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VARIATION IN THE METHODS OF ELONGATING THE MUSCLES OF THE ARMS AND THEIR EFFECT ON SOME PHYSIOLOGICAL INDICATORS AND THE COMPLETION TIME OF A 100-METER FREESTYLE SWIM.

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Abstract

The study aimed to identify the effect of variation of diversification by methods of elongation of the muscles of the arms in some physiological indicators represented by the electric muscles of some arm muscles and the time of completion of swimming (100) meters freestyle, and adopted the experimental approach by designing the same group of swimmers of the Iraqi youth team for the distance (100) meters free for the sports seasonal (2020-2021) of 12 swimmers, all of whom were deliberately selected from their community of origin (100%), in measuring achievement adopted an electronic stopwatch and to measure physiological variables adopted by (EMG) using two pickups of it For each right and left muscle of the arm muscles to read both the top and the electric signal area of each muscle in each distance (50) and (100) meters from the distance of this race, the experimentation in contrast was by codifying the training load of young swimmers by remaining difficult training between (90%-100%), and the variation in the independent variable by diversifying the two methods and their different application to be crowned by the training load from one unit to the other, and by determining the times of inter-comfort between repetitions and groups for muscle elongation exercises of the arms between Repeats (15-45) seconds, And between groups of (90-120) seconds, and between exercises of (5-10) minutes and this contrast allows the recovery of energy sources between one exercise and another after pressure to break the rule of (2-5) minutes, and after the completion of the experiment the researcher checked the results with a system (SPSS) to be extracts and applications that because of the variation of diversification by methods of stretching the muscles of the swimmers muscles (100) free effects in the physiology of electrical signals for neuromuscular control, to reflect positively on reducing the time of completion of their swimming to this distance, it is necessary to support Knowledge of swimming instructors (100) freestyle about the importance of varying diversification by methods of stretching the muscles of the arms, to depart from the limitations imposed by the exercises within the first energy system.

Keywords: Muscle elongation, physiological indicators, swimming achievement (100) freestyle meters.
2021 年的运动季节（2020-2021年）免费设计同一组伊拉克青年队游泳运动员的实验方法，所有运动员均从其原籍社区（100%）中特意选择。在测量成绩时采用了电子秒表并使用它的两个拾音器测量（EMG）采用的生理变量对于手臂肌肉的每个左右肌肉读取每个距离每个肌肉的顶部和电信号区域（距离本次比赛的距离为50）和（100）米，相比之下，实验是通过在（90%-100%）之间进行困难训练来编纂年轻游泳运动员的训练负荷，以及通过使两种方法及其不同应用多样化，以通过从一个单元到另一个单元的训练负荷，并通过确定重复和组之间的相互舒适时间来确定自变量的变化，以进行肌肉伸展运动手臂在重复（15-45）秒之间，在（90-120）秒的组之间，在（5-10）分钟的练习之间，这种对比允许在一个练习和另一个练习之间恢复能量来源，以打破压力（2-5）分钟的规则。在实验完成后，研究人员用一个系统（SPSS）检查结果，作为提取和应用程序，由于游泳者肌肉拉伸方法的多样化变化肌肉（100）在用于神经肌肉控制的电信号生理学中的自由效应，为了积极反映减少游泳到这个距离的时间，有必要支持游泳教练（100）自由泳的知识，了解通过伸展手臂肌肉的方法进行多样化的重要性，以摆脱第一能量系统内练习所施加的限制。

