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The effect of electrical stimulation with specific frequency in improving back pain for physical strength athletes in the city of Baghdad

Mohammed Ubaid Hussein

Department of Physiology and Medical Physics, College of Medicine, Anbar University

Corresponding author email: dr.mohamed.o.hussen@uoanbar.edu.iq

Mohammed Ibrahim Younus

Department of Physiology and Medical Physics, College of Medicine, Anbar University

Ahmed Talib Yassen

Department of Physiology and Medical Physics, College of Medicine, Anbar University

Abstract---In this study, the electrical muscle stimulation device was used in the treatment of back muscle pain for a number of players with back pain in the city of Baghdad, numbering (16 injured players), this experiment took place during a period of (3 months) , two sessions per week, the time of the session .It took 15 minutes, to find out the level of pain and muscle flexibility, it was found that the device had a positive effect in reducing the level of pain and rehabilitating the back muscles, where the great role was noted in reducing the level of pain and improving the muscle flexibility of the back.

Keywords---electromyogram, muscle stimulator, back pain, pain level, flexibility.

Introduction

Muscle fibers are electrical muscles, these fibers have a resting potential within a membrane called (muscular rest potential), during activity ; the muscle fibers show action potential called (muscular action potential). The kinetic potential is a moving activity along the muscle fiber then disappears at the end of the muscle fiber, creating an magnetic field around the muscle fiber during movement called the electromagnetic field. This electromagnetic field is recorded by a galvanometer, which is shown on an electromyogram called an

Electromyogram(EMG) [1,2]. The electromagnetic field associated with a single muscle fiber is usually small, when a group of fibers or more of them work for the same muscle as a result of voluntary nerve excitation, this field becomes much larger and the process of recording it by these devices becomes easy as well [3].

Through the electrode of the needle, it records the value of the muscle electromyogram, which represents the excitatory electromagnetic field of a number of muscle fibers in that area(Motor Unit) [4]. In addition to the above, the kinetic Potential is recorded using an electrode, such as electrodes, needles, and fine wires, where the resting Potential is recorded action Potential. Inside the fiber (intracellular) or outside it by placing a surface electrode, and in both cases we can record the kinetic potential of the entire working motor unit [3,4].

When lifting a heavy weight from the ground or doing unexpected exercises, it will produce muscle effort and sprain the ligaments of the body, causing stress and sprain, it is possible that a person's lower back will be injured, in the case of the body is weak and the muscles supporting the back are also weak, also the lack of physical equivalence. It also contributes to keeping the body in a bad position and lifting weights incorrectly, weight gain and fatigue[5]. When a nerve or muscle disorder appears, such as muscle spasm, numbness, pain and muscle weakness, an electromyogram is performed.[6].

The pain that occurs in the muscle fibers causes a disturbance in the skeletal and muscular system, this pain may be accompanied by sleep disturbance, fatigue and psychological problems. Researchers believe that myofascial pain increases perception of this pain by analyzing the brain and spinal cord for types of painful and non-painful signals [3,6]. Electrical stimulation is a method for relieving chronic pain without the risk of drug interactions or side effects [3]. Electrical stimulation is most commonly used in physical therapy to help increase the strength of weak muscles. It stimulates and increases skeletal muscle forces through internal mechanical stimulation, which controls pain without significant side effects.

Flexibility means the ability of an individual to perform sports movements to the widest range permitted by the joints involved in the movement [7]. Some use the term muscular flexibility as an expression of the muscle's ability to stretch to its maximum extent, while some reject this term and prefer describing muscular flexibility with elasticity [7,8]. Some believe that it is attributed to the joints, while others believe that it is attributed to the muscles, and a third opinion believes that flexibility is attributed to the joints and muscles [9].

