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Effect of Exercises by (TABATA) Method in Speed of the Nerve Signal, Maximum Strength and Snatching Lift for Young Weightlifters

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Abstract

This study touched on several axes, including the introduction to the research and the importance of using specialized exercises using the (TABATA) method, as researchers see that it affects the speed of the nerve signal, in addition to developing the maximum strength and achieving the snatch lift for weightlifters.

As for the research problem: that the nature of performance in the effectiveness of lifting weights is characterized by strength and speed, and this is what makes the player need a great deal of physical integration in addition to functional integration because it requires great muscle capacity and speed in the delivery of nerve signals in order to achieve performance with speed and fluidity, and through the researchers' personal experience they noticed there is a slow movement in the skill of kidnapping, and therefore this negatively affects competition and achieving titles, the researchers believe that the reason for this is the lack of use of modern training methods, including the (TABATA) method, which is one of the methods that raise the body's ability to its maximum limits, as it uses muscle strength and speed, and is a challenge to the two energy systems (ATP, CP, LA), as it is believed researchers that it will contribute to the development of nerve signal speed and maximum strength and achievement of snatching leverage for young weightlifters.

Through the foregoing, the research problem can be summarized by the following question: Does the use of specialized exercises using the method of metabolic adaptation (TABATA) have a positive effect on the speed of nerve signaling, maximum strength and the achievement of snatching lift for young weight players.

The aim of the research was to: Prepare specialized exercises in the (TABATA) method for young weight players, as well as to identify the effect of specialized exercises using the (TABATA) method on the speed of the nerve signal and some special abilities and to achieve the lifting of the snatch for young weight players. (TABATA) effect on neural signal speed, maximum strength and snatch lifting achievement for young weightlifters, as for the place of conducting exercises and field experiments, they chose researchers (Imam Ali Youth Forum) to be a place for their work, in addition to choosing the players of the Solidarity Club for Youth to be a sample for their work, and the time for conducting the research was limited to the time period from 10/7/2020 until 22 / 3/2021.

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The researchers used the experimental method to solve the research problem, and on the research community, the research community was defined by the 6 participating youth sports club players, who were fully chosen by the researcher, after that, the group members underwent training that included the use of specialized exercises in a (TABATA) method, and after eight weeks, post-tests were conducted, and then the data was processed using the appropriate statistical methods.

As for the most important conclusions, they were: The specialized exercises that were applied in the (TABATA) method helped in the development of maximum strength (the maximum strength of the arms, the maximum strength of the trunk, the maximum strength of the two legs), as well as that the development of the level of the nerve signal of the target muscles led to the development of the level of achievement of the snatching lift.

As for the most important recommendations, they were: Researchers recommend coaches for teams in sports institutions in youth and sports, coaches for clubs and national teams, to use specialized exercises in the (TABATA) method because of their positive impact on players, researchers also recommend the adoption of exercises and the approach prepared by the researcher as basic data when training players weight lifting .

Introduction:

The field of training was affected by the revolution of science and technology, as the training process took a form, structure and organization consistent with the state of development and modernity of the methods and means used in the training process, the scientific and technical development has added many new and modern methods in line with the nature of the trainee's age group through the trainers 'endeavor to choose the best and latest methods that are commensurate with the specialized activity, this is in order to achieve and invest in the specificity of training related to the type of activity in order to reach a direct effect to raise the level of skill, physical, functional, plans and psychological, and to bring it to the sports form.

The weightlifting event is one of the games that has received increasing global attention, and the development that took place at the international levels of that event, which we sensed dramatically during the last World Cup and Olympic championships, came as a result of physical, skill, mental and functional harmony and integration, this harmony and complementarity did not appear spontaneously and randomly, but rather came as a result of the coaches 'reliance on the science of sports training based on other sciences that achieve the best levels and results because it has been scientifically proven that the response of the body's systems to sports training has a special importance in knowing the extent of physical and functional improvement for athletes, as well as the state of creativity, innovation and development in methods and means of sports training through the use of the foundations and principles of sports training and the scientific planning required to prepare comprehensive training curricula.

