

The Effect of Special Exercises Pursuant to Strength Reserves On Maximum Strength And Top of Electric Activity Of Muscles *EMG* Of Weightlifters

¹ Dr. Ghassan Adeb Abdulhassan, ²Dr. Ali Ahmed Hadi , ³Dr. Hussein khmais Hussein

ABSTRACT--To get acquainted with the types and forms of strength and not to confuse each other, it was necessary to address the issue of force reserves that are trained with a negative range of movement and with an intensity greater than 100%. This concept in the type of training has been the subject of controversy about how to define the training framework with extreme intensity, which some believe is itself the maximum force, while our research **focuses** on identifying this type of strength, the field situation conforms that it is (the super strength) and the most important research objectives come to identify the following: Knowing the effect of special exercises according to the strength reserves in the maximum strength of the weightlifters. The researchers have chosen a random sample of (6) students from the College of Physical Education and Sports Science / University of Baghdad for weightlifting players, and the researchers have conducted tests for the maximum strength of legs and arms on the research sample. The results have been obtained and statistically treated using the statistical bag (SPSS). The most important conclusions are as follows: The exercises according to the force reserves came with positive returns on maximum strength and electrical activity top

Keywords-- (force reserves - peak electrical activity)

I. INTRODUCTION TO THE RESEARCH

1-1 Introduction of the research and its importance

Types of strength are still under the philosophy of training science and they need to a lot of reconsideration to keep pace with the progress made in various areas of sport, and perhaps (the super strength) that is considered one of the types of strength that left an opened controversy is still the subject of discussion among the concerned persons . As the wheel of human sport progress does not believe in doubt as much It tries to touch the actual reality inside the field, but due to the super strength 's association with the problems of interpretation, it is necessary to shed light on all its mysteries, means and field methods necessitated to show them in a field that is applicable and codified away from randomness and emergency conditions . As the prevailing belief indicated that these methods and ways appear under the weight of mobility and the result of panic and fear, hypnosis, electrical stimulation and the like. Hence, the importance of research lies in the possibility of proving that there are modern methods to train

¹Asst. Prof Ghassanadeeb4@gmail.com

² Asst. ProfDr.ali-training@yahoo.com

³ Inst. hk933353@gmail.com

the super strength scientifically on the one hand, and also to place these methods in the hands of our trainers to use it correctly on the other side.

1-2 Research problem

The great strength is considered as one of the most important types of strengths and the prevailing idea around it still indicates that it appears only under a certain emergency, such as panic, fear, electrical stimulation and other things that press on a person, but that represents a fact surrounded with doubt, especially as the scientific development in various fields of science, especially sport, did not leave anything passes randomly, but rather it legalized some filed ideas as to get rid of suspicion through experimentation and to search in reasons standing behind the results. From this the research's problem has been formed in that the great strength did not take the largest part of the research in a manner that suited its importance as it is not conditioned to be there an emergency to appear, but rather there are training methods by which it is possible to develop this important physical characteristic as a type of force, and by this we try in our research to get to these methods in order to solve the problem of randomness in classifying cases in which the great strength appears and there is no better way than training with a negative range of movement.

1-3 Research objectives

1- Prepare special exercises based on the strength reserves.

2- Know the effect of special exercises pursuant to the strength reserves in the maximum strength of weightlifters.

3- Know the effect of special exercises pursuant to the strength reserves at the top of the electrical activity of the muscles of the weightlifters.

1-4 Research hypotheses.

1- There is a positive effect of special exercises according to the strength reserves in the maximum force and the peak electrical activity of the muscles of the weightlifters.

1-5 Research Fields

1-5-1 The human field: - student of Physical college and sports sciences / University of Baghdad from weightlifters.

1-5-2 Timeline: - Wednesday 28/1/2019 until 26/3/2019

1-5-3 Spatial domain: - Weightlifting Hall / College of Physical Education and Sports Science.

II. THEORETICAL AND PREVIOUS STUDIES

2-1 Theoretical studies.

