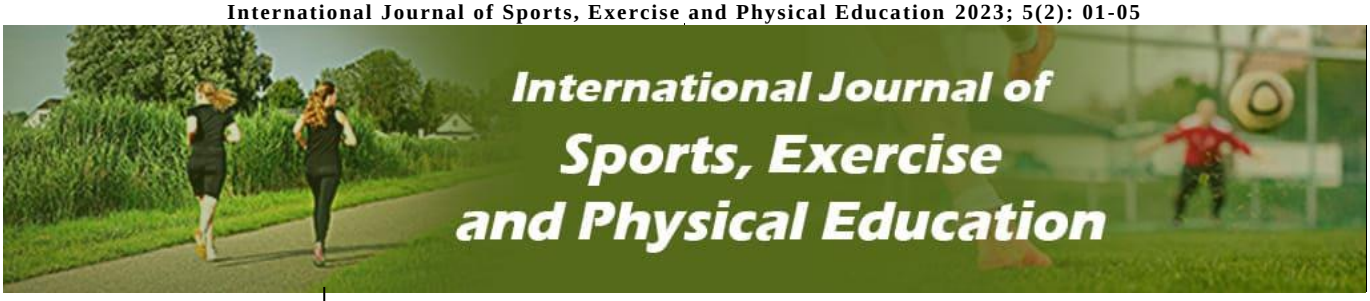

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The effect of using the muscle stimulation device (E.M.S) on the method (electrical stimulation - plyometric) in the development of some biomechanic variables and achievement in the effectiveness of high jumping for applicants

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Abstract
The research contained four doors that included the first part of the importance of research, which is the importance of electrical stimulation of muscles in accordance with the combination of the method of electrical training and the method of training Plyometric (electrical stimulation - Plyometric) and the problem of research is to ignore the training process in Iraq for mechanical training and the limited interest in physical training and the research aims to find out the effect of the muscle stimulation device (E.M.S) according to the method (electrical stimulation - Plyometric) and develop a curriculum that includes physical exercises in the method (electrical stimulation - Plyometrictur) and identify the values of Bio mechanics of the variables extracted and the researchers assumed the existence of statistically significant differences between post and visual tests at the level of biomechanical variables and achievement, while the second part included the use of the experimental method on the research samples of (4) players and in chapter 3 the researchers presented, analyzed and discussed the variables and reached conclusions consisting of improvement and clear development in the performance test in the effectiveness of high jumping (achievement In the post-test of the research samples, the researchers recommended the need to use the method of combining the methods of integration between the methods of electrical stimulation and training of the plastic (in the special preparation phase as well as attention to the correct biomechanical and analytical foundations (length and speed of the last step) and after the area of advancement of the keel in addition to other biomechanical foundations.

Keywords: Muscle stimulation device (E.M.S), high jumping effectiveness

Introduction
The development of the effectiveness of high jumping in the way of Fosbury Flop came through the great development of the nature of performance based on biomechanical foundations since 1968 and at the Olympic games in Mexico City, where this type of jump appeared after the world was taking on its clinical and short jump, and motor analysis is one of the most honest scales in the assessment and guidance, Being one of the main pillars of the performance evaluation [1]. Which gives the coaches a chance to discover weaknesses and strengths and work to overcome them to achieve better achievement. The Plyometrics training is one of the methods of developing the explosive force necessary in the development of achievement in the effectiveness of high jumping and this method includes a range of various jumping exercises such as deep jumping, jumping barriers, jumping with one man and running by jumping.

Electrical stimulation is also a special form of isometric training. Training is carried out against constant resistance. This type of training is called electrical training. On the other hand, another type of training has emerged that combines these two types of training: electrical stimulation and Plyometric training, which is called electro-Plyometric, a method in which the mixing of Plyometric training (voluntary contraction) and electrical muscle alert (involuntary contraction) which leads to the development of strength and speed where the player begins using the electrical alarm device by installing the electrodes of the device to perform the stimulation process, which is part of the size (repetition) of the training unit, and

then completes The rest of the training unit using the Plyometric training to complete the training unit, so the importance of research was focused through the numbers of a suitable training curriculum that develops the electrical activity of the strength and surroundings of some muscles working in the development of some muscle and skills abilities of advanced high jumpers through the use of the method (electrical stimulation – Plyometric).

