

Assessing Effectiveness of Acupressure Sports Massage on Lower Arm Nerves Using Electromyography (Emg)

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ABSTRACT

Despite sport massage using being widely used by athletes. Little scientific evidence exists to confirm the efficacy of massage for promoting both physiological and psychological recovery. Therefore this study aims to assess the efficacy of acupressure sport massage on the muscle fatigue of lower arm using Electromyography (EMG). As a preliminary study, the subject is rugby players were used to obtaining the EMG signal of the left or right lower arm and followed by applying the first attempt of acupressure sport massage approximately to the proximal rote of median nerve. After that, the second attempt was performed to the radial nerve before the third attempt to the ulna nerve. The result shows that the sense of muscle contraction and excitability especially to the extensor carpi ulnaris, flexor carpi radialis and brachioradialis was increased. Moreover, the first attempt which is applying acupressure to median nerves is shown significant changing than other attempts. (2009) both has studied that there has been no conclusive evidence that sports

INTRODUCTION

Massage has been a therapeutic modality in most cultures since early civilization and has had a long tradition of use in sport (Brian Hemmings, Marcus Smith, Jan Graydon, Rosemary Dyson, 2000). Frequent claims made in the sports literature for the benefits of massage include improved stretching of tendons and connective tissue and relief of muscle tension and spasm (Lynne H Johnston, Douglas Carroll, 2016). Massage is also commonly assumed to enhance muscle recovery from intense exercise, principally because it speeds up muscle blood flow (Jonathan Davies, 2003).

Sports massage is an alternative method to provide treatment and rehabilitation provided to athletes and coaches (Lynne H Johnston, Douglas Carroll, 2016). Sports massage is defined as the science and art of applying massage (Jason Brummitt, 2008) and related techniques to maintain the health of the athlete. Sports massage can produce mechanical stress to the muscle and may reduce the effects on pain of muscle (A. Chaturvedi Pilladi, Ch. Ashok Chakravarthi, P. Keerthi and Chandra Sekshar, 2014). Under the muscle biochemical reaction mechanism expected to increase muscle compliance resulting in increased range of joint motion, decreased passive and active stiffness on the muscle (Jonathan Davies, 2003).

The main goal of sport massage is to enhance sports performance (Benjamin and lights, 2005) to the athlete. According to Jason Brummitt, (2005) states that among the benefits of therapeutic massage in the muscles including muscle tension and relieve stiffness. It will also promote faster healing of strained muscles or ligaments and sprains (R Mohamed Al-Noble, Francisco Sepulveda and Martin Colley, 2011) in addition to help in a greater range of motion (ROM).

Despite sports massage is frequently used by both coaches and athletes, the present literature doesn't support the positive effects that massage has on recovery. Samples (1987) and Weeks and Horan

massage helps to improve performance and recovery time in a training or competition setting.

A previous review studies pointed out that reports on limb blood flow vary from no effect of massage to as much as a 50% increase (Shih S.F., Lew-Ting C.Y., Chang H.Y., Kuo K. N..2008). Acupuncture and acupressure are based on the meridian system of traditional Chinese medicine and use fingers or needles to stimulate acupoints by various techniques to achieve the same therapeutic effect (Gan-Hon Lin, Wei- Chun Chang, Kuan-Ju Chen, Chen-Chen Tsai, Sung-Yuan Hu, and Li- Li Chen, 2016). This studies was supported by Pornratshanee, Weerapong, Patria A. Hume and Gregory (2005) contextualizing the muscle mechanism reaction effect such as biochemical, physiological and neurological.

The studies done by S. Zhou , M, F. Carey , R. J. Snow , D. L, Lawson I and W. E. Morrison (1998) state that the effect of repeated maximal isometric knee extensions on ElectroMechanical Delay (EMD) and associated muscle temperature changes. The exercise preclude a significant reduction in muscle contraction force development and muscle conduction velocity, whilst the muscle temperature increased by 2.1 degree Celsius. The results showed that the information of the effects of muscle temperature on EMD could be useful when evaluating the effects of strenuous exercise, in which a substantial muscle temperature change might occur, on the time delay between myoelectrical activity and force generation

In conclusion, this study proposed that massage could increase blood flow to the muscles being acupressure massaged, and blood flow is suggested to be an important for muscle recovery from muscle fatigue. Beside that the efficacy sport massage using acupressure point principle are alternative treatment for rehabilitation and prevention of muscle fatigue.

MATERIALS AND METHOD

The study inclusion criteria were as follows after determined by coaches which were involved with muscle fatigue, exhaustion, spasm and cramps. Besides that willingness to participate in the study and sign the consent form. The exclusion criteria is that the players don't complain any sign and symptom of muscle fatigue, skin damage at the acupressure or injury of the lower extremities such as dislocation or fracture of the radial and ulna bone.

Materials

In this study, Electromyography (EMG) is to be used to assess the effectiveness of sport massage. The experiment was conducted with putting 3 electrodes of Electromyography (EMG) to the left or right lower arm (Figure 1). After that apply the first attempt of acupressure sport massage approximately to the proximal rote of median nerve about 6 centimeter to the antecubital line. Next second attempt to the radial nerve before third attempt to the ulna nerve about 6 centimeter to the antecubital line. EMG was recorded pre and post experimental test of acupressure massage.

