



The effect of weight training on muscles using Muscle and Motion applications on some types of strength for advanced boxers

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Abstract

The research aimed to identify the effect of using weight training for the working muscles using Muscle and Motion applications in some types of strength for advanced boxers, and the researchers used the experimental method by designing the control and experimental groups on a sample of (18) boxers who were divided equally into two control and experimental groups, and the researchers used the Muscle and motion applications, which consist of two applications: the Anatomy application, which is specific to identifying the working muscles in training and dissecting them, and the Strength Training application, a special application for strength training. After applying the training method for (8) weeks at a rate of (3) training units per week, the results showed statistically significant differences between the results of the post-tests of the experimental and control research sample, and the researchers attributed the superiority of the experimental group to the use of the Muscle and motion application

Keywords: application, boxing, strength, weights.

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Introduction:

Strength is the basis of motor performance. Movement does not occur unless there is strength, and the source of strength in humans is muscles, its contraction and expansion lead to movement, Muscle training is the activation of the components responsible for contraction within the muscle fibers. And strength training aims to develop the muscles that are in turn responsible for all kinds of movement. Therefore, strength training and development can only be achieved by applying resistances appropriate to the level of the targeted muscles, meaning that these resistances must be standardized and studied scientifically in order to have a positive impact on them.

Boxing is a sport that requires exceptional efforts, and that the player should be physically prepared, this requires the development of appropriate training curricula that target the working muscles, whether weak or strong in the boxer, and that the curriculum be studied and standardized in a way that is consistent with the goal of training in order to achieve the best results. Modern concepts in sports training, including the concept of using modern technology in training, constitute an inevitable matter imposed by the nature of the era in which we live, as modern technology has entered every aspect of life, leading to major changes in the lifestyle. The researchers believe that competition between countries is no longer limited to raw materials and talents - despite their great importance in the results - but has expanded to include technological capabilities in all their branches.

On the other hand, one of the modern trends in training is training the working muscles that contribute to performance, whether in the center of the body, especially the muscles of the shoulder girdle, pelvis, lower back and abdomen, or the muscles involved in motor performance, as these muscle groups form the basis on which sports exercises are based on and the basis that the athletes use to battle large training loads during preparation periods. (MEIER, QUEDNOW, & SEDLAK, 2015)

The responsibility for motor performance falls on the motor system, which consists of three systems linked to each other: the muscular system, the skeletal system and the nervous system. The motor action falls on the muscles, as they are the source of strength production, and the muscles are connected to the skeletal system by tendons to form levers that partially or completely move the body, and the functions of the muscles differ in movement, as the muscle or muscle group can be the main muscle in the motor action, in which case they are called the working muscles, or they can be muscles that contribute partially to supporting the movement, in which case they are called the supporting muscles.

The aim of the research was to identify the effect of using weight training for working muscles using Muscle and Motion applications on some types of strength for advanced boxers. Since the researchers are former boxers, they noticed that the training they had previously undergone, whether in their club or the national team, did not focus much on training working muscles. In addition, through their review of the training of current teams and clubs, they found that this problem is a common problem within the local boxing community. Most of the training represents general strength training such as push-ups, pull-ups and throws and does not aim to develop working muscles with appropriate repetitions. The main goal of working muscle training is to develop those muscles that perform a mechanical action, which in turn leads to correct and productive performance. Most of the common training in general muscle training is using body mass, while special training is focused on training with special boxing equipment such as punching bags of different weights and sizes. This made the boxers use their own strength in punching performance without increasing it, meaning that they use their own strength reserve in performing skills and in tactical performance. In other words, there is a missing stage in training, which is the stage of targeting the development of the working muscles and increasing their strength output by applying external resistance and with repetitions and intensities calculated precisely according to the literature of sports training science. This procedure, according to the researchers, will increase the specific output of performance in terms of strength.

