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Functional strength training and its impact on some of the skill abilities of soccer players

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Abstract

The researcher touched on the importance and place of the game of football among sports, as functional strength exercises were prepared and their impact on some skill abilities in football. The research community included the teams of government institutions in Diyala Governorate, and the research sample was chosen intentionally, which was represented by the Diyala youth and adult football teams. There are 9 indoor players This research is one of the scientific attempts to raise the skill level of the teams of government institutions in the governorate through the use of functional strength training. The results showed that there is a clear development among the research sample in the post-test as a result of the use of these training.

Keywords Functional strength training, football skills.

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Journal of Physical Education
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https://jcope.uobaghdad.edu.iq

Introduction

Football has gained widespread popularity across various countries, becoming a universal language because it provides enjoyment both through watching and playing. It is considered one of the challenging team sports, requiring its players to possess skill, intensity in performance, and quick attentiveness. Therefore, it demands new methods and approaches to develop its training aspects. The success of any football process depends on comprehensive preparation, aiming to enable players to master the skills that accelerate the path to victory.

Several factors influence the players' execution of different game plans during a match, including their skill level, physical fitness, and proficiency in fundamental techniques. Players are required to perform high levels of running throughout a match, which may last 90 minutes, and to overcome various resistances. These include managing body weight against gravity, continuous rotations, sudden stops, physical challenges, maintaining balance, and engaging in physical contact with opponents, the ball, and the playing field. All of these demands necessitate advanced skill and physical preparation, enabling players to execute game strategies efficiently and effectively without a decline in performance during the match.

Martin Bidzinski notes the importance of integrating football skills with physical fitness components, as both must be developed simultaneously. Over time, the application of a structured training program enhances the effectiveness of passing, receiving, and running with and without the ball. Moreover, the quality of a football player's performance can only be accurately assessed under pressure—whether physical, psychological, or competitive—as this reflects their true abilities. Training under such conditions significantly improves overall performance (Bidzinski, 1996).

According to Issam Abdel-Khalek (2000), the ability to perform a skill is closely related to specific physical motor abilities. Mastery of a skill depends on the development of these abilities, such as muscular strength, coordination, flexibility, agility, and balance. The level of skill performance is often determined by the extent to which an individual has acquired these specific physical and motor characteristics (Abdel-Khalek, 2000).

The researcher observes that neglecting strength training during the preparation period of football players results in a lack of the muscular strength required to perform fundamental skills efficiently. This deficiency is clearly reflected in the performance of players at that stage, which emphasizes the need to address this phase and to explore the most suitable training methods for them, as they represent the future of football teams. Strength training for youth is considered one of the important training methods for enhancing their technical level. Such training works by

Journal of Physical Education
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https://jcope.uobaghdad.edu.iq

indirectly affecting the muscles, transferring the strength gained from a specific movement to the entire neuromuscular system.

Therefore, the researcher aims to use strength training to develop muscular strength in young football players and to investigate its effect on the improvement of skill performance levels (currently under investigation).

Functional strength training is considered one of the modern approaches in sports training. It is characterized by integrated movements that engage multiple muscle groups simultaneously. The advancement of various football skills and the ability of certain players to change the course of a match through their individual capabilities have prompted the researcher to explore functional strength training for football players.

Regarding the influencing factors, there may be challenges in identifying the variables that affect the effectiveness of this type of training. Factors that should be considered include age, physical fitness, nutrition, prior training experience, and previous injuries. Therefore, when studying functional strength training, it is necessary to investigate its effectiveness and determine its impact on specific skill abilities in football players. Functional strength training is recognized as an important training method for enhancing technical and physical performance because it indirectly affects the muscles, transferring the strength gained from a particular movement to the entire neuromuscular system.

Consequently, researchers aim to utilize functional strength training to improve performance, helping football players understand its effect on the levels of skill performance under investigation.

Research Objective: The study aimed to investigate the effect of functional strength training on certain skill abilities of the Diyala Youth and Sports Football Team.

Research Hypothesis: There are statistically significant differences between the pre-test and post-test measurements in the technical performance level of the experimental group, in favor of the post-test measurements.

Research Scope: **Human Scope,** Diyala Youth and Sports Football Team. **Temporal Scope,** From February 10, 2023, to June 10, 2024. **Spatial Scope,** The study was conducted at the late Ali Salam Indoor Hall and the Sports and Scout Activity Hall of Diyala College of Education.

Journal of Physical Education
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https://jcope.uobaghdad.edu.iq

Methodology

The researcher employed the experimental method using a single-group experimental design with pre-test and post-test measurements, as it suits the nature of the study.