**关键词：肌肉伸长，生理指标，游泳成绩（100）自由泳米数。**

**The problem and importance of research:**
Swimming instructors aspire to the International Olympics and have many ways and means to search for, plan and implement data on swimmers' characteristics, thereby looking out of the ordinary by taking into account the physiological characteristics of muscle strengthening exercises, especially since swimming (100) Free depends on the maximum speed determined by genetic determinants, which take two directions either to improve the efficiency of automatic contractions by affecting neural control that increases the length and frequency of the strike, or the second direction in the effect of metabolism on muscle force upgrade and its effect on velocity improvements in these directions, where muscle strength is determined. "It is the ability to overcome or counter external resistance, as defined as the maximum strength the muscle can perform in the maximum contraction of the individual muscle, and there are three types of muscle strength that are the maximum strength, the force that characterizes speed and force tolerance. "(Sid, 2019) also suggests that" power is greater if force is used for a relatively long distance or if force is used for a short period of time or both, sport depends more on capacity than power. "(Marwan and Mohammed, 2004). "Training results in physiological changes involving body organs, and the level of athletic performance progresses because these changes are positive for the physiological adaptation of body organs and hence physical pregnancy." (Safety, 2018) "Diversity in giving a single exercise - avoiding intellectual confusion and increased willingness to train, and experience in the diversity of athletic performance, the player also gains various
physical qualities and abilities. The function of the nervous system is to stimulate different biomarkers in the body to continue their work, and in the case of continuous stimulation the motor activity of the organism increases "(Walgurbi Valley, 2005). (Amount of fiber-muscle involved in the performance - Type of muscle fibers involved in performance, angle of muscle strength production - Length and condition of muscles before contraction - and length of time involved in muscle contraction The degree of muscle compatibility involved in the performance - the emotional state of an individual athlete before and during the production of muscle strength - other factors such as age, sex, and warm-up. " HAMMAD, 2001), "Trainers invest repetitive movements as repeats that strengthen brain stimulation processes and increase the level of excitement." As the neurological signal in the muscle is strengthened by the effect of physical exercise on the efficiency of the motor system, the movement centers in the cerebral cortex are alerted and emotional centers are discouraged. "(Tulane et al., 2012) and that "musculoskeletal dilation of important qualities in events that require a wide mobility to perform athletic skills and the availability of this trait ensures that skilled performance is highly successful."(almudamagha, 2008) Also, "Many other models of this method of muscle elasticity training have been introduced, including an Elongation training methods, which is the training of the pleometric exercise, which the muscle can accomplish down to its maximum strength in the shortest possible time as the muscle passes through two phases, the first is decentralized (lengthening) followed by a central action (shortening)," (Baechle & Earle, 2000) Experiments and studies have also provided another model to develop muscle elongation, which is Ballistic Training. "During this type of performance in balsti exercises, the force is produced very effectively against the resistance and from the beginning to the end of the movement, and as a result of this productive force, the distance of the instrument (resistance) is proportional to the amount of muscle capacity produced. (William & Keijo, 2006) And no differences on these methods, which have proved successful in several experiments, but the focus of the debate is that the anaerobic system imposes the high intensity of the training load to bring out muscle capacity with the strength of water resistance and swimming speed to suit breaking numbers in a swim. (100) m freestyle, and get rid of the restrictions imposed by training at the same pace, as "muscle capacity lies in the potential for force generation, and individuals vary among themselves in force production due to the following factors: (motor units and muscle size), (angle of the joint), (muscle length), (speed of action) (Saad Eddin, 2000). and the Stress, whatever its sources, will strain receptors and sensations associated with the nervous system and negative effects occur in the activity of the central nervous system."(Hassan, 2009) and that "the load given to the player causes a functional and chemical arousal and change in the body's vital organs and devices, which is shown in the form of an improvement in the adequacy of the various organs and devices, as well as an economy of effort as a result of the continued performance of the load despite the onset of a feeling of fatigue, and thus begins to adapt whit this load."(Abu Zayd, 2007), and "the continuation of the same intensity used preserves and does not develop the adaptations acquired. This where the need for training is demonstrated by a new and appropriate overload and this
increase in training loads is an honest example of achieving the principle of progressive progress." (Alqt, 1999) "In burst strength and speed-strength exercises, trainers work to reach the muscles for maximum strength according to the (istinalk) physicist's law, which is concerned with the generation of airway and force whose application is that the more a muscle elongates after shortening the more it is able to The output of greater muscle power.” (Al-Nasri, 2009) “Skeletal muscle contracts in response to a nerve signal from the motor neuron and does not respond directly under the influence of hormones, unlike cardiac muscle and smooth muscle.” (Sajt and Ali). (2017) Functional anatomy indicates that “muscle fibers are almost all innervated by only one nerve end located near the middle of each muscle fiber, the specialized nerve connection that separates the nerve from the muscle cell membranes called the motor end plate or (motor unit) that comes from the end of the nerve A substance (acetylcholine) to the muscle that begins to contract, and the blood vessels are generally directed parallel to the muscle fibers and the numerous capillaries passing through the spaces between individual muscle fibers, the blood vessels in the muscle may contract or expand under internal, hormonal and nervous control to regulate the blood flow, but During a dynamic exercise, the blood flow may increase up to 100 times relative to its resting muscle flow.” (Hallab et al., 2000) Thus, the time of muscle elongation allows a very effective systolic response time to produce a rapid force “After the electrical and chemical processes of muscle movement, these muscles move the bones according to the theory of lever or levers and light movement of a muscle attached to one of the ends of the bone can be performed To a much greater movement at the other end of the bone, movement of muscle force to the bone mediated by tendons and some of these long tendons for example, some finger movement muscles are located in the forearm and are connected to the finger by tendons (20-25 cm), when calcium and ATP are available in amounts sufficient, the filaments interact to form actomyosin and are limited to slipping on each other, and if the electrical signal passes effectively along the sarcolemma and below, the calcium pump releases calcium from the sarcoplasmic network to the sarcoplasm, and then works later to activate and contract the filaments row, this excitation begins with the arrival of Nerve stimulation in the muscular membrane mediated by the motor end plate (motor unit)” (Michael & Ronald, 2001). Digital to achieve swimmers (100) meters freestyle, which is the problem of this research, which aims, through experiment, to identify the effect of differential diversification in the ways of elongating the muscles of the arms on some physiological indicators represented by electricity for some muscles of the arms. And the time to complete swimming (100) meters free, the researcher assumes that the diversity of methods of tightening the muscles of the arms has a positive effect on some physiological indicators represented in the electricity of some of the arm muscles and the time of completion of swimming (100) meters freestyle in the research sample.