The problem of study arise there are questions that arise: why are we far from the world record and even from the Arab numbers? Do world or Arab champions have better qualifications than local heroes? Or do they rely on the right methods of training based on scientific foundations and we are far from them?

According to the researchers, the exercises (electrical stimulation - Plyometric) did not receive sufficient attention in scientific research, especially in Iraq, and hence the problem of research arises, which led the researcher to think in a way that accelerates and develops the special muscle abilities and skill of players at the same time.

The aims of study is to know the effect of the muscle stimulation device (E.M.S) [2] on the method (electrical stimulation - Plyometric) on the development of achievement in the effectiveness of high jumping [3] for applicants, develop a curriculum that includes physical exercises for the method (electrical stimulation - Plyometric) and some muscular abilities and skill for advanced high jumpers. And Identify the values of biomechanical variables derived from kinetic analysis of some stages of technical performance of advanced players in Iraq. The study hypothesis that there are statistically significant differences between post and post-tests in some biomechanical variables and there are statistically significant differences between post and post-tests in the level of achievement.

Material and Methods

The researchers adopted the experimental approach to suit the nature of the problem by chose their research to be a true representative of the community of origin, with the main requirement of this sample being "the possibility of circulating its results to the original group selected from it ".

The sample was selected in the deliberate manner represented by a group of 4 advanced club players in Iraq (Army Club) representing the entire research community at 100%. The researchers performed the process of homogeneity between the individualization of the sample through measures of height, body mass and age as shown in table (1).

Table 1; The twisting factor for all members of the research sample shows a homogeneous evidence that the value of the twisting factor for all variables under study falls within the ±3) indicating their homogeneity.

Statistical treatments	Unit	Twisting factors	Std. deviation	Median	mean
Length	cm	0.229	3.304	189	189.25
Body mass	kg	1.138	3.096	70	70.75
Age	year	0.855	0.957	21.50	21.75

Materials and Methods

1. Arab and foreign sources
2. Internet
3. Interviews
4. Exercises used in the training curriculum

After reviewing the scientific sources, messages and frames the researchers were able to collect some exercises related to the game in addition to the experience of the researchers in this field, where a variety of exercises were prepared and presented to a group of experts in the science of sports training, testing and measurement, as they were used according to the method of gradient from easy to difficult when used in training units.

Electrical Stimulation Device (E.M.S)

In Germany in 2007, the electromuscular stimulation technique (EMS) appeared and is based on electrical flashes that activate the cells of the muscles of the body and through exercise sessions during which the device sends electrical signals to the target muscles to become larger strength, elasticity and development, and when the muscle contracts as a result of the signal (EMS) [4], the chemical changes that occur within the muscles are similar to those associated with muscle contractions in natural exercise, The device contains four electrolyte and when stimulating a particular muscle the electrodes are placed on the origin and toned muscle and the electrodes are installed on the muscles by a ligament around the muscle**.** The material uses high jumping device with rug, stop hour to measure comfort, measuring bar, medical balance, boxes of various heights, barriers at various altitude, square and square stadium, laptop type Dell. The tools that used in the experiment are a smooth wall at least 3.5 m high from the ground, Ink to put on the finger to leave a mark on the wall and a measuring bar.

We place ink on the middle finger of the lab hand and then stand facing the wall and extend one of the arms as high as possible without lifting the heels and mark the ink. The laboratory stands almost next to the wall and swings the arms down the successor with the trunk bending the imam and the bottom and bending the knees at an angle only. The laboratory extends the knees and push high (jumping up) and weights the arms high and points a mark on the wall at the highest point. The distance between the two marks is the test standard. The best attempt is taken from three attempts

High jumping test (achievement)

Each of the members of the same research performs the high jump test (achievement) from the full approximate jogging distance of each athlete which is the right distance to get the speed that fits any high jumper, especially the sample members, and records the highest height achieved by the jumper, and implements them international game law.

