



A Comparison of Traditional Ultrasound with, Sustained Accoustic, Medicine (SAM)

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Introduction

Therapeutic ultrasound is one of the most common deep heating modalities used by physical therapists, athletic trainers, and occupational therapists [1]. Its thermal effects are treatment of soft tissue injuries [2], relieving a muscle contraction [3], restoration of range of motion [4], an increase in collagen extensibility [5], aiding in collagen alignment and increased wound strength [6,7]. The non-thermal effects of ultrasound include increased histamine release [8], increased phagocytosis [9], increased protein synthesis, [10] tissue regeneration [11,12], wound healing [11], increased fibroblasts and vascular regeneration [12]. Therapeutic ultrasound uses high frequency, inaudible, acoustic vibrations to produce these thermal and non-thermal physiological effects. Unfortunately, despite its common use, therapeutic ultrasound is often misunderstood and misused. However, when used properly, it is an effective treatment method that can be applied to both normal and damaged tissue.

Traditional ultrasound treatments are labor intensive and time consuming, requiring a clinician to manually move the ultrasound transducer over the target tissue. This requires the clinicians' time and energy, leaving them tied up and unable to complete other tasks. Sam (sustained accoustic medicine) is a relatively new device that doesn't require moving of the sound head by a clinician. Multiple studies have compared the SAM to traditional ultrasound. At 3cm deep, traditional ultrasound will raise the temperature 4°C, whereas the SAM will raise the temperature 3°C. At 1cm depth, the traditional ultrasound will raise the temperature 5°C, and the SAM raises it 4°C. The SAM is small (about the size of a cell phone). One or 2 crystals are applied to the skin with an adhesive patch. Traditional ultrasound uses a messy gel, whereas the SAM requires no gel nor clinician to move the soundhead. When using 1 crystal SAM produces 9,000 joules of power in 4 hours and 18,000 joules when 2 crystals are used for 4 hours. A traditional ultrasound treatment is considered acceptable when 2,500 or more joules are used. A traditional ultrasound treatment takes about 10 minutes. The SAM can last 4 hours.

We compared a treatment SAM group with a sham group in treating pain of the upper trapezius. Subjects were between 6-8 on a numerical rating scale, 0= no pain, 10= take me to the hospital. The treatment group showed a decrease in pain from 6-2 and 8-4 (significantly better than the sham group (p= .01). Figure 1 shows the SAM being applied to a patient.

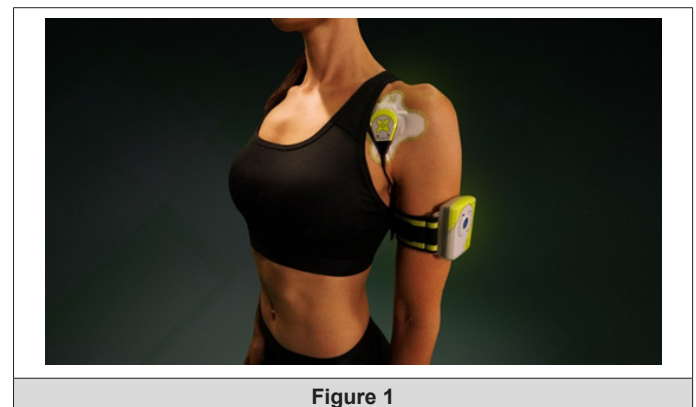


Figure 1

Conclusion

We successfully measured intramuscular temperature changes during SAM and traditional ultrasound treatments. There was no significant difference in heating when comparing the SAM to traditional ultrasound (p=.01). However, there was a significant difference when using sham SAM and treatment SAM in patients with upper trapezius pain. SAM is currently being used by several universities and professional athletes.

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