Thi Qar University Journal of Physical Education Vol 2 Issue 3 p 2

مجلة جامعة ذي قار لعلوم التربية البدنية

مجلة علمية محكمة تصدرها كلية التربية البدنية وعلوم الرياضة

The Effect of Explosive Strength Exercises for the Leg Muscles on Developing the Accuracy of Set-Piece Shooting Skill in Football Players

Hussein Ahmed Salman

hussein20@basrahaoe.iq

ABSTRACT

Article history:
Accepted: 20/ 6/ 2025
Published online: 20/9/ 2025

Keywords:
Strength Exercises,
Skill
Football.

Corresponding Author :
07722016620

The study includes an introduction highlighting the significant development in scientific research, which is considered one of the most prominent features of the modern era across various fields of life. Since football requires numerous physical attributes and technical skills that directly affect players' performance on the field, one of the most important of these skills is the accuracy of shooting from set-pieces, which can significantly determine the outcome of a match.Successful execution of such shots primarily depends on the level of muscular strength. Therefore, the importance of this study lies in examining the impact of explosive strength exercises on the accuracy of set-piece shooting among the research sample in football. The research problem is defined as follows: Do explosive strength exercises for the leg muscles contribute to the development and improvement of shooting accuracy from set-pieces in football?:
- Designing proposed explosive strength exercises to develop the accuracy of set-piece shooting in football.
- Identifying the differences between the experimental and control groups in the post-tests of both explosive strength and shooting accuracy from set-pieces among the research sample.

The study employed a true experimental design involving pre- and post-tests for both experimental and control groups. Each group consisted of five players. A set of relevant tests was applied during the main experiment, and the statistical analysis was. The researchers presented and discussed the results of the pre- and post-tests for both the control and experimental groups across the study variables. Furthermore, they analyzed the post-post comparisons between the two groups.

These results ultimately led to a set of conclusions and recommendations derived from the findings of the study.

-Introduction and Importance of the Study

The significant advancements in scientific research are among the most prominent features of the modern era, extending into various aspects of life. Since sports is one of these fields, it has received considerable attention in research and studies covering physical, skill-based, tactical, and psychological dimensions. As a result, reliance on scientific and training methods has become crucial for achieving athletic progress. Football is a globally popular sport that has evolved and gained prominence in most countries. Success in football requires physical, skillful, tactical, and psychological preparation. Among the essential skills in football is the accuracy of shooting from set-pieces, which significantly influences match outcomes. The importance of set-pieces lies not only in scoring goals but also in demonstrating players' ability to control the ball by combining strength and accuracy. Successful execution of these shots largely depends on the strength and flexibility of the leg muscles, which play a central role in generating powerful and accurate kicks. Therefore, enhancing the function of these muscles is a primary goal in player training. This highlights the importance of incorporating explosive strength exercises, which aim to develop muscles' ability to rapidly generate force. These exercises help improve athletic performance across sports, particularly in football, where explosive power contributes to key skills like passing, quick movement, jumping, and shooting. Thus, the importance of this study lies in examining the impact of explosive strength exercises on the accuracy of shooting from set-pieces among football players. The study aims to determine how these exercises influence players' abilities in executing set-pieces accurately and technically. The central research problem focuses on the following question: Do explosive strength exercises for the leg muscles lead to the development and improvement of shooting accuracy from set-pieces in football? The study aims to provide a scientific answer by analyzing results and evaluating the positive or negative effects of such exercises. The study objectives are:(Propose explosive strength exercises to develop shooting accuracy from set-pieces, Identify differences between pre- and post-tests in explosive strength and shooting accuracy for both experimental and control groups, Compare the experimental and control groups in post-tests of explosive strength and shooting accuracy among the study sample.)

