
Explosive Strength and Its Relationship with Shooting Accuracy in Basketball among Students of the College of Physical Education and Sports Sciences

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ABSTRACT

Background: The purpose of the current study was to identify the essence of the link between explosive strength and shooting accuracy in basketball. In the hypothesis, it was stated that the statistical correlation between these two characteristics would be revealed among the study participants.

Methods: It was decided to use a descriptive research methodology based on the correlation analysis due to its suitability for the research problem. The research was conducted among a purposive sample of 70 second-year students of the College of Physical Education and Sports Sciences at the University of Samarra in the academic year of 2025-2026. Fieldwork included the assessment of the subjects' physical qualities as well as of their skill sets such as leg explosive strength and jump-shot accuracy after dribbling. Statistical analyses involved the computation of arithmetic mean, standard deviation, and the Pearson correlation coefficient through SPSS.

Results: The obtained results revealed the presence of the significant positive correlation between explosive strength and shooting accuracy, with the Pearson correlation coefficient r being equal to 0.87 and significantly greater than 0.235 at 68 degrees of freedom and 0.05 significance level. The results obtained prove the idea that explosive strength enables the enhancement of motor stability and accuracy of the ball trajectory control.

Conclusions: It can be concluded that further emphasis should be placed on the development of explosive strength and the combination of it with the skills of shooting. Furthermore, the additional studies should be conducted with regard to physical properties and their impact on sports performance.

Keywords: Explosive; Strength; Shooting; Accuracy; Basketball.

INTRODUCTION

The sport of basketball evolved from a purely physical sport into an athletic discipline which combines physical abilities and technical skill through advances made in sports training science (Petkova & Aleksieva, 2018; Yang, 2024) . Modern athletic performance depends on the

athlete's ability to utilize his/her physical abilities and fine motor skills for success on the court. Speed-strength is an important physical ability which is directly related to an individual's offensive game and is considered as one of the key determinants of the results (Al-Jubouri, 2021).

Empirical research in sports training defines speed-strength as the athlete's ability to produce a lot of muscular force in a small period of time. It is especially important for basketball because of the frequent need of making explosive movements in the game, like making jumps for a shot, making sprints when performing offense plays and braking quickly during defense maneuvers (Akhmetkarim et al., 2019; Pan, 2025) . The applied research shows that the development of speed-strength is an effective way to improve the technical and offensive performance due to the interaction of technical and physical performance (Al-Hasnawi, 2020).

The empirical research about the methods used in training of speed-strength, for example, ballistic training, plyometrics and others, shows that the use of such methods allows developing the lower limb muscular strength (Hasan, 2023; Sun et al., 2025) . This development is important for improving shooting skills since the shooting in basketball requires the combination of produced force, the speed of its application and the fine motor skills of the shooting technique (Al-Tamimi, 2019).

The empirical research in the context of basketball which investigated the correlation of speed-strength and shooting accuracy found out a significant positive correlation between these variables. Thus, the development of speed-strength in upper and lower limbs can increase the efficiency of shooting performance as a result of the improvement of motor skills and control of ball trajectory during a shot (Cabarkapa, Eserhaut, et al., 2022; Cabarkapa et al., 2026a) . In particular, empirical research on youth basketball players showed that speed-strength development allows decreasing the time needed for a jump shot with high accuracy of shots (Bompa & Buzzichelli, 2019).

Physiological and biomechanical factors which play a role in determining the effectiveness of shooting involve accurate control over both the speed of the ball and the direction in which it moves (Cabarkapa, Cabarkapa, et al., 2022; Li et al., 2025) . Hence, one of the key aspects of successful shooting in basketball is the strength of the force produced while executing this particular skill. The athletes should be both fast and precise in the ability to exert force with muscles in the process of performing the motor skill (McInnes et al., 1995).

Traditionally, the development of strength and skill has been considered to be two different processes; yet there has been little research conducted on the interaction between the two and its effects on shooting accuracy (Cabarkapa et al., 2026b; Mir et al., 2025; Xue, 2024) . Therefore, it becomes necessary to conduct further studies in order to create a scientific basis and develop special programs which will help improve speed-strength and shooting accuracy in basketball (Knudson, 2007).