**Research approach:** Based on the data for finding solutions to the problem of this research, the researcher adopted the experimental approach, which is defined as "the approach in which we treat and control an independent variable to see its impact on a Continued variable, noting and interpreting the resulting changes, whether the experience involves an
independent variable, a dependent variable, more than one independent variable or more than one child variable." (Al-Mahdi, 2019) with a one-set experimental design with tribal and remote test settings.

**The research community and its sample:** The boundaries of the research community were the 12 swimmers of the Iraqi youth team (100) freestyle ready to participate in the external races for the sports season. (2020-2021) of 12 swimmers aged (15-17) in the year AD, all of whom were deliberately selected from their community of origin by 100%, because they are the society of the phenomenon researched in the problem of research themselves.

**Measurement, tests, and research procedures:**
In measuring achievement adopted an electronic stopwatch and to measure physiological variables, the researcher adopted a Device (EMG), an American-made (Myo trace 400) with Bluetooth by using two pumpkins of it for each right and left muscle of the arm muscles to obtain results EMG signal and analysis with (Myo Research XP 1.06.67) stored with a portable computer to read both the top and the electric signal space, as after synchronizing between a (SONY) digital camera does not increase quickly (75 images seconds). In this measurement, EMG is referred to by both muscles at a distance of (50) and (100) meters of a swimming race (100) meters free through two EMG systems, each placed in front of the specified distance. With a swimmer's in parallel at a depth of (5) cm from the surface of the legal pool water dimensions, the experimentation in contrast by codifying the training load of young swimmers with the remaining training difficulty between (90%-100%), and the variation in the independent variable in this research is to diversify For two methods and different applications in the training units to be crowned by the training load between one unit and another, by determining the time of inter-rest between repetitions and groups for muscle elongation exercises of the arms within the training unit, reaching between repetitions (15-45) seconds and between groups of (90-120) seconds, and exercises from (5-10) minutes) and this contrast allows the recovery of energy sources between exercise and after pressure in Between carrying one exercise in the training unit to break a rule of (2-5) minutes, and it does not violate the physiological rules considering that the palium and ballistic training is applied with a highly difficult training stress varying and it needs to restore muscle cells the ability to control contractions in the movements of these two methods that have been controlled for the internal safety of the experimental design in a way that goes hand in hand in The training unit itself to be a single independent variable, as "to ensure the advancement of the player's physical and functional abilities, it is necessary to take care of the inter-pregnancy breaks when repeating the training load so that the next pregnancy falls into the stage of increased recovery, as at this stage the stores of phosphate and glycogen are renovated with muscles, and the myoglobin is filled with oxygen as well as lactic acid is eliminated in muscles and blood, so each trainer had to adjust the inter-comfort periods between each repetition of the training campaign and between each repetition of the training campaigns. Every other training." (Salama, 1999), after the completion of the experimentation by tribal measurement, application, and telemetry, the researcher verified the results with the (SPSS) version (V26), to calculate both the percentage values, the computational medium, the standard
deviation, and the t-test of the interconnected samples.

