Sustained Acoustic Medicine For Improved Recovery from Tendinitis: A Pilot Study

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Introduction

Tendon injuries account for 30% of sports-related injuries and 7% of all primary care physician visits, but there is currently no gold standard of treatment. Therapeutic ultrasound has been used for over 80 years to treat injuries, but treatment has been confined to the clinician’s office, which limits both the duration and frequency of application. Animal research has demonstrated that ultrasound can effectively heal tendons, producing increased tensile strength, greater collagen deposition, and improved collagen alignment compared to sham-treated tendons. Sustained acoustic medicine (SAM) is the application of continuous low-intensity long duration ultrasonic waves to accelerate repair processes deep within soft tissues. A previous pilot study (n=4) examining the effects of long-duration ultrasound treatment on rotator cuff tendinopathy found a 30% reduction in pain and a 52% improvement in global health over 12 treatments.

Purpose

To demonstrate the use of a long duration therapeutic ultrasound device (sam®) to enhance tendon recovery, relieve pain, and increase tendon strength.

Methods

Participants:
- 22 subjects (12 male), 27-75 yrs (M = 49.63, SD = 11.35), average BMI of 25.38
- Clinician-diagnosed with epicondylitis (n=16), Achilles (n=5), or patellar (n=1) tendinopathy
- Injury durations of 2-6 weeks (n=2), 6-12 weeks (n=1), 3-6 months (n=4), > 6 months (n=13), did not respond (n=2)
- 27.2% taking NSAID medications during study

Study Design:
- All subjects received an active SAM device despite being told they had a 50% chance of receiving a placebo - to avoid biasing the study.
- For 6 wks, subjects self-applied the device to their injured tendon daily for 4 h and recorded pain and activity in a daily journal.
- Attended bi-weekly study visits for strength measurements using dynamometry: exert force until they begin to feel pain in the tendon. Avg. of 3 measurements recorded.

Results

- Significant Pain Reduction Throughout Study Duration
  - 93.75% of patients who completed all 6 weeks reported pain reduction ≥ 50%
  - Significant pain reduction (4.28 VAS pts) from baseline to end of Week 6, p<0.001

- Significant Pain Reduction Each Treatment

<table>
<thead>
<tr>
<th>Pain Scores From Start to End of Each Daily Treatment</th>
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<tbody>
<tr>
<td>Pre-Treatment</td>
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<tr>
<td>30 minutes</td>
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<tr>
<td>2 hours</td>
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<td>4 hours</td>
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Discussion

- Demonstrates that sam® significantly reduces pain and increases tendon strength during recovery from tendinopathy.
- Confirms evidence of tendon healing from therapeutic ultrasound evidenced in published clinical & pre-clinical trials
- Due to limited sample size in lower limb tendinopathies (n=5 Achilles, n=1 Patellar) there were no significant changes in strength in either treated or untreated limb
- Next Steps: Conduct additional trials with larger patient populations, double-blinded placebo arms, and additional outcome measures including:
  - Goniotmetric movement assessment, tendon sensitivity to pressure and manual movements, diagnostic ultrasound to measure tendon thickness, neovascularity, hypoechoic foci, calcifications and intrasubstance tears

References


Patient Testimonials

“Wearing sam® during tasks that normally hurt my elbow helped. I had no pain.”

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