Many researchers have studied the training of working muscles. The study titled “A training program to achieve balance in the muscle strength of the flexor and extensor muscles of the elbow joint in boxers and its effect on the speed of performing straight punches” (Zakariya, 2010) aimed to develop the speed of performing straight punches by designing a 12-week training program that works to achieve balance in the muscle strength of the flexor and extensor muscles of the elbow joint and to know the effect of this on the speed of the reaction movement and the speed of the basic movement of straight punches and thus the total time of performing straight punches. As for the study titled the influence of exercises using weights in developing the distinctive power of speed and the side punch for young boxing players , (Rami, 2013) it aimed to prepare weight exercises and know their effect on developing the distinctive power of speed and the side punch for young boxing players. The exercises were used on the experimental group over a period of 10 weeks at a rate of three training units per week. The study entitled “The effect of special exercises in developing explosive power and straight punches for junior boxers” (Muneer, 2020) aimed to improve the boxers’ motor paths, control performance well, isolate the internal muscle movements and contractions that affect the boxer’s performance and abilities during training units and official matches, achieve good results, and match the result with the plan and planning.

The study entitled “The effect of using battle ropes in increasing the number of single, double, and compound punches for advanced boxers”. (Nasser & Ahmed, 2022).

The aim of the research was to identify the effect of battle rope exercises with wave and whip movements on increasing the number of punches of all types (single - pair - compound). The study, entitled "Using Information Technology in Building a Proposed Technical Administrative Training System in Boxing", aimed to build a computer system that includes a set of features, including the possibility of building integrated training curricula to develop boxers. In another study, the effect of exercises using weights in developing the distinctive power of speed and the side punch for young boxing players was discussed. The researchers concluded that the exercises used with weights showed a positive effect in developing the distinctive power of speed and the technical performance of the side punches (left and right) in boxing. (Naser, 2012)

Method and tools:

Research methodology: The researchers used the experimental method by designing the control and experimental groups to suit the nature of the research. Research community and sample: The research community consisted of advanced players from Baghdad clubs, numbering (106) boxers, selected from the boxers of the Iraqi Airways Club, numbering (22) boxers. The researchers were keen to select the sample from advanced players qualified to participate in the Iraqi championships, numbering (18) boxers, with an average age of (23) years (± 2.222), and an average training age of (7.388) (± 1.195). They were divided equally into two groups, control and experimental. The researchers took care to distribute the weights for each group equally.

Research tests

- 1 kg medicine ball throwing test with the back arm always.
- Broad jump test from a standstill.
- Arms speed strength test for 15 seconds.
- Legs speed strength test for 15 seconds.
- Trunk speed strength test: Raising the trunk from a supine position for (15) seconds with the hips fixed on the ground.

Applications used in the research.

- Anatomy: An application for identifying the muscles working in training and their dissection.
- Strength Training: An application for exercises and strength training.

It is one of the global applications that are used in most universities in the world, such as Seattle University, the University of Southern California, the University of Arizona, the University of Utah, and Hartford University, (Muscle and Motion, 2024) which indicates that it enjoys high reliability. This application is a website uploaded to the World Wide Web consisting of three separate applications as websites and connected in terms of content, which are:

The researchers used the Anatomy application to identify the muscles working in boxing skills, and using the Strength Training application, the researchers reached the developed exercises for each muscle according to the required movement path, as we notice that the application gives us many options, as after identifying the working muscles, the researchers used the section for exercises according to body parts (Exercises) and then went to the (By Model) section to choose the body part to show its exercises.



Figure (1) Strength Training Application

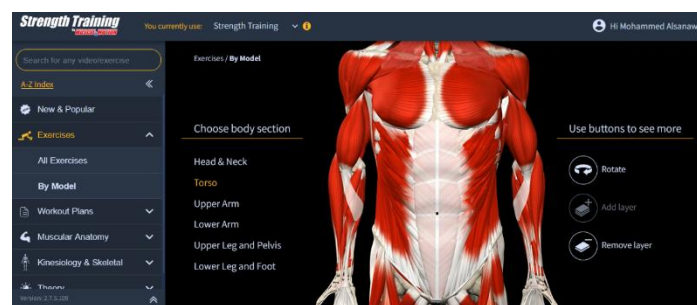


Figure (2) Strength Training - Exercises Application

After selecting the required part from the following list:

Tordo: trunk and central muscles.