The length of the last step, it means the distance between the front and rear feet while they are in contact with the ground. The length of the last step is measured by KINOVEA. The time of the last step, step time is measured by KINOVEA by choosing the start and end of the move to extract step time and after the area of getting up from the crossbar 3-

The vertical distance between the foot rise point and the bottom of the beam was extracted through KINOVEA.

After reviewing scientific sources, messages and frames, the researchers were able to choose some of the body muscles that have a direct impact on the high jumping event and were presented to experts and specialists.Muscles that have been stimulated are quad muscle, twin muscle, straight abdominal muscles and electrode placement areas: The

following problems illustrate the areas of the position of electrodes on the twin muscle.

Reconnaissance experiment

The researchers conducted a reconnaissance experiment on Saturday accompanying (10/2/2018) on the field of the Ministry of Youth and Sports, on the eye of players from Iraq (police club) high jump and from outside his eye research and from the original community itself, where the special tests were conducted by the researchers, aims to know the extent to which the sample members understand the vocabulary of special tests and their suitability for them. Diagnosis of the obstacles and disadvantages encountered by the researcher when carrying out the main experiment. Identify and observe the time taken when conducting the test. Avoiding the obstacles and problems that the researcher may face during the implementation of the tests, know the efficiency of the differences when carrying out the tests. Make sure that the tools and devices (cameras) used are safe and fit for search and adjust the motivation scores* players.

The researchers adjusted and determined the grades of motivation of the players on the experimental group before starting the training curriculum for the purpose is to know the degree to which each player is motivated while working on the stimulation device, i.e. the degree to which each muscle will be stimulated, and determines the electrical excitability of the muscle depending on the player's tolerance. The electrode is placed on the muscle to be stimulated and then the stimulation process is carried out by gradually increasing the electrical passing to the muscle through a key of the device until the muscle is aroused so that it does not cause pain to the player.

Field actions

Post Tests of the researchers conducted post tests on the same search on Tuesday (February 13, 2018) and at 3:00 p.m. at the Stadium of the Ministry of Youth and Sports. The researchers gave a brief explanation of how the tests were performed and sequenced, and gave sufficient rest between the tests, as the researchers proved all the conditions specific to the test in terms of (time - place - climate) so that it can be prepared by the conditions approached when conducting the tests lateral.

A training curriculum was prepared by the researchers and presented to training science experts to take their opinions in the training units of the curriculum. The experimental curriculum (15/2/2018) began where the training curriculum developed by the two researchers was applied. The curriculum includes two training units per week (Saturday and Wednesday).

- The curriculum included progressive exercises that are easy to hard and took into account the intensity, size and rest times between each exercise and the totals. The application of the exercises was carried out immediately after the warm-up where the electrical stimulation was performed immediately after warm-up, the reason for this so that the stimulation area is active and the amount of blood reached is sufficient to feed the muscle during the electrical stimulation process, and the duration of the implementation of electrical stimulation with the exercises of the Plyometric (45-60 minutes) and is given rest for (10 minutes) between electrical stimulation and Plyometric exercises for the purpose of hospitalization.
- The sequence was done in stimulating the muscles of the body as the stimulation of the muscles of the legs (twin muscles) first and then the transition to the muscles of the thigh and then the abdomen as specified in the curriculum subject E is stimulated (2-3) muscle groups during work and after the completion of the stimulation of muscle groups moves to other muscle groups different from previous groups.

Distance tests

The post-tests were conducted on the same day on Monday (April 1, 2018) (and at 3:00 p.m. at the Stadium of the Ministry of Youth and Sports, the researchers were keen to create the same conditions in terms of (time - place - climate) and the same devices and tools used themselves when implementing the vocabulary of post-tests.

