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# Relationship between selected Motor Fitness Variables and Playing Ability of Football Players

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***Abstract:*** The aim of this study was to examine the relationship between motor fitness variables and the playing ability of intercollegiate football players. A total of 120 intercollegiate football players from degree colleges affiliated with Davangere University, Karnataka, who had participated in intercollegiate tournaments, were randomly selected as the sample. The players' ages ranged from 18 to 25 years. The independent variables in this study included speed, explosive strength, cardio-respiratory endurance, agility and flexibility, while the dependent variable was overall playing ability, which was assessed using a panel of experts in football skills such as dribbling, passing, shooting. The fitness tests used included the 50-meter sprint (speed), standing broad jump (explosive strength), 600-yard run/walk (cardio-respiratory endurance), 4x10 meter shuttle run (agility) and the sit-and-reach test (flexibility). The Pearson Product Moment Correlation was used to analyze the data at the 0.05 significance level. The results showed that there were significant correlations between all the motor fitness variables and the overall playing ability of the football players, indicating that motor fitness is crucial for enhancing football performance.

**Index Terms** – Relationship, motor fitness, playing ability, football, players.

## 1. INTRODUCTION:

Football is a dynamic and physically demanding sport that requires a combination of skill, agility, strength and endurance. In the competitive world of football, players must continuously improve their physical and motor abilities to excel. The game itself involves a variety of skills such as running, passing, shooting, dribbling and defending, all of which require specific fitness levels. Motor fitness, which refers to the capacity of an individual to perform physical tasks efficiently, plays a pivotal role in a player's performance on the field. It includes components such as speed, strength, endurance, flexibility and coordination, which are all necessary to meet the physical demands of football. In football, explosive strength is needed for powerful kicks and tackles, while speed is critical for running, agility for changing direction quickly and endurance for maintaining performance throughout the game. Additionally, flexibility ensures that a player can execute wide-ranging movements without injury.

Football, widely regarded as one of the most physically demanding sports, requires a comprehensive blend of physical, technical and mental skills. To excel at the highest levels, players must possess a combination of strength, speed, agility, endurance and coordination. Each of these physical attributes-collectively referred to as motor fitness-plays a vital role in a player's ability to perform on the field, as football requires players to rapidly adapt to the ever-changing dynamics of the game. Whether it's sprinting down the wing, executing a powerful tackle, maintaining possession under pressure, or delivering an accurate pass, a player's motor fitness significantly impacts their overall playing ability.

Motor fitness is defined as the ability to perform physical tasks efficiently and effectively and it directly influences the technical execution of football skills. Specifically, motor fitness encompasses several key components, such as speed, explosive strength, endurance, flexibility and coordination, all of which are crucial for optimizing performance in football.

**Speed:** Speed is one of the most essential attributes in football. A player's ability to cover distance quickly is critical for both offensive and defensive maneuvers. Speed allows players to outrun opponents, create goal-scoring opportunities, recover defensively and transition quickly between different phases of play. In fast-paced situations like counter-attacks or one-on-one situations, players with higher speed have a clear advantage. Speed also enhances a player's agility, enabling them to change direction rapidly while maintaining control of the ball.

**Explosive Strength:** Explosive strength, or power, is necessary for performing high-intensity movements that require rapid force generation. This includes actions such as sprinting, jumping, tackling and kicking with power. In football, explosive strength is essential for making powerful tackles, delivering strong shots on goal and executing accurate crosses or passes. Players with greater explosive strength are also better at challenging aerial balls and shielding the ball from opponents during physical confrontations.

**Endurance:** Football is a game that requires sustained effort over a 90-minute period (or more, in extra time). Endurance, particularly cardiovascular endurance, allows players to maintain a high level of performance throughout the match without succumbing to fatigue. Players with strong endurance can run longer distances at higher intensities, contributing to both offensive and defensive actions. This is especially important in modern football, where the game is characterized by frequent transitions and a high tempo, demanding players to cover large areas of the field.

**Flexibility:** Flexibility is often overlooked but is a key component of motor fitness. It allows players to perform a wide range of movements required in football, such as stretching to reach for the ball, executing accurate passes with various angles, or performing stretching movements to avoid injury. Flexibility is particularly important in preventing injuries, as a more flexible body is less likely to suffer from muscle strains, joint injuries and ligament tears, which are common in the high-impact, fast-paced environment of football.

**Agility:** Agility refers to the ability to synchronize various body movements and muscle groups to execute technical skills effectively. In football, agility and coordination is critical for ball control, dribbling, passing and shooting. For example, the ability to dribble past defenders while keeping the ball close to the feet requires exceptional hand-eye and foot-eye coordination. Similarly, executing a perfect pass or a well-timed tackle demands precise coordination between the player's limbs and the ball. Good coordination ensures that a player's movements are fluid and precise, reducing the risk of errors in high-pressure situations.

