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The effect of rebound strength training on some indicators of electrical muscle activity (EMG) and achievement of javelin throwing from sitting cp34 youth group

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***Abstract*---**The study aimed to prepare rebound force training, as well as to identify the effect of rebound force training on some indicators of the electrical muscle activity device (EMG) and the achievement of javelin throwing from sitting class Cp34 youth, and the problem of the study is that there is a weakness in the kinetic performance technique in putting the force of the thrower in the process Pulling and pushing because it affects the achievement and causes the rapid contractions of the muscles. The aim is to create strength and speed at the stage of pulling and pushing. In addition, the sample needs a sufficient amount of explosive and rapid force according to the performance technique to create interference between the training aspect when performing the pull and push during the javelin throw because there is a weakness in the explosive force of the working muscles In performance, and there are hypotheses with statistical significance between the tribal and remote tests of some indicators of electrical activity of the muscles (EMG) and the achievement of javelin throwing from sitting cp34 category of young people in favor of the post test. In the intentional way, they are the players of the javelin throwing activity from the seated category CP34, the number of young people (L .). players) out of (4) players, as their percentage constituted (50%) of the original community, and the use of statistical means (spss) program The results of the study found that the rebound strength training of the trunk and arms works to develop some indicators of the electrical activity of the EMG muscles (the summit, the rate of the peaks, the area under the curve) and the achievement of the javelin throwers from sitting cp34 youth class, and the researchers recommend emphasizing the development of rebound strength

training that can be used In line with the motor path and the desired goal that works to strengthen the training process, as well as emphasizing the use of regressive force training in training the disabled and according to the activity or game they play for the upper or lower extremities, taking into account the player's ability and the correct gradation in stress.

***Keywords*---**rebound strength training

Introduction

The development and scientific progress is increasingly invading the world, and the sports side has the best luck in progress in light of modern technology in various games and achieving great achievements in all events, especially the disabled, who practice different types of collective and individual sports activities, whether they are standing or using chairs or devices Compensatory, each type of disability has a sport that suits his abilities, and javelin throwing is one of the important activities practiced by the disabled category of standing and sitting in athletics for the disabled. Therefore, the EMG device, as the device records the electrical activity of skeletal muscles and analyzes it, is important for many sports because they need a neuromuscular system to assess the safety and speed of transmission of nerve impulses to the muscles as well. The development of some indicators of electrical activity (EMG) of the working muscles and the achievement of the effectiveness of javelin throwing from the to sit down.

1-2 Research Problem:

By observing sports progress at the global level, especially in world championships, this led to the emergence of theories and methods of training for the disabled to advanced methods, both in individual and group games, and that training the effectiveness of javelin throwing for the disabled depends on the strength of the muscles of the upper part working in the performance of the athlete. Throwing is due to the fact that the handicap in this category is in the lower extremities, through the researchers' frequency to the Athletics Training Center for the Disabled and through the training units of the javelin throwers from sitting class cp34, the researchers noticed that there is a weakness in the motor performance technique in the position of strength for the thrower in the process of pulling and pushing Because it affects the achievement and causes the rapid contractions of the muscles, the aim of which is to create strength and speed at the stage of pulling and pushing, and there is a weakness in the strength of the muscles working in performance, as well as the sample needs a sufficient amount of explosive and rapid force according to the performance technique. Therefore, the researchers decided to work on measuring some indicators of electrical activity (EMG) of the muscles working in the performance of javelin throwing from sitting for the research sample and putting in place a proposed rebound force training that works to develop these indicators and explosive power and thus develop the achievement.

1-3 Research Objectives:

1- Preparing rebound strength training.

2-To identify the effect of rebound force exercises on some indicators of the electrical muscle activity device (EMG) and the achievement of javelin throwing from the seated Cp34 category of young people.

1-4 Research hypotheses:

There are statistically significant differences between the pre and post tests for some indicators of the electrical activity of the EMG muscles and the achievement of javelin throwing from sitting cp34 youth category in favor of the post test.