Search results and discussion:

Table (1) showing the results of tribal tests

<table>
<thead>
<tr>
<th>Ass.</th>
<th>(Sig)</th>
<th>Leven</th>
<th>N</th>
<th>EMG</th>
<th>The tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.S</td>
<td>0.733</td>
<td>0.055</td>
<td>12</td>
<td>summit</td>
<td>right brachialis muscle</td>
</tr>
<tr>
<td>N.S</td>
<td>0.233</td>
<td>0.361</td>
<td>12</td>
<td>space</td>
<td></td>
</tr>
<tr>
<td>N.S</td>
<td>0.099</td>
<td>0.710</td>
<td>12</td>
<td>summit</td>
<td>left brachialis muscle</td>
</tr>
<tr>
<td>N.S</td>
<td>0.696</td>
<td>0.078</td>
<td>12</td>
<td>space</td>
<td></td>
</tr>
<tr>
<td>N.S</td>
<td>0.629</td>
<td>0.039</td>
<td>12</td>
<td>summit</td>
<td>right brachialis muscle</td>
</tr>
<tr>
<td>N.S</td>
<td>0.899</td>
<td>0.018</td>
<td>12</td>
<td>space</td>
<td></td>
</tr>
<tr>
<td>N.S</td>
<td>0.369</td>
<td>0.233</td>
<td>12</td>
<td>summit</td>
<td>left brachialis muscle</td>
</tr>
<tr>
<td>N.S</td>
<td>0.515</td>
<td>0.089</td>
<td>12</td>
<td>space</td>
<td></td>
</tr>
<tr>
<td>N.S</td>
<td>0.177</td>
<td>0.429</td>
<td>12</td>
<td>Completion of a 100-meter freestyle swim</td>
<td></td>
</tr>
</tbody>
</table>

