

## **The effect of anaerobic efficiency training on some of the bio-kinetic abilities of young players in futsal football**

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**Abstract:** The purpose of this paper is to prepare anaerobic competency exercises in some of the bio-kinetic abilities of young players in futsal football and identify the effect of anaerobic competency training in developing some of the bio-kinetic capabilities of young players in futsal football. The researchers followed the experimental method by designing the experimental, control groups with the same pre-, and post-test. The research community was determined by the intentional method, and they are the players of Wasit Governorate clubs in football for the youth halls, which numbered (12) clubs participating in the youth league for first-class clubs, and their number was (180) players. (20) Players after the goalkeepers were excluded due to the different nature of their training from the sample members, and the research sample was chosen in order to provide the appropriate conditions and obtain approvals to conduct the experiment in coordination with the management of the two clubs. As for the control group, it was represented by a sample of Al Sharqiya Sports Club members, numbering (10) players and the research sample constituted (11.11%) of the research community. One of the most important results reached by the researcher is that : The anaerobic competency training contributed to the development of the bio-kinetic capabilities represented by (explosive ability, flexibility and agility) in the experimental research group, the superiority of the experimental group over the control group in the post-tests is due to the anaerobic competency exercises and the nature of their application using the training tools represented by the Swiss ball, rubber ropes and others. One of the most important recommendations recommended by the researchers is that: Necessity of employing anaerobic competency training in the training curricula for young players because of their effective contribution to the development of players in terms of bio-kinetic capabilities, which in turn will be reflected in the final level of the player positively, young players need to develop their bio-kinetic capabilities, as it is an important pillar for building the player correctly, and necessity of using training tools during the application of anaerobic competency exercises because they work on making perfect muscle contractions in the players.

**Keyword:** anaerobic efficiency training, kinetic abilities, futsal football.

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### **Introduction:**

The coaches and workers in the field of football turned to the futsal field to develop the game, as this depends on the players' physical, skill and scheming levels. muscular in a strong and fast anaerobic manner and continue to do so in order to resolve the situations that the players are exposed to during the match, as well as to determine the performance of the skills of futsal. Performing exercises in a fast and strong manner and continuing to perform them (anaerobic efficiency) will contribute to the development of physical as well as tactical abilities, as performing anaerobic competency exercises in times that fall under the anaerobic system works to achieve high rates of agility, flexibility and force that players must enjoy in order to increase their ability To roll and run against the direction, as well as friction with the opponent and try to overcome it through the body's ability to flexibility and agility during the transition from defense to attack and vice versa, and the continuation of the motor work in proportion to the time required for this and the many repetitions during the match. Also, these exercises (anaerobic efficiency) help in the explosive force, agility and flexibility of the player, and its reflection on the performance of attacks and return to defense as quickly as possible without affecting the performance of the skills of the game and its performance to the fullest.

Hence, the importance of the study in preparing the players and subjecting them to perform anaerobic competency training for its importance in raising some of the biokinetic capabilities represented by (explosive ability, agility, and flexibility) by improving their ability to perform well and continuing that without decreasing the player's ability to continue playing during the match.

### **Research problem:**

The research problem emerged through the researchers' follow-up to the Youth League in Wasit Governorate and some training units. I noticed their lack of many biokinetic abilities, especially in explosive ability, flexibility and agility, and these capabilities lead to weak players' ability to perform strong and fast continuous throughout the match, and the researchers explain the weakness of the players' biokinetic abilities to

The vocabulary of the training units does not include exercises of an explosive nature, as well as flexibility and agility. The researchers believe that the solution to this problem lies in the inclusion of training units for anaerobic competency exercises, which have an important role in developing the level of physical kinesthetic players and enabling them to perform their duties and their skill and planning tasks depending on what they have acquired of physical and kinetic capabilities and obtaining the last fruit of that, which is the best performance.

**Research objective:**

- Preparing anaerobic competency exercises in some of the bio-kinetic abilities of young players in futsal football.
- Identifying the effect of anaerobic competency training in developing some of the bio-kinetic capabilities of young players in futsal football.

**Research hypotheses:**

- There are statistically significant differences between the experimental and control groups in some bio-kinetic abilities and in favor of the experimental group.
- There are statistically significant differences between the pre, post-tests of the experimental, and control groups in some bio-kinetic abilities in favor of the post-test.