Research Population and Sample

The research population includes the teams of government institutions in Diyala Governorate. The research sample was selected intentionally, consisting of the Diyala Youth and Sports Football Team, totaling nine (9) futsal players.

Homogeneity of the Research Sample

The research sample was homogeneous in terms of the variables: age, height, weight, and training experience. Table (1) illustrates this.

Table (1): Homogeneity of the Research Sample in the Studied Variables

No.	Variables	Mean	Standard Deviation	Skewness Coefficient
1	Age	28.41	1.18	1.04
2	Height (cm)	175.6	3.16	0.56
3	Weight (kg)	68.8	2.43	2.22
4	Training Experience (years)	3.4	1.21	0.99

Data Collection Methods

The researcher relied on scientific references, previous studies, and international electronic sources to determine the necessary tools, measures, and tests for collecting the research data.

Observation

The researcher observed that previous studies focused on either the physical, skill, or tactical aspects of players, but they did not address the integration of these aspects with functional strength training. This gap highlighted the need for the present study.

Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

Questionnaire

The questionnaire was used to determine the following:

1. The most important skill tests applied to the Diyala Youth and Sports Football Team players (as shown in Appendix 1).
2. The most suitable functional strength training exercises for the Diyala Youth and Sports Football Team players (as shown in Appendix 2).

First: The researcher designed a set of 24 specific functional strength tests for the players. These tests were developed to align with the functional strength requirements of the Diyala Youth and Sports Football Team.

Second: The most suitable functional strength training exercises for the players were identified, including:

- Running with the ball for 10 minutes.
- Performing the throw-in skill 10 times.
- Rotating around the ball and shooting.
- Running with the ball and receiving from above.
- Running with the ball and receiving from below.
- Short passing exercises with the maximum number of repetitions.

Additionally, the researcher prepared a survey form for a panel of nine (9) experts holding academic degrees in Physical Education and Sports Sciences to evaluate the appropriateness of these functional strength exercises for the Diyala Youth and Sports Football Team players.

Equipment and Tools Used in the Study

- Rastameter
- Medical scale
- Measuring tape
- Stopwatch
- Footballs
- Cones
- Standard football field
- Whistle

Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

Scientific Validity and Reliability

Discriminant Validity

The discriminant validity of the skill tests in their initial form was calculated by computing the mean differences between a distinguished group of players (9 players from the same research population but outside the research sample) and a non-distinguished group (9 players from the Diyala Youth and Sports Football Team). This procedure was conducted on Monday, February 20, 2024. Table (2) illustrates the results.

Table (2): Significance of Differences Between the Distinguished and Non-Distinguished Groups for Skill Tests (n1 – n2 = 18)

No.	Variables	Distinguished Group (Mean ± SD)	Non-Distinguished Group (Mean ± SD)	Difference Between Means	t-value
1	20-meter Ball Running Test (Transition Speed)	5.17 ± 0.98	6.23 ± 1.02	1.06	2.30
2	Three Rotations Around the Ball Then Shooting (Motor Balance)	1.30 ± 0.65	1.97 ± 0.58	0.67	3.72
3	Shooting at Cones in Goal Posts (Spatial Accuracy)	2.11 ± 0.99	3.06 ± 0.78	0.95	3.65

Reliability Coefficients

The researcher retested the method on Sunday, March 3, 2024, using a sample of nine players familiar with the tests, considering a two-week interval between the two applications. Pearson's correlation coefficient was used to determine the relationship between the two applications, as shown in Table (3).

Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

Table (3): Correlation Between the First and Second Applications of the Skill Tests (n = 9)

No.	Variables	First Application (Mean ± SD)	Second Application (Mean ± SD)	Difference Between Means	r-value
1	20-meter Ball Running Test (Transition Speed)	4.65 ± 1.02	3.91 ± 0.98	0.74	0.71
2	Three Rotations Around the Ball Then Shooting (Motor Balance)	1.18 ± 0.72	1.41 ± 0.63	0.23	0.74
3	Shooting at Cones in Goal Posts (Spatial Accuracy)	1.09 ± 0.95	1.89 ± 0.82	0.80	0.81

Procedures

Pre-Tests for the Research Sample

The pre-tests for the research sample were conducted on Wednesday and Thursday, March 10–11, 2024. The researcher informed the participants of their results to help them improve their performance.