• Significance level = 0.05; t-test value is significant at p-value ≤ 0.05

Table (2) shows the results of the pre and post tests

<table>
<thead>
<tr>
<th>Ass.</th>
<th>(Sig)</th>
<th>(it)</th>
<th>Std. Error</th>
<th>Mean Differences</th>
<th>Posttest</th>
<th>Pretest</th>
<th>EMG</th>
<th>The tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Man.</td>
<td></td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SD +</td>
<td></td>
<td>Mean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>0.000</td>
<td>7.67</td>
<td>26.009</td>
<td>57.583</td>
<td>10.773</td>
<td>610.33</td>
<td>33.77</td>
<td>552.75</td>
</tr>
<tr>
<td>S</td>
<td>0.000</td>
<td>5.992</td>
<td>1.975</td>
<td>3.417</td>
<td>4.239</td>
<td>76.83</td>
<td>3.817</td>
<td>80.25</td>
</tr>
<tr>
<td>S</td>
<td>0.000</td>
<td>11.022</td>
<td>31.377</td>
<td>99.833</td>
<td>25.914</td>
<td>649.92</td>
<td>34.595</td>
<td>550.08</td>
</tr>
<tr>
<td>S</td>
<td>0.000</td>
<td>13.895</td>
<td>3.49</td>
<td>14</td>
<td>5.41</td>
<td>67</td>
<td>4.492</td>
<td>81</td>
</tr>
<tr>
<td>S</td>
<td>0.000</td>
<td>5.912</td>
<td>7.96</td>
<td>13.583</td>
<td>9.904</td>
<td>481.42</td>
<td>14.256</td>
<td>467.83</td>
</tr>
<tr>
<td>S</td>
<td>0.000</td>
<td>5.805</td>
<td>3.232</td>
<td>5.417</td>
<td>3.988</td>
<td>85.92</td>
<td>5.176</td>
<td>91.33</td>
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<tr>
<td>S</td>
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<td>6.268</td>
<td>14.784</td>
<td>26.75</td>
<td>3.167</td>
<td>496.17</td>
<td>13.365</td>
<td>469.42</td>
</tr>
</tbody>
</table>
The results of the pre- and post-comparison of the tests and measurements presented in Table (2) show that the 100-meter freestyle swimmers have improved the electrical signal variables for each of the humerus muscles by increasing the crest and decreasing the space in each of the two imaging synchronization distances, which gives meaning to the evolution in the physiology of the farkamological signals to increase for their muscle constriction after muscle elongation that allows the production of greater force, the results of which appeared clear in improving the completion time for a distance of (100) meters free swimming in the research sample. The researcher attributes the emergence of these results to the role of the modifications provided by varying exercises in restoring the muscles and nerves to their physiological sufficiency after the exercises that placed a high load on it that does not match the chemical contents and energy production to enable the muscle to invest the substance acetylene colin, which is related to contraction, due to the accumulation of metabolic products that hinder the conduct of these reactions if they take place in conditions of continuous high intensity, meaning that the size must be taken into account. Training in a manner appropriate to the possibility of maintaining systolic muscle performance for the longest period of time and efficiently, and this is what the results of this research achieved in moving away from the usual restrictions on the training unit. "The difference in the speed of fiber contraction is due to their different methods of destroying the adenosine triphosphate molecule located in the myosin heavy chain side, in order to derive the energy needed for contraction." (Lewandrowski,2000) As “when the body responds to external stimuli, complex chemical reactions and simple electrical charges occur, which travel quickly in the nerve fibers, then another nerve message is followed by another stimulus, and so on. Millions and after millions of these electrical nerve impulses are fired every second during the conscious and unconscious life of the human being, heading towards To and from the brain, muscles and glands, and as a result of the coordination and interconnection of millions of these electrical nerve messages in the cerebral cortex and the organization of the cerebellum to their impulses. (Wilmore & Costil,2007) In order to provide the results of the research an incentive for trainers to get rid of the restrictions in order to raise the level of achievement. This comes through integrating and diversifying the exercises and varying the rest times and the accompanying methods, provided that they are subject to determinants that take into account the specificity of the target group of (100) freestyle swimmers, where "It is possible to obtain the greatest efficiency for muscle work when the muscle contracts at a moderate speed, and in the case of slow contraction or without a kinetic output, large amounts of (Maintenance heat) will be lost during the contraction process despite the fact that no work or the completion of little work, thus reducing the sufficiency of muscle contraction, and the highest effectiveness is obtained when the rate of contraction reaches (30%). (Sylvia, 2001) Also, athletes who undergo structured training programs with fixed times, goals, methods, and training contents achieve better results than those who train in random ways during

| S | 0.000 | 6.974 | 4.595 | 9.25 | 4.827 | 80.25 | 5.317 | 89.5 | space | Completion of a 100-meter freestyle swim |

- df N-1 Significance level = 0.05; t-test value is significant at p-value ≤ 0.05
the time periods designated for training times and the acceptable interpretation is based on the physiological responses of each of the muscle fibers that are recruited for performance, nervous activation, and the use of energy sources. (Abd al-Zahir, 2014), as “after regular training, the player is able to instruct the main muscles to contract more, While the antagonist muscles are in a high degree of relaxation or rest, which is reflected in the amount of strength that the muscle produces, because the antagonist muscles do not exercise any Resistance (counteraction), especially in rapid muscular contractions. (Michael & Frederick, 2007) and the physiological explanation for the improvement in the electromyography of The biceps brachii muscles “the membrane effort at rest of the nerve is caused by the permeability of potassium outside the cell, which is caused by the high permeability of the membrane to potassium ions compared to sodium and the degree of potassium concentration between the inside of the cell relative to the outside of the cell.” (Saad Al-Din, 2000) Also, "the ability is greater if the force is used for a relatively long distance or if the force is used in a short period of time or both, sports games depend more on ability than on strength." (Marwan & Muhammad, 2004))

Conclusions and applications:

1- The variation in the muscular elongation methods of swimming humeral muscles (100) meters free has positive effects on the physiology of electrical signals of neuromuscular control, which are positively reflected in reducing the time of their swimming completion for this distance.

2- It is necessary to support the knowledge of the (100) meters freestyle swimming coaches about the importance of varying the diversification of the methods of elongating the muscles of the arms, to get out of the restrictions imposed by the exercises within the first energy system, and to pay attention to the physiological indicators responsible for the neuromuscular control of the humeral muscles of the swimmer (100) meters freestyle.

Sources:

7. Salama, Baha Ibrahim (2018). Applications of biochemistry and energy representation in the sports field: Cairo, Dar Al-Hekma, p. 179.