It is known that recent trends in sports training through studies carried out by scientists and researchers focus on the efficiency of the body's functional apparatus and prepare it as the basis for the improvement of the physical and skill levels and functional devices, because there is

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a direct link between the functional improvement of the vital body systems and the athletic achievement of the players.

The weightlifting is one of the games that require great scientific efforts, so knowing what accompanies the player's performance during training and competition is very necessary to see the effectiveness of the methods and training methods used, which each have an effect on improving the performance of players as a result of adaptations of the functional devices because the training load is the main means Used during the training program to influence the functional levels of an athlete's body systems and organs for their progression.

Hence the importance of research in preparing specialized(TABATA) exercises for young weightlifters, as researchers see that they affect the speed of the nerve signal and some special abilities and the achievement of the snatch lift.

The researchers have identified the problem of their research through the researchers' personal experience. They noticed that there is a slow movement in the movement performance of the skill of kidnapping, and therefore this negatively affects competition and achieving titles, and the researchers believe that the reason for this is the lack of use of modern training methods, including the (TABATA) method. It is one of the methods that raise the body's ability to its maximum limits, it uses muscle strength and speed, and is a challenge to the two energy systems (ATP, CP, LA), as researchers believe that it will contribute to the development of nerve signaling speed and some special abilities and achieving snatching leverage for young weight players.

Through the foregoing, the research problem can be summarized by the following question: Does the use of specialized exercises using the method of metabolic adaptation (TABATA) have a positive effect on the speed of nerve signaling, maximum strength and the achievement of snatching lift for young weight players.

Consequently, the researchers set the objectives of the research, which are (preparing specialized TABATA exercises for young weightlifters, as well as identifying the effect of specialized exercises using the (TABATA) method on the speed of the nerve signal and maximum strength and the achievement of snatching lift for young weight players. Likewise, they assumed that there was an effect of specialized exercises using the (TABATA) method, on the effect of nerve signal velocity, maximum strength, and the achievement of snatching levitation for young weight players.

As for the areas of research, they were represented by the players of the Solidarity Club for Youth in lifting weights, and the time of conducting the experiment was from 7/10/2020 until 22/3/2021, as for where to conduct exercises and field experiments, they chose the Imam Ali Youth Forum.

Research methodology and field procedures:

Research Methodology:

The researchers used the experimental method because it is compatible with the nature of the research problem, and by designing the method of the one with the pre and post- tests..

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Community and sample research:

The research community was determined by the young athletic solidarity club players for the sports season (2019-2020), whose number is (6) players, and the researchers chose them entirely for the experience while they are within the officially prescribed ages (19-20) years.

Devices, tools and means used in the research:

Means of data collection:

- Arab and foreign sources and references.
- Personal interviews.
- Tests and measurements.
- Special forms for recording test results for players..

Tools and devices used:

- An electronic stopwatch made in China, count (2).
- Office tools (papers and pens).
- Metric tape measure measuring (40m).
- Electronic medical balance for height and weight.
- Electroencephalogram (NCS)
- Rubber ropes.
- A plastic ladder for training, length (10 m).
- A Chinese electronic device for measuring height and weight.
- Weight lifting devices, (10) Swedish-made iron bar, with discs of different weights, (2) sets, and a legal platform for weightlifting.
- (1) Canon copier..

Field research procedures:

Determine search tests and variables:

First: Electromyography (NCS) test.

The laboratory lies on an examination bed or a relaxing chair so that he is in a comfortable position, and in order to facilitate access to the areas to be examined, when conducting a motor nerve planning, adhesive tapes (electrodes) are placed on the skin over the muscle to be examined, while small electrical currents are passed by a metal disc through the skin over the nerve that supplies the muscle, and the speed at which the nerves transmit these electrical impulses (the speed of transmitting the nerve signal) and the amount (range) of the response are recorded as shown in the figure below.

