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Effect of exercises of variation of resistance to the exchange of leg muscles with variation of rest time on the transition speed of the legs and the scoring speed of football players

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Abstract

The research aimed to prepare exercises for the diversity of resistances to exchange the work of the muscles of the legs by varying the duration of rest between the football players, and to know its impact on the transitional speed of the two legs and the scoring speed of football players, to assume the researcher that there are statistically significant differences between the results of the pre- and post-tests of the experimental and control research groups for both the transitional speed of the two men and the speed of scoring in football, and there are statistically significant differences between the results of the experimental and post-control research groups tests for both the transitional speed of the two men and the speed of scoring Football, and the experimental approach relied on a deliberately selected sample of young players in the Student Football Club who are advanced in the open arenas who are continuing their training for the sports season (2022-2023), The number of (24) players representing (80%) of their community of origin, and after determining the tests, the exercises were prepared by various means of resistances and with a variation in the balance of interstitial rest, and applied to the players of the experimental group for a period of (8) consecutive weeks, and at a rate of (3) units per week in the period of special preparation, and after the end of the experiment on them, the data was processed with the statistical system (SPSS), to be the conclusions and applications that the exercises of the diversity of resistances to exchange the work of the muscles of the legs with the variation of the rest period between them help in improving the transitional speed of the two legs, and in improving The speed of scoring for football players, and it is necessary when using resistors to take into account the speed and direction of muscle contractions of football players to enable them to overcome the conditions of the matches at the maximum speed, that is, to avoid negative effects on decreasing speed when increasing the amount of these resistances.

Keywords: Variety of resistances, variation of rest time, transition speed of the legs, scoring speed of footballers

Introduction

Research problem and its importance

The principle of diversification of exercises and their means, and the principle of exchange of muscular work, are among the most important principles of sports training that help football players avoid fatigue and stress that impede progress at the level of transitional speed in open arenas, which is one of the necessities for players' transfers in the various playing areas and lines, and training focuses The modern athlete is to depart from the constraints of the stability of some axioms in rationing the training load and seeking to raise the physical level of the improvements required for football players, whose movements require economical energy to be invested according to the requirements of the playing situations, to perpetuate the duration of the mechanical effectiveness of the repetitive movements at a high level that suits the specificity of the game of generosity, and the matter It is not only related or determined only by how to obtain this economy, but rather extends to obtaining the economy of the movements of repeated muscle contractions that represent this mechanical effectiveness represented by the transitional speed in question, as well as the speed of scoring, which is in fact dependent on the kinetic speed of the two men in kicking the ball, the rapid movement of kicking it More precisely.

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As "speed in its easy sense is the ability to perform a physical movement or a specific group of movements in the least possible time and is divided into three forms (transmission speed, movement speed, and response speed)" (Abu Zaid, 2007, p. 272) ^[1]

Speed is also defined as "those different similar or dissimilar movements that an individual can perform in a repeated manner in a place, or move from a place in a healthy motor rhythm and in the least possible time." (Muhammad and Hamad, 2002, p. 9) ^[17]

Speed is also defined as "the ability to achieve the maximum frequency of movement in a specific unit of time related to the possibility of changes occurring between muscle contraction and relaxation." (Al-Rabadi, 2005, p. 58) ^[5]

The trainers face the reality of the natural readiness of the muscular gene responsible for speed, so their training is linked to improvements in the functioning of the neuromuscular system and strength training, as muscular strength is one of the most important physical capabilities, if not the most important, then it is the basis for motor performance, which requires the development of strength in a high degree for all parts of the body. Especially the muscles working on both sides of the joints of the body, especially the muscles of the legs. The muscles usually work in pairs, and when a muscle or muscle group contracts, the muscle or groups of muscles opposite it on the same joint relax for the purpose of not hindering the movement and when the movement (Of the leg that kicks the ball) reaches the limit. The final range of movement of the joint is that the muscle or muscle group contracts momentarily to match the strength of the working muscles and the speed of the kicking man. The contraction of the opposing muscles has a reverse effect on the force resulting from the working muscles. What is meant by the exchange of muscular work for the two men is the work of the muscles to meet the corresponding completion of the duties of the variety of exercises. Which imposes a change in the contractions of each of the working, stabilizer and auxiliary muscles, and thus the physical development of each of the capabilities that are positively affected by resistance exercises is considered a development of the amount of mechanical energy for the transitional speed, and the good rationing of the variation of the interval rest period that should not take place at one pace according to the restrictions The anaerobic energy system, but with the same determinants of this system, provided that it is commensurate with the level of training intensity for each exercise with a variety of resistances, to be a specialized training mix for football players.

