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## Relationship between agility and functional performance in recreational football players

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### Abstract

**Introduction:** Agility can be defined as the ability which allows one to act and alter direction quickly and effectively to achieve a specific goal e.g., evade, deceive, react to the opponent, create space, etc. Functional performance refers to any action performed with a certain goal or action with purpose. Agility is one of the significant components which contributes individually to exhibit optimal performance in daily activities as well as in recreational games. But the relationship between agility and functional performance in recreational athletes is not established.

**Aim:** To determine the relationship between agility and functional performance in recreational football players.

**Methodology:** Twenty-four male recreational football players were selected according to the inclusion and exclusion criteria. Each participant performed tests for agility and functional performance i.e T-test and Triple hop test respectively. Karl's Pearson Correlation Coefficient test with SPSS v.26 was used to determine the correlation between the two tests.

**Result:** A statistically significant positive correlation was found between agility and functional performance in recreational football players. ( $r=0.739$ ,  $p=0.000$ )

**Conclusion:** This study confers a positive relationship between agility and functional performance indicating better agility can result in better functional performance.

**Keywords:** agility, t-test, triple hop test, functional performance, recreational players

### Introduction

Agility can be defined as the ability which allows to act and alter direction quickly and effectively to achieve a specific goal e.g., evade, deceive, react to the opponent, create space, etc. [1]. Agility is one of the significant components which contributes individually to exhibit optimal performance in daily activities as well as in recreational games. Several components contribute to agility, such as reaction time, strength, power, and decision making [2]. Agility is of vital importance to improve game performance [3]. Most agility exercises consist of quick acceleration, change direction and quick deceleration, power is significant for the skill to accelerate [4].

Improving agility is one of the most important aspects of off-season strength and conditioning programs. In football, there is a strong interest present in developing a field test that could effectively measure the agility of football players. In a game situation, the changes of directions may be initiated to either pursue or evade an opponent or react to the moving ball. Thus, it has been recognized that the response to a stimulus is a component of agility performance [5].

Functional performance refers to any action performed with a certain goal or action with purpose is called functional movement. Functional performance tests, such as the hop tests and Agility T-test are closed chain in nature and therefore assimilate the joint loading forces and kinematics that occur functionally. Agility is important to sports, except for track sprinting and marathon running, individuals rarely run in a straight line. In the majority of sports, athletes are required to change direction constantly. There is a current paradigm of speed development in the sports training community where a greater emphasis is being placed, not only on acceleration, top speed, and speed endurance but on change of direction drills. The traditional definition of the ability to rapidly change direction has been redefined as the change of direction speed or planned agility. More recently it has been suggested that agility contains

both a change of direction movement and a perceptual and decision-making component since changes of direction and speed are often performed in response to an opponent's action. Highly skilled players produced significantly faster movement times and decision times than less-skilled players [6]. Over the past several years, the body of literature concerning the relationship between agility and functional performance significantly increased. However, the relation between the two in recreational football players has not still clearly defined. T-Test and Triple Hop tests were considered for a study because these tests have excellent construct validity and excellent reliability. The purpose of this study is to find the relationship between agility and functional performance in recreational football players. The correlation found between the two will be of clinical significance and will be helpful in rehabilitation and will help enhance performance.

## Methodology

### Study design and subjects

A single-blind, observational study design was conducted on recreational football college players in and around Mangalore, India. 24 participants based on inclusion criteria were selected in this study by convenience sampling technique. This study was performed from October 2020 to February 2021 in South India. Subjects included in this study were male recreational football players aged between 18 to 25 years who were willing to participate. Subjects who are not physically fit, the recent injury to lower limb, any neurological condition affecting the neuromuscular system and balance, and professional players were excluded from this study. The study protocol was approved by Institutional Ethical Committee.

### Procedure

All the participants gave written consent to participate in the study after a brief explanation of the purpose of the study and test procedure. T-Test and Triple Hop Test were used as

outcome measures to measure agility and functional performance of participants respectively.