Study Methodology and Field Procedures

The nature and requirements of the research problem dictate the appropriate methodology. Each research study has its own method that serves as a path toward problem-solving. Since the current study addresses a training-based instructional process, the experimental method was deemed the most suitable for solving the problem. Experimentation is defined as "a deliberate and controlled change in the specific conditions of an event, followed by observing and interpreting the resulting changes in that event itself" (2:277). Given the various types of experimental designs, the researcher employed the true experimental design with pre- and post-tests for both the experimental and control groups. According to Mohammad Hassan Allawi (1999), quoting George Mouly, this type of experimental design is one of the traditional formats. It relies fundamentally on precise random selection of the experimental group while ensuring the same procedures are followed in selecting the control group. The experimental group is subjected to a pre-test, followed by the application of the experimental treatment (training exercises), and then

a post-test. The control group undergoes the same pre- and post-test procedures but is not exposed to the experimental variable (6:231).

Study Population and Sample

Selecting an appropriate sample is one of the crucial steps in any study, as it helps the researcher avoid errors and ensures the accuracy and reliability of the data obtained. The selected sample is defined as "the portion that represents the original population or the model upon which the researcher bases the core of their work" (6:139). Accordingly, the research population was determined to be the youth football players of Naft Al-Basra Sports Club for the 2024–2025 sports season, totaling (22) players. The study sample consisted of (10) players who were intentionally selected based on their proficiency in performing set-piece kicks. They were then randomly divided into two equal groups:(5) players formed the experimental group,

(5) players formed the control group, constituting 45.45% of the original population. To ensure the appropriateness of the sample selection and to assess the degree of homogeneity between the two groups, the researcher used the coefficient of variation (CV) for the field survey results of anthropometric measurements for both the experimental and control groups, as shown in Table (1). Furthermore, to establish equivalence between the two groups (experimental and control) in the study variables, a T-test was applied. The results showed no statistically significant differences between the two groups, indicating that they were equivalent in the studied variables, as presented in Table (2).

Table (1)
Homogeneity of the Experimental and Control Groups in the Study Variables

Variables	Experimental Group			Control Group		
	Mean (M)	Std. Dev	Coefficient of Var	Mean (M)	Std. Dev	Coefficient of Var
Height (cm)	168.75	3.64	2.19 %	166.74	3.98	2.41 %
Weight (kg)	71.43	3.96	4.92 %	64.12	3.29	% 4.84
Chronological Age (yr)	22.31	0.91	4.02 %	20.76	1.22	3.98 %

Table (2)
Means, Standard Deviations, Calculated and Tabulated T-values for Group Equivalence in Study Variables

Variables	Experimental Group		Control Group		df	T-Calculated	T-Tabulated	Significance
	Mean (M)	Std. Dev	Mean (M)	Std. Dev				
Height (cm)	168.75	3.64	166.74	3.98	8	1.78	1.86	Not Significant
Weight (kg)	71.43	3.96	64.12	3.29	8	1.67		Not Significant

Chronological Age (yr)	**22.31**	**0.91**	**20.76**	**1.22**	**8**	**1.31**		**Not Significant**
Explosive Strength	**1.61**	**0.03**	**1.60**	**0.032**	**8**	**0.30**		**Not Significant**
Chronological Age	**41.81**	**6.03**	**40**	**8.94**	**8**	**0.53**		**Not Significant**

From Table 1, it is evident that the coefficient of variation (CV) for all the study variables was less than 30%, confirming the homogeneity of the two samples. Additionally, the results in Table 2 show that the calculated T-values for all variables were less than the tabulated T-value of 1.86 at a degree of freedom (df = 8) and a significance level of 0.05, indicating no statistically significant differences between the experimental and control groups. This confirms the equivalence of the two groups, allowing the researcher to proceed with the experiment while maintaining statistical control over the variables.Study Conclusions and Training Program