1-5 Research areas:

1-5-1 Human field: Javelin throwers from sitting cp34 youth class

1-5-2 Time Domain: 1/1/2022 to 6/15/2022

1-5-3 Spatial domain: Athletics Training Center for the Disabled, Baghdad

1-6 Define the terms:

1-6-1 Training of rebound force or plyometrics:

The use of plyometrics has become common practice

Table No. (1)
shows the homogeneity of the sample

skew modulus	Mediator	standard deviation	standard error	SMA	measruing unit	Statistical parameters / variable name
0.00	65.0000	1.41421	1.00000	65.0000	kg	Bloc
0.00	18.5000	.70711	.50000	18.5000	year	the age
0.00	1.7500	.35355	.25000	1.7500	year	training age

3-3 Means of collecting information, devices and tools used in the research:

3-3-1 Means of collecting information:

1- .Arab and foreign sources and references. 2...internet international information network.

2 Personal interviews, telephone contact and social media programs with specialists. 4. Information release form.

3-3-2 Devices and tools used in the research:

1- .Stopwatch, whistle, tape measure. 2. Camera (NIKON) size (5200.(

2- .An electronic calculator (no laptop), three (3) of them (hp) and one (Lenovo.(

3- .Electromagnetic activity device (EMG) with four poles (Myotrace 400) from the American company (nor axon) number (2) and programming applications model (Mr. 3.14). 5. Receivers from the US company (nor axon) one time use for EMG measurement.

4- Razor blades, cotton, scissors, spiritto (wound disinfectant), medical tape (plaster). 7. Throwing chair. 8. Shaft weight (600) count 8. 9. Medical balls of different weights, rubber ropes, staplers, punching bag, weights.

3-4 Identification of working muscles:

The most important muscles working in the effectiveness of javelin throwing from sitting were determined after the researchers reviewed Arab and foreign scientific sources and previous studies, and conducted personal interviews with experts and specialists in the field of biomechanics, physiology and athletics, including the assistant work team. Where 4 muscles used in the research were selected: (6: 19-51(

1- The middle deltoid muscle: It is a thick muscle that covers the shoulder joint, and gives the shoulder a circular circumference.* Origin: It arises from the lateral edge of the metacarpophalangeal. * Fusion: its fibers converge to rest on the deltoid tuberosity located on the middle of the lateral surface of the body of the humerus. * Action: It works to distend the upper limb at the shoulder joint, the main effort falls on the shoulders of the strong medium fibers of many-feathered shape.

2 -The biceps brachii muscle: This muscle is located anteriorly to the upper arm and consists mainly of two muscles, one long and the other short. * Origin: the long head from the tuberosity above the glenoid of the scapula, and the short head from the tip of the coracoid tissue of the scapula. * Fusion: on the back of the radial tuberosity, by means of an aponeurotic strip called the aponeurosis of the basic structures in the cubital fossa.* Action: It is a strong extensor muscle of the forearm, and it is considered one of the basic muscles of the process of pulling, flexing and rotating the elbow outward and swinging the arm forward.

3- The triceps brachii. It is a large muscle that forms the largest part of the components of the spiral section of the humerus.* Origin: the long head of the subglenoid tubercle of the scapula, the lateral head from the upper half of the posterior surface of the body of the humerus above the spiral groove, the medial head from the posterior surface of the lower half of the body of the humerus under the spiral groove. The fused: the common tendon rests on the upper

surface of the ulna ulna.* Action: This muscle is a strong extensor of the elbow joint, adducting the arm.

.4- The second muscle of the ulnar arch.* Origin: The humeral head arises from the common tendon (from the medial epicondyle of the humerus), and the ulnar head arises from the medial face of the ulna process of the ulna and the posterior edge of the ulna. Action: flexion and adduction of the hand at the wrist joint.