Upper Arm: upper part of the upper limbs.

Lower Arm: lower part of the upper limbs.

Upper Leg and pelvis: upper part of the lower limbs and hip.

Upper Leg and Foot: lower part of the lower limbs and feet.

By referring to the required muscle, the application displays the appropriate exercises for this muscle.

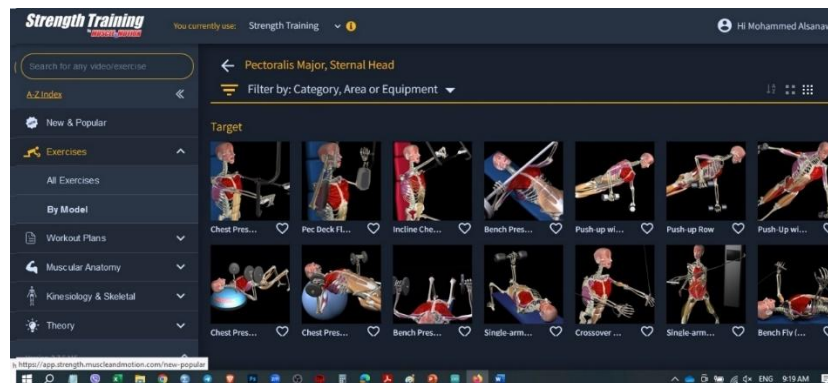


Figure (3) Strength Training - Exercises - By Model Application

Rationing in the sports training load represents the basis on which training is based, as rationing is the process of organizing training according to its limits in intensity, volume and rest periods. The researcher relied on a period of (12) training weeks at a rate of (3) training units per week, and the number of training units reached (36) training units as it is consistent with the studies that addressed this aspect in boxing fitness as in the study (Rønnestad & Others, 2012), (Dick, 2014, p. 315), (Krčmarová, 2018) and (Elliott KJ, 2002).

Through the Muscle and motion application in the experimental curricula section, the researchers applied the training curriculum for the selected working muscles, and the researchers used the gradation of training intensity.

After conducting the pre-tests, and recording the highest achievement (the maximum weight that the tester can lift once) for each individual of the three groups, this measurement represents (100%) of the highest achievement. The intensity of the load (the weight lifted) for each exercise was determined through the following equation:
$$\text{Intensity} = \frac{\text{the athlete's highest achievement} \times \text{the selected intensity}}{100}$$

Research results

Table (1)

Results of the arithmetic mean and standard deviation for the pre- and post-tests for the control group in the research tests

Test	Pre Test		Post Test	
	Mean	Std. Deviation	Mean	Std. Deviation
1 kg medicine ball throwing test with the back arm always -left	8.39	1.10	9.62	0.55
1 kg medicine ball throwing test with the back arm always- right	9.94	1.11	11.28	1.37
jump test from a standstill	1.93	0.07	2.04	0.13
Arms speed strength test for 15 seconds	19.33	1.80	21.56	1.51
Legs speed strength test for 15 seconds	13.44	1.24	15.33	2.00
Trunk speed strength test for 15 seconds	13.11	1.76	15.44	1.33

Table (2)

Test results of the differences test between the pre- and post-tests of the control group in the research tests

Test	Paired Differences		t-test	Sig.
	Mean	Std. Error		
1 kg medicine ball throwing test with the back arm always -left	1.23	0.47	2.59	0.03
1 kg medicine ball throwing test with the back arm always- right	1.33	0.53	2.52	0.04
jump test from a standstill	0.11	0.05	2.44	0.04
Arms speed strength test for 15 seconds	2.22	0.89	2.49	0.04
Legs speed strength test for 15 seconds	1.89	0.65	2.88	0.02
Trunk speed strength test for 15 seconds	2.33	0.62	3.74	0.01