## Outcome measures

### T-test

T-test was done with the markings on the ground with standard measurement i.e., 4.57 m  $\times$  2 horizontal distance and 9.14 m vertical distance dividing the horizontal line from the center at an angle of 90 degrees. Cones were used for markings in each point i.e., on starting point, of vertical line, two ends of a horizontal line, and center of a horizontal line forming a "T" shape. Participants were instructed to sprint from the starting point of the vertical line to the center of the horizontal line and shuffle sideways to left first to the end of the horizontal line and shuffle back to the right end of the same line then come to the centre and run backward-facing front to the starting point and time was measured from start to end.

### Triple Hop Test

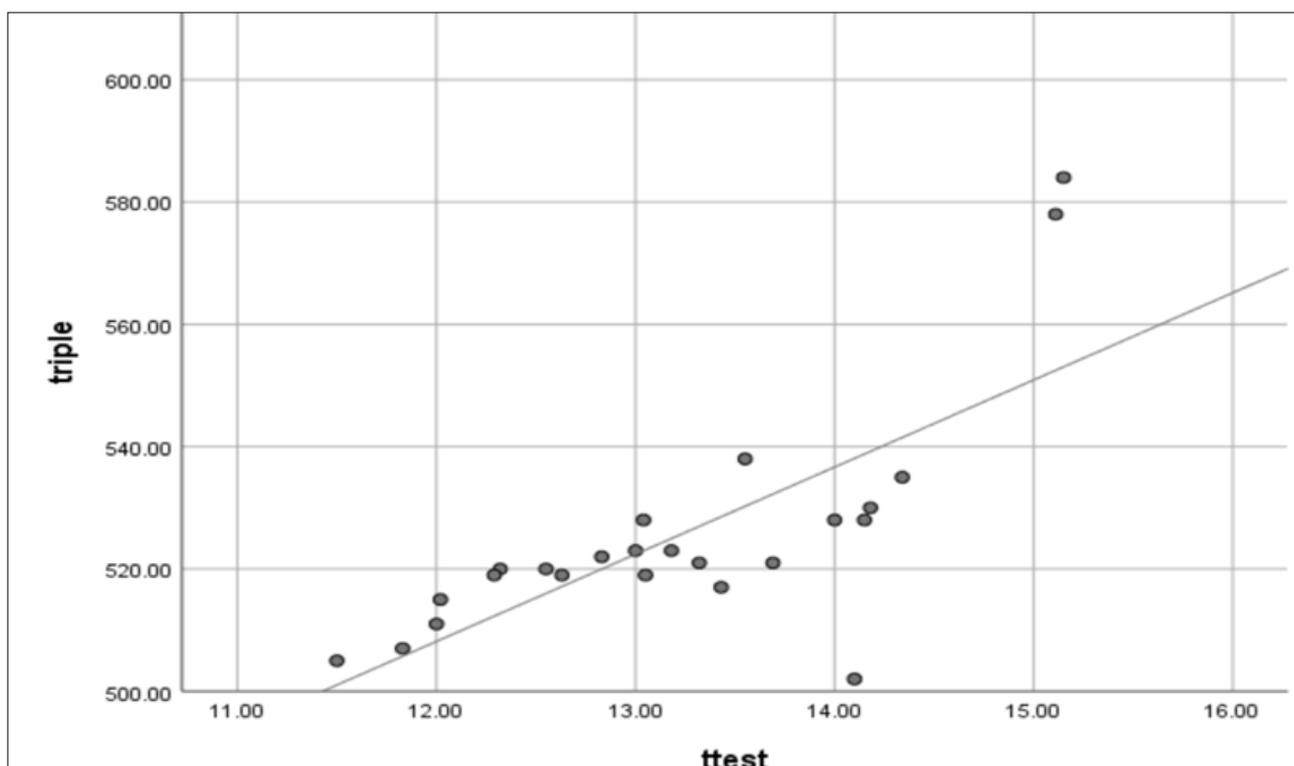
In the triple hop test, the aim is to jump as far as possible on a single leg three consecutive times, without losing balance and landing firmly. The distance was measured in meters from the start line to the heel of the landing leg.

### Statistical Analysis

Karl Pearson's correlation coefficient was used to find the relation between agility and functional performance test (T-Test & Triple Hop Test).  $p < 0.05$  was considered significant.