3-5- Determining the indicators of the electrical activity of the EMG muscle

Indicators of the EMG electrical activity of the target muscles were determined in the effectiveness of javelin throwing from sitting after the researchers reviewed the scientific sources and previous studies, and consulted with the assistant working team represented by (Dr. Indicators for each muscle are (maximum peak, mean peaks, area under the curve), and these indicators were measured by means of EMG muscle activity measurement device. Where the researchers defined these indicators as follows:

1- Peak, uv: It is the highest peak that the muscle reaches during performance, according to the EMG reading, and it is measured in microvolts.

2- .Mean, uv peaks: It is the sum of the peaks that the muscle reaches during performance on their number according to the EMG reading, and it is measured in microvolts.

3- .Area, uv's: It is the real calculated area that lies under the crest curve. It is determined by the number of sectors produced by the force curve during a unit time according to the EMG reading, and it is measured in microvolts/time.

3-6 Procedures for measuring the electrical activity of the muscles (EMG:(

The researcher used the Myotrace 400 device produced by the American company Noraxon to record the electrical activity of the skeletal muscles with four poles (4 Channel) with an application program (Mr3.14), which is one of the latest portable laboratory technologies, through which it is possible to examine and record the electrical activity of four muscle groups simultaneously and through Bluetooth signals within a distance of 20 meters from the computer (8: 83), and it consists of the signal receiver and transmission by means of the Bluetooth signal, which weighs (370) g, and the Bluetooth that connects the signal from the device to the computer and connecting wires between the device and between the surface and surface receivers An application program for the device, as it is installed on a laptop computer, through which the EMG signal can be displayed and stored, the signal of each muscle separately.

How EMG device works:

*Before starting the process of opening the (EMG) program, we shave the location of the muscles targeted by the researcher to measure the indicators of electrical activity represented by (4) muscles represented by (the middle deltoid muscle,

biceps brachii, triceps brachii, second ulnar muscle) to remove hair from These muscle areas, and then we work on cleaning your area

Table(1)

It shows the values of the arithmetic means, deviations, standard errors and the rate of evolution of the EMG indicators for the pre and post tests

evolution rate	standard error	standard deviation	M ediator	unit of measure	test	Variables	
18.347	13.06189	45.24772	604.0833	microvolt x sec	pre	peak rate	Middle scapular deltoid muscle
	16.50687	57.18146	714.9167		post		
18.759	20.91377	72.44742	1596.0833	microvolt	pre	The highest peak	
	28.35690	98.23117	1895.5000		post		
23.403	37.59339	130.22731	3517.6667	microvolt	pre	area under the curve	
	80.59443	279.18728	4340.9167		post		
43.348	2.78079	9.63294	77.1083	microvolt x sec	pre	peak rate	biceps brachii muscle biceps
	3.06093	10.60337	110.5333		post		
24.989	14.66486	50.80056	395.8333	microvolt	pre	The highest peak	
	10.99940	38.10303	494.7500		post		
31.174	15.46640	53.57719	427.1667	microvolt	pre	area under the curve	
	26.22176	90.83485	560.3333		post		
23.395	2.20479	7.63763	153.1667	microvolt x second	pre	peak rate	triceps brachii muscle Triceps
	2.22928	7.72246	189.0000		post		
12.733	14.85696	51.46601	1210.7500	microvolt	pre	The highest peak	
	6.22125	21.55103	1364.9167		post		
21.325	20.17617	69.89229	1102.7500	microvolt	pre	area under the curve	
	21.76613	75.40009	1337.9167		post		

32.176	3.18466	11.03197	60.9917	microvolt x sec microvolt x sec	pre	peak rate	
	3.21254	11.12857	80.6167		post		
21.769	19.42130	67.27735	887.3333	microvolt	pre	The highest peak	
	15.30671	53.02401	1080.5000		post		
25.469	13.22093	45.79864	496.6667		pre	area under the curve	
	14.42579	49.97242	623.1667		post		