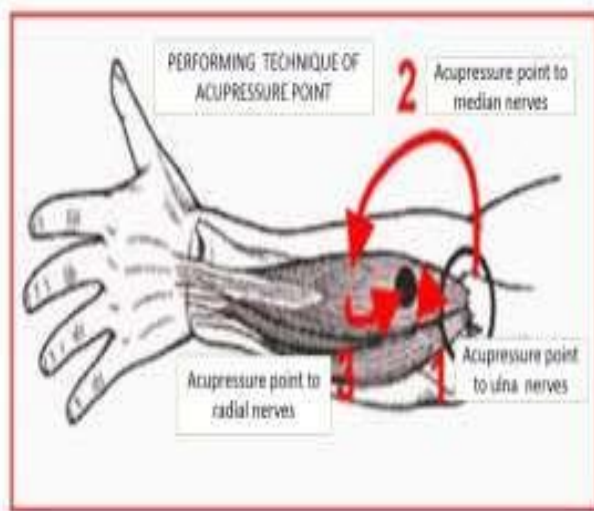


Fig. 1 Location of acupressure to the nerves of lower arms (Source: Ross & Willson, 2001)

The subject was asked to lie down on the bed during the study period. It took approximately 15–20 min to explain the consent form and secure written informed consent from each study participant. This time interval had the advantage to do the treatment smartly and to get the accuracy of the reading. All result need to recorded for further analysis. The intervention was performed in all study subject by the massage practitioner. The acupressure sport massage on the muscle fatigue technique and procedures used were identical to the location of the acupressure. Experimental acupressure was applied to the left or right arm (located on the proximal brachioradialis muscle and extensor carpi ulnaris, palmaris longus and flexor carpi radialis) which is median nerve, radial nerve and ulna nerves places (Figure 2). The acupressure sport massage on the muscle fatigue was applied to a nerves approximately 6 centimeter from the antecubital line. The thumb was used to apply pressure to the acupressure in a perpendicular manner. Pressure was applied and held for 5 seconds (sec) and then released for 1 sec. This hold-release pattern was repeated 15 to 30 times over the course of 3 min.

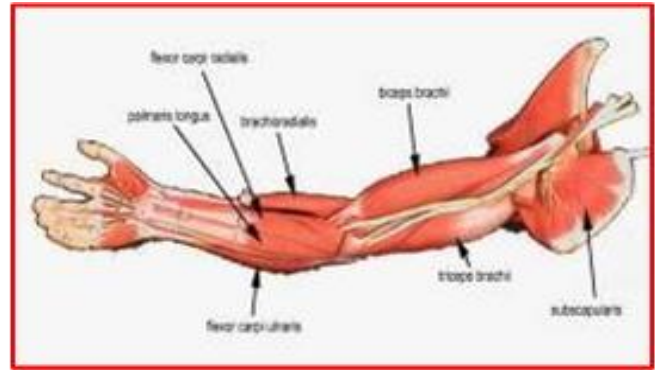


Fig. 2 Application of acupressure to the lower arms (Source: Ross & Willson, 2001)

Data Analysis

The statistical analysis was performed using Microsoft Excel. In this analysis, the means and standard deviations for each EMG signal (pre and post experimental) were obtained which will infer the effectiveness of Acupressure Sports Massage.

RESULTS AND DISCUSSION

The results are based on the experimental that was applied to the subject. The findings are divide by 2 sections, the pre experimental (before) the post experimental (after) acupressure sport massage was done to the ulna nerve, followed by medium nerve and end by radial nerves. Overall, it can be seen in Figure 3-8 that the EMG signals for each nerve are significantly change after acupressure sport massage was apply to the subject. The formulated mean and standard deviation for each EMG readings are displayed in Table 1. The means as well as standard deviations are drastically increase after the massage. It can interpreted that the acupressure sport massage trigger the muscle activities of each nerves which cause the EMG signal after massage drastically change in term of mean and standard deviation.

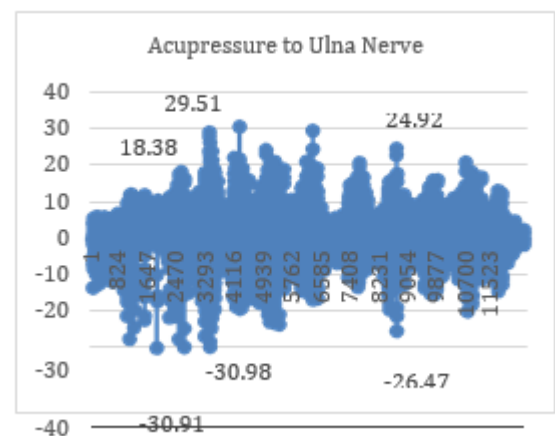


Fig 3: The finding result before applied (pre experimental) acupressure to ulna nerves (Mean= 18.38 and Standard Deviation =5.59).

