

Effects of ultrasound therapy on myofascial pain

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Abstract:

Myofascial Pain is thought to occur commonly in the general population. 21% of patients who have been to orthopaedic clinics have myofascial pain. This number grows to 90 percent when speciality pain management centers are taken into consideration.

Myofascial pain seems to occur more frequently with increasing age until midlife. Incidence declines gradually after middle age.

Ultrasound has been used to treat people suffering from trapezititis. It is a method of Stimulating tissue beneath the skin surface using Sound waves. We can apply the Ultrasound waves in two modes, Continuous and Pulsed. During Continuous mode, the beam of ultrasound patients receives is constant. With Pulsed mode the waves are transmitted in short or intermittent transmissions that prevent the tissues from heating but still provide mechanical effects such as greater permeability of cell walls. For example, Pulsed at 0.5W/cm² at 1:4 ratios will deliver same energy as continuous mode at 0.1W/cm². Continuous mode is opted for musculoskeletal disorders such as spasm, Joint stiffness, and pain. While the Pulsed Mode is mainly used for soft tissue repair. There is another mode which I used for my comparative study, the SHAM mode. Sham Ultrasound is one method of giving ultrasound therapy where the intensity is kept on zero while keeping the patient unaware.

History of spontaneous pain is associated with acute overload or chronic overuse of the muscle. The mildest symptoms are caused by latent MTrPs (Myofascial Trigger points) that causes no pain but causes some degree of functional disability. More severe involvement results in pain related to the position of movement of the muscle. The most severe level involves pain at rest.

For my study, all subjects were interviewed and examined to ensure that the inclusion and exclusion criteria were fulfilled. Before examining, consent was taken from the patients for each treatment group. All groups received a week of ultrasound treatment and outcome was based on self-reported pain (VAS) measured immediately before and after intervention and ROM. Patients were not aware of the theoretical bases of each of the treatment regimens. This was a prospective, randomized, double blinded, placebo controlled, comparative clinical trial to establish the efficacy of therapeutic ultrasound and compare the effectiveness of the two waveforms of ultrasound and placebo effect in the treatment of myofascial pain syndrome. Fifty patients with active upper trapezius myofascial trigger points were randomly allocated to one of three groups. The allocation procedure was performed by an independent party and neither the researcher nor the participants were aware of the outcome. Group A received the continuous waveform of ultrasound while group B received the pulsed waveform. Group C received sham (detuned) ultrasound. Each participant received six minutes of ultrasound (or sham ultrasound in group C) during the four treatments, within a three-week period. An independent party set the parameters of every ultrasound treatment and kept records of the allocation.

It is evident that patients with active upper trapezius myofascial trigger points the pain has drastically reduced in the subjects treated with a continuous mode in comparison with Pulse and Sham. It has been observed that pain has drastically reduced in the subjects and continuous mode of ultrasound is helpful in treating the condition. Continuous mode produces some heat in the tissue and if the temperature is raised to 40-45

degree, centigrade will cause hyperaemia, the effect of which will be therapeutic. In addition, I also think temperature in this range help in initiating the resolution of a chronic inflammatory state of muscle. Continuous mode also helps in increasing the blood circulation to the affected area, which helps in reducing the pain.

There was no remarkable reduction in pain, but minor pain was reduced in the subjects treated by pulse mode. Pulse mode with the same instantaneous intensity of continuous mode would have a much lower time than average intensity and hence there is negligible heating (e.g.: 0.5W/cm² Pulsed at 1:4 will deliver the same energy of 0.1W/cm² of continuous mode). The difference is like continuous small tabs at a nail or a few stronger blows. Effects of pulsing increases rate of ion diffusion across cell membranes.

There was minute reduction in pain of the subjects treated with sham as the intensity of the ultrasound was detuned, i.e. the intensity was zero. The thermal and non-thermal effects of ultrasound were not delivered to the trigger points as the ultrasound was detuned. The minimum or the minute changes in the reduction of the pain which is seen in the study is because of the psychological factor that the patients think he or she is been treated this is a placebo method.

As far as Range of motion is concerned there was a remarkable improvement in ROM of the subjects treated with Continuous mode, slight improvement in ROM of the subjects treated by Pulse mode and negligible improvement in ROM treated with Sham mode.

The Thermal effects produced in the continuous mode results in increasing the blood circulation to the affected area which helps to regain the elastic property of the muscles which results in improvement of range of motion. As far as Pulse is concerned increased particle movement on either side of membrane or the mild mechanical agitation has certain effects of ionic movement. Because of negligible heating in pulse mode the blood circulation does not improve much and there is no faster circulation which helps very little in regaining the elastic property of the muscle which affects in improvement of the range of motion. It was observed that there was negligible improvement in the range of motion of the subjects treated with Sham as the intensity of the ultrasound was detuned i.e. the intensity was 0. The thermal and non-thermal effects of ultrasound were not delivered to the trigger points as the ultrasound was detuned. Therefore, there was absolutely no increase in the blood circulation to the affected area. Therefore there was no regain in the elastic property of the muscle The minimum or the minute changes in the reduction of the pain which is seen in the study is because of the psychological factor that the patients think that he or she is been treated this is a placebo method.

The study concluded that all three groups showed a significant decrease in the levels of pain perception, overall pain intensity and extent to which the patients were suffering with myofascial pain syndrome together with an overall increase in pain thresholds But only the patients treated with Continuous ultrasound showed significant improvement in pain and range of motion.