2-1-1 Exercises for strength reserves (great strength)

Many sources emphasize that there are reserves that exceed the extreme limits that a person makes in certain cases, thereby confirming that the human does not use all his powers in natural situations but rather needs an external stimulus to provoke him towards the exclusion of these limits that exceed the limits and this is what they call the great strength. But the most important thing comes through clarifying the extent of trust in this vision and whether it is really that the superpower (the subject of the research) does not come out except under a specific

emergency influence or there are ways by which these reserves could be taken out by force, especially with athletes in the activities of strength and perhaps the answer to these questions could be interpreted by one of the training methods confirmed by some sources (the negative-range training method) which is special exercises for specific muscle groups whose training content is up to (130%), means exceeding the athlete's maximum abilities. These exercises aim to stimulate muscle groups at high rates above the threshold Maximum excitement, but the movement of the exercise towards the ground gravity and the work of resistance to the weight of the weight by the player, provided that there are two assistants are recovering the weight to its first position and then the player returns the performance to do the next repetition and so on. This is confirmed by (Mohamed Reda) in that the use of the intensity that exceeds the sport 's maximum strength by athletes who have a strong background of strength training including the application of this intensity using the method of decentralization by the upper-level quadrants who use percentages between (110-120%) of Maximum intensity for each exercise (2-3) times per week, taking into account the availability of assistants to the athlete when performing this intensity to avoid injuries during the exercise.

III. RESEARCH METHODOLOGY AND FIELD PROCEDURES

3-1 Research methodology: - *The researchers have adopted the experimental method, with pre and post tests, for its suitability with the research procedures.*

3-2 Research community and its sample

The researchers have chosen a random sample consisting of (6) weightlifting students in the College of Physical Education and Sports Science in the third stage, whose weight ranges (70-80) kg, and homogeneity has been calculated in the scale (time age, body weight, training age) as shown in Table (1) The value of the torsion coefficient came between (± 1)

Coefficients	Measurement unit	Mathematic mean	Medium	Standard aviation	Torsion coefficient
Chronological age	Years	20.666	20.500	1.632	0.305
the weight	Kg	76.166	77.500	6.96	0.575
Training age	Month	42.500	42	12.92	0.166

3-3 The means, tools and devices used

Observation –measurement and testing - iron weights - weightlift from 1-25 kg - medical scale - camera - electrical signal planning device

3-4 Field research procedures

3-4-1 / Determining the tests used in the research

The researchers have identified the physical test commonly used in the sport of weightlifting to measure the maximum strength of the muscles of the legs (squat) and also (pinj press) to measure the muscles of the arms as well as to measure the electrical activity of the muscle groups involved in the performance of the same tests, the researchers have relied on identifying these tests on scientific sources as follows :

1- Name of the test: Back Squat - (knees bent and extended from standing with iron lift)

Devices and tools used in the test: - Shaft iron (bar), iron discs , different weights, leather belt.

1).Muhammad Reda Ibrahim: Field application of theories and methods of sports training: 2nd edition (Baghdad, National Library, 2008) p. 627

2) - Ali Salman Abdul: Applied Examinations in Physical Education: 1st edition (Baghdad, National Publishing Library, 2013, p. 52)

The purpose of the measurement: - To measure the maximum strength of the quadriceps femor muscles of legs

Method of performance: The player stands and holds the iron behind the neck on the shoulders from the back and grabs the iron from the sides with both hands and when given the starting signal the player bends the knees completely and stands again.

Recording method: The player is given three attempts, which are calculated according to the weight lifted.

2- Name of the test Panj Press (bending the arms and extending them from lying on a flat bench):

Test purpose: To measure the maximum strength of the arms .

- Used equipments :

1- Iron shaft weighing (20) kg.

2- Iron discs of different weights from (0.5 kg to 25 kg).

3 – Bench for exercising iron bar pressure with two hands (Banj Press).

The method of performance: The player lies on the flat bench , and carries the iron from the iron carrier over the chest and grabs the iron from the sides with both hands of equal dimensions, and when given the starting signal, the player fully bends both arms to the chest level and then the full extension of both arms.

Recording method: The player is given three attempts, which are calculated according to the weight lifted.

Secondly. Physiological tests

First: - Measuring the electrical activity of muscles (EMG)

The electrical activity of the anterior rectus muscles of the thighs has been recorded, by linking a device to measure the electrical activity of the muscles to the femoral straight muscle during the physical performance, squat back - leg, and the electrical activity of the three-headed brachial muscles has been recorded, by linking the device to measure the electrical activity of the muscles to the Brachial muscle during the Performance of Punj test, the results have been analyzed and highest electrical signal of the muscle (peak) has been extracted in a unit of measurement (micro volt)

3-4-2 Exploratory experience

It is a mini-experiment for the used tests, in which some conditions are available to get benefit of its results, as well as identifying the total time of the tests and defining the auxiliary team * with what is required of them. The exploratory experiment has been conducted in physical tests on Wednesday (28/1/2019) on a sample of 2 players outside the research sample.

