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Dr. Atheer Abdul-Jabbar Farhan
General Directorate of Education
of Baghdad, Rusafa 3, Iraq

The effect of synchronization of functional strength training and muscle elongation on the speed strength of the legs and the rolling skill of young football players

Dr. Atheer Abdul-Jabbar Farhan

Abstract

The research aimed to prepare exercises in which the functional strength and muscle elongation exercises for young football players coincide, and to identify the effect of synchronization of exercises on the strength of the speed of the two men and the skill of rolling them, which assumed that there are statistically significant differences between the results of the pre- and post-tests of the experimental and control research groups for each of the power distinguishing speed of the two men and the skill of rolling, and there are statistically significant differences between the results of the tests of the experimental research groups and the dimensional control of each of the strength distinguishing speed for the two men and the skill of The experimental approach was adopted by designing the experimental and control groups on a sample that was deliberately selected by (100%) of the (24) young players of the Industry Club for the sports season (2021-2022), After determining the appropriate tests for the research sample, the researcher prepared the exercises in synchronization of the functional strength and muscle elongation of the two legs using rubber ropes for the legs, wooden boxes and medical balls, and the movement of muscle contractions for both legs in a manner similar to play, especially when running with the ball and rolling it on the pitch and by adopting high training stresses according to the method of repetitive training and according to the specificity of the synchronization of these exercises, and for a period of (8) consecutive training weeks, and after the completion of the research experiment, the results were processed with the SPSS system. & Applications It helps the application of training synchronization of functional strength training and muscle elongation in the development of the strength of the speed of the two men, and helps in improving the level of ball rolling skill among young football players, and it is necessary to adopt the combination of the types of physical training methods that aim to develop the strength characteristic of speed for football players and good rationing of high-intensity training load without exaggerations, and it is necessary to pay attention to the development of the capabilities of football coaches when working by combining the types of physical training methods that It targets the development of the physical and skill factor in football.

Keywords: Synchronization of exercises, functional strength, muscle elongation, speed strength of the legs, football rolling skill

Introduction

Maintaining the high level of dynamic movements of the two men's muscular power, especially the strength distinguished by speed, requires that the soccer player maintain the level of contractions of this force in training and competition, as the matter cannot be restricted or limited to the laws of bioenergy conservation that target biological metabolic processes In order to compensate for the missing ones in the intensity exercises that aim to overcome the breaking of the training threshold, and this matter calls for attention to good rationing of training muscle contractions, and their timing when training the muscles working in the repetition of movements for the skill of rolling the ball forward, and thus it is possible to work on integrating more than one training method targeting Improving the output of muscular ability according to what is required by skill techniques by means of training that achieve more than one purpose in one action, and then reach football players to the levels of international confrontations that are an endeavor for every coach and player by challenging them or overcoming the decline of the physical factor in the skill factor training. Muscular strength is defined as the ability to overcome or confront external resistance, and it is also defined as the

Corresponding Author:

Dr. Atheer Abdul-Jabbar Farhan
General Directorate of Education
of Baghdad, Rusafa 3, Iraq

maximum amount of force that a muscle can perform in one maximum muscle contraction. 264)

Also, "the development of muscular strength is one of the important things that every coach seeks to achieve and every player tries to reach, because of its essential role in developing physical performance and improving skills in the various skills of a football player." Winchester, 2005, P: 1731)^[25]

As "no matter how diverse the methods of developing muscular strength and their various methods are, the required improvements fall within the determinants of good planning for the application of these methods and methods, which often focus on plyometric and ballistic exercises in muscle lengthening and shortening cycles for the rapid, high-productivity contraction in the effect of the force resulting from it." (Goldberger, 2013, P: 258)^[19]

Functional strength is also defined as integrated and multi-level movements (frontal, transverse, and sagittal) that include acceleration, stabilization, and deceleration in order to improve locomotor ability and central force, meaning the spine and mid-body, and neuromuscular efficiency. (Abdul Rahman, 2015, p. 131)^[5]

Likewise, "functional strength is the basis for achieving achievement in most physical and sports activities."

It is also indicated that "functional strength training includes core ability, which are movements performed with few repetitions, simple or medium intensity with gradual progress in performance and aims to achieve self-stability and neuromuscular control in the muscles of the center, and core strength, which They are more dynamic movements that use external resistances at all levels and aim to achieve muscular strength, motor integration, and core power, which are movements characterized by producing force and converting it into instantaneous speed. (Dave, 2003, p:147)^[16]

Also, athletes practice functional exercises in the training environment under the name of qualitative exercises, due to the similarity of performance in functional and qualitative 1-exercises. Also, balance is a key element in functional training, not only the balance between strength and flexibility, or working and non-working muscles, but also what we might think of as the methods used, and this is an important interactive feature in functional training and that functional strength training is a combination of strength training And balance exercises are performed at the same time. (Fabio, 2004)^[18]

Likewise, "muscular elongation is an important characteristic in activities that require a wide range of motion to perform 1-sports skills, and the availability of this characteristic guarantees the success of skillful performance in a large way."