Thus, the current study is focused on examining the relationship between speed-strength and shooting accuracy in basketball players in view of its importance in the process of becoming a technically perfect athlete and reaching success in sports by scientific means.

Research Problem

Shooting is one of the core skills which ensures success in basketball performance in terms of both individual and team play. In order to become skilled at shooting, one must be able to master all technical components and have physical abilities that would allow to perform this skill effectively and accurately.

A significant amount of basketball players demonstrate the problem with maintaining shooting accuracy under the circumstances when they attempt to shoot quickly or after jumping. It seems that this is due to the lack of coordination between the force necessary for performing the shot and speed of movement which might lead to poor shooting effectiveness. While shooting in competition, there is possible decrease in accuracy caused by a lack of coordination of these two

characteristics. This might mean the lack of ability to use physical abilities such as speed and strength which serve as the essential physical foundation for fast movements in shooting.

Even though coaches recognize that training for sports activities should include the development of speed and strength but these two factors are often trained separately without taking into account their functional interaction and the effect they have on shooting skill. Previous research in the sphere of development of speed and strength mainly focused on improving of physical abilities separately but not on the effect their interaction might have on shooting accuracy. Therefore, there are only few studies dedicated to this aspect.

Research Objective

The investigation of the connection between speed-strength and shooting accuracy in basketball.

Research Hypothesis

There is a statistically significant connection between speed-strength and shooting accuracy in basketball.

Research Domains

Human Domain:

Subjects: Students of the College of Physical Education and Sports Sciences, University of Samarra.

Time Domain:

Period: The period from February 9, 2026, to April 8, 2026.

Space Domain:

Place: The basketball court at the College of Physical Education and Sports Sciences, University of Samarra.

METHODS

Research Method

In the course of investigation, the researcher applied a descriptive research method which is considered to be applicable for the research under consideration. It provides an accurate description of relations between different characteristics, tendencies, attitudes, preferences and development within a population. The research helps to provide a full-scale picture of the situation that exists at present and facilitates the discovery of indicators for further predictions.

Research Sample

The sample included 70 second-year students of the College of Physical Education and Sports Sciences in the period of 2025-2026.

Data and Information Collection Methods and Supporting Tools

1. Arabic and foreign sources.
2. Tests.

Research Tools

The research tools included:

1. A basketball court
2. Two basketballs
3. A whistle

Tests Used

Test for Measuring Muscular Power in the Lower Limbs

Leg Speed Strength (Sargent Jump Test)

The Sargent Jump Test was used to measure the explosive power of the leg muscles (Aragón-Vargas, 2013).

Objective:

Measurement of the explosive power of the legs.

Equipment Needed:

Chalk, measuring tape, and suitable testing surface.

Procedure:

The individual faces a wall, keeping both feet firmly on the ground. The person then raises his hands above his head and makes a chalk mark at the highest possible point on the wall. He then bends his knees and performs the maximum vertical jump, making a chalk mark at the highest point of the jump. The difference between the standing and jumping chalk mark points is taken as the result of the test, and this process is repeated three times (Aragón-Vargas, 2013).

Jump Shooting Test After Dribbling

Jump Shooting After Dribbling

Purpose of the Test:

Determining the precision of the jump shooting after dribbling (Rose, 2013).

Test Equipment:

Court, basket, and ball.

Procedure of the Test:

The participants start dribbling on the court towards the basket. After coming to the shooting spot located at the intersection of the free throw line and the three-point arc, the participant takes the shot on the basket using the jump shot.

Scoring Procedure:

Each participant is allowed 10 shots. If the shot is taken without the jump shot then it is not included into the score. Each made shot receives one point for each shot; the total points are the number of made jump shots out of 10 shots (Rose, 2013).

Pilot Study

A pilot study was carried out on March 9, 2026 (Monday) among nine basketball players belonging to the College of Physical Education and Sports Sciences, University of Samarra. The pilot study was intended for the following reasons: (1) To understand any difficulties or challenges faced while administering the tests in order to resolve those problems before conducting the main experiment, (2) To check whether the equipment used is suitable or not, and (3) To know the time needed for testing.