Figure 1

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demonstrates the electroencephalogram (NCS) with one of the subjects electromyography

Determine Maximum Strength Tests:

First: Test pressure to the top from a sitting position (front and back): [1]

The purpose of the two tests: to measure the maximum force moving during an upward tide.

Tools :

- A typical iron bar.
- Different weights.

Performance description the two tests: After placing the appropriate weight in the iron bar, the tester takes a balanced position on the bench and holds the rod with a medium opening. As for the second test, the two assistants raise the iron bar from both sides to place it above the hands behind the shoulders, as the laboratory holds the iron bar with the hands behind the back and is balanced on the shoulders, with periods of rest (2-3) minutes between repetitions and with the increase in weight, when giving the signal, the laboratory extends the arms to raise the iron bar to the top and so that the arms become extended, when the laboratory wants to do a second attempt, he changes the weight of the weight and then makes the attempt.

Score calculation: Calculates the maximum weight lifted in kilograms with correct performance.

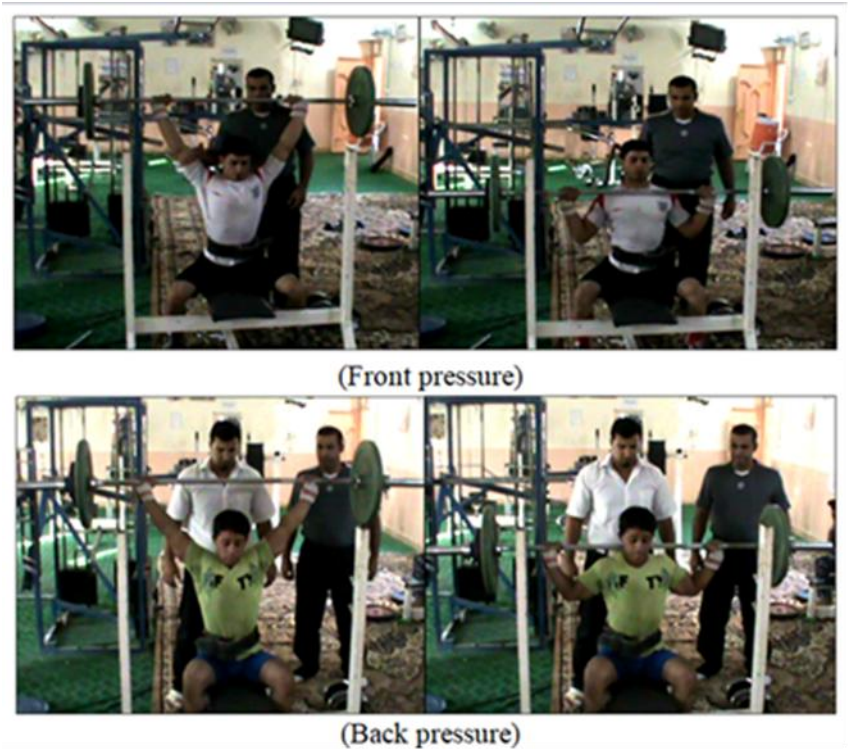

Figure (2)

Pressure test up from a sitting position (Front and Back pressure)

Second: Dead Cloud Test (Wide and Medium) Maximum (Weight):[2], [3]

Purpose of the two tests: to measure the maximum strength of the back and leg muscles.

Tools: Legal iron bar with different weights.

Performance description:: The laboratory stands in front of the bar of gravity placed on the ground and the feet have a suitable opening at the width of the shoulders, and the combs below

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the column bend the torso from the pelvis to hold the bar of weight, so that the grip method differs between the two tests only in the first test the width of the opening is shoulder width and the two openings of the hands are opposite and in the second test it is wide, as the legs are stretched out and the back is taut, the laboratory raises the iron from the ground until the full extension and the weight is gradually increased with each repetition until we obtain the best weight as this weight is the criterion for the maximum strength of the back and leg muscles with a suitable rest time between one attempt and another.