Another model of training methods for developing muscular elongation was presented, which is ballistic training, as "during this type of performance in ballistic exercises, force is produced with great effectiveness against resistance and from the beginning of the movement to its end, and as a result of that force produced, the distance reached by the tool (resistance) It is proportional to the amount of muscle power produced." (William & Keijo, 2006, P: 83)^[20]

"Since simultaneous training is considered to be a high-intensity resistance training, followed directly by plyometric exercises with the aim of improving one physical ability, which is the muscular ability, in which a group of exercises is performed with different means of resistance first, then a group of plyometrics within a mechanically similar training series, that is, it must be The muscle groups used in resistance

training are the same as those used in plyometric exercises. (Ebben & Other, 2000, P:538)^[17]

Synchronous training is also defined as "a program of strength and aerobic endurance training in a training setting". (Kraviz, 2004, P:34)^[21]

"It is recommended that the organization of the training program be in a simultaneous manner by applying (3-6) units (training doses) per week in accordance with the planning of the training load, and with the difficulty of the exercises from high to maximum, so that its effect is clear and tangible on the level of muscular power and muscular endurance." (Mikkola & Other, 2007, P:602)^[24]

As it is after this digression in which the researcher links between the training methods and the importance of strength distinguished by speed in specialized training for young soccer players, and by virtue of the work of the academic and training researcher, he noticed a lack of interest in producing training mixtures that integrate more than one training method to influence each of the distinctive strength of the two men Which is one of the factors controlling the transitional speed and the skill of rolling, which usually notices a decrease in the level of the players reflecting their level of fitness, so that this weakness constitutes the problem of the current research, which is explained as an attempt by the researcher to find solutions to it by targeting a physical factor and a skill factor in the training units that they receive during the preparation period Special, which is an attempt to exercise according to the precautions to avoid sports injuries when receiving these high-intensity exercises.

Research objectives

Preparing exercises in which functional strength and muscle elongation exercises coincide for young soccer players.

To identify the effect of the synchronization of exercises in the speed-distinguishing strength of the two legs and the speed of the dribbling skill for young soccer players.

Research hypotheses

There are statistically significant differences between the results of the pre and post tests of the experimental and control groups for each of the speed-discriminating strength of the two legs and the speed of the rolling skill.

There are statistically significant differences between the results of the posttests of the experimental and control groups for each of the speed-discriminating strength of the two legs and the speed of the rolling skill.

Research limits

Human Frontiers: Futsal players in Al-Sinaa Al-Shabab Club for the sports season (2021-2022).

Time limits: for the period from (9/1/2022) to (6/3/2022).

Spatial borders: Baghdad / Rusafa / Municipalities / Industry Club.

Research Methodology

The researcher adopted the experimental research method, which is defined as "the objective observation of a specific phenomenon that occurs in a situation characterized by tight precision and includes one or more variables (factors), while the other variables (factors) are fixed." (Allawi and Ratib, 2017, p. 243)^[8], by designing the experimental and control groups, which are equal and tightly controlled by the pre and posttests.

The research community and its sample

The limits of the research community were represented by the young players in the Al-Sina'a Youth Club in futsal football, who numbered (24) players who are continuing their training for the sports season (2021-2022). (20) players with a rate of (83.333%) to represent the main research sample who were divided according to the requirements of the experimental design into two experimental and control groups with an equal number of each (10) players distributed to them randomly, and they were homogenized in some extraneous variables that affect the internal integrity of the experimental design The values of the distortion coefficients ranged between (+1), and (4) players were selected from them, with a rate of (16.667%) for the survey sample.