3-4-3 Pre- tests

Pre-test (1/30/2019) for the following tests, has been made :

Back squat test and simultaneously measure the electrical signal of the muscles working in this test (the great femoral straight muscle)

2- Panj test at the same time measuring the electrical signal for the muscles working in this test (humeral triceps muscle)

* The assistant work team: - M. Ali Kamel (College of Engineering Al-Khwarizmi) – Student// Mukhallad Abdul Karim (College of Physical Education and Sports Science)

3-4-4 main experience

The main experiment was conducted on the same sample as from (1/2/2019). Exercises were used with a negative range of movement.

- The stress came above 100%, at the forefront of the training unit in the main section
- The intensity was increased between (10% -30%), above the maximum strength in the training units.
- The number of iterations ranged between (3-5) repetitions

Number of groups (3-4)

- The rest period between groups is (3-4) minutes
- Post-workout break period (3 minutes)
- One exercise was taken in the training unit in this manner, taking into account the specificity of this high intensity, as the exercise came at the beginning of the main section.
- Using this exercise for three training units per week
- (26) training units were conducted in this manner from (1/2/2018) to (24/03/2018).

3-4-5 Post - tests

Post tests were conducted on (26/3/2019) under the same circumstances in which where pre- tests have been conducted, taking into account the similar performance: -

- 1- The back squat test and the same time measuring the electrical signal for the muscles working in this test (the great femoral straight muscle)
- 2- Punj Press test at the same time measuring the electrical signal for the muscles working in this test (humeral triceps muscle)

3-5 Statistical Methods

The researcher has used the SPSS.

(Torsional coefficient, mean, standard deviation, T-test for symmetric samples)

IV. THE RESULTS ARE PRESENTED AND DISCUSSED

4-1 Display and discuss the results of the maximum strength and electrical activity of the muscles of the research group.

4-1-1 Present the results of the pre and post tests of the maximum strength and electrical activity of the muscles to the research group.

Serial	Tests	Measurement	S-		F-	F5	Value of T	Errors
Maximum Strength of Arms (Bing Press)	Pre	112.50	11.762	9.166	0.833	11	0.010	
	Post	121	11.690					

Maximum strength of two legs (rear squatting).	Post	121.66	14.791	18.330	1.66	10	0.002	
	Pre	140.00	14.142					
Measuring the electrical activity of the arms	Pre	1147.5	116.83	89.16	27.49	3.243	0.023	
	Post	1236	131.90					
Measuring the electrical activity of the arms	Pre	1631.3	453.50	88.66	30.88	2.903	0.034	
	Post	1721	427,82					

- Means Moral under error level $\leq (0.05)$ and degree of freedom (5)

4-1-2 Discuss the results of the maximum strength and electrical activity of the legs and arms muscles:

The researcher attributes the superiority of the post results to the pre results in the maximum force by using the exercises in a negative range method from the movement performed by the research group, which was performed in a sufficient period, i.e. through 26 training units due to the specificity of these exercises that suited with the type of performance practiced by the research sample to lift the two (Bing Press, and Dibani) as well as the levels of stress that exceed the maximum in this type of training formation of weight exercises where the type is hugely considered at the expense of the quantum, in other words, the increase of the stresses above the maximum in the weight training. As that confirmed by Dr. Adil AbedulBaser who indicated that each group of exercises must be prepared in a way that gives an effective impact in developing all capabilities related to the type of activity. "In addition to what was stated by (Ahmed Abdullah)" as he confirms that the development of maximum strength follows the necessity of coordination between the type of strength training according to the nature and type of the systolic muscle method, then a process Planning to achieve the goal of strength development, and it became clear that exercises of the maximum strength achieve the required return using (6 iterations) or less.

This is consistent with what the researcher used of iterations in the exercises with a negative range method that ranged between (3-4) iterations and this matter forces us to use high stresses up to (130%) down and at the same time, the use of the stress in this amount works within the first phosphorous energy system that It depends entirely on the excitability of fast-contracting white muscle fibers with higher efficiency and muscle groups differently from what it is used to in traditional exercises, as well as these muscles are mainly targeted by excitement of the nervous system at a higher rate than the maximal due to the number of repetitions and intensity targeted in the exercise. The researcher confirms to break the physiologic recession.

These exercises worked to stimulate the muscle fibers greatly due to the start of their work under a higher intensity than usual and its main training goal is to start with a threshold for the motion units up to a higher stress in the exercise to confirm that the muscle in the usual maximum exercises in all its conditions does not reach the highest constriction in order to preserve integrity of the tendons and ligaments from injury, which confirms that there are physical efforts stored for the player that are not used even in the highest training cases, but rather appear

under specific conditions which are called (the super strength) and this is confirmed by (Abu Al-Ella Ahmed) "despite the muscle reaching the maximum contraction , but the nervous system does not recruit all muscle fibers in maximum contraction (100%).