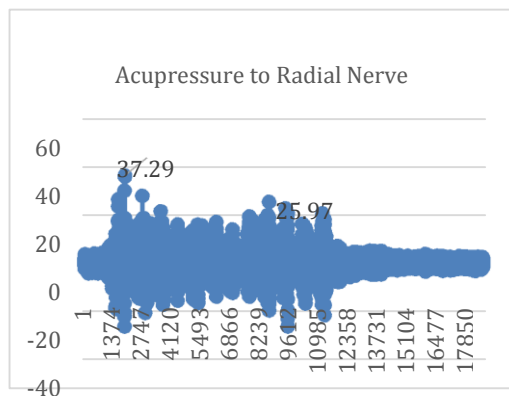


Fig. 4 The finding result before applied (pre experimental) acupressure to radial nerves (Mean = 13.82 and Standard Deviation = 4.84).

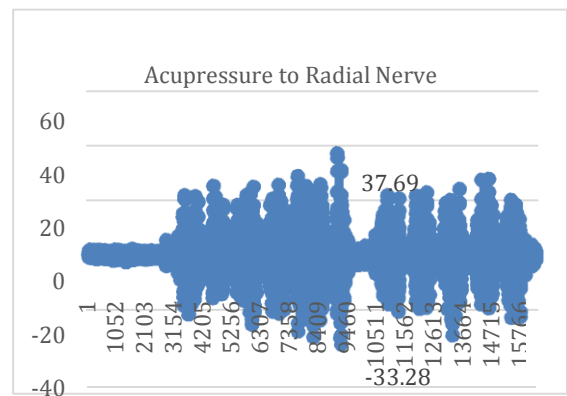


Fig. 7 The finding result after applied (post experimental) acupressure to radial nerves (Mean = 18.76 and Standard Deviation = 7.46)

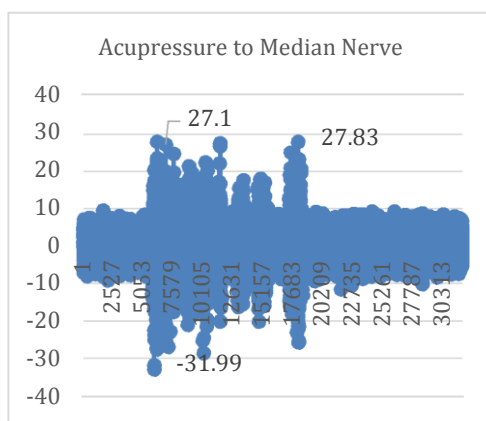


Fig. 5 The finding result before applied (pre experimental) acupressure to median nerves (Mean = 15.67 and Standard Deviation = 3.88)

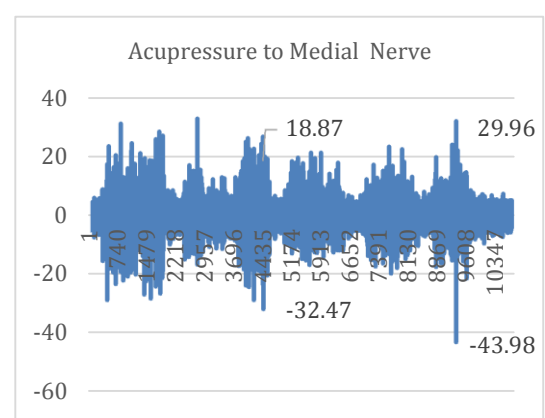


Fig. 8 The finding result after (post experimental) applied acupressure to median nerves (Mean = 20.76 and Standard Deviation = 6.35).

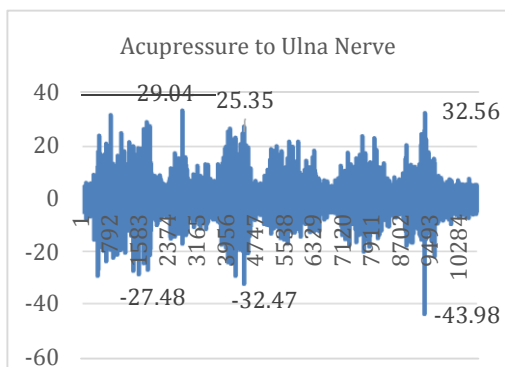


Fig. 6 The finding result after (port experimental) applied acupressure to ulna nerves (Mean = 20.25 and Standard Deviation = 3.60)

Table 1 The mean and standard deviation of EMG signal for each case.

Item	Pre		Post	
	Min	S.D.	Min	S.D.
Applied acupressure to Ulna nerves	18.38	5.59	20.25	3.60
Applied acupressure to Radial nerves,	13.82	4.84	18.06	7.46
Applied acupressure to Median nerves	15.67	3.88	20.76	6.35

CONCLUSION

The result shows that the sense of muscle contraction and excitability especially to the extensor carpi ulnaris, flexor carpi radialis, palmaris longus and brachioradialis was increased. Moreover, the first attempt which is applying acupressure sports massage to median nerves shows significant changing then other attempts. Therefore the acupressure sports massage are measurable using Electromyography (EMG).

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