As the amount of speed achieved in muscle contraction and the extent of muscle shortening is closely related to external loads, and the amount of shortening speed is at its maximum value when the external load reaches zero. The maximum load that the muscle can bear, then the speed of muscle contraction is equal to zero, and the form of contraction here is a fixed contraction, but if the load continues to increase to more than the maximum capacity of the muscle, then the eccentric muscle contraction occurs.

Also, "continuing the same intensity used maintains the acquired adaptations and does not develop them, and here appears the need for training with a new and appropriate overload, and this increase used in training loads is a true example of achieving the principle of gradual progress." (Al-Qot, 2020, p. 31) ^[15]

Likewise, "diversity in giving one-sport exercises avoids intellectual confusion and works to increase the desire for

training, just as experience in the diversity of sports performance gives the player various physical characteristics and abilities as well." (Al-Rabadi, 2004, p. 27) ^[4]

And that the force-producing muscle contractions are affected by a number of factors, including (the number of excited fibers - the section of the muscle or muscles participating in the performance - the type of muscle fibers involved in the performance - the angle of muscle force production - the length and condition of the muscle or muscles before contraction - the length of time spent in the muscle contraction - The degree of coordination of the muscles participating in the performance - The emotional state of the individual athlete before and during the production of muscular strength - Other factors such as age, gender and warm-up). (Hammad, 2001, p. 177) ^[2]

And that the training based on the gradient in 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 trainee must set specific goals for his capabilities. (Al-Dalawi, 2011, p. 254) ^[3]

As "it is useful to divide strength training according to the methods of obtaining maximum muscle tension, and this division is according to the type of exercise used." (Abdul Basir and Adel, 2004, p. 162) ^[8]

"And that this converging effort on the large muscles requires a study for the coaches to know the player's condition that enables him to fulfill the requirements of this physical effort, which combines the goals of developing strength, balance, flexibility and other capabilities." (Cymara & *et al*, 2014, P: 441) ^[19]

Also, "the term (resistance training) is sometimes used as a substitute for muscular strength training, and resistance exercises are used to develop muscular strength and increase the size of skeletal muscles. Gravity (ropes, weights, discs, and dumbbells) or hydraulic and rubber resistances work against muscle contraction, and it is possible to train muscle strength without weights that impede the movement of the hands through ligaments and free weights exercises." (Faraj 2012, p. 34) ^[13]

It is necessary to know the nature and direction of muscular work so that this helps in how to direct the movement of contractions by varying the resistances and diversifying the muscular work according to the most common classifications in the physiology of sports training represented by static muscle contraction (isometric), muscle contraction by lengthening (isotonic / eccentric), and muscle contraction by shortening (isotonic). / central), reversed (plyometric) and isokinetic (Maleh *et al*. 2011, p. 55) ^[16]

"Training to strengthen the muscles of the body in different positions increases the balance of training through repetition of those positions and equalizing the moving moments." (Duane, 2007, P: 188) ^[20]

Through the work of the academic and training researcher, he noticed the need to pay attention after adhering to the familiar training axioms in his planning when using the resistances, and the need to pay attention to the variation of clear rest times in accordance with the training intensity, whose effects appear clear to the club players in the stage of approaching the opponent's goal, to form this weakness observed The problem of the current research in which it is clarified as an attempt by the researcher to find solutions to it by targeting the transitional speed of the two men and the scoring speed of football players during the period of the special preparation period, to achieve more than one purpose in one work.

Research aims

1. Preparing exercises for the diversity of the resistances of the exchange of the work of the muscles of the two legs by varying the rest period between the soccer players.
2. To identify the effect of the various exercises of the resistances of the exchange of work of the muscles of the two legs by varying the rest period between the transitional speed of the two legs and the scoring speed of the soccer players.