**Research fields:**

- Human field: Al Sharqiya Football Club Youth Futsal Players for the 2021-2022 season
- Time field: (2/2/2022) to (1/8/2022)
- Spatial field: Closed Jihad Club hall.

**Research methodology and field procedures:**

**Research Methodology:**

The researchers followed the experimental method by designing the experimental, control groups with the same pre-, and post-test.

**Community and sample research:**

The research community was determined by the intentional method, and they are the players of Wasit Governorate clubs in football for the youth halls, which numbered (12) clubs participating in the youth league for first-class clubs, and their number was (180) players. (20) players after the goalkeepers were excluded due to the different nature of their training from the sample members, and the research sample was chosen in order to provide the appropriate conditions and obtain approvals to conduct the experiment in coordination with the management of the two clubs. As for the control group, it was represented by a sample of Al Sharqiya Sports Club members, numbering (10) players and the research sample constituted (11.11%) of the research community.

**Homogeneity of the research sample:**

The researchers performed homogeneity for the sample members in terms of (height, mass, age, training age) as shown in Table (1).

Table (1) shows the homogeneity of the research sample with the torsion coefficient of the variables (Length, mass, age, training age)

Variables	Measuring unit	Mean	Std. Deviations	Median	Skewness
Length	Cm	171	5.902	170	0.599
Mass	Kg	63.40	5.977	61	0.137
Age	Year	18.75	0.85	18.5	0.534
Training age	Months	29.5	4.859	26	0.381

**Equivalence of the two search groups:**

The equivalence was carried out on the two research groups by conducting tests for the research variables, as shown in Table (2).

Table (2) shows the equivalence of the two research groups in some bio-kinetic abilities

bio-kinetic abilities	Measuring unit	Experimental		Control		T value	Level Sig	Type Sig
		Mean	Standard deviation	Mean	Standard deviation			
Explosive force	cm	37.600	2.503	36.800	1.813	0.818	0.424	Non sig
agility	Second	7.500	0.971	7.550	0.724	0.130	0.898	Non sig
Kinetic flexibility	Repetition	19.500	1.581	19.300	1.636	0.278	0.784	Non sig

#### Data collection methods:

They are all devices, tools and means that help the researcher collect information and solve the problem to be studied. The following devices have been used:

#### Equipment used:

- Electronic stopwatch, two (2) type (Casio).
- A two (2) video camera for the purpose of documentation.

#### Tools used:

- tape measure.
- Footballs (12).
- whistle number (2)
- Adhesive tape.
- Miscellaneous office tools.
- Barriers (20) of different heights.
- Number of (40) pillars of different heights.

#### Means of collecting information:

- Arab and foreign sources.
- International Information Network (Internet).
- Questionnaire form.
- Tests and measurements.
- Personal interviews (experts and specialists)

### Field Research Procedures:

#### Determining the search variables:

After reviewing the scientific sources and previous studies, the dependent variables were identified as follows:

Bio-kinetic capabilities (explosive ability, agility, flexibility).

#### Determine the tests used in the research:

##### Tests of biokinetic aptitudes:

##### First: Test name: Vertical jump test from stability (Latif and Kateh, 2021):

- Objective of the test: To measure the explosive force of the muscles of the lower extremities.
- **Test tools:**
  - A blackboard, made of wood, 1.5 meters long and half a meter wide, on which white lines are drawn, and the distance between each line is 2 cm.
  - A smooth wall whose height is not less than 3.5 cm from the ground.
  - Chalk pieces or lime powder, a piece of cloth to wipe the marks of lime after reading each attempt made by the player.
- **Procedures:**
  - The board or piece of wood is fixed on the wall with a distance of not less than 15 cm so that the player does not make contact with the wall while jumping up.
  - It must be taken into account that the bottom edge of the board is at a height from the ground for the shortest player to take the test from the vertical jump allowed up.
  - Draw a line on the floor perpendicular to the wall with a length of 30 cm.