### Result

Descriptive data were expressed in mean and standard deviation ( $X \pm S.D$ ). The Mean age was  $22 \pm 2.5$  years, the mean T-test value was  $13.22 \pm 0.99$ , and the triple hop test was  $525.54 \pm 19.13$ . Statistically significant strong positive correlation was found between the scores of T-test and Triple hop test ( $r=0.739$ ,  $p=0.000$ ) (Figure 1)



**Fig 1:** Correlation between agility and functional performance in recreational football players

## Discussion

Agility is an ability to change the body's position efficiently and requires the integration of isolated movement skills using a combination of balance, coordination, speed, reflexes, strength, and endurance. Agility is the ability to change the direction of the body efficiently and effectively and to achieve this requires a combination of balance, which is the ability to maintain equilibrium when stationary or moving through the coordinated actions of our sensory functions (eyes, ears and the proprioceptive organs in our joints), speed, which is the ability to move all or part of the body quickly, strength, the ability of a muscle or muscle group to overcome resistance, and lastly, coordination, the ability to control the movement of the body in co-operation with the body's sensory functions. Functional performance refers to any action performed with a certain goal or action with purpose. Measuring variables such as flexibility, strength, endurance, coordination, and balance in an isolated way and without integrating them in a movement may cause us to believe that the tissue is cured when functionally this is not the case. In turn, it is necessary to highlight the psychological importance which these types of functional performance tests provide. If an athlete verifies his capacity to perform in environments and movements similar to his sports modality, his confidence will also increase.

So, this study was conducted to determine the relationship between agility and functional performance in recreational football players. 24 Participants performed the T-Test and Triple Hop Test were used as an outcome measure to measure the agility and functional performance of participants. T-test was done with standard measurement. The present study result showed there is a strong positive association between the agility T-Test and functional performance Triple Hop Test ( $r=0.739$ ,  $p=0.000$ ) suggesting that these tests can be paired as an outcome measure to assess the components of fitness, though one of these assesses the speed, change in direction, the precision of movements, perception of distance and many other while other assesses the power exertion of the lower limb and neuromuscular control. The agility test for this study was chosen because of its combination to cover frontal and sagittal plane movements. The study done by Chaouachi *et al.*, suggests that agility should be regarded as a physiological ability for recreational players. Consequently, agility drills should be stressed in athletic or recreational training. Given the association between squat 1 RM performance and short sprint times, squat exercises should be a major component for conditioning recreational football players<sup>[7]</sup>.

Another study done by Goran Markovic suggests that most of the multi-joint leg extensor strength and power measures are poor predictors of agility in physically active men. Thus, the effects of interventions aimed towards the improvement of functional movement performance may not require evaluation using the common tests of muscular strength and power. A more specific approach including both the functional strength tests and functional movement performance tests could be recommended instead<sup>[8]</sup>. R Tylor Hamilton *et al.* have conducted a study to find Triple-Hop distance as a valid predictor of lower limb strength and power and found Triple-hop distance is a useful clinical test to predict an athlete's lower extremity strength and power. Although THD was not a predictor of static balance, further research is needed to examine its relationship with more dynamic balance tests<sup>[9]</sup>.

During daily activities or sports, there are very few times that the body will maintain a completely static state of balance. Agility does not have a universal definition, but it is often

recognized as the ability to change direction and start and stop quickly, and/or as the ability to change direction rapidly and accurately. Agility is important to daily activities & sports, except track sprinting and marathon running, individuals rarely run in a straight line.

In the majority of sports, athletes and other daily activities are required to change direction constantly. To change direction, or perform an agility task, athletes decelerate and accelerate and maintain their COG (center of Gravity) over a base of support. With all of the demands placed on the body to maintain a COG and the actions performed in each athletic activity, balance is pushed to an extreme. With these observations, it can be seen that balance and agility might go hand in hand.

## Limitations

The sample size considered for the study was small and had included only male recreational football players of the 18-25 age group.

## Conclusion

The present study concluded that there is a correlation between agility and functional performance in recreational football players and when there is good agility there will always be a better functional performance.

## Conflict of interest

There is no potential conflict of interest relevant to this article

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