Register: The weight that the laboratory performed and could not repeat it more than once is recorded, and it is the maximum strength of the back muscles.

Figure (3)
Drag tests (Medium and Wide)

Third: Examination of bending and extending the knees fully (squatting) (back and front):[4]

Purpose of the two tests: to measure the maximum muscle strength of the legs.

Tools: Iron bar legal weight with different weights.

Performance description:: The laboratory stands with two legs open about shoulder width, entering under the column of weight carried on the suspenders, the laboratory raises the bar of weight with weights to fix it on the shoulders with an emphasis on tightening the back and raising the shoulders to the top to focus the iron on the shoulder muscles, then bends the knees completely and then extends them. Attempts are given to the laboratory. With periods of rest (2-3) minutes between repetitions and another with weight gain, the second test is of the same specifications as the first test, but the weight bar is placed in front of the laboratory and balanced on the collar bones and the deltoid muscles.

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Register: The highest weight that the laboratory can bend and extend the knees completely is recorded for one time that is not repeated, and it is the maximum strength material for the legs.

Back

Front

Figure (4)
Squatting tests (front and back)

Snatch Lift Achievement Test: [5]

Purpose of the test: To measure the balance of the liftgate in its velocity in falling under the weight and achievement in the snatch lift.

Tools :

- Iron bar (column of gravity) legal weight (20) kg.
- Wooden table measuring 4 x 4 meters.
- (2) Canon video cameras.

Performance description: The laboratory performs (the snatch lift) according to its legal conditions, as the column of gravity (the bar) is placed horizontally in front of the legs of the laboratory, and is arrested so that the phalanges of the fingers are down, the hands back out, and the weight is withdrawn in one movement from the ground to the maximum extension of the arms above the head, with Bending the knees, and the bar passes in front of the body in a continuous movement so that no part of the body touches the wooden plate except the feet during the performance of the lift, after the end of the lift, the player stands without movement with the legs, arms and feet extended in one line, until the referee signals to drop the weight on the board, and there is no specific time for the player to stand after the end of the movement, and the position ends and the feet are in one line and parallel to the torso and the bar and the signal to drop the weight is given when The player is completely immobile in all parts of the body.

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Register : The best lift score is scored from three attempts.

Main experience :

Pre-tests:

The researchers applied the main experiment by applying tests and standards to the research sample, and the pre-tests were conducted on Sunday 12/30/2019, as the tests were according to the following sequence: -

- Measuring the velocity of the nerve signal.
- Tests the maximum strength and accomplish the snatch lift.

Implementation of (TABATA) exercises:

The researchers prepared and organized the specialized exercises in the TABATA method, depending on the personal experience of the researchers, and they were applied to the experimental group on 4/1/2020 until 19/2/2020, taking into account (intensity, repetitions, appropriate rest periods) and the researchers codified these exercises on the basis of Physiological scientific, as well as the physical and functional capacity of the research community, the tools used and the training method, so that these exercises are able to speed up the nerve signal and maximum strength and achieve the hijacking lift, and to achieve the objectives and goals of the training process.

Details of the specialized exercises in the TABATA style in the training curriculum are as follows:

- The total number of training units that included specialized exercises in the style of (TABATA) (24) units.
- The number of weekly training units that provide specialized exercises using the (TABATA) method (3) units for a period of (8) weeks.
- The time for specialized exercises in the style of (TABATA) in one training unit (40-45) minutes (main section only).
- Training days during the week are (Sunday, Tuesday, Thursday).
- The goal of (TABATA) specialized exercises is to improve nerve signal velocity.
- The goal of (TABATA0 Specialized Exercises is to develop the maximum strength of the research sample.
- Observing the exchange of action between muscle groups.
- Planning the formations of specialized exercises in the manner of (TABATA) during the weekly and daily units are (1-2).

