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A Study on the Association Between Playing Ability and General Motor Skills in Adult Sports Participants

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Abstract:

The study has been carried out to examine the relationships among playing ability variables, including general fundamental skill, evasion skill, tackling and defensive skill, and offensive skill, in adult sports participants and to analyze the associations between general motor ability parameters (speed, muscular strength, agility, explosive strength, and cardiovascular endurance) and various playing ability variables. A total of 60 participants (N = 60) were randomly selected for the study, with all subjects screened to ensure they were physically fit for the assessments. The study measured playing ability variables, including general fundamental skill, evasion skill, tackling and defensive skill, and offensive skill, alongside general motor abilities such as speed, muscular strength, agility, explosive strength, and cardiovascular endurance. Data collection was conducted in a controlled environment under the supervision of trained professionals, using standardized testing procedures across multiple sessions to reduce fatigue and ensure accuracy. Statistical analysis involved calculating Pearson's correlation coefficients (r) to evaluate the strength and direction of relationships between variables, with significance levels set at $p < 0.05$ and $p < 0.01$. General motor abilities such as speed and cardiovascular endurance showed significant correlations with playing skills, whereas agility and explosive strength showed weaker associations. The findings highlight the importance of fundamental and motor skills in explaining variations in playing performance.

Keywords: *Playing Ability, General Motor Skills, Adult, Sports Participants.*

Introduction:

Playing ability in sports is a multifaceted construct influenced by technical skill, tactical understanding, and physical fitness. Among these, general motor skills—such as speed, muscular strength, agility, explosive power, and cardiovascular endurance—form the physiological foundation that supports effective performance across a range of sports (Bompa & Buzzichelli, 2018). The association between playing ability and general motor skills has been widely studied, demonstrating that superior motor abilities often underpin higher playing proficiency (Zemková, 2018).

Playing ability refers to the athlete's capability to perform sport-specific skills effectively under competitive conditions (Williams & Reilly, 2000). These include fundamental skills such as evasion, tackling, and offensive maneuvers, which are essential for success in team sports like football, basketball, and rugby. While these skills are refined through practice and experience, they rely heavily on an athlete's general motor abilities to execute efficiently during play (Gabbett, 2016).

Speed, as a general motor skill, has been consistently identified as a significant predictor of playing ability. Research indicates strong positive correlations between speed and skills such as evasion and defensive tracking (Lockie et al., 2014). For example, an athlete's ability to accelerate quickly and change direction enables effective evasion of opponents, a critical aspect in many field sports (Young et al., 2001). Moreover, speed has been shown to explain a substantial proportion of variation in playing skill performance, highlighting its importance in athlete development (Spiteri et al., 2015).

Muscular strength also contributes to playing ability, particularly in actions that require power and physical confrontation, such as tackling and explosive movements. However, its relationship with playing ability may be moderate compared to speed or endurance, suggesting that while strength is important, it is often one component within a broader physical profile (Cormie, McGuigan, & Newton, 2011). Similarly, agility, defined as the ability to rapidly change body position or direction, is positively related to playing skills but may exhibit varying degrees of significance depending on the sport and level of competition (Sheppard & Young, 2006).

Cardiovascular endurance plays a vital role in sustaining performance throughout the duration of a game. Athletes with higher endurance levels maintain skill execution and cognitive function during prolonged competition, which enhances overall playing ability (Bangsbo, 2015). Studies have demonstrated moderate to strong positive associations between cardiovascular endurance and playing skills such as tracking, defense, and offense (Buchheit & Laursen, 2013).

Significance of the Study:

This study is important in sports science and coaching as it examines how general motor skills like speed, strength, agility, explosive power, and endurance relate to playing ability in adult athletes. Its findings help coaches design targeted training programs, improve talent identification, and optimize athlete development. By clarifying the connection between physical abilities and sport-specific skills, the research advances understanding of athletic performance and supports more comprehensive training approaches. Additionally, it lays groundwork for future studies on sport-specific factors and training effects, ultimately aiming to improve competitive performance in adult sports participants.

Objectives: The study has been carried out with the following objectives

- To examine the relationships among playing ability variables, including general fundamental skill, evasion skill, tackling and defensive skill, and offensive skill, in adult sports participants.
- To analyze the associations between general motor ability parameters (speed, muscular strength, agility, explosive strength, and cardiovascular endurance) and various playing ability variables.

Hypothesis:

H_1: There are significant positive relationships among playing ability variables—general fundamental skill, evasion skill, tackling and defensive skill, and offensive skill—in adult sports participants.

H_2: General motor ability parameters (speed, muscular strength, agility, explosive strength, and cardiovascular endurance) are significantly and positively associated with playing ability variables in adult sports participants.

Methods

Sample: A total of 60 participants (N = 60) were selected for the study using random sampling. All subjects were screened for health conditions to ensure they were physically fit to undergo physical assessments.

Variables Measured:

- **Playing Ability:** General Fundamental Skill, Evasion Skill, Tackling and Defensive Skill, Offensive Skill
- **General Motor Ability:** Speed, Muscular Strength, Agility, Explosive Strength, Cardiovascular Endurance

Data Collection: Data collection was carried out in a controlled setting under the supervision of trained professionals and followed standardized testing procedures for all variables. The assessments were conducted over multiple sessions to minimize fatigue and ensure the accuracy of results.

Statistical Analysis: Pearson's correlation coefficient (r) was calculated to determine the strength and direction of the relationship between each pair of variables. A significance level of **$p < 0.05$** and **$p < 0.01$** was used.