Results and discussion

Table 2: Shows unit of measurement, computational medium, standard deviation, values (P), value (T), error value and sig values

Variables	Unit	Sig	Sig value	Calculated T	Error deviation	Differences	Post		Pre	
							Std. deviation	Mean	Std. deviation	Mean
Vertical jumping	Vertical jumping	Cm	0.006	7	0.25	1.75	1.29	66.05	1.5	64.75

Table 2 shows that the vertical jumping variable of the post-test (64.75) was the computational medium of the post-test (64.75) with a standard deviation (1.5) and the mathematical average of the vertical jump variable in the post-test (66.50) was a standard deviation (1.29) and the differences (P) between the two mediums were 1.75 With an error deviation of (0.25) and the calculated value of the T test for interconnected samples (7) at the indicative level (0.05), a function compared to the sig value of 0,006, which is smaller than (0.05), this means a statistically d difference between the vertical jump variable And for the sake of the far-reaching test.

Table 2 of the vertical jumping test, which aims to measure the explosive strength of the men's muscles of the experimental group, shows that there has been a morally significant development between the post and post-tests. The researchers attribute this development to the practice method used has actively contributed to the development of explosive force.

Table 3: Shows unit of measurement, computational medium, standard deviation, values (P), value (T), error value and sig values

Variables	Unit	Sig	Sig value	Calculated T	Error deviation	Differences	Post		Pre	
							Std. deviation	Mean	Std. deviation	Mean
High jump	Cm	significant	0،024	4.24	0.707	3	2.44	193	1,63	190

Table 3 shows where the computational medium of the high jump variable of the post-test (190) with a standard deviation (1.63) and the computational average of the high jump variable in the post-test (193) with a standard deviation (2.44) and the differences (P) between the two mediums (3) were achieved by a deviation of error of (0.0) 707) The calculated value of the T test for interconnected samples (4.24) at the indicative level (0.05) is a function compared to the sig value of (0,024) which is smaller than (0.05) which means a statistically dal difference between the high jump variable and in favor of The post-test.

From table 3 of the test, which aims to measure the achievement in the high jumping effectiveness of the experimental group, it has emerged that there is a morally significant development between the post and post-tests. The researchers attribute this development in the achievement of the effectiveness to the that the training method used has actively contributed to the development of the explosive power of the special working muscles of the event, where the participation of special muscle groups in addition to the elements of movement of the chosen game

Table 4: Shows unit of measurement, computational medium, standard deviation, values (P), value (T), error value and sig values

Variables	Unit	Sig	Sig value	Calculated T	Error deviation	Differences	Post-test		Pre-test	
							Std. deviation	Mean	Std. deviation	Mean
Length of the last step	Cm	significant	0.006	7.2	1.341	9.66	9.66	160.83	2.61	170.94

Table 4 shows that the arithmetic average of the last step variable of the post-test (170.49) was a standard deviation (2.61) and the arithmetic average of the last step length variable in the later test (160.83) was a standard deviation (0.79) and the differences (P) between the two mediums were (9.6). 6) With an error deviation of (1,341) and the calculated value of the T test for interconnected samples (7.2) at the indicative level (0.05), a function compared to the sig value of (0,006) which is smaller than (0.05), this means a statistically d difference between a variable The length of the last step and for the benefit of the further test**.**

Through table 4, a statistically significant difference emerged for the length of the last step between the post and post-tests of the experimental group for the post-test interest, which means that the training curriculum prepared by the researchers using the technique (E.M.S) has led to a clear impact on the level of change in the required and appropriate lengths for sample members.

The last steps of his approach run play a crucial role in applying biomechanical conditions such as the correct tilt towards the center of the bow, and not to reduce the speed, with high hip height and employ it during the correct binding process at the moment of advancement, and in a way that ensures the weight gets the best vertical height. The length of the last step has become in recent years one of the main reasons for the development of achievement as the last step is the shortest and fastest in order to get the highest possible height of the center of body weight relative to the model when it starts at the end of the stage of advancement.