Table (3)

Results of arithmetic mean and standard deviation for pre-tests And the post-test for the experimental group in the research tests

Test	Pre Test		Post Test	
	Mean	Std. Deviation	Mean	Std. Deviation
1 kg medicine ball throwing test with the back arm always -left	8.13	1.14	9.82	0.49
1 kg medicine ball throwing test with the back arm always- right	10.44	1.66	12.59	1.14
jump test from a standstill	2.01	0.23	2.27	0.28
Arms speed strength test for 15 seconds	20.22	3.46	23.56	2.46
Legs speed strength test for 15 seconds	13.89	0.93	17.22	1.48
Trunk speed strength test for 15 seconds	14.22	2.05	16.67	0.71

Table (4)

T-Test differences test between the pre- and post-tests of the experimental group

Test	Paired Differences		t-test	Sig.
	Mean	Std. Error		
1 kg medicine ball throwing test with the back arm always -left	1.69	0.46	3.67	0.01
1 kg medicine ball throwing test with the back arm always- right	2.15	0.26	8.21	0.00
jump test from a standstill	0.27	0.11	2.41	0.04
Arms speed strength test for 15 seconds	3.33	0.96	3.48	0.01
Legs speed strength test for 15 seconds	3.33	0.37	8.94	0.00
Trunk speed strength test for 15 seconds	2.44	0.71	3.45	0.01

Table (5)

T-Test differences test between the pre- and post-tests of the experimental group in the research tests .

Test	Pre Test		Post Test		t-Test	Sig.
	Mean	Std. Deviation	Mean	Std. Deviation		
1 kg medicine ball throwing test with the back arm always -left	9.62	0.55	9.82	0.49	2.57	0.02
1 kg medicine ball throwing test with the back arm always- right	11.28	1.37	12.59	1.14	2.46	0.03
jump test from a standstill	2.04	0.13	2.27	0.28	2.46	0.03
Arms speed strength test for 15 seconds	21.56	1.51	23.56	2.46	3.37	0.00
Legs speed strength test for 15 seconds	15.33	2.00	17.22	1.48	2.73	0.01
Trunk speed strength test for 15 seconds	15.44	1.33	16.67	0.71	2.42	0.03

Discussion

The researchers used the SPSS statistical package to extract the results of the independent sample differences test. Table (2) shows the results of the t-Test differences test between the pre- and post-tests of the control research sample. In the research tests, we note that all the true significance values were less than the significance level of (0.05) and below the degree of freedom of (8). The researchers attribute this to the fact that the coach of the Iraqi Airways Club team is one of the high-level coaches and holds the highest international training certificate from the International Boxing Association (IBA), and has practical and scientific experience and knowledge, and that the approach followed in the club was prepared in a sound scientific manner. In addition, the club's training is subject to the principle of continuity, and "this principle is one of the most important principles that positively affect physical, functional and skill capabilities. (Shahata, 2006, p. 125) This is consistent with a study (Ogasawara, Yasuda, Sakamaki, Ozaki, & Abe, 2011) that indicated that the use of continuous strength training without interruption has a great positive return regardless of the type of training used, provided that it is subject to the correct training standards. Therefore, the continuity of training for this group without interruption and for long periods has achieved the availability of a broad base Of the capabilities, each of which affects the other, to have a comprehensive development, and it represents the main goal that the athlete needs for integration and moving towards a high level, as the principle of continuity in training represents one of the most influential features of modern sports training, as he indicated, he stated that "one of the basic principles in sports training is that the player continues training throughout the year without interruption, with the organization of his transition period from one year to another." (Alambaki, 2010, p. 67)

Through Table (4) which shows the results of the t-Test differences test between the pre- and post-tests of the experimental research sample, we note that all the true significance values were less than the significance level of (0.05) and below the degree of freedom (8), which indicates the existence of statistically significant differences between the pre- and post-test of the experimental research sample in the research tests. (Kadhim, 2024b)