Research hypotheses

1. There are statistically significant differences between the results of the pre and post-tests of the experimental and control groups for each of the transitional speed of the two men and the speed of scoring in football.
2. There are statistically significant differences between the results of the experimental and control group posttests for both the transitional speed of the two men and the shooting speed of football.

Research limits

Human limits: Football players for outdoor stadiums in Al-Talaba Sports Club for the sports season (2022-2023).

Time limits: For the period from (27/3/2023) to (28/5/2023).

Spatial borders: Baghdad / Al-Talaba Sports Club Stadium.

Research Methodology: In light of what the researcher mentioned in the problem of his current research, the experimental research approach was adopted, which is defined as "controlling a specific variable within the conditions of an experiment that enjoys safety conditions to see its effect on one or more variables by fixing the rest of the influencing factors." (Abdel-Fattah 2022, p. 218) [10], and the experimental design was adopted with two groups, the experimental and the control, with tight control, in the pre and post -tests.

The research community and its sample: The limits of the community of this research are represented by the young players in the student football club, who are advanced in the open arenas, numbering (30) players who are continuing their training for the sports season (2022-2023), from whom (2) injured players were excluded, the research sample was chosen from them by the intentional method (24) (80%) players from their original community, then they were divided into two experimental and control groups as required by the experimental design for each of them (12) players were distributed to them randomly after adopting the symmetrical pairs method, and homogenization was performed for them in some extraneous variables that affect safety The internal design of the experimental design, in which the values of the coefficients of distortion ranged between (+1), and (4) players were selected from them for the reconnaissance sample, with a rate of (13.333%) from their original community.

Measuring tools and procedures

To measure the transitional speed, the (running in a straight line) test was adopted (Sayed, 2019, pg. 271-272) [7], and to measure the speed of scoring in football, the test was adopted (Al-Atwani, 1999, p. 37) [11], and after conducting the reconnaissance experiment on (4) players on Monday corresponding to the date (27/3/2023), the researcher prepared the exercises to strengthen the muscles of the center of the body in the torso and the legs, to include the muscles of the abdomen, back and legs of each of the players in the experimental group, according to the specifics of these exercises, which are characterized by the exchange of muscle work and the diversification of the means of resistance to be the central stability (Core ability). It is performed with few repetitions, with low or medium intensity, with a gradual training load to use these resistances in order to achieve self-stability and neuromuscular control in the muscles of the center, and core strength exercises, as it is performed more dynamically and uses external resistances in all levels, and core strength exercises) as it is performed with movements characterized by the production of force by using a variety between the rowing apparatus by focusing on the muscles of the back and pushing the legs, pushing the bench press by investing the body weight, pulling the fixed ropes with the multigam device, and pulling the rubber ropes with a degree of resistance (3), as the exercises applied a variety of resistances to the exchange of muscle work by (3) times a week, for a period of (8) consecutive weeks during the period of special preparation, bringing the number of training units to (24) training units, the intensity was graduated from (85% to 100%) using the method of high-intensity interval training and repetitive training, with a rest rate between The exercises are from (2-5) minutes, and the exchange between the work of the muscle groups is to include one time for the muscles of the legs and one time for the muscles of the torso alternately in each training unit. The researchers derive it from the sources of foreign studies in which the athletes in their society differ from the local players in Iraq in terms of structure and physiological indicators, and here the duration is proportional to the intensity performed by the exercise by pressing on the vital organizations in reducing them by (5%) from what is familiar and followed in the times of rest of the phosphogene system And after the completion of this experiment, which began on Sunday (1/4/2023) and ended on Thursday (25/5/2023), and then the post-tests were applied on Sunday (28/5/2023), data were collected. The pre- and post-tests for each player from the two research groups were processed with the SPSS system to extract the values of each of the percentage, the arithmetic mean, and the standard deviation, and the (T) test for unrelated samples, and the (T) test for correlated samples.

Results and Discussion

Table 1: Shows the results of the pre-tests between the two groups in the dependent variables

Test and group	Number	Mean	S.D	Levine for contrast smoothing	(Sig)	(t)	(Sig)	The difference
Transitional speed of the two legs (s)	Experimental	12	4.341	0.1868	0.002	0.962	0.693	0.495
	control	12	4.289	0.1783				
Scoring speed (points)	Experimental	12	7.33	1.826	0.189	0.668	0.537	0.597
	control	12	6.92	1.975				

Degree of freedom n-2 = (22), non-significant if (Sig) < (0.05) at the level of significance (0.05).