Table 5: Shows unit of measurement, computational medium, standard deviation, values (P), value (T), error value and sig values

Variables	Unit	Sig	Sig value	Calculated T	Error deviation	Differences	Post		pre		Measurement Unit	Variables
							Std. deviation	Mean	Std. deviation	Mean		
Length of the last step	Cm	significant	0.004	8.31	0.001	0.014	0.001	0.286	0.003	0.300	Sec	Last step time

Table 5 shows that the arithmetic average of the last plan time changer for post testing (0,300) was a standard deviation (0,003) and the arithmetic average of the last step time variable in the later test (0.286) was a standard deviation (0,001) and the differences (p) between the two mediums were (0.001). 14) with an error deviation of (0,001) and the calculated value of the T test for interconnected samples (8.31) at the indicative level (0.05), a function compared to the sig value of (0,004) which is smaller than (0.05) which means a statistically d difference between a variable The time of the last step and for the benefit of the further test**.**

Table 5 shows that there is a moral difference between the post and post-tests for the time of the last step in favor of the post-test of the experimental group, which is due, of course, to the exercises carried out for individuals appointed by the research and prepared by the researchers **.**The neuromuscular system has adapted to a certain performance time and jumpers can change their future promotion strategy to rely more on speed.

Table 6: Shows unit of measurement, computational medium, standard deviation, values (P), value (T), error value and sig values

Variables	Unit	Sig	Sig value	Calculated T	Error deviation	Differences	Post		pre	
							Std. deviation	Mean	Std. deviation	Mean
After the getting up from the crossbar zone	Cm	Significant	0.011	5.59	0.893	5	1.49	9.57	2.83	95.57

Shown in table (6) where the computational medium of a variable after the area of advancement from the crossbar for the post test (95.57) reached a standard deviation (2.83) and the computational medium of a variable after the area of advancement of the crossbar in the post-test (90.57) with a standard deviation (1.49) and the differences (P) between the middle (5) With an error deviation of (0,893) and the calculated value of the T test for interconnected samples

(5.59) at the indicative level (0.05), a function compared to the sig value of (0,011) which is smaller than (0.05) this means a difference Statistically, between the last step time variable and in favor of the post-test.

Through table 6, a statistically significant difference emerged for a variable after the area of advancement of the crossbar between the post and post-tests of the experimental group for the interest of the post-test, which means that the training method prepared by the researchers using the technique L (E.M.S) has led to a clear impact on the level of change in the distance of the area of advancement from the crossbar and suitable for sample members [6].

A variable after the elevation point (advancement) of the crossbar is associated with the physical measurements of the weight, as "the longer the body of the weight is distinguished by the length, the more this point is relatively far away to allow for the performance of the movements of the fuse and rotation at the moment of advancement and change of position of the body, as the faster the approach, the more relatively far away the point of elevation" [7].

Conclusions

Through the results of the tests, the researchers reached the following conclude that the training method using the training method (electro-Plyometric) has had a positive impact on the physical development of muscles (abdominal muscles, quadrital muscle, twin muscles) as well as the skill development of the computational circles and the rate of development between the post and post-tests and in the remote interest of some of the study variables. The method (electrical stimulation - Plyometric) led to an improvement in the results of physical tests and a moral degree of statistical significance and for the interest of the post-test, as the results shows that clear improvement and development in the vertical jumping test of the stability of the experimental group in the post-test -Clear improvement and development in the high jumping test (achievement) of the experimental group in the post-test. The development of the rate of speed of performance of the last step of the experimental group, which indicated the effectiveness of the method of training (electrical stimulation - Plyometric) in the development of the ability of rapid muscle contractions. The method (electrical stimulation - Plyometric) led to a change in the distance of the area of advancement from the crossbar and consistent with the possibilities of the players where this variable is related to the physical measurements and speed of the player .And as for the variable length of the final step, the training curriculum prepared by the two researchers led to a clear positive impact in the level of length of the final step and suitable for the individualization of the sample.

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