Table (2)

It shows the arithmetic means, deviations, standard errors of differences, the calculated (T) value, and the error rate of the EMG indicators for the pre and post tests

indication	**mistake percentage**	**value (T(**	**H-F**	**A-F**	**S-F**	**Variables**	
moral	moral	**6.131**	**18.07804**	**62.62418**	**110.83333**	peak rate	Middle scapular deltoid muscle
moral	moral	**9.032**	**33.15013**	**114.83542**	**-299.41667**	The highest peak	
moral	moral	**11.146**	**73.86332**	**255.87004**	**-823.25000**	area under the curve	
moral	moral	**8.235**	**4.05902**	**14.06085**	**-33.42500**	peak rate	biceps brachii muscle biceps
moral	moral	**7.358**	**13.44262**	**46.56659**	**-98.91667**	The highest peak	
moral	moral	**7.423**	**17.94049**	**62.14767**	**-133.16667**	area under the curve	
moral	moral	**11.916**	**3.00715**	**10.41706**	**-35.83333**	peak rate	triceps brachii muscle Triceps
moral	moral	**8.803**	**17.51313**	**60.66725**	**-154.16667**	The highest peak	

moral	moral	**9.029**	**26.04624**	**90.22682**	**-235.16667**	area under the curve	
moral	moral	**9.070**	**2.16369**	**7.49523**	**-19.62500**	peak rate	
moral	moral	**9.052**	**21.33990**	**73.92359**	**-193.16667**	The highest peak	
moral	moral	**7.719**	**16.38851**	**56.77147**	**-126.50000**	area under the curve	

Table No. (3)
It shows the values of the arithmetic means, deviations, standard errors, and the percentage of development of achievement

evolution rate	standard error	measuring unit	measruing unit M	measruing unit	the test	Variables
29.619	.33361	1.15567	11.9967	M	Pre	achievement
	.46953	1.62649	15.5500		post	

Table No. (4)
It shows the arithmetic means, standard deviations of differences, standard error, and the (T) value of the favorability of achievement

indication	mistake percentage	value (T(	H-F	A-F	S-F	Variables
Sig	.000	15.213	.23357	.80911	3.55333	achievement

4-2 Discussing the results of the tests (pre- and post-tests) for the EMG indicators and achievement:

Tables (4,3,2,1) show that there are significant differences between the tribal and remote tests and in favor of the post tests in the indicators of electrical activity for the first and second muscle groups. The rebound force training that was used had an effective effect in stimulating the working muscle groups positively in performing the movements as quickly as possible, which raised the intensity of the training load to a high degree and for a short period, and this was reflected in the improvement of performance and the electrical muscles of the muscles, as many scientific sources confirm that strength training Regression causes an increase in the size and strength of muscles, ligaments, and tendons as a kind of

adaptation to protect them from damage caused to them as a result of increased tensile strength. Ahmed and Mohamed Sobhi Hassanein, 1997) that “the physiological reason for the increase in electrical activity when the force of muscle contraction is increased is the increase in the number of joint motor units in This contraction, as well as the increase in its synchronization in work during contraction." (1:206)

And (Talha Hussam, 1994) mentions that “strength training affects the central nervous system and the processes of braking and increasing the ability to recruit muscle fibers” (10: 45). The method on a regular basis helps to strengthen the muscles and control the kinetic weight, and moreover, this type of training during the special preparation phase reduces the risk of injuries (12:29.)