Measurement and procedures

To measure the strength characteristic of the speed of the two men, a test was adopted from the position of bending the knees in full jump up for a period of (10) seconds. (Sabr *et al.*, 2005, p. 39) ^[9], and to measure the speed of the skill of front wheeling, the test was adopted. After conducting the exploratory experiment on (4) players, on (9/1/2022), the researcher prepared the exercises with the synchronization of functional strength and elongation. The muscular muscles of the two legs, by using different training tools represented by each of the rubber ropes for the two men, wooden boxes of different heights, Chinese air balls, and free weights, and the movement of the muscle contractions for both legs is in a manner similar to playing, especially when running with the ball and rolling it on the field, and by adopting high training stresses according to the method Repetitive training and according to the specificity of the synchronization of these exercises, as the players are targeted at the beginning of the main section of the training unit at a rate of (3) units per one training week, applied on (Sundays, Tuesdays, and Thursdays), so that the total training units are (24) units, and for a period of (8) Consecutive training weeks, as the intensity and times required to perform the repetitions, the duration of the rest periods between the repetitions, and the number of sets were determined, by adopting the capabilities of each player in the results of the pretests for each of the strength

distinguished by speed and the skill of rolling, to know the maximum load for each player, and then extract The stresses required for each exercise, and taking into account the gradualness of the training load and the principle of ripple with these training stresses, from the beginning of the training load with intensity (90%) and ending with intensity (100%) of the ability of the force that distinguishes the speed of the two legs, Appendix (2) and the ripple of the training load was (two training units rise and the third Going down), the researcher took into account the individual differences for each player when rationing the exercises for each player according to his maximum intensity, with repetitions of (1-5), with groups (4-6) and with a transitional rest period between one exercise and another (2-5) minutes according to The anaerobic energy system, as shown in Appendix (3), since after the completion of the implementation of the pre-test, the exercises began to be applied simultaneously with the functional strength and muscular elongation of the two legs for the players of the experimental research group, in the period of special preparation, the duration of the training unit was (90) minutes and one session was The exercises in the main part of the department are (25-30) minutes, which is the time in which the researcher applied these exercises, as the total time in minutes for the synchronization of functional strength and muscle elongation exercises reached (600-720) minutes, and the application of the exercises began on Sunday corresponding to the date of (16 1/2022) until Thursday corresponding to the date (3/3/2012), when the players of the experimental group meet with training at the same time as functional strength and muscular elongation, while the players of the control group are satisfied with the method of the coach followed with them in their training units, and after completing this experiment in Post-tests on Sunday corresponding to (3/6/2022), whose data were processed using the (SPSS) system to extract the values of each of the percentage, the arithmetic mean, the standard deviation, the coefficient of torsion, the (t) test for correlated samples, and the (t) test for unrelated samples .

Results and Discussion

Table 1: shows the results of the tribal tests between the two research groups

Th test	Group and number		Mean	Standard deviation	Value	Th test	Group and number	Mean	Standard deviation
Distinguishing power with speed for the two men	Experimental	(10)	12	2,789	3,285	0.087	0.098	0.923	Non
	Control	(10)	11.9	1,595					
Speed rolling skill	Experimental	(10)	14.9	1,101	1,275	0.274	1.32	0.203	Non
	Control	(10)	15.6	1,265					

Non-significant when (Sig) < (0.05) at the level of significance (0.05) and the degree of freedom n-2 = (18)

Table 2: Shows the results of the pre and post tests for the two research groups

Th test	The group	Comparison	Mean	Std	Variances	Deviation of variances	(t)	(sig.)	Difference
Distinguishing power with speed for the two men	Experimental (10)	Tribal	12	2,789	5.3	2,946	5,689	0.000	Sig
		After me	17.3	0.675					
	Control (10)	Tribal	11.9	1,595	2.3	1,567	4,641	0.001	Sig
		After me	14.2	1,317					
Speed rolling skill	Experimental (10)	Tribal	14.9	1,101	5.8	0.919	19,959	0.000	Sig
		After me	9.1	0.738					
	Control (10)	Tribal	15.6	1,265	2.8	1,814	4,882	0.001	Sig
		After me	12.8	2,573					

(Sig) > (0.05) at the level of significance (0.05) and degree of freedom (n) - (1) for each group.

Table 3: Shows the results of post-tests between the experimental and control groups

The test and the unit of measure	The group	The number	Arithmetic mean	Standard deviation	(t)	(Sig.)	Difference
The power discriminating with the speed of the two legs (repetition)	Experimental	(10)	17.3	0.675	6,626	0.000	Sig
	Control	(10)	14.2	1,317			
Roll skill speed (s)	Experimental	(10)	9.1	0.738	4,371	0.000	Sig
	Control	(10)	12.8	2,573			

Significance of the difference (Sig) > (0.05) at the level of significance (0.05) and the degree of freedom ($n_1 + n_2 - 2$) = (18)