- **Test description:**

- The player grabs a piece of chalk not less than 3 cm, then stands facing the board (the blackboard) and raises the arms as high as possible and makes a mark with chalk on the board, noting that the two heels are attached to the ground.
- The player then stands facing the board at the side, so that the feet are on the 30 cm line.
- The player swings the arms down and back with the torso bent forward and down and the knees bent to a right angle position only.
- The player extends the knees and pushes the feet together to jump up while swinging the arms strongly forward and upward to reach them to the maximum possible height, where he puts a mark with chalk on the board, wall or blackboard at the highest point he reaches.
- The player swings the proximal arm forward and down when landing.

- **Test instructions:**

- The feet should be pushed together from the jumping position.
- It is necessary for the player to swing the arms forward and down to adjust the timing of the movement before performing the jump up process in order to reach the maximum possible height.
- The tested player is given 3-5 consecutive attempts, and the result of the best attempt is calculated.
- Measurements are taken to the nearest 1 cm.
- Jump up with feet together from a stationary position.
- Do not stick a piece of chalk outside the fingers of the hand so as not to affect the results.
- It is preferable for the arbitrator to stand on a ladder or a table near the board or the blackboard so that he can clearly read the results of the different attempts.

- **Test management:**

- An observer who calculates the score and notes the performance.
- Recorder: Calls the players and records the results

- Calculation of the score: The number of centimeters between the line he reaches from a standing position and the mark reached by the player as a result of the jump is recorded to the nearest 1 cm.

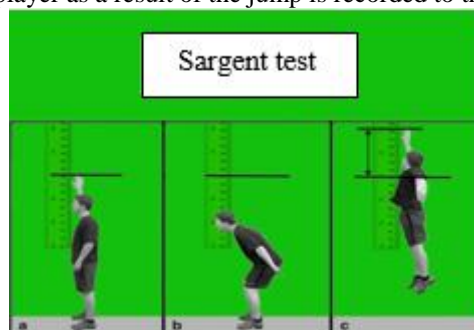


Figure (1)

Shows the performance of the vertical jump test of stability

**Second, the agility test**

- Test name: zigzag ran the Barrow method (Al-Hakim. 2004).
- The purpose of the test: To measure agility.
- Tools: a rectangular running field built on solid ground, its length (4.75) and its width (3 m), a stopwatch, five posts (with a standing height of not less than (30 cm)), and the distance between the starting line and the first post is (75 cm).
- Performance description: The tester takes the standby position from the high start behind the starting line and when given the signal at the start, he sprints between the five legs and back to the start.
- Calculation of the score: The time taken by the laboratory to travel the distance from the beginning to the end is recorded, and each player is given two attempts and calculating the best one.

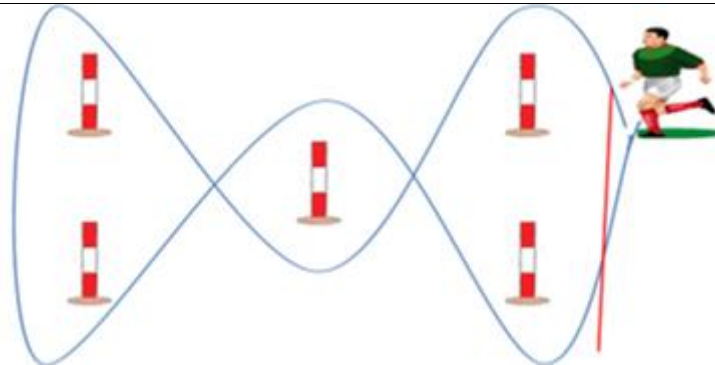


Figure (2)  
Shows the agility test

### **Third, the kinetic flexibility test**

- Test name: Touching the floor and wall, right and left, consecutively (20 seconds) (Saadallah. 2002).
- The objective of the test: To measure kinetic flexibility.
- Tools used: stopwatch, wall, draw an (X) on two points:
  - On the floor between the feet of the laboratory.
  - On the wall behind the back of the lab (center).

The height of the mark on the wall depends on the height of the player, as well as the distance between the wall and the mark on the ground.

- Performance method: Upon hearing the start signal, the tester bends the torso forward downward to touch the ground with the tips of the fingers at the (X) mark between the feet, then extends the torso high while turning to the left to touch the (X) mark behind the back with the tips of the fingers, then rotates the torso and bends it down to touch the (X) mark between the feet a second time, then extends the torso while turning to the right to touch the (X) mark behind the back, and so on, taking into account not to move the feet during the performance.
- Recording: The player records the number of rounds he completed during (20 seconds). The right and left round is considered one attempt.
- Number of Attempts: Only one attempt.