Table 2: Shows the results of the pre and post tests for the two groups in the dependent variables

The test	Group and number	Comparison	Mean	Standard deviation	Average variances	Deviation of variances	(v) Calculated	Degree	The difference
Transitional speed of the two legs (s)	Experimental (12)	Pre	4,341	0.1868	1,189	0.187	22,074	0.000	D
		Post	3,152	0.030					
	control (12)	Pre	4,289	0.1783	0.196	0.145	4,691	0.001	D
		Post	4,093	0.202					
Scoring speed (points)	Experimental (12)	Pre	7.33	1,826	8.25	2,179	13,113	0.000	D
		Post	15.58	0.793					
	Control (12)	Pre	6.92	1,975	4.5	2,747	5,675	0.000	D
		Post	11.42	2,275					

Significance of difference (Sig) \geq (0.05), degree of freedom (n)-(1) for each group, significance level (0.05).

Table 3: Shows the results of the post-tests between the two groups in the dependent variables

Test and group	Num	Arithmetic mean	standard deviation	(t)	(Sig.)	the difference
Transitional speed of the two legs (s)	12	3,152	0.030	15,937	0.000	D
	Experimental control	12	4,093			
Scoring speed (points)	12	15.58	0.793	5,992	0.000	D
	Experimental control	12	11.42			

Degree of freedom n-2 = (22), non-significant if (Sig) < (0.05) at the level of significance (0.05).

From reviewing the results of Table (2), it is clear that the players of both the experimental and control groups have improved in their transitional speed and football scoring speed in the results of the post-tests compared to what they were in the pre-tests. From reviewing the results of Table (3), it appears that the players of the experimental group were The researcher attributes the appearance of these results to the young players in the experimental group to the positive effect of the exercises of the diversity of the resistances of the exchange of the work of the muscles of the two legs by varying the duration of the inter-rest in terms of the fact that the scientific fact confirms the association of speed training with muscular strength training because the first It is defined by the natural readiness of the football player and is inherited by the type of white or red fibers as mentioned, but it improves with training, which the researcher was keen to train logically in a training environment characterized by diversification between exercises and the exchange of work of muscle groups according to the specificity of each exercise, to improve the effectiveness of Nerve signals, increased muscle control, and reduced erroneous movements that deviate from the paths of performance and waste time in them, which necessitated an increase in compatibility between neuromuscular work, which was helped by exercises that were rationed by the laws of intensity according to the diversity of resistances, and this in turn acted as a stimulus that helped break the threshold In addition, the repetitions of these exercises have contributed and helped to improve the work of the muscles and reduce their internal resistance, which is represented by facilitating contraction and reducing the frictional resistance between them, taking into account the gradient to accustom the muscles to the required movements within the skill requirements and the time allotted for each exercise, which The less the difficulty of this exercise increases, especially with target speed exercises. In addition, the researcher attributes the emergence of these results to the good planning of exercises in the training units and their arrangement in them, the duration of each exercise, the number of units applied in them, and the suitability of the variety of resistances in the training units with the exercises of these two types of physical and skill speed. The researcher also attributes the improvement of the two speeds in question among the young players in the control group to the players' communication in their attendance of the number of training

units followed with them by the coach for a period of eight weeks, as the time of these two speeds falls within the first vital energy system, which is considered sufficient to improve them, but they did not They rose to the improvement in the results of the players of the experimental group because they did not apply the resistance exercises of the exchange of work of the muscles of the two legs by varying the duration of rest between them.

That "training leads to physiological changes involving the body's systems, and the level of athletic performance advances whenever these changes are positive, in order to achieve physiological adaptation of the body's systems and then to physical load." (Salamah, 2018, p. 179) ^[6].

He points out that "there must be rationing in the components of loads in terms of intensity, size and rest so as not to cause any health, physical or technical harm to the athlete." (Hussein and Amer, 2006, p. 23) ^[12].