The researcher attributes the development of the players of the experimental group in the results of strength tests characterized by the speed of the two legs and the improvement in the results of the speed of the skill of front-rolling in football in the post tests compared to what these results were in the pre tests, to the simultaneous training of functional strength and muscle elongation that was done with a similar muscle work in terms of The direction of muscular work is according to the specificity of the speed of the front-rolling skill in football, as the movement of the two legs represents the decisive factor in the force it produces, distinguished by speed, to increase the transitional speed that increases the ability of the player to control the ball, which requires controlling the appropriate amount of this ability to deliver the ball to the area The specific spatial and how much of it is needed to achieve the desired purpose, and to the positive reflection of what the physical factor achieved for the strength distinguished by speed in the skill factor represented by the rolling skill in question, which helped to maintain the smoothness of the integrated form of the skill without intersection of muscular work, and control of the speed factor in the production of total forces In strength characterized by speed, as the repetitions and training stresses were gradual in this matter, and the results proved their suitability for the players of the experimental group, and this led to their superiority over the students of the control group, whose results developed for receiving training for the dependent variables in this research according to the method of the followed coach, as the researcher attributes this The superiority in the results of the posttests for the development of the strength characteristic of speed for the two men, and the superiority of the improvement in the results of the speed of the front-rolling skill in football, to the positive effect of the synchronization of functional strength and muscle elongation exercises, given that the strength characteristic of speed is the sum of explosive forces with less intensity and continuous without a time interval, and this is what The exercises also helped him in overcoming the problem of decreasing speed for young soccer players, the results of which appeared in the speed of their performance tests of strength characterized by speed and the speed of the skill of dribbling, as the appropriate repetitions and training intensity that the researcher implemented in their training had an influential role in their access to this development and superiority by the strength distinguished by speed. It should not be overlooked that the speed factor is also of importance in producing it as required, and here came the effect of muscular elongation in increasing neuromuscular coordination as a result of the repetition specified in the unit of time in their exercises and the type of shortening and lengthening exercises with resistances that limit the decrease in this speed because the speed exercises are in fact known to target the device It is affected by the natural readiness of the player who is governed by what he inherits from the type of muscle fibers from his parents, but it improves with training by overcoming the viscosity of the muscles that form an internal resistance to the spiral friction of contraction according to the work of the

skeletal muscles of the football player, as the simultaneous training of functional strength and muscle elongation helped to increase the elasticity Muscles and according to each type of it, as the researcher proceeded to multiply its types in the application of exercises according to the precautions to preserve the safety of the players and avoid their muscle injuries on the one hand, and according to their ability to the maximum depth of muscle elongation, in order to target the component of strength in the explosive capabilities, which together form the force that is distinguished by speed, and from Requirements for strength characterized by speed that there is proportionality in improving the two abilities together to extract the best possible strength from speed in specialized football training, which may not appear clear in skills, most of which are characterized by the explosive ability of the parties according to the type of skill, but it is a necessary requirement for every player who performs movements Repeated within the stadium for a period of less than (10) seconds.

As "the importance of functional strength exercises is evident in that all training programs must include these exercises, and when observing the runners during their performance in competitions, we find that there are very few periods in which the runner rests on both feet equally and on one line." (Dave, 2003, p:147)^[16]

It also "improves strength, elongation, and muscular balance, and muscular balance on both sides of the body is the actual basis for a good figure. It also adjusts the shape of the body from the current position it is in to the ideal position that it should be." (Al-Qott, 2020, p. 28)

And the law of the participation of the largest number of muscles in muscle elongation exercises forces the muscles to produce the largest amount of force applied in the least period of time, and that the muscles gather from least to most when the force increases, in addition to the speed of movement in order to ensure the participation of muscle fibers in full and must be Movement speed is incremental through the entire movement and up to its end. (Winchester, 2008, p:1731)^[25]

"Because plyometric training requires the integration of maximum strength with maximum speed of the muscle, the development of muscle response speed, and the improvement of the efficiency of nerve pathways for the development of fibers, as this method contributed to overcoming the problems that correspond to the development of muscle power" (Talaat, 2003, p. 424)^[4]

Also, "training based on the gradual progression of the training load from one training unit to another and with an appropriate increase will lead to the appropriate muscular adaptation to this increase, which leads to the improvement of muscle strength, and therefore the coach must set specific goals for the capabilities of the players." (Al-Dalawy, 2011, p. 254)^[1]

It is indicated that "power is greater if force is used for a relatively long distance or if force is used for a short period of time, or both together. Sports games depend more on power than on power" (Ibrahim and Al-Yasiri, 2017, p. 106)^[14].