### **Exploratory experience:**

The two researchers conducted the exploratory experiment over two days accompanied by the assistant work team. It was conducted on Wednesday (9/2/2022). It was conducted on (4) players from outside the research sample. The exercises are appropriate to the sample, as well as an opportunity to learn about the efficiency of the auxiliary work team.

### **Pre-tests:**

The pre-tests of the research sample were conducted on Saturday, 12/2/2022 at four o'clock in the afternoon, accompanied by the auxiliary work team in the closed Jihad Hall, tests were conducted for explosive ability, kinetic flexibility and agility.

### **Exercises used**

After reviewing the scientific sources and previous studies, the researchers prepared anaerobic competency training, and these exercises were applied in the (Jihad) hall during (24) training units in (8) weeks, at a rate of (3) training units per week on (Sundays, Tuesday, Thursday) every week. It started on Sunday (20/2/2022) until Thursday (14/5/2022).

Anaerobic competency exercises were used with the experimental group, taking into account the appropriate intensity that suits the age group and the training stage of the player, and those exercises were prepared with a time that falls under (2 minutes) and the appropriate intensity was taken into account in each exercise in proportion to the players' abilities, and the intensity was legalized According to the level of the players using the maximum that can be performed in one exercise, and the nature of those exercises was characterized as being physical, skill and skillful physical vehicle within a time (2 minutes) according to anaerobic efficiency using training tools, including the Swiss ball, rubber ropes, medical balls, weights, agility ladder and other tools.

The principle of gradualness was taken into account during training, starting from intensity (80%), up to intensity (100%) using the high intensity interval training method, and the repetitive training method. The exercises were applied during the special preparation period and the load formation (1:2), and the intensity of the exercises Through the best time to perform each exercise, or according to the maximum heart rate, as follows:

Best achievement  $\times 100 \div$  required intensity, in training the exercises for which the best achievement was taken over time.

Best achievement  $\times$  desired intensity  $\div 100$ , according to heart rate.

Rest was calculated according to pulse rate, and time.

**Post-tests:**

After the exercises are completed during the application of the experiment, the post-tests of the research sample will be conducted on Sunday, 17/5/2022, accompanied by the assistant work team in the Jihad Hall, as it included the bio-kinetic tests according to the conditions of the pre-tests.

**Statistical methods:** The search data was processed through the Statistical Package for the Social Sciences (SPSS).

**Results and discussion:**

**Presentation and discussion of the results of the tests for the bio-kinetic abilities of the control and experimental groups for the results of the two tests, the pre and post-tests:**

**Presentation of the results of the pre and post-tests in the bio-kinetic abilities of the control group**

Table (3) shows the arithmetic means, standard deviations, mean difference, standard deviation, calculated (T) value and the result differences for the results of the pre and post-tests in the bio-kinetic abilities of the control group.

Variables	Measuring unit	Pre-test		Post-test		arithmetic mean of difference	standard deviation of differences	T value calculated	Level Sig	T type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
Explosive force	cm	36.800	1.813	39.400	1.505	2.600	0.791	3.284	0.009	Significant
agility	Second	7.550	0.724	7.300	0.888	-0.250	0.271	0.921	0.381	Not significant
Kinetic flexibility	Repetition	19.300	1.636	20.400	1.264	1.100	0.640	1.718	0.120	Not significant

• At a significance level of  $\leq 0.05$  and with a degree of freedom (9)

Presentation of the results of the pre and post-tests in the bio-kinetic abilities of the experimental group

Table (4) shows the arithmetic means, standard deviations, arithmetic mean difference, standard deviation, calculated (T) value and the result differences for the results of the pre and post-tests in the bio-kinetic abilities of the experimental group

Variables	Measuring unit	Pre-test		Post-test		arithmetic mean of difference	standard deviation of differences	T value calculated	Level Sig	T type Sig
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation					
Explosive force	cm	37.600	2.503	40.100	2.558	2.500	0.960	2.591	0.021	Significant

agility	Second	7.500	0.971	6.400	0.459	-1.100	1.074	3.236	0.010	Sig
Kinetic flexibility	Repetition	19.500	1.581	22.100	1.911	2.600	0.819	3.170	0.011	Sig

