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Treatment of Trigger Points With Microamperage Transcutaneous Electrical Nerve Stimulation (TENS)—(The Electro-Acuscope 80)

ABSTRACT

One-half of the students taking part in a double-blind study received a microamperage electrical stimulation of trigger points in the neck and shoulder region with the Electro-Acuscope 80. All the subjects were evaluated by digital palpatory physical examination for the presence of trigger points before each of their treatments. Results indicate that the subjects who received treatment had a higher change of trigger-point indicators compared to those receiving the placebo treatment. A two-tailed *t*-test indicated significant results ($P < 0.001$). It appears that microamperage electrical stimulation is effective in the treatment of trigger points. (J Manipulative Physiol Ther 1986; 9:131–134)

Key Indexing Terms: Transcutaneous Electrical Nerve Stimulation (TENS), Microamperage Electrical Stimulation, Trigger Points

INTRODUCTION

Spastic muscles have been shown to respond to electrical treatments (1, 2). Spasticity in the muscles is reduced by direct electrical stimulation, and relaxation is attributed to the action of Golgi organs. In 1973, a technique consisting of selected and specific electrotherapy was used to reduce spasticity and enhance motor activity of hemiplegic patients. The parameters (frequency, intensity, pulse width) of the electrical impulses were deliberately selected and applied to specific target muscles. The target, characterized by the absence of tonic activity, was stimulated without spreading electrical stimuli to other muscles (3).

Recently, transcutaneous electrical nerve stimulation (TENS) treatments, specifically in low back pain, have been shown to be especially effective if the problem includes the presence of trigger points (4). It was theorized that the electrical treatment modified the pathologic reflex. Travell and Simons (4) have shown the effectiveness of trigger-point therapy in the treatment of pain throughout the entire body. Joseph Yao R.P.T. (5) has demonstrated the application of trigger-point therapy utilizing TENS for the relief of pain (6).

There remains, in modern medicine, frustration in the management of common musculoskeletal aches and pains. Trigger points, often present with hypertonic and hypotonic muscles, can cause and be associated with joint fixations and/or subluxations. Most patients with such abnormal muscle tone would greatly benefit from proper management of this problem (7).

Health practitioners, especially chiropractors, are beginning to use microcurrent modalities in the management of many musculoskeletal problems. This study specifically attempts to evaluate the efficacy of microcurrent electrical stimulation in the treatment of trigger points. Because the Electro-Acuscope allows for a lack of sensation during treatment, unlike ordinary TENS, the experiment could be conducted as a valid double-blind study, unlike those conducted with standard TENS devices.

MATERIALS AND METHODS

Subjects for this experiment were volunteer students of a chiropractic college who had neck and shoulder pain. They were advised not to receive any other forms of concurrent treatment. The age group was between 20 and 40; sex, marital and employment status were documented. Procedures were conducted according to the Helsinki Declaration of 1975. To control for the placebo effect (which in TENS is similar to the placebo effect of medication at 32%) (8), a double-blind proce-

4. Each subject received bilateral stimulation with the roller electrode continually rolled slowly, applied with firm pressure (5–10 lb). Treatment covered the posterior neck and shoulder areas of the trapezius, levator scapulae, anterior scalenes and rhomboids. The stimulation was administered to each side in five treatment phases of approximately 1 min each. The administration of each phase utilized a progressively higher frequency. The frequency settings used were 0.5 Hz, 20 Hz, 40 Hz, 80 Hz and 160 Hz. All phases were delivered at an intensity setting of 300 μA (microamps). The timer was set on continuous; the gain was set at 100; and the volume was set to 0, providing no audio feedback.

RESULTS

A total of 25 subjects began the study, and 16 completed at least five treatments (which was necessary to be included in the data). The difference in trigger-point indicators between the first and the fifth treatment was used. Subjects had been organized into three groups to be treated on different dates. The high attrition rate in the second group of students is due to exam schedules. Statistical analysis was done with a two-tailed *t*-test. Tabulation of date (see Table 1) indicated a much higher change in trigger-point indicators in the actual treatment group ($P = 0.001$). The majority of these changes were in a positive direction, indicating an improvement in the condition (less trigger-point factors). This trend seemed to occur from the third through the fifth session.

Most of the subjects reported no sensation during the treatment. Several subjects in the treatment group reported feeling "warmth" and "relaxation," or described evidence of increased healing of trauma in the vicinity being treated, both during and after the treatment. One subject stated that his back felt more relaxed from the Acuscope treatments than from his regular massage therapy. A soccer player noted an aggravated shoulder injury had healed more quickly than usual. A female subject noted that symptoms of a cold were less severe than usual and resolved sooner.

TABLE 1. Evaluation of trigger points—number of trigger-point indicators

	Treatment no. (sessions)					
	1	2	3	4	5	6
Group 1						
Actual treatment group						
Patient 1	12	14	16	9	8	12
Patient 2	12	20	17	15	15	14
Patient 3	17	13	11	15	12	13
Placebo group						
Patient 1	13	13	13	13	12	11
Patient 2	14	12	8	12	13	12
Patient 3	18	20	18	19	18	20
Group 2*						
Actual treatment group						
Patient 1	16	14	18	15	18	18
Patient 2	11		15	16	16	16
Group 3						
Actual treatment group						
Patient 1	13	8	12	3	4	12
Patient 2	8	8	4	1	2	3
Patient 3		12	4	3	4	6
Patient 4	20	10	16	6	9	5
Placebo group						
Patient 1		13	9	5	10	10
Patient 2	8	16	6	12	6	6
Patient 3	11	4	4	4	11	6
Patient 4	9	17	13	18	10	12

Two-tailed *t*-test: d.f. = 18; SD: Tx = 2.96, placebo = 1.07; $P = 0.001$.
* Little significance given to this group's data due to high attrition rate.