## 2. REVIEW OF RELATED LITERATURE:

Recent studies have continued to explore the significant relationship between motor fitness variables and football playing ability, highlighting the crucial role of physical conditioning in optimizing performance. For instance, Mohammed et al. (2022) examined the impact of strength, speed and agility on football players in Nigerian universities and found that explosive strength and agility were the most significant predictors of performance, particularly in midfielders and forwards. Endurance also played an essential role for defenders. Similarly, Kumar et al. (2023) conducted a study on youth football players in India and found that speed and cardiovascular endurance were the most influential factors on playing ability, with flexibility contributing to injury prevention and the ability to perform technical skills effectively. Singh and Das (2021) analyzed the relationship between speed, strength and coordination in elite Indian footballers and concluded that higher levels of coordination and explosive strength were crucial for executing complex skills under pressure, especially during high-intensity moments in the game. Additionally, Mishra et al. (2020) focused on professional football players in Europe and identified agility and explosive power as key components for offensive players, while endurance was deemed more important for defenders, underscoring the need for role-specific fitness training. Collectively, these studies reinforce the idea that motor fitness variables, including strength, speed, agility and endurance, are critical to football performance, with each factor contributing to specific aspects of the game. Studies by Jeyaraj and Gopinathan (2014), Devaraju and Needhiraja (2013) and others have found that variables like speed, strength and endurance are positively correlated with football performance.

The motor fitness variables speed, explosive strength, endurance, flexibility and agility are deeply intertwined with a football player's playing ability. The more efficiently a player can perform these physical tasks, the better they can execute the technical and tactical aspects of football. Therefore, improving motor fitness through targeted training programs should be a priority for football players who wish to enhance their overall performance and excel in their careers. This relationship between physical fitness and playing ability forms the foundation for developing successful training regimes aimed at optimizing a player's potential on the field.

## 3. SIGNIFICANCE OF THE STUDY:

This study is significant because it aims to provide insights into how specific motor fitness components contribute to football performance. By identifying the fitness variables most closely related to playing ability, coaches and trainers can focus on targeted training regimens to improve player skills. Additionally, this research can inform the development of fitness assessments and training programs that are better modified to the demands of football, particularly at the intercollegiate level, enhancing overall athletic performance and potential for success in competitive play.

## 4. STATEMENT OF THE PROBLEM:

This study aims to explore the relationship between selected motor fitness variables (such as speed, explosive strength, cardio-respiratory endurance, agility and flexibility) and the overall playing ability of football players. Understanding these relationships helps improve training methods to enhance football performance among degree college-level players. The topic selected for investigation is as under:

**"RELATIONSHIP BETWEEN SELECTED MOTOR FITNESS VARIABLES AND PLAYING ABILITY OF FOOTBALL PLAYERS"**

## 5. OBJECTIVES:

1. To measure selected motor fitness variables (speed, explosive strength, cardio-respiratory endurance, agility and flexibility) among the players.
2. To examine the relationship between each motor fitness variable (speed, explosive strength, cardio-respiratory endurance, agility and flexibility) and overall playing ability.

## 6. HYPOTHESES:

There is a significant relationship between motor fitness variables (speed, explosive strength, cardio-respiratory endurance, agility and flexibility) and the playing ability of football players.

## 7. METHODOLOGY:

**7.1 Method:** Descriptive Survey Method.

**7.2 Sample Selection:** A total of 120 intercollegiate football players from degree colleges affiliated with Davangere University University, Karnataka, who had participated in intercollegiate tournaments, were randomly selected as subjects for the study. The age of the subjects ranged from 18 to 25 years.

**7.3 Selection of Variables:** The following variables were chosen for the study along with their respective tests and measurement criteria:

| Variable | Test | Criterion Measure |
|---|---|---|
| Dependent Variable | Overall Playing Ability | Assessed by expert panel (dribbling, passing, shooting, etc.) |
| Independent Variables | | |
| Speed | 50-Meter Sprint | Time (seconds) |
| Explosive Strength | Standing Broad Jump | Distance (meters) |
| Cardio-respiratory Endurance | 600-Yard Run/Walk | Time (minutes) |
| Agility | 4x10 Meter Shuttle Run | Time (seconds) |
| Flexibility | Sit-and-Reach Test | Distance (centimeters) |

**7.4 Statistical Procedure:** The Karl Pearson Product Moment Correlation was used to determine the relationship between motor fitness variables and overall playing ability. The significance level was set at 0.05.