Here, the researchers point out that the members of the experimental group were subjected to the same principle of continuity that the control group was subjected to, as they were from the same team, and had the same solid basic base of abilities that were built through continuous training without stopping, in addition to that, the use of weights according to the Muscle and Motion application, which had a positive effect on abilities, in addition to that, the exercises in this application are standardized according to the correct scientific conditions, as it is not possible to call unorganized



exercises scientifically an external load, but rather the term external load is applied to correct exercises. (Albashtawee & Alkhawaga, 2005, p. 58).

The researchers believe that one of the well-known characteristics of boxing is that the punch is not only performed with force, but the force must also be with a high degree of explosive force, and that performing punches with explosive force is nothing but a reflection of the amount of force that the boxer possesses. On the other hand, the boxer also needs strength in defensive skills in blocking the opponent's strong punches, and he also needs a kind of special strength in engagement and cohesion. Accordingly, the development that occurred among the individuals of the research sample in the post-tests was due to the use of weight exercises according to the Muscle and Motion application. (Salman et al., 2022) On another important note, the researchers attribute the results of the experimental group to the fact that the exercises were directed at targeting the working muscles, which are actually used in the game of boxing, as the use of the Muscle and Motion application, which produced the working muscles and their training directions, and the adoption of this in building the training curriculum, the weight exercises used targeted the muscles of the shoulder, hands and chest, in addition to the central muscles and leg muscles, and this combination of exercises together represents the true meaning of specialized training. Core Muscles Training also achieved stability in the center of the boxer's body. This stability and steadiness achieved in the front and back trunk muscles and other muscles associated with the center of the body contributed to increasing the ability to control the body's position in performance (Kadhim, 2024a) He believes that the stability of the trunk at the top of the pelvis and control of movement in it gives a better opportunity to produce greater strength in the rest of the muscle groups, as all the limb muscles are directly connected to the center of the body in some muscles and indirectly in other muscles, and allows control and control of movement in the final part in performing sports skills. This study also indicated that strength in the center of the body and trunk helps increase the level of control in the muscles surrounding the spine in the lumbar part, which gives stability and steadiness. (Kadhim, 2024a)

The researchers attribute the development in the researched capabilities to the fact that the researchers followed two important training principles: the principle of overload and the principle of increasing resistance. The researchers believe that these two principles represent the basis for developing muscle strength in addition to other principles. This is consistent with studies that have confirmed the use of a load greater than the muscle's capacity by certain percentages to ensure development, (Suchomel, McKeever, & Comfort, 2020) و (Fiorilli, Mariano, & Iuliano, 2020) in addition to the gradual increase in load according to the increase in strength achieved as a result of training. They are the basis on which muscle strength training is based.



The researchers attribute the results achieved for the experimental group to the fact that the researchers took into account adjusting the weights of the weights every two weeks of the application period, **Invalid source specified.** and since it is possible for a noticeable development in muscle strength to occur after 2-4 weeks of training, Matveyev is quoted as saying that the percentage of improvement in strength exceeds 20% or more in the first weeks, so that the improvement can rise to more than 50% during the first eight weeks of the training program.

It works to narrow the gap between speed and muscle strength. Moreover, these exercises employ the force of gravity to store energy in the muscles and then convert this stored energy into kinetic energy. The benefit of them lies in the fact that they require (strength-speed) which has the ability to implement maximum force in the shortest possible time. Another factor that helped in developing the elements of physical fitness for the experimental research sample is the increase in the rate of transmission of nerve impulses to the working muscles, causing rapid and strong voluntary muscle contraction resulting from the intensity of weight training.