Post-test:

The researchers, with the help of the assistant work staff, conducted the post tests for the research sample after completing the application of specialized exercises using the (TABATA) method, and that was on (4/3/2020) and with the same sequence of pre-tests, as the researchers took into account the same conditions in which the pre-tests were conducted in terms of sequence the tests .

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The statistical means used: The researchers used the statistical bag (spss), including:

- Mean .
- Standard deviation .
- Test (t) for cross-linked samples.

Presentation, analysis and discussion of results:

Presentation and discussion of the results of the pre and post- tests of the research sample for the variables under consideration:

Table (1) shows the mean, standard deviations, the calculated (t) value and the significance of the differences for the nerve signal tests and the relative maximum strength (for arms, trunk and legs) for the pre and post- tests of the research sample

variables		Unit	Pre-test		Post-test		T value	Sig level	Sig type
			Mean	Std. Deviations	Mean	Std. Deviations			
Nerve signal	For right deltoid muscle	M / s	58.25	3.30	62.00	0.81	2.51	0.087	Sig
	For left deltoid muscle	M / s	54.50	2.08	59.75	3.20	6.14	0.009	Sig
	For right thigh muscle	M / s	53.00	0.81	55.75	0.95	4.37	0.022	Sig
	For left thigh muscle	M / s	50.50	1.29	55.75	1.50	3.99	0.028	Sig
	For right leg muscle	M / s	40.50	0.57	44.50	0.57	6.92	0.006	Sig
	For left leg muscle	M / s	42.25	0.96	42.00	0.81	0.397	0.002	Sig
Maximum strength for arms	Front	Relativity	0.99	0.10	1.41	0.34	3.12	0.001	Sig
	Back	Relativity	0.96	0.075	1.09	0.074	5.97	0.003	Sig
Maximum strength for trunk	Wide	Relativity	1.84	0.16	1.97	0.21	3.43	0.001	Sig
	Middle	Relativity	2.16	0.16	2.30	0.13	2.04	0.000	Sig
Maximum strength for legs	Front	Relativity	2.19	0.12	2.39	0.18	3.92	0.003	Sig
	Back	Relativity	2.37	0.20	2.51	0.21	7.87	0.002	Sig
Snatch lift		Relativity	1.13	0.05	1.43	0.07	8.08	0.000	Sig

Discuss results:

It is evidenced by the values of the variable of the nerve signal velocity in table (1) which shows the arithmetic mean, the standard deviation, the value of (t) calculated for the corresponding samples, the level of significance and the significant difference for the members of the research sample in the pre and post- tests in the speed of nerve signal delivery for both the left and right deltoid muscle and the muscle the left and right quadriceps, in addition to the left and right front leg muscle, for the post test, the researchers attribute the reason for these

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differences to the specialized exercises in the (TABATA) style that were prepared and designed according to the movement's requirements as requirements for the effectiveness of kidnapping, these exercises in and of themselves need to focus on the movement of more than one member in the different movements of the body simultaneously, as it requires quick instructions from the nervous system as nerve signals for the movement of all the members participating in the snatching.

And that the speed of nerve signal delivery is affected by a set of factors, including high temperature, age and sports training, and the sources indicate that "the high temperature in the body or muscles during exercise leads to an increase in the speed of nerve conduction, while the decrease in temperature leads to a decrease in the speed of nerve conduction" [(6)]. As well as sports training has a great effect on the speed of transmission of the nerve signal, and this is what (Bahaa El Din Ibrahim Salama 1994) indicated, "Sports training has a great effect on the adaptation of the nervous system. In training there is a continuous decrease in the duration of nerve reflexes, that is, an increase in the speed of nerve conduction as well as Increased nervous action for speed games "[(7)].