• At a significance level of  $\leq 0.05$  and with a degree of freedom (9)

Discussing the results of the pre and post-tests on the bio-kinetic abilities of the experimental and control groups

Through Table (4), it is clear that the experimental group has developed with the studied bio-kinetic capabilities, and this was evident through the significant differences between the results of the pre and post-tests that were in favor of the post-tests, because the anaerobic competency training contributed to raising the level of the kinetic capabilities of the experimental group, as the exercises prepared By the researchers, it was characterized as physical, skill and physical skill (combined), as it included various exercises such as running with the ball, jumping, rubber ropes, using the agility ladder and Swiss balls to take into account the occurrence of appropriate muscle contractions in the players ... and others, and raising the level of difficulty of performing the exercises in a gradual manner, beginning in the exercises After that, football was included in the physical exercises to be a skillful physical vehicle, and the players trained in it in circumstances close to what happens during the game at an appropriate time and repetition, while giving rest times commensurate with work times. "One of the exercises that serve the special preparation are the compound exercises, which are appropriate in their composition to the level of performance of the players that serve two goals at the same time, physically and skillfully, and then gradually become difficult with the passage of time." (Hamada. 2002) the anaerobic competency exercises have taken into account the researchers when developing the important bio-kinetic capabilities in the game of futsal, as well as the times of training doses and rest times, which aim to develop the experimental group with the so-called approach, used in the research.

Also, developing and applying the exercises according to the correct scientific methods related to the bio-kinetic capabilities, has a significant impact on developing the level of performance of these skills by choosing training on special exercises that fit the nature of the sample.

Choosing the appropriate exercises enables the coach to develop physical qualities and at the same time works on the player's mastery of skills (Mukhtar. 1995), in addition, the futsal player cannot master the skills unless he has the necessary bio-kinetic capabilities that allow him to perform perfectly through the interrelationship of those skills with each other to implement the tactical duties during the course of the match, and that anaerobic competency exercises had an effective effect in reaching The results are clear through the great progress made in the players' bio-kinetic capabilities, as these exercises had a great impact in bringing about a development at the level of functional body systems because those exercises contained in the content of their performance on bio-kinetic capabilities such as agility, flexibility and explosive power, especially if the performance was more than The energy system used in these abilities increases the difficulty of performance to lead to the occurrence of adaptation to those exercises, and this reflects on the bio-kinetic abilities and contributes to their development, This was confirmed by the "that the training curricula's success is measured by the extent of progress achieved by the player through the skill, physical and functional level, and this depends on the adaptation that the player achieves with the applied training curriculum." (Al-Qat. 1999).

**Presentation and discussion of the results of the post-tests of the two research groups (experimental and control) in bio-kinetic abilities:**

**Presentation of the results of the post-tests of the two research groups (experimental and control) in bio-kinetic abilities.**

Table (5) shows the significance of the differences and the value of sig in the post-tests of the two research groups (experimental and control) in the bio-kinetic abilities.

Variables	Experimental		Control		T value	Level Sig	Type Sig
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Explosive force	40.100	2.558	39.400	1.505	0.746	0.465	Non sig

agility	6.400	0.459	7.300	0.888	2.846	0.011	Sig
Kinetic flexibility	22.100	1.911	20.400	1.264	2.345	0.031	sig

At a significance level of  $\leq 0.05$  and a degree of freedom (18)

### **Discussing the results of the post-tests of the two research groups (experimental and control) in bio-kinetic abilities.**

Through Table (5), we showed the significant differences between the experimental and control groups in the variables of agility and flexibility. As for the explosive ability variable, it did not appear significant in the differences in the T-test and the error rate, but in the case of comparing the arithmetic means between the experimental and control groups in the post-test, we find that the explosive ability of The experimental group has better than the control group and the reason for this is due to the anaerobic competency exercises prepared by the researchers and which took into account the development of bio-kinetic capabilities, because the bio-kinetic abilities are important for the futsal football player, including the research variables of explosive ability, agility and flexibility. Various side and forward jumping exercises, as well as the use of weights and rubber ropes, which ensured the achievement of muscle contractions for the muscles of the legs, which reduced the response time of the muscle fibers, characterized anaerobic efficiency training. that suits the level In the sample and their ages, and these factors combined played a key role in the development of the explosive abilities of the two legs of the futsal players“Because when training strength, it must be taken into account that the exercises are easy, commensurate with the ability of the players and that they be performed regularly and in the form of groups subject to the capabilities of the player, and to reconcile the effort, repetition and rest periods, as well as the increase in the number of exercises in a gradual manner and according to time periods.(Amira Hassan Mahmoud and Mahar Hassan Mahmoud)as such“Various jumping exercises play a large and effective role in developing the level of explosive ability of the players, as the various jumping exercises are an appropriate method, but it is the best way to develop the explosive ability of the muscles of the legs, increasing the level of strength of the muscles of the legs leads to improving the explosive ability.” (Darwish.1998).