Flexibility is related to other physical components, such as speed and strength, as well as its connection and importance for motor performance in general, not only in the sports field, but also in the manifestations of normal daily life. Such as joint flexibility (wrist and forearm) for discus throwers , joint flexibility (knees and foot) for swimmers in addition to the hip joint for hurdlers. The electrical muscle stimulation device creates sensitivity through the skin and nerves by lightly tingling by generating a small oscillating current, this current prevents part of the pain sensation from being transmitted from the spinal cord to the brain. This current is used for painful areas several times a day for a period of time (20

minutes), and it may be several hours for each time, depending on the severity of the pain. [9,10]. EMG is possible to diagnose or exclude a number of diseases such as muscular disorder and muscle inflammation through the results of electromyography



Figure 1: Electromyography EMG[9].

Material and Methods

Muscle contraction occurs through electrical signals coming from motor neurons, these signals are translated using small electrodes into graphs, sounds, or numerical values that are interpreted. In this study, the level of pain was measured by selecting a number of players suffering from muscle spasm and pain in the lower back (16 injured players) in one of the areas of Baghdad. The experiment lasted for 3 months, with two sessions per week, each session had a period of 15 minutes. The electrical muscle stimulation device (muscle flexibility, muscle relaxation) was used to measure the level of pain and the effect of the device in treating muscle tension for injured players by relieving pain and increasing relaxation.

Results and Discussion

The results clarify the detection of any nerve defect or muscle weakness, in addition to the problems of transmitting nerve signals to the muscles, as the procedure for electromyography is to assess the health of nerve cells and muscles.

Diagnosis of pain level through electrical stimulation

The average pain level changes from (4.76) to (3.4), due to electrical stimulation, which played an important role in relieving pain in the back area, and this was found to be a difference in the two cases. As shown in Figure (2).

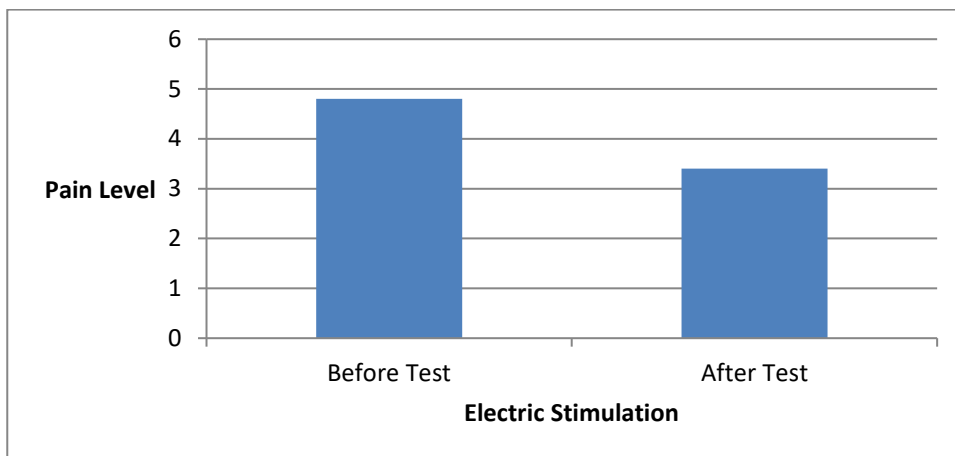


Figure 2: Change Pain Level before & after Test with Electric Stimulation.

Reducing the level of pain as a result of the effect of electrical muscle stimulation and muscle relaxation, thus reducing muscle spasm due to pressure and stress on the back such as lifted weights and high loads, which leads to difficulty in playing games and movements, especially in this area. The pain factor hinders the functional work of the muscles and the intensity of movement, and this causes muscle inflammation and impairs the work and ability of the muscles. [9,11].

Muscular flexibility as a result of electrical stimulation

In Figure (3) it is clear that the muscular flexibility of the back area on the front side changed from (38) to (48), on the back side it changed from (24) to (34). As well as in figure (4), the muscular flexibility changed from the right side from (43.5) to (47.5), from the left it changed from (46.5) to (48.5) this indicates a difference in the two cases, a clear increase and the reason is as a result of the use of electrical stimulation, which in turn helped to increase the flexibility muscles and relaxation in the back area.