As (Sulaiman Ali 1983) indicates, "Exercise leads to the development of nervous system functions, including the speed of nerve signal delivery, and this leads to improved work in every muscle" [(8)].

The researchers believe that if athletic training is used in general and specialized in (TABATA) method in particular according to scientific foundations, then it will contribute effectively to developing the speed of transmission of the nerve signal in terms of accuracy, safety and good recruitment of the motor units to be used during the performance of motor duty and thus the occurrence of adaptation Muscular nervous through moving the members of the body participating in the performance in a way that guarantees and achieves the goal of movement, as the (TABATA) method is one of the modern training methods that raise the ability of players to its maximum limits [(9)], this is consistent with what was stated by (Muhammad Al-Arabi 1996), "Sports training contributes to developing skills by strengthening the neural pathway that helps correct performance when it is repeated in the next times when applying the training curriculum"[(10)].

(Al-Bishtawi and Khawaja 2005) states that "the functional adaptation of the nervous and muscular systems and some performance requirements as a result of structured exercises can be clarified through the EEG system" [(11)].

Since the effectiveness of lifting the kidnapping depends to a large extent on a number of skill and physical elements, including speed, compatibility and accuracy in performance, as researchers see that the nervous system represented by the nerve signal and the muscular system represented by the muscles working during performance are closely related to each other and this is a given that the nature of performance With this activity, it requires a high harmony between the nervous and muscular systems, as the legs, hands, trunk and all parts of the body participate during the performance, and this is confirmed by (Muhammad Sobhi Hassanein 1987) "The precision component requires full cooperation between the nervous and muscular systems in

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order to be able to perform the movements in the best way, especially the complex ones, that is, those movements that use more than one part of the body at the same time, or that require the integration of movements of different types into one frame " [12].

Also, "the nerve signals must reach the muscles quickly in order for movement to take place at the appropriate time, and these signals must be accurate enough to implement the movement in the required direction" [13].

By presenting the results of the pre and post tests for maximum strength (arms, torso, and legs) shown in Table (1), significant differences emerged between the pre and post-tests in favor of the post-tests. Researchers attribute this development to the use of specialized exercises using the (TABATA) method based on scientific foundations. Which was applied to the players led to changes in the players' physical levels for the better because the programmed training according to the correct scientific foundations has a clear effect on the results of the post tests.

As those exercises that were applied in the method of (TABATA) depend mainly on balance and stability, the balance of the body and the stability of the position of the feet, shoulders, head and back is what the Tabata exercises depend on, and this is what will make the Tabata exercises require great focus and make them difficult exercises, since these aerobic exercises are considered difficult execution drains maximum effort and energy limits[14].

The researchers believe that this development of the maximum strength of all the variables reflected positively on the relative strength, as the maximum strength is the simpler of the relative strength equation and is due to the nature of the exercises used during the training process based on scientific foundations, in terms of the intensity of the exercise and the number of repetitions and rest periods, as the effect of training appeared The results of the post-tests clearly and this is what (Abu Al-Ela and Ahmed) confirm, as "the use of exercises that are consistent in the nature of their performance with the general form of performing specialized skills leads to better results in gaining strength"[15]. This is consistent with the principles of mathematical training science, which indicates that programmed training according to the correct scientific formulas and the principle of gradual increase leads to a positive effect on the trainees, as well as the regularity of the members of the three research groups and their commitment to the vocabulary of the training curriculum led to the observation of a positive change in the relative strength (for arms and torso) and the two legs), all because of the training methods of the approach that led to an increase in muscle tension, which made the work of the muscles at the best productivity possible. In addition to the excitement obtained by the two experimental groups, it led to the excitement of the largest number of muscle fibers, and that the continuation of these loads makes the muscle gain strength as a result of adaptations that occurred in these fibers, and this is what (Abd Ali) referred to, meaning, "The more muscle fibers are thicker as a result of training, the more The force generated by the muscle to contract is greater (Muhammad) states, "There is a basic rule by which the maximum force can be developed, which requires the use of a load intensity (80% - 100%) of the maximum with iterations (1-5)" [16].