And he confirms that "muscle strength plays the main role in improving performance and preventing sports injuries, as the information available not long ago indicated that muscle strength is the basic rule and an important requirement for almost all sports." (Michael & Other, 2007, p:11-12) ^[22].

Modern sports training has adopted an organizational structure consistent with the state of the new development by using modern scientific means in the process of sports training away from those traditional methods previously relied upon and adopting new means and methods according to a codified method that leads to knowing the impact of sports training in developing many physical, skill and functional indicators. ". (Adel, 2018, p: 18) ^[8].

The process of kinetic linking is the ability of the athlete to coordinate the partial movements of his body with each other in space and time, and the movement and performance of this coordination when confronting the competitor or using the tool." (Hoffmann, 2012, P: 66) ^[21].

"Motor performance in sports activities requires a high degree of motor coordination in the sense of the ability to show appropriate motor actions in certain circumstances based on previous motor experiences or mastered skills, and in other words the ability of the athlete to act motor in the face of different circumstances during performance." (Abdel-Fattah, 2012, p. 233) ^[9].

There is a strong relationship between the results of the physical tests of ability, strength and speed and the results of

the skill aspects. (Wesley, 2006, p: 155) ^[24].

Also, "during muscle contraction, the internal pressure associated with shortening the length of the muscle fibers increases, as the amount of this internal pressure at the intensity of (10-50%) of the maximum contraction of the muscle is sufficient to fold the walls of the microvessels that feed the muscle, and during successive muscle contraction, the pressure of the contraction waves Muscles help in distributing metabolic sources as well as getting rid of its products, and perhaps this is one of the primary reasons for the muscle to have a partial rest before contraction, which is estimated at less than half a second, because it is under the influence of the accumulation of toxic substances resulting from work and the lack of nutrition sources." (Roberto & Philip, 2004), p: 64) ^[23].

And that the physical training must be closely linked to the movements in the skill, so the physical qualities must be developed related to the basic skills through the design of special training programs for each sporting activity, and this means that the training program focused on the muscles working in the performance itself. (Petersen & *et al*, 2002, p: 112) ^[25].

Also, "the use of muscle strength in motor skills is the basis for developing motor and transitional speed." (Steven, 2001, p:) ^[26].

Conclusions

1. Variety of resistance exercises for the exchange of work of the muscles of the legs, by varying the duration of rest between them, helps in improving the transitional speed of the two legs for football players.
2. Variety of resistance exercises for the exchange of work of the muscles of the legs, by varying the duration of rest between them, helps in improving the scoring speed of football players.
3. When using resistors, it is necessary to take into account the speed and direction of muscle contractions in soccer players to enable them to pass the conditions of the matches as quickly as possible, that is, to avoid negative effects on the decrease in speed when increasing the amount of these resistances.

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Appendix (1) explains the scoring speed test: (Al-Atwani, 1999, p. 37)

Name of the test: Shooting at the wall.

The purpose of the test: Measuring the scoring speed (the

largest number of correct times in 30 seconds).

Tools used

- Football (5).
- Stopwatch.
- Manira powder (white borek).
- Metric tape measure.
- A wall marked with a rectangular target measuring (3 x 6 m).

Procedures

- Draw a line of (burek) facing a wall and parallel to it, at a distance of (6) meters from it.
- The player stands behind the starting line, facing the wall, with the ball behind the line in front of him.
- The coach gives the starting signal and when the tester touches the ball with his foot, the timer starts the clock.

Performance Specifications

- The experimenter kicks the ball in any way with the foot to direct it towards the blocking wall as quickly as possible.
- If the ball goes far from the test place, the tester can use one of the spare balls instead of retrieving the ball that went far.
- The tester can kick the ball while it is in the air or on the ground, provided that this is done behind the starting line.
- Test ball is based on speed, accuracy and ball control.
- In order for kicking the ball away from the starting line to be counted, the tester must retrieve it with the feet or hands and return it behind the line before continuing the test.

Recording and measurement unit

- The laboratory scores are calculated for the total points obtained from the largest number of correct kicks within (30) seconds.
- Returning when two attempts are given to him and the best of them is calculated.

Appendix (2) shows some pictures of the variety of resistances used in the exercises of the exchange of work of the muscles of the legs