Main Study

The main study was carried out on March 18, 2026, which was a Wednesday, on the research sample selected according to the research design. The speed-strength test was done on the first day, whereas the shooting accuracy test was performed on the second day.

Statistics Techniques

The data were processed and analyzed through the Statistical Package for the Social Sciences (SPSS). The statistical techniques used in the study were:

1. Arithmetic mean
2. Standard deviation
3. Pearson correlation coefficient

RESEARCH RESULTS

The arithmetic means, standard deviations, and the correlation coefficient between shooting accuracy and speed-strength are presented below.

Table 1. Arithmetic Means, Standard Deviations, and Correlation Coefficient between Shooting Accuracy and Speed-Strength among the Research Sample

Variable	Arithmetic Mean ($\bar{X}$)	Standard Deviation (SD)	Correlation Coefficient (r)	Critical Value of r	Significance Level
Shooting Accuracy	53.11	4.10	0.87	0.235	Significant

Speed-Strength	4.88	0.57	0.87	0.235	Significant
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n = 70, df = 68, significance level = 0.05

It is evident from Table 1 above that there is a highly positively correlated association between speed-strength and shooting accuracy among the participants, with a correlation coefficient of $r = 0.87$. This figure exceeds the critical level of correlation coefficient (0.235) at 0.05 level of significance and 68 degrees of freedom. The implication is that speed-strength among participants is associated with shooting accuracy.

DISCUSSION

This finding may be attributed to the nature of speed-strength, which requires the neuromuscular system to generate force within a short period of time. Athletic performance is not determined solely by the amount of force produced; rather, it is also influenced by the rate of force development and the force-velocity relationship during movement.

This relationship can also be explained in light of the nature of the basketball shooting skill, which requires a coordinated sequence of movements and the transfer of force from the lower limbs through the trunk to the upper limb and hand, while maintaining balance and neuromuscular coordination during ball release. This requirement becomes even more pronounced during the jump shot, which combines rapid lower-limb propulsion with upper-limb movement and the release of the ball at the appropriate moment. A study examining the effects of plyometric training combined with shooting training reported improvements in jumping, power, and speed variables during jump-shooting performance, supporting the importance of explosive physical capabilities in this type of performance (Zaboon, 2024).

The present finding is also consistent with evidence examining the relationship between physical capabilities and shooting performance in basketball. One study investigated the relationship between upper- and lower-limb strength and shooting performance and found that certain capabilities related to jumping and anaerobic power were associated with long-distance shooting performance. This suggests that shooting performance is influenced by a combination of physical capabilities in addition to technical skill (Saeed, 2025).

Furthermore, shooting accuracy does not depend solely on speed-strength; it is also influenced by other factors, including neuromuscular coordination, balance, proper shooting mechanics, release angle, ball velocity, distance from the basket, and technical experience. Studies examining the mechanics of the jump shot have shown that modifications to certain elements of movement performance can affect shooting accuracy, confirming that physical capabilities operate in integration with the technical execution of the skill (Naseef, 1975, p. 18).

The high correlation coefficient found in this study ($r = 0.87$) suggests that there is a strong relationship between speed-strength and shooting accuracy in the studied sample. However, this does not mean that speed-strength is the only factor responsible for shooting accuracy and that there exists a causative relationship between these two variables. This finding is consistent with approaches to the physical development of athletes that take into account the combination of physical fitness and skill development in basketball with special attention to fast force generation and shooting training.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The subjects involved in the study displayed different levels of shooting skills.
2. The subjects involved in the study displayed different levels of speed-strength abilities.
3. The basketball players involved in the study showed significant correlation between speed-strength of the lower limbs and jump-shooting skills.

Recommendations

1. It is suggested for physical educators to pay particular attention to speed-strength and its impact on jump-shooting skills in training sessions.
2. Further research needs to be carried out in order to identify other physical qualities that can affect shooting accuracy in various team sports.
3. More focus needs to be given to other physical qualities important for the athletic performance.

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