Tests Used in the Study
1. Explosive Strength Test
Test Name: Standing Long Jump (4:176)
Purpose of the Test: To measure the speed-strength (explosive power) of the legs.
Required Equipment: A jumping area marked in meters and centimeters to the farthest end, a measuring tape, and chalk pieces.
Performance Description:The participant stands behind the starting line with feet slightly apart and parallel. The test begins with the subject swinging the arms backward while bending the knees, followed by an explosive forward jump using full knee extension and a strong push-off from both feet, while swinging the arms forward to maximize jump distance.
Scoring Method: The measurement is taken from the starting line to the nearest point of body contact with the ground (usually the heel). Each attempt is measured to the nearest 5 cm. Each player is allowed three consecutive attempts, and the best attempt is recorded.
2. Free-Kick Shooting Accuracy Test
Test Name: Set-Piece Shooting Accuracy Test (7:55)
Purpose of the Test: To measure the accuracy of goal scoring from set-piece situations.
Required Equipment: Football goal, 3 footballs, iron rods to divide the goal, measuring tape, and a marker (cone or peg) to designate the shooting distance.
Performance Procedure: One ball is placed at the designated shooting spot, which is 16.75 meters from the center of the goal, as shown in Figure 1. The player approaches the ball from 9.15 meters away and strikes it powerfully while stationary, using the inside of the right foot, aiming at the following goal segments: The right side of the goal The left side of the goal. The center of the goal Scoring Method: The total score is 100 points, distributed as follows:40 points for the right segment 40 points for the left segment 20 points for the center segment Each player is given two attempts for each of the three segments. The best attempt is counted for each segment only if the ball enters the designated scoring box. The final score is the sum of the best attempts across all three segments.

-Main Experiment

Pre-tests: The researcher, with the help of the assisting team, conducted pre-tests two days after the exploratory experiment. These pre-tests included collecting selected anthropometric measurements from both study samples, in addition to performing the designated skill and strength tests. The pre-testing was conducted on December 15, 2024.

Implementation of the Proposed Exercises: The researcher developed a training program that included proposed explosive strength exercises, after reviewing relevant scientific sources and previous studies. These exercises were designed to cover the entire duration of the experiment, which extended from December 21, 2024, to February 18, 2025, lasting a total of eight weeks, with two training sessions per week.

Post-tests: After the completion of the training program, which incorporated the proposed exercises, the post-tests were conducted for both the experimental and control groups on Saturday, February 22, 2025, at 3:00 PM, using the same procedures and conditions as the pre-tests.

Statistical Tools**:** The researcher used the Statistical Package for the Social Sciences (SPSS) to analyze the data and extract the results.

-Discussion of Study Results

Discussion of Pre- and Post-Test Results for Both Groups in the Study Variables

Table (3)
Shows the Calculated T-values for the Pre- and Post-Tests of the Control and Experimental Groups in the Study Variables

Variables	Experimental Group			Control Group			T-Tabulated	Significance
	Pre (M)	Post (M)	T-Calculated	Mean (M)	Pre (M)	Post (M)		
Explosive Strength	**1.60**	**2.07**	**2.88**	**1.61**	**2.9**	**8.13**	**1.86**	**Significant**
Shooting Accuracy	**40**	**54.5**	**6.72**	**41.8**	**74.5**	**10.75**		**Significant**

> Significance level at 0.05 and degrees of freedom (df) = 8

The results presented in Table 3 indicate that the control group showed improvement in the post-test. This development is attributed to their consistent attendance and commitment to the training sessions, as well as their serious application of the exercises included in the coach's program. This consistency likely contributed to the observed improvements. As for the experimental group, the significant improvement seen in the study variables is attributed to the use of the proposed exercises designed by the researcher, in addition to those already present in the coach's training program. The results of the post-tests clearly reflect this progress. Implementing these scientifically structured exercises played a critical role in improving both explosive strength and shooting accuracy from set-pieces. This aligns with the statement of Mohammad Hassan Allawi (1986), who noted: "Proper training and the scientific application of exercises by athletes lead to the development and improvement of both physical abilities and skill performance levels." (5:17)

Discussion of Post-Test Results Between the Two Groups in the Study Variables

Table (4)

Shows the Differences in Calculated T-Values in the Post-Tests Between the Control and Experimental Groups in the Study Variables

Variables	Control Group		Experimental Group		T-Calculated	T-Tabulated	Significance
	Mean (M)	Std. Dev	Mean (M)	Std. Dev			
Explosive Strength	2.07	0.313	2.9	0.032	6.11	1.86	Significant
Shooting Accuracy	54.5	5.5	74.1	5.9	3.15		Significant

> Significance level at 0.05 and degrees of freedom (df) = 8 .