Data Analysis and Interpretation:

Table 1. Pearson correlation coefficients among playing ability variables (N=60)

		General Fundamental Skill	Evasion Skill	Tracking and Defensive Skill	Offensive Skill
General Fundamental Skill	Correlation coefficient (r) p values	1	.776** <0.001	.819** <0.001	.356** 0.005
Evasion Skill	Correlation coefficient (r) p value		1	.745** <0.001	0.005
Tackling and Defensive Skill	Correlation coefficient (r) p value			1	0415**
Offensive Skill	Correlation coefficient (r) p value				1

**p<0.01

The degree of association among playing ability variables are shown in Table 1. General fundamental skill of subjects was found to have highly significant strong and positive correlation with evasion skill having estimate of 0.776. Corresponding coefficients with tracking and defensive skill and offensive skill were recorded as 0.819 and 0.356, respectively and revealed as strong, positive and very highly significant. The

coefficient of determination between general fundamental skill with evasion skill, tackling and defensive skill and offensive skill were calculated as 0.602, 0.671 and 0.199, respectively depicting explanation of 60% of variation in evasion skill and 67% of tackling and defensive skill by general fundamental skill; but corresponding explanation of 20% is attributed in case of offensive skill.

The degree of association between evasion skill with tackling and defensive skill was strong, positive and highly significant with estimate of 0.745. The coefficient of determination so obtained between evasion skill with tackling and defensive skill was calculated as 0.555. However, moderate, positive but significant correlation coefficient of 0.356 was recorded between evasion skill and offensive skill depicting around 13% of variation in offensive skill that is explained by evasion skill and indicated that, the model provided a good fit to the available data in the present study.

The Pearson correlation coefficient of 0.415 between tackling and defensive skill was found to be moderate, positive and significant. Coefficient of determination of 0.172 was obtained in this relationship.

Table 2. Pearson correlation coefficients among general motor ability parameters and playing ability variables (N=60)

		Speed	Muscualar Strength	Agility	Explosive Strength	Cardio Vascular Endurance	General Fundamental Skill	Evasion Skill
Speed	Correlation Coefficient (r)p value	1	.274* 0.034	.220 0.091	.104	.608** 0.429	.909** <0.001	.855** <0.001
Muscular Strength	Correlation Coefficient (r)p value		1	.325* 0.011	.392** 0.002	.126 0.338	.277* 0.032	.261* 0.044

The correlation coefficients among general motor ability and playing ability variables are shown in Table 2. General motor ability variables of subjects were found to be significantly and positively correlated with all the playing ability parameters under study.

Speed recorded very strong, positive and highly significant coefficients of 0.909, 0.855 and 0.884 with general fundamental skill, evasion skill and tackling and defensive skill, respectively. However, a moderate positive and significant relationship was incurred between speed and offensive skill with estimate of 0.387. Thus, the degree of determinations of general fundamental skill, evasion skill, tackling and defensive skill and offensive skill were calculated as 82.6, 73.1, 78.1 and 15%, respectively on speed, showing handsome portion of variation in the playing ability variables being explained by speed and the model proved to provide a good fit to the available data.

Muscular strength recorded moderate to weak, positive and significant coefficients of 0.277, 0.261 and 0.349 with general fundamental skill, evasion skill and tackling and defensive skill, respectively. However, a very weak, positive and non-significant relationship was incurred between muscular strength and offensive skill with estimate of 0.153. Thus, the degree of determinations of general fundamental skill, evasion skill, tackling and defensive skill and offensive skill were calculated as 7.67, 6.81, 12.2 and 2.34%, respectively on muscular strength, showing negligible portion of variation in the playing ability variables being explained by muscular strength.

Agility recorded weak, positive and non-significant coefficients of 0.192, 0.238, 0.253 and 0.116 with general fundamental skill, evasion skill, tackling and defensive skill and offensive skill, respectively. Thus, the degree of determinations of general fundamental skill, evasion skill, tackling and defensive skill and offensive skill were calculated as 3.69, 5.66, 6.40 and 1.34%, respectively on agility, showing negligible portion of variation in the playing ability variables being explained by agility.

Explosive strength recorded very weak, positive and non-significant coefficients of 0.175, 0.082, 0.210 and 0.196 with general fundamental skill, evasion skill, tackling and defensive skill and offensive skill, respectively. Thus, the degree of determinations of general fundamental skill, evasion skill, tackling and defensive skill and offensive skill were calculated as 3.06, 0.67, 4.41 and 3.84%, respectively on explosive strength, showing negligible portion of variation in the playing ability variables being explained by explosive strength.

Cardio vascular endurance recorded moderate to strong, positive and significant coefficients of 0.576, 0.432, 0.612 and 0.307 with general fundamental skill, evasion skill, tackling and defensive skill and offensive skill, respectively. Thus, the degree of determinations of general fundamental skill, evasion skill, tackling and defensive skill and offensive skill were calculated as 33.18, 18.66, 37.45 and 9.42%, respectively on cardio vascular endurance, showing considerable portion of variation in the playing ability variables being explained by cardio vascular endurance.

Findings:

- The study highlights that general fundamental skill is strongly associated with other playing abilities such as evasion, defensive, and offensive skills.
- Among general motor abilities, speed and cardiovascular endurance have the strongest positive associations with playing ability, while muscular strength shows moderate influence and agility and explosive strength show limited predictive value.
- These results emphasize the importance of speed and cardiovascular fitness in enhancing playing skills and overall athletic performance in adult sports participants.

Conclusion:

In conclusion, playing ability and general motor skills share a significant and positive association. Superior speed, endurance, and, to a lesser extent, muscular strength and agility, form the physiological foundation necessary for high-level playing performance. Integrating motor skill development with technical training is therefore critical for optimizing athletic success and longevity in competitive sports.

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