"As muscle strength plays the main role in improving performance and preventing sports injuries? As the

information available not long ago was that muscle strength is of great importance and was considered the basic rule and an important requirement for almost all sports, but in recent years we can notice that muscle strength is definitely important. But combined with speed, it becomes explosive power and it will definitely be more important." (Michael & Frederick, 2007, P:111-12)^[23]

Also, "athletes who undergo structured training programs with specific times, goals, methods, and training contents achieve better results than those who train randomly during the time periods allotted for training times." (Abdul Zahir, 2014, p. 47)^[7]

Likewise, "the gradual increase in the training load is the basis for any player training planning, and it must be followed by all players who care about their level of achievement." (Al-Abdullah, 2018, 66)^[7]

"Skeletal muscles contract in response to a nerve signal from the motor neuron and do not respond directly under the influence of hormones, unlike the heart muscle and smooth muscles." (Sajit and Ali, 2017, p. 62)^[2]

Also, "training leads to physiological changes involving body systems, and the level of athletic performance advances whenever these changes are positive, in order to achieve physiological adaptation to body systems and then to physical load and skill performance." (Makki, 2010, p. 182)^[15]

And that the elasticity or elongation of a muscle is determined by the connective tissue that forms from the sheaths of the skeletal muscle fibers in the muscle rather than from the proteins of these fibers themselves. (Joseph & Kathleen, 2009, P: 66-321)^[20]

"And when developing the strength that is distinguished by speed, emphasis should be placed on the motor matching of the skillful performance in football." (Martin, 2013, P:78)^[22]

Conclusions and recommendations

- 1- The application of simultaneous exercises for functional strength and muscle elongation helps in developing the speed-distinguishing strength of the two legs of young soccer players.
- 2- The application of simultaneous exercises for functional strength and muscular elongation helps in improving the speed level of the dribbling skill of young soccer players.
- 3- It is necessary to adopt a combination of the types of physical training methods that aim to develop the speed-distinguishing strength of football players and to properly codify the high-intensity training load without exaggerations.
- 4- It is necessary to pay attention to developing the capabilities of football coaches when working with a combination of the types of physical training methods that aim to develop the physical and skill factor in football.

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Appendix (1) explains the rolling speed test: (Al-Moamen, 2001, pg. 75)

- ⚙ **Name of the test:** rolling between five tokens back and forth.
- ⚙ **The purpose of the test:** measuring the rolling speed.
- ⚙ **Tools and equipment**
 - ✓ A place to perform the test in which the starting line is determined at a distance of (2m) from the first sign and four consecutive signs, and the distance between each sign and another is (1.5m) so that the test distance is (8m) and the number of signs is (5) as shown in Figure (1).
 - ✓ Football.
 - ✓ Electronic stopwatch.
 - ✓ whistle.
- ⚙ **Test administration**
 - ✓ A recorder / calls out the names of the players first and records the time of the test performance second.
 - ✓ Timer / giving the start signal with the timing and noting the validity of the test performance.

⚙ **Performance specifications**

After the player hears the starting signal, she rolls the ball quickly, passes the five signs, and also returns by passing the

signs, and reaches the start and finish line as quickly as possible.

⚙ **Test instructions**

- ✓ The player can start by passing the first sign on the right or left side.
- ✓ The player's movement must not stop during the test.
- ✓ If the ball is out of the player's control, the attempt is not counted.
- ✓ The player is given two attempts and the best time recorded is calculated for him.

⚙ **Recording and measurement unit**

- ✓ Time is calculated to the nearest (1/100) of a second.

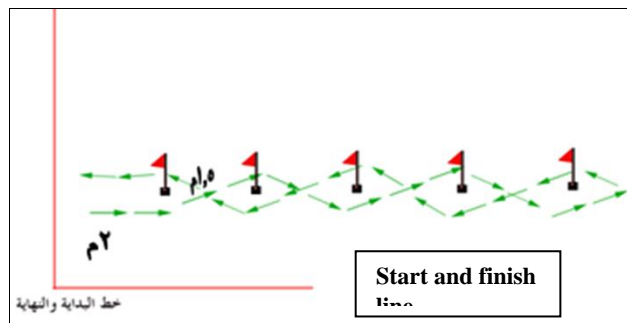


Fig 1: Shows the rolling test between five characters back and forth

Appendix (2) illustrates a model for a training unit for synchronization exercises of functional strength and muscle elongation

Exercise number	Distress	Exercise time	Repetition	Rest time between repetitions	Number of groups	Rest time between sets	Transitional rest time
(1)	90%	10 sec	3	10 sec	3	120 sec	270 sec
(2)	90%	8 s	2	15 sec	4	130 sec	254 sec
(3)	95%	5 s	1	-	5	150 sec	175 sec
(4)	90%	8 s	2	15 sec	4	130 sec	254 sec
(5)	90%	10 sec	3	10 sec	3	120 sec	270 sec
The total							1.223 sec
The total time for the exercises in the main section of the training unit is (90) minutes							20.383 minutes