and soccer players are involved in various tasks that are very specific to different playing positions. For example, the attackers must be able to receive the ball and create opportunities to score. The midfielders are often highly skilled and better at ball handling technique. As they connect the game forwards and backwards, they excel at ball control and have better dribbling abilities and tactical knowledge. Whereas, the defenders need to anticipate the opponent players movement and prevent them from creating chances to score a goal. [13]

The main finding of this study was that there was a significant difference of Reactive Agility among the players of the three different field positions.

As shown by the results of this study, the midfielders performed better in Reactive Agility, tested by soccer specific reactive agility test as compared to attackers and defenders. Reactive Agility being an open skill that cannot be pre-planned, it allows the player in each role to accelerate, decelerate and change direction in response

to stimuli. [14] The midfielders were able to 'read and react' to a given stimulus faster showing better cognitive ability along with physical capabilities, which means they were able to complete the decision-making process and reaction faster than attackers and defenders. [8]

In one study they confirmed that there was a significant anthropometric difference among players of different playing positions. [15] Specifically, in all age groups, defenders were the tallest and heaviest players as compared with midfielders and attackers who were smaller and leaner. [4] In another study, they found similar positional differences among players and concluded that the midfielders were the lightest. [6] Additionally, they have both defensive and offensive tasks including frequent movements up and down the field. [4] This, along with their ball control and dribbling skills, led to the midfielders showing better reactive agility.

In another study the midfielders were shown to be engaged in significantly less amount of time standing still and shuffling and most time running and sprinting. In terms of direction, they also performed the most diagonal and arc movements along with attackers which adds to the result of our study where midfielders and attackers performed better at Reactive agility. [16]

In one study they did not find a significant difference in Reactive agility among player roles in youth soccer players. The results obtained were such as the players in youth soccer teams were trained in different positions in response to different game situation to develop tactical skills. Also, the players were assessed using Y-Reactive Agility test which was more appropriate for forward oriented sports like rugby. [17]

The results obtained in this study can be attributed to the players' physical, physiological, cognitive abilities as well as technical skills developed at that position. Hence, this study recommends use of Reactive Agility as an indicator to assign players to different positional roles in amateur football players.

CONCLUSION

This study showed that there was a significant difference in Reactive Agility among the different playing positions in amateur football players. It can help coaches and professionals who work with amateur football players as a measure to assign players to different playing positions and utilising their skills to the maximum.

Future Scope of the Study:

Further research can be done by analysing the subgroups in soccer teams.

Reactive agility can be tested among professional players to analyse the effect of a position on reactive agility with higher levels of training.

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