As shown in Table 4, the experimental group outperformed the control group in terms of the development of both explosive strength and shooting accuracy from set-pieces in football. As previously discussed, this improvement can be attributed to the researcher's proposed training exercises, which were designed and implemented scientifically and methodically, taking into account the appropriate intensity, repetitions, and sufficient rest periods. These rest periods were particularly important to allow the players' heart rates to return to normal, which is essential when training for explosive strength, especially in youth players who require longer recovery. The successful development of shooting accuracy can also be directly linked to the development of explosive strength through these exercises. This connection enhanced the players' ability to perform accurate and powerful shots during set-pieces. This aligns with what Saleh Radi Ameesh (1990) stated: "Reaching the stage of mastery in motor skill performance in sports activities requires continuous training to improve physical attributes, which in turn enhances the level of skill and technical performance of athletes." (3:33) Additionally, the researcher attributes these improvements to several factors: The proposed exercises incorporated in the training program, The use of educational tools, devices, and aids during implementation, Emphasis on feedback, which was central to the instructional strategy, Correction of motor paths during performance, guided by the researcher. Moreover, it is important to highlight that: "The mechanical foundation of achieving accuracy lies in how well the player adjusts body positioning, striking base, and coordination with other body parts involved in the kicking motion—each playing a crucial role in the successful and efficient execution of the shooting skill." (1:2)

Study Conclusions

1. The proposed exercises had a positive impact on developing explosive strength and the accuracy of set-piece shooting for the experimental group.

2. The experimental group achieved statistically significant improvements in the values of the study variables, as evidenced by the comparison between pre- and post-test results for explosive strength and shooting accuracy from set-pieces.

3. The experimental group outperformed the control group in all post-test values and in the skill of shooting accuracy from set-pieces, which is a strong indication of the effectiveness of the proposed exercises implemented during the instructional program.

4. The proposed exercises incorporated into the instructional program took into account individual differences among learners and contributed to improving the qualitative and quantitative learning levels of the experimental group.

References

1. Amal Jaber & Mahmoud Ibrahim. The Effect of Intensity Variation on Some Kinematic Variables Related to Motor Coordination among Football Players in Bahrain, Proceedings of the Scientific Conference on the Reality and Future Aspirations of Arab Sports, United Arab Emirates University, April 12–14, 1999.

2. Van Dalen, Deobold B. Research Methods in Education and Psychology, Arabic Translation by: Mohamed Nabil Nofal et al., Cairo: Anglo-Egyptian Bookshop, 1984.

3. Saleh Radi Ameesh. The Effect of Key Physical Fitness Elements and Sports Skills on Achievement Level, M.A. Thesis, College of Physical Education, University of Baghdad, 1990.

4. Kamal Darwish. Measurement, Evaluation, and Match Analysis in Handball (Theories and Applications), Cairo: The Book Publishing Center, 2002.

5. Mohammad Hassan Allawi. Science of Sports Training, 2nd Ed., Egypt: Dar Al-Maaref, 1986.

6. Mohammad Hassan Allawi & Osama Kamel. Scientific Research in Physical Education and Sports Psychology, 2nd Ed., Cairo: Dar Al-Fikr Al-Arabi, 1999.

7. Wael Qasim Jawad Al-Muhammadi. The Effect of Corrective Exercises on the Development of Some Kinematic Variables for the Accuracy of Shooting from Set-Pieces in Football, M.A. Thesis, University of Basrah, College of Physical Education, 2007.

Week One – Training Unit Design

Week: First Sample: Experimental Group (5 players)
Training Sessions: Units 1 & 2 Days: Saturday and Tuesday
Unit Objective: To develop explosive strength in the leg muscles

Until Section	Exercises used	Training load			sets each exercise Rest
		Intensity	Duration	Rest	
Preparatory Section					

Main Section	1. (Standing) Jump in place 3 times, then forward jump on the 4th repetition. 2. Kick the ball with a partner from a squat position. 3. (On all fours) Jump upward while raising arms high. 4. (Squat position) Forward jump for maximum distance.	90%	2 min × 4 2 min × 4 2 min × 4 2 min × 4	Until pulse returns to 120–130 bpm	Until pulse returns to 120–130 bpm
Final Section					