

The Effect of Transcutaneous Electrical Nerve Stimulation on the Pain Pressure Threshold in Collegiate Athletes with Undiagnosed Shoulder Pain

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Background

Shoulder injuries are common among athletes in every level of performance and most sports today. Repetitive overhead throwing increases the chances of pain to the shoulders of these athletes. Transcutaneous electrical nerve stimulation (TENS) has been proven to reduce and numb pain.

Purpose of Study

The purpose of this study is to determine how long treatment with TENS reduces a participant’s shoulder pain. Pain pressure threshold (PPT) is a measurement of physiological pain and is measured with a pain algometer (Wagner Research). The hypothesis was: When controlling for the healthy shoulder PPT, TENS treatment will decrease pain immediately post-treatment, 30 minutes post-treatment, and 48 hours post-treatment compared to pre-treatment.

Methods

Collegiate athletes between the ages of 18-25, with undiagnosed shoulder pain were screened for eligibility. In order to determine a baseline, PPT measurements were taken on the healthy shoulder at the site of the anterior, medial, and posterior deltoid, and the trapezius muscle. Following this, the pre-treatment measurements were taken on the shoulder with pain. An athletic trainer administered electrical stimulation. Following treatment with TENS, measurements were taken immediately, 30 minutes, and 48 hours post-treatment.



Preliminary Results

Four participants consisting of 3 females and 1 male have completed all measurements. Participant characteristics include a mean BMI of 26 and a mean age of 21 years. Data collection is ongoing. The healthy shoulder was used as a control variable for the painful shoulder in a two-way repeated measures analysis of variance (ANOVA). PPT measurements are provided below.

Meas. Site	Healthy Shoulder M ± SD	Pre-TENS M ± SD	Post-TENS M ± SD	30 Min Post M ± SD	48 Hour Post M ± SD	F	p
Deltoid Anterior	3.8 ± 1.8	2.6 ± 1.6	2.7 ± 1.7	2.9 ± 2.2	2.6 ± 1.6	5.4	0.04
Deltoid Medial	4.5 ± 1.3	2.6 ± 1.8	3.3 ± 2.7	2.6 ± 1.2	3.0 ± 1.3	3.4	0.10
Deltoid Posterior	3.7 ± 1.2	2.6 ± 1.7	3.0 ± 1.7	3.1 ± 1.4	2.8 ± 1.1	4.2	0.06
Trapezius	3.2 ± 0.7	2.2 ± 0.9	3.0 ± 2.1	2.7 ± 0.9	2.8 ± 1.2	1.6	0.30

Conclusion

- Electrical stimulation (TENS) improved pain, but not to the levels of the healthy shoulder.
- PPT measurements at 48 hours post-treatment were above pre-treatment measurements, but it did not reach statistical significance.
- We can infer that TENS may have an effect that surpasses the 24 hour timeframe of efficacy.