As for agility, anaerobic competency exercises and the containment of these exercises on postures invite players to control the positions of the body, through the use of various different tools such as ground stairs, which make the frequency of the movement of the two legs fast by reducing the time of friction with the ground and the speed of moving the body in modes, and the control and control of those situations In a smooth and timely manner, as well as the use of exercises that contain changing positions and exchanging movements between their beginnings and ends, and the difference and diversity of exercises for agility and involving under anaerobic competence, all of this together contributed to reducing the time of motor reaction through compatibility and the correct link between the different movements, which contributed to increasing the players' ability to feel the movement and the compatibility of work between the muscular and nervous systems, which was confirmed that "the greater the player's ability to sense the movement, the more the possibilities of controlling the motor change, the speed of communication and the responses that take place between the nervous and muscular systems are positive" (Amira Hassan Mahmoud and Mahar Hassan Mahmoud).

The researchers also took into account the effect of these exercises on the nervous system and the increase of compatibility between the muscular and nervous systems through the improvements that occurred in it in terms of the speed of sending nerve signals through the branched motor units within the muscle fibers. Changing the positions of the body according to the changing and diverse situations, is what he brought “One of the factors affecting agility is the efficiency and readiness of the nervous system in terms of receiving sensory signals about the nature of stimuli and sending appropriate nerve signals to them.” (Al-Mayahi. 2017)As for the flexibility variable, the researchers have used anaerobic efficiency exercises that are based in nature on exercises that allow the use of the maximum range of motion allowed by the joints, and vanity in turn depends on the extent of the muscles' ability to contract and relax, which the researchers touched improved through the tests under study, through the improvements in the The level of explosive force, which contributed to increasing the muscle's ability to contract and relax and great flexibility quickly to return to its initial normal position, as one of the factors that increase flexibility is the degree of compatibility between the main working muscles and their antagonists, meaning that flexibility depends largely between the correct compatibility of my quality. Those muscles that is why the researchers used exercises that allow the use of the widest range of motion according to the anaerobic efficiency times, whether through multiple repetitions or the performance time.Here mentions “The more flexible the tendons and ligaments of the muscles, the wider the range of movement performance, and the muscles that pass or that are adjacent to the joint also have an effect in improving the level of flexibility, in any movement that the individual makes, the contraction of the muscles the main factor is parallel to the relaxation or extension of the work of the antagonist's muscles, that is, the easier the work of the antagonist's muscles, the less energy is expended to overcome their resistance (Al-Madamgha. 2017)



### **Conclusions and Recommendations:**

#### **Conclusions:**

- The anaerobic competency training contributed to the development of the bio-kinetic capabilities represented by (explosive ability, flexibility and agility) in the experimental research group.
- The superiority of the experimental group over the control group in the post-tests is due to the anaerobic competency exercises and the nature of their application using the training tools represented by the Swiss ball, rubber ropes and others.
- The use of physical and skill exercises and physical skill has a great impact on developing the bio-kinetic abilities of the experimental group.

#### **Recommendations:**

- Necessity of employing anaerobic competency training in the training curricula for young players because of their effective contribution to the development of players in terms of bio-kinetic capabilities, which in turn will be reflected in the final level of the player positively.
- Young players need to develop their bio-kinetic capabilities, as it is an important pillar for building the player correctly.
- Necessity of using training tools during the application of anaerobic competency exercises because they work on making perfect muscle contractions in the players.
- Necessity of using anaerobic competency exercises to develop other bio-kinetic capabilities such as (strength characterized by speed, transitional speed, kinetic speed, compatibility and strength of all kinds).

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