Table (4): Physical Fitness Components and Applied Tests in the Study

No.	Component	Test Description	Unit of Measurement
1	Transition Speed	20-meter Ball Running Test	Seconds (least time)
2	Motor Balance	Three Rotations Around the Ball Then Shooting	Maximum number of repetitions
3	Spatial Accuracy	Shooting at Cones in Goal Posts	Maximum number of repetitions

Main Experimental Tests for the Research Sample

The main experiment for the study sample was conducted from Thursday, March 14, 2024, to Thursday, May 16, 2024, over a period of eight (8) weeks, with three training sessions per week. Each session lasted 90 minutes and included a variety of skill exercises based on the objectives of the training unit.

Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

After designing the exercises, they were presented to a group of experts in sports training and football to provide their opinions and feedback regarding the suitability of the exercises for the research sample, which consisted of the Diyala Youth and Sports Football Team. The exercises were then adjusted according to the experts' recommendations before being implemented in the training units.

Post-Tests

The post-tests for the research sample were conducted under the same conditions as the pre-tests on Sunday and Monday, May 19–20, 2024. The aim of the post-tests was to determine the level achieved by the players and to assess their improvement after practicing the applied skills.

Statistical Analysis

The researcher employed appropriate statistical methods, including:

- Mean (Arithmetic Average)
- Median
- Standard Deviation
- Skewness Coefficient
- Significance of Differences Between Means (t-test)
- Pearson's Simple Correlation Coefficient
- Percentage of Improvement (%)

Results

Table (5): Differences Between Pre-Test and Post-Test Measurements for Skill Tests in the Experimental Group

No.	Variables	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Mean Difference ($\bar{X}f$)	SD Difference (Sf)	Calculated t-value
1	20-meter Ball Running Test	4.65 ± 1.02	6.17 ± 1.12	1.52	1.18	4.47
2	Three Rotations Around the Ball Then Shooting (Motor Balance)	1.18 ± 0.72	2.62 ± 0.84	1.44	0.87	5.76

Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

3	Shooting at Cones in Goal Posts (Spatial Accuracy)	1.09 ± 0.95	2.57 ± 0.79	1.48	0.93	5.69

Discussion

Based on the data presented in Table (5), a clear distinction can be observed between the mean values of the pre-test and post-test measurements. This indicates the presence of statistically significant differences in favor of the post-test. These results provide further evidence of the positive impact of the exercises implemented during the training sessions, which aligns with the assertions made by Fabio Comana. Functional strength exercises include a set of integrated, multi-level movements that involve various aspects of motion, including acceleration, stability, and deceleration (command, 2004).

The effectiveness of functional strength training lies in its ability to engage multiple muscle fibers simultaneously. The observed improvements can be attributed to the careful planning of the functional exercise program, the appropriate selection of training loads based on the participants' age and training stage, and the implementation of modern training methods during the main training sessions.

In this regard, Dave Schmitz (2003) emphasizes that one of the most important features of functional strength training is the focus on the core, as strong core muscles connect the lower limbs with the upper limbs. Furthermore, functional strength training incorporates multi-directional movements, which are performed by concentrating on one limb at a time. This makes it one of the most effective training methods for enhancing core (mid-body) muscle strength and overall balance (Schmitz, 2003).

The researcher believes that functional training, which is often confused with sport-specific training, is the preferred training approach for most athletes. Although functional training may share certain similarities with sport-specific training, it is important to recognize the distinctions between the two. The primary difference lies in the fact that functional training focuses on strengthening the core muscles, while acknowledging the pivotal role of the spine in facilitating movement.

Journal of Physical Education
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https://jcope.uobaghdad.edu.iq

Conclusions

There are statistically significant differences between the mean scores of the pre-test and post-test measurements for the research sample in terms of skill performance, in favor of the post-test. This study represents a scientific effort to enhance the skill performance of football players through functional strength training. Moreover, it may draw the attention of football coaches and practitioners to the importance of developing psychological capacities through functional strength exercises, which could, in turn, positively impact the skill performance levels of football players.

Recommendations

The use of specialized skill tests within functional strength training provides an effective means of assessing the performance level of football players. The proposed program implements functional strength exercises with consistent intensity, repetitions, and rest intervals across different age groups, given their role in enhancing muscular strength and the effectiveness of skill performance. Additionally, applying functional strength training studies can contribute to improving the overall performance levels of football players. The program also presents a scientific approach to using these exercises, which may help address deficiencies and weaknesses in the players' performance.

Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

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Journal of Physical Education
Volume 37 – Issue (3) – 2025 Open Access
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https://jcope.uobaghdad.edu.iq

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