References

- Alambaki, M. J. (2010). *Sports Training and Future Prospects*. Baghdad: Office of Creativity.
- Albashtawee, M. H., & Alkhawaga, A. I. (2005). *Principles of Sports Training*. Amman: Dar Wael for Publishing.
- Dick, F. (2014). *Sports training principles* (6th ed.). London: Bloomsbury Publishing.
- Elliott KJ, S. C. (2002). Effects of resistance training and detraining on muscle strength and blood lipid profiles in postmenopausal women. *Journal of Sports Medicine*, 33(2).
- Fiorilli, G., Mariano, I., & Iuliano, E. (2020). Isoinertial eccentric-overload training in young soccer players: Effects on strength, sprint, change of direction, agility and soccer shooting precision. *ournal of sports science & medicine*, 19(1).
- Kadhim, M. J. (2024). Digital Literacy and Its Importance in the Modern Workforce. *International Journal of Social Trends*, 2(2), 44–50.
- Kadhim, M. J. (2024a). Digital Literacy and Its Importance in the Modern Workforce. *International Journal of Social Trends*, 2(2), 44–50.
- Kadhim, M. J. (2024b). Social Networks' Place in Contemporary Political Movements. *International Journal of Social Trends*, 2(2), 51–59.
- Salman, S. M., Kadhim, M. J., & Shihab, G. M. (2022). The effect of special exercises in the rehabilitation of the shoulder muscle for the youth wrestling category. *INTERNATIONAL JOURNAL OF EARLY CHILDHOOD SPECIAL EDUCATION*, 14(5), 4606–4609. <https://doi.org/10.9756/INTJECSE/V14I5.555>
- Krčmárová, B. (2018). The effects of 12-week progressive strength training on strength, functional capacity, metabolic biomarkers, and serum hormone concentrations in healthy older women: morning versus evening training. *Chronobiology International*, 35(6), 1-13.
- MEIER, J., QUEDNOW, J., & SEDLAK, T. (2015). The Effects of High Intensity Interval-Based Kettlebells and Battle Rope Training on Grip Strength and Body Composition in College-Aged Adults. *International Journal of Exercise Science*, 8(3), 124-133.
- Muneer, F. (2020). The Effect of Specialized Exercises on Developing Explosive Strength and Straight Punches for Junior Boxers. *Journal of Sports Sciences*.
- Muscle and Motion. (2024, february 21). *The Anatomy & Biomechanics of Movement*. Retrieved from muscleandmotion: <https://www.muscleandmotion.com/>



- Naser, A. J. (2012). The Use of Information Technology in Developing a Proposed Administrative, Technical, and Training System in Boxing / PhD Dissertation. *University of Baghdad - Faculty of Physical Education*.
- Nasser, A., & Ahmed, D. (2022). The effect of battle rope exercises on increasing the number of single, double and multiple punches in elite boxing. *Ibero-American Journal of Exercise and Sports Psychology*, 17(5).
- Ogasawara, R., Yasuda, T., Sakamaki, M., Ozaki, H., & Abe, T. (2011). Effects of periodic and continued resistance training on muscle CSA and strength in previously untrained men. *Clinical physiology and functional imaging*, 31(5), 399-404. doi:<https://doi.org/10.1111/j.1475-097X.2011.01031.x>
- Rami, A. (2013). The Effect of Weight Training Exercises on Developing Speed-Strength and Side Punch Performance in Young Boxing Athletes. *University of Thi-Qar, Faculty of Physical Education*.
- Rønnestad, B., & Others. (2012). Effects of 12 weeks of block periodization on performance and performance indices in well-trained cyclists. *Journal of Medicine and Science in Sports*, 24(2).
- Shahata, M. I. (2006). *Basics of sport training*. Aliskandariya: Ejeption lb.
- Suchomel, T., McKeever, S., & Comfort, P. (2020). Training with weightlifting derivatives: The effects of force and velocity overload stimuli. *The Journal of Strength & Conditioning Research*, 34(7), 1808-1818.
- Zakariya, M. (2010). A training program to achieve balance in the muscular strength of the flexor and extensor muscles of the elbow joint for boxers and its impact on the speed of straight punches. *Faculty of Physical Education, Tanta University*.