Reflexive strength training stimulates changes in the neuromuscular system and increases the ability of the muscle group to respond quickly and powerfully to rapid changes. To recruit motor units. (4:32)

As (Muhammad Hassan Allawi and Abu Al-Ela Abdel-Fattah, 1984) confirms that “the ability to stretch in the muscles contributes to increasing the speed of the motor performance of the exercises used” (14: 139), as the regressive strength training works effectively as a result of the harmonious contractions of the working muscles from During the process of effective exchange in performance, it also works to improve the compatibility between the nerves feeding it in terms of increasing the frequency of the nerve signals of the working muscles. The coordination within the muscle includes the number of motor units, the frequency and speed of the nerve signals, increasing the activation of motor units and other neural adaptation processes. (2:133)

And that the rapid eccentric movement in regressive strength training generates a loop (extend-shortening) that precedes a larger central muscular action by the muscles themselves. This mechanism is the muscle spindl in relation to the amount and time of extension (the time taken for the muscle to change its action from the form of sympathetic lengthening to transcendental shortness). The movement causes the muscle that was previously stretched to shrink, and this process represents a protection for the muscle from being stretched more than its capacity. (15:54)

Mr. Abdel-Maksoud, 1997) states that “reflexive force training improves the level of motor coordination to a large degree, and the functional ability of the central nervous system is one of the important factors determining the level of regressive force, and this is due to the fact that the performance of regressive force movements is allowed only for a short period of time. To expand the use of force, as it is performed in a very short period of time during which it must reach the use of the maximum possible level of strength, and regular proper training leads to reducing the time required for contraction of fast muscle fibers, as well as improving the coordination between working and opposite muscles, which leads to a decrease From the effect of braking the opposite muscles or completely eliminating them, and their level also depends on the speed of contraction of the muscle fibers. (7:126)

Hussein Ali and Amer Fakher, 2006) states: “Rebound strength training depends on the stretching and shortening cycle using the muscle spindle reaction for the potential energy. Pulsating loops that line up a chain in the myofilament (actin, myosin, and tendon), and it is believed that focusing training on accelerating the stretch-shortening cycle will enhance the muscle group to move faster and with greater strength in response to changes in muscle length and tension, and improve stored elastic energy capacity during eccentric action of movement. This only happens when it is quickly exhausted, the energy is not used to perform a mechanical function but rather is dissipated in the form of heat (4:19)

And (Bastawisi Ahmed, 1996) points out, "The regressive strength training works physiologically to lengthen the muscle fibers through the eccentric muscle contraction, followed immediately by the central contraction, where the muscle fibers are lengthened and shortened. for working muscles. (3:19)

Talha Hossam El-Din and others, 1997) explains that "plyometric training is a directed method with the aim of developing explosive capacity, and the main purpose of this.

Supplements (1)

Rebound Strength Training

exercise description	basic mode	exercise icon
Pulling and pushing the arm is similar to the technical performance of throwing a javelin from the beginning to the end of the movement, and the exercise is repeated	The player sitting on the chair designated for throwing and holding the javelin and tying the first end of the rubber rope to the tail of the javelin and the other end tied by a fixed object behind the player at an angle (37) d similar to the technical performance	A1
Push the punching bag forward, away and quickly, and repeat the performance of pushing forward again after returning it while maintaining the same body position	Sit on a bench and tie a punching bag at the top of the shooting arm	A2
Throwing the medicine ball from behind the head with both arms in front of high to the coach and then handing it back directly to the player and also repeating the exercise	Lie down on an inclined bench, holding a medical ball for 2 kilos, with the arms extended behind the head to the farthest point and facing the coach at a distance of 3 metres.	A3
The torso is tilted back and the arm is stretched back as well, then pull and rise in a movement similar to the technical performance and then go back, and repeat the exercise	Sitting on a bench and the first part of the rubber rope is tied around the chest and the other end is tied to a fixed object in front at the level of the chest	A4

	and a weight is held by the palm of the throwing arm. The weight is 1	

Supplement (2)

Form for Training Unit No. (17) Month: Second
Week (6) The location of the training unit: Athletics Training Center

Date: March 23, 2022 Total Time: 35 d

total time	Rest between groups	totals	repetitions	intensity	N
690	2_3	2	5	90%	A1
630	2_3	2	5	90%	A2
580	2_3	2	5	90%	A3
530	2_3	2	5	90%	A4