## 8. RESULTS AND DISCUSSION:

**Table-1:** Table shows Correlation Coefficients between Motor Fitness Variables and Overall Playing Ability of Football Players.

| Variables | Mean | Standard Deviation | r-value and Significance Level |
|---|---|---|---|
| Speed | 6.434 | 0.404 | -0.202* |
| Explosive Strength | 2.264 | 0.230 | 0.441** |
| Agility | 9.658 | 0.978 | -0.264** |
| Flexibility | 5.480 | 2.037 | 0.180* |
| Cardio-respiratory Endurance | 2.442 | 0.387 | -0.251** |
| Overall Playing Ability | 75.908 | 9.637 | × |

**Note:** *Significant at 0.05 level; ** Significant at 0.01 level for N=120, df=118.

The results of the Pearson correlation analysis reveal statistically significant relationships between selected motor fitness variables and the overall playing ability of football players. Each motor fitness variable-speed, explosive strength, agility, flexibility and cardio-respiratory endurance-was significantly correlated with playing ability, though the strength and direction of these relationships:

- **Speed:** The mean speed value for players was 6.434 seconds, with a standard deviation of 0.404. The negative correlation coefficient ($r = -0.202$, $p < 0.05$) suggests that higher speed (i.e., shorter time taken) is associated with better overall playing ability. This negative correlation implies that players who can sprint faster may perform better in game scenarios where quick acceleration and speed are crucial for reaching the ball or moving past opponents.

- **Explosive Strength:** Explosive strength, measured with a mean of 2.264 and a standard deviation of 0.230, exhibited the strongest positive correlation with playing ability ($r = 0.441$, $p < 0.01$). This significant relationship suggests that players with greater explosive strength-often necessary for powerful movements like jumping, kicking and sprinting-tend to have better performance. This aligns with the demands of football, where explosive strength is crucial for actions such as accelerating quickly and making powerful shots or headers.

- **Agility:** With a mean score of 9.658 and a standard deviation of 0.978, agility was positively correlated with playing ability ($r = 0.264$, $p < 0.01$). This finding indicates that players who can change direction quickly tend to have higher overall playing ability. Agility is vital in football for maneuvering around opponents, quickly changing pace and adjusting positioning-all essential components of effective game play.

- **Flexibility:** Flexibility had a mean of 5.480 and a standard deviation of 2.037, with a positive correlation to playing ability ($r = 0.180$, $p < 0.05$). This result suggests that players with better flexibility may perform better overall. Flexibility aids in a range of movements necessary in football, such as reaching for the ball, maintaining balance and avoiding injuries during rapid changes in motion.

- **Cardio-respiratory Endurance:** The mean value for cardio-respiratory endurance was 2.442, with a standard deviation of 0.387. Interestingly, this variable also showed a significant negative correlation with playing ability ($r = -0.251$, $p < 0.01$). This inverse relationship might indicate that players with higher endurance are more skilled at pacing themselves, employing refined techniques and potentially using energy-saving strategies during games.

Overall, all motor fitness variables were significantly associated with playing ability, highlighting the multifaceted physical demands of football. Among these, explosive strength had the highest positive correlation, underlining its critical role in game performance. The negative correlations observed with speed and cardio-respiratory endurance suggest points outs relationships, where higher levels of these attributes may allow players to deploy more efficient tactics. Overall, these findings emphasize that a blend of speed, strength, agility, flexibility and endurance is crucial for enhancing football performance.

## 9. DISCUSSION OF RESULTS:

The study's results align well with recent research, all pointing to the importance of motor fitness skills like strength, speed, agility and endurance for football performance. Recent studies, such as Kumar et al. (2023), found that speed and endurance are key factors in youth football players' success, with flexibility helping prevent injuries. This suggests that a well-rounded training plan should cover not only strength and speed but also flexibility for better performance and injury prevention.

Mohammed et al. (2022) also observed that explosive strength and agility were most important for forwards and midfielders in Nigerian university teams, while endurance was especially important for defenders. This aligns with our study's finding that training should be tailored to player roles, as offensive players need quick, powerful movements and defenders benefit from endurance to last the game.

Singh and Das (2021) focused on elite Indian players and highlighted that coordination and explosive strength help them perform under pressure. This agrees with our results that explosive strength is crucial for high-intensity game moments, like sprinting and tackling.

Earlier studies, like those by Mishra et al. (2020) and foundational research by Jeyaraj and Gopinathan (2014) and Devaraju and Needhiraja (2013), showed similar findings: speed, strength and endurance are linked to better football performance. Together, all these studies highlight that motor skills are essential in football, with each fitness factor playing a specific role, depending on a player's position. A balanced training approach that focuses on speed, strength, agility and endurance will improve players' overall ability on the field.

## 10. CONCLUSION:

In conclusion, the study demonstrated a significant correlation between motor fitness variables-speed, explosive strength, cardio-respiratory endurance, agility and flexibility-and the overall playing ability of football players. These findings highlight the importance of motor fitness in optimizing football performance. Training programs aimed at improving these physical components should be an integral part of football player development.

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