By presenting the results of the pre and post tests for the achievement of the kidnapping lift in table (1), significant differences emerged between the pre and post-tests in favor of the

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post tests, the researchers attribute this positive change in achievement to the specialized exercises that have been prepared and that have been applied accurately and scientifically to affect the muscles. The targeted workforce, which in turn led to an increase in the development of the maximum force, which was positively reflected in the digital achievement of the research sample, "As the opinions of experts confirm, regardless of the sources of their scientific and practical culture, that the training program inevitably leads to the development of achievement as it was built on a scientific basis in organizing and programming the training process, using the appropriate and gradual intensity and noting the necessary individual differences, as well as using the optimal repetitions and the effective interval and under the supervision of specialized trainers under conditions, good training regarding place, time and tools used [(17)].

Likewise, the maximum strength is of great importance in the effectiveness of lifting weights and raising its level among the players, which in turn leads to an increase in digital achievement due to the small duration of its performance and the large size of its resistances, and this is what (Raisan and Ali) confirms that "the importance of muscle strength for athletic achievement increases the greater the resistance and the duration of the effort exerted. In the match, Kassir "() as (Qasim and Raisan) mentioned that maximum strength" is an essential element that sets the level in activities that require overcoming major resistance such as weightlifting, gymnastics and wrestling" [(18)].

Also, specialized exercises that were applied in the (TABATA) method fulfilled the requirements for economic effectiveness in movement by targeting working muscles only and not involving unwanted groups during training, that is, targeting muscles with direct action in performance, which leads to the development of these groups towards serving their work in achieving achievement high in effectiveness.

This came in accordance with the opinion of (Gunden and others), "The best achievement comes through an increase in the level of muscles that are necessary in work and performance. "That is, the muscles will be able to involve the largest number of muscle fibers during the exercise, which leads to an increase in the cross-section of the muscle, which has an effective role in bringing out the maximum force as much as possible. There is general agreement that there is a strong relationship between the cross-section of the muscle and the level of its maximum strength"[(19)]. The maximum strength increases as the number of muscle fibers involved in the exercise increases, and many scholars confirm this fact that" the maximum strength "increases in the case of the ability to excite all muscle fibers, one or the stimulation of the largest possible number of necessary muscle fibers, so the greater the degree of intensity of the stimulus (an increase in the degree of resistance, for example), the more that requires the participation of the largest number of muscle fibers and the increase in strength that the muscle can produce "[(20)].

Conclusions and recommendations:

Conclusions:

- The specialized exercises that were applied using the TABATA method led to an increase in the level of the nerve signal for the target muscles.

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- The specialized exercises that were applied in the TABATA method helped in the development of maximum strength (maximum strength of the arms, maximum strength of the body, maximum strength of the two legs)
- The evolution of the level of the nerve signal of the target muscles led to the evolution of the level of achievement of the snatch.
- The development of the maximum strength (maximum strength of the arms, the maximum strength of the trunk, the maximum strength of the two legs) led to the development of the level of achievement of the snatch lift.

Recommendations:

- The researchers recommend paying attention to the use of specialized exercises using the (TABATA) method according to scientific training bases to raise the efficiency of lifters during matches and competitions.
- The researchers recommend attention to the use of specialized(TABATA) exercises prepared by them as basic data when training weightlifting athletes.
- Conducting periodic evaluation of training results through the nerve signal and maximum strength as important variables to assess the training status of the players.
- Researchers recommend team coaches in sports institutions in the Ministry of Youth and Sports and coaches for clubs and national teams to use specialized exercises in the (TABATA) method in their training curricula because of its positive impact on the players.
- Conducting similar studies on other individual and group activities, and on different age groups.

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