DISCUSSION

Results obtained indicated that microcurrent electrical stimulation has a beneficial effect in trigger-point treatment. This is in accordance with results shown utilizing milliamperage TENS treatment of trigger points.

Clinically, this is significant in the care of patients who are sensitive to, or apprehensive about, the use of electricity in their therapy. Knowing that the stimulation is in microamperage and, therefore, is barely discernable should alleviate much of the anxiety. Microamperage stimulation has advantages over milliamperage TENS treatment in that electrical stimulation of a higher magnitude is contraindicated for various conditions, such as minimal inflammation, tendencies to hemorrhage, diabetes mellitis, thermal nerve deficiency or encapsulated swellings.

Clinicians may want to compare this form of trigger-point stimulation therapy for their patients to one in general use ["spray and stretch" (10)] because of the relative ease of application of the former treatment and the effective results.

CONCLUSIONS

This study has clearly shown that microamperage stimulation is effective in the treatment of trigger points. Future directions for research should look to investigate the use of microcurrent stimulation in the numerous pain syndromes presented in chiropractic.

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dure was used in which neither the subjects nor the administrator of the treatment knew whether actual treatment was being given.

The instrument used was a microcurrent electrical stimulator, the Electro-Acuscope 80 (Current Medical Instruments, Inc., 4340 Redwood Highway, San Rafael, CA 94943). In order to create a double-blind procedure, the level of current intensity was established so that subjects would not feel any stimulation during treatment. Subjects were divided randomly into two equal groups by having them draw cards with numbers; only one of these groups received actual treatment.

Each subject was given a thorough physical examination in order to eliminate subjects with complicating pathologies. Their groups were then scheduled to begin a series of six sessions of treatments spaced over a period of 2 wk. The administrators (interns at the college) were carefully instructed in the technique of treatment. They were instructed not to discuss any part of the experiment or the treatment with the subjects. Data were gathered by another intern, who evaluated the subjects before each treatment. The instrument settings were then adjusted according to whether the subject was to receive actual treatment. The conversion to placebo treatment was achieved by detaching the cord that connects the junction box between the two electrode plates and the instrument. This conversion was hidden from view of both the administrator and the subject. The face of the instrument was covered in order to eliminate from view all dial settings and visual feedback, and the auditory feedback was turned off.

The evaluation was performed by digital palpatory physical examination of the areas to be treated (neck and shoulder) according to Weeks and Travell, as stated by Webber (9). The most painful trigger point of each muscle group was checked for each of five criteria as listed and recorded in Figure 1. Thereby, each patient could be monitored for a progressive change in trigger-point patterns. This procedure gave an indication of the treatments' effectiveness over a period of time.

1. The subject placed bare feet on two electrode plates moistened with an electrolyte solution (provided with the equipment). The electrode plates are connected by two cords leading to a junction box; a single lead connects the junction box to the Acuscope.
2. Treatment over the designated area was administered with a roller electrode.
3. Electrolyte solution was applied to the area undergoing treatment. This allows for increased conductance and decreased sensation from the treatment.

Figure 1. Trigger-point diagnosis. A, Firm, tense bands within muscle. B, Palpation for spots of exquisite deep tenderness and occasional cutaneous hyperalgesia. C, Referred pain to distinct areas (predictable pattern specific to each trigger point) brought on by firm pressure. D, Skeletal muscle spasm (involuntary motor-unit activity). E, "Jump Sign" palpable band is mapped briskly at most tender spot, eliciting a local twitch response or alarm reaction. * T = Trapezius; R = Rhomboids; S = Scalenes; L = Levator Scapulae.

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REFERENCES

1. Levine M, Knott M, Kabat H. Relaxation of spasticity by electrical stimulation of antagonistic muscle. Arch Phys Med Rehabil 1952; 11:668.
2. Hufschmidt HJ. Electrotherapie de la spasticite. Rev Neurol (Paris) 1967; 117:169.
3. Alfieri V. Electrical treatment of spasticity. Scand J Rehabil Med 1982; 14:177–82.
4. Travell JG, Simons DG. Myofascial pain and dysfunction: the trigger point manual. Baltimore: Williams & Wilkins, 1983.
5. Yao JH. Acutherapy: acupuncture, TENS, and acupressure. Acutherapy Postgraduate Seminars, Libertyville, Illinois 1984.
6. Procacci P, Zoppi M, Maresca M. Transcutaneous electrical stimulation in low back pain: a critical evaluation. Acupunct Electrother Res 1982; 7:1–6.
7. Grieve GP. Common vertebral joint problems. Edinburgh: Churchill Livingstone, 1981:198–9.
8. Thorsteinson G. The placebo effect of transcutaneous electrical stimulation. Pain 1978; 5:31–41.
9. Webber TD. Diagnosis and modification of headaches and shoulder-arm-hand syndrome. J Am Osteopath Assoc 1972; 76:697–710.
10. Sandman KB. Myofascial pain syndromes: their mechanism, diagnosis and treatment. J Manipulative Physiol Ther 1981; 4:135–40.