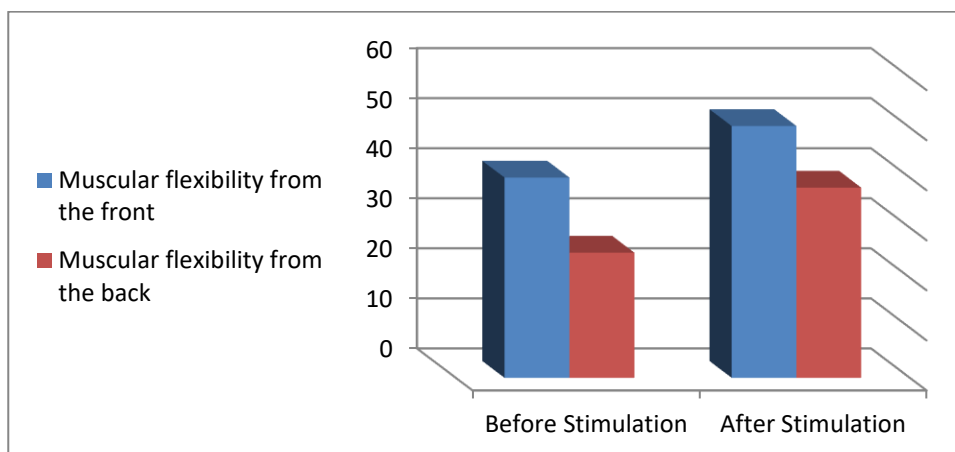


Figure 3: Change muscular flexibility from front & back before & after test with electric stimulation

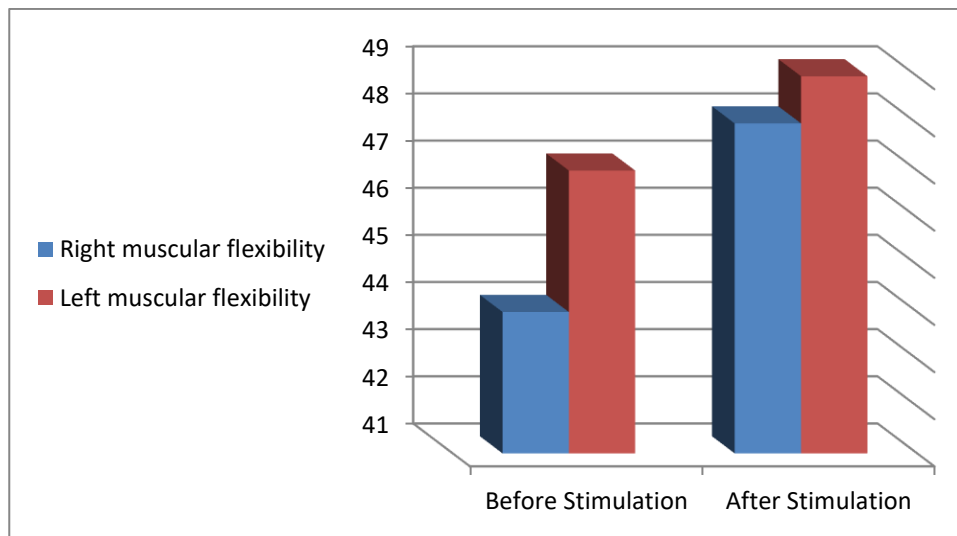


Figure 4: Change right muscular flexibility & left before & after test with electric stimulation

Increasing the relaxation of the back muscles leads to an increase in blood circulation to the muscles, a decrease in the repetitive muscle contractions that result in back spasms. This electrical stimulation of the muscles has a clear effect in increasing the range of motion of the back muscles of the players towards the front and back, as well as the right and left sides of the back, so the electrical stimulation technique for the muscles is necessary for training and treatment, especially for the back muscles because of the frequent occurrence of injuries in it[10,11].

Conclusions

Electrical stimulation plays an important and positive role in increasing muscle relaxation and flexibility, as it is a modern technique for muscles and to get rid of spasm and tension that affect athletes, especially back pain, where electrical muscle stimulation relieves the level of pain in the back area in addition to muscle relaxation and muscle flexibility.

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