Thus, the effect of training of highest intensity on the motion units can be reached with the highest differential threshold, so high stresses must be used in order to mobilize the motion units through a few repetitions to avoid fatigue and injury. This fully explains the use of exercises with the passive range of movement to raise training intensities from the first set of repetitions performed by the player in order to mobilize the higher-impact motor units with the highest difference in muscle work. On the other hand, this works to employ work for added energy in a way that exceeds its predecessor in the player, that this energy is represented by increasing the maximum effort of the first system of phosphorous energy due to the high nervous mobilization due to the exercises used in the negative range, as well as the excitement of added energy due to the increase in the effectiveness of the white fibrosis and its ability to mobilize a greater amount of ATPase enzymes present on the myosin heads that increase the effectiveness of contractility.

The ability of tendons and ligaments to increase their effectiveness by bearing higher thresholds of maximal , which is positively reflected in the development of maximal achievement by intensity rates between (10-20%) above the maximum achievement in the type of exercise. This is confirmed by some data from Russian researchers as that indicated by (Wadih Yassin) that Emphasizes that it is possible to develop the maximum energy added to the maximum (2- 3.5) more than normal, since the possibility of its stimulation works to stimulate muscle fibers and increase their systolic efficiency and all soft tissues as well when working simultaneously, whether in weightlifting and throwing exercises , and on the one hand of another good performance that depends on the development of special exercises, so this added energy can be used and increased in greater extreme working conditions when performing the art of performance and can reach to (35-40%) of the potential energy. This energy greatly affects the achievement.

The service of the weight training exercises comes by increasing capabilities of a higher level of the race and this is what makes the coaches put their players under atmosphere higher than the atmosphere of competition. There is no better way for this situation than the exercises with the negative extent that imposes on players.

1- Adel Abdel-Basir: Biomechanical analysis of human body movements: 1st edition (Port Said, United Press Center, 2006), p. 108.

2 - Ahmad Abdullah Shehadeh, Weightlifting Sport: 1st edition (Amman, Arab Society Library, 2013), p. 38

3 - Abu El-Ela Ahmed; Physiology of Training and Sports: First Edition (Cairo, Dar Al-Fikr Al-Arabi, 2013) pp. 203-251

4 - Wadih Yassin and others: weightlifting fitness for all sports: 1st edition (Baghdad, Al-Wafaa Printing House, 2011) pp. 248-250

The motor skill and achievement are only achieved by the presence of special physical abilities. "On the other hand, the researcher attributes the superiority of the results of the post tests to the research group in the maximum force to change the conditions of the exercise, since the field situation indicates the necessity of changing the methods, means, tools and methods of training, especially with the athletes as this confirmed by (Abu Al-Ela Ahmad) to necessarily deal with the higher levels to alter the methods of exercise implementation by developing

new methods, and exercises or by changing the arrangement of the exercise, the number of groups, repetitions, stresses, etc.

The results in Table (3) show the differences in the results of measuring the electrical activity, the top contraction of the muscle of the legs (femoral straight), and the arms (triceps brachii) between the pre and post tests, which is a measure of adaptation in the strength of the neuromuscular signal in the muscle depending on the highest contracting peak reached by the muscle with the emergence of a clear superiority of the arithmetic mean in the post test. The reason is due to the use of exercises in the negative range, which worked to develop flexibility of neurological processes dependent on high levels when performing it. Thus, the speed of the nerve conduction is very fast and strong through the conduction of one nervous flow that circulates the formation of a single muscle contractility having a degree of force that changes the electrical polarity of the cell membrane and the emergence of the movement potential. This occurs when the voltage level exceeds the threshold and creates (the motion voltage), which means the electric charge difference that arises in the cell as a result of a stimulus located above the threshold of excitation between an excited site and another unexcited as to reach the nerve fluids to all muscle fibers and thus to all sarcomeres (3)

V. CONCLUSIONS AND RECOMMENDATIONS

5-1 Conclusions

- 1- The training units, according to the strength reserves, have positively affected the maximum muscle strength.
- 2- The training units, according to the strength reserves, have had a positive effect on the electrical activity of the muscles

5-2 Recommendations

- 1-The necessity of getting benefit of the compensatory efficiency achieved by the training units according to the force reserves by investing the motor units with the greatest maximum threshold difference.
- 2 - Not to exaggerate in giving the amount of high stress and being satisfied with effective stress ranges within this method, which are (130%) or less and in specific periods of preparation.

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