The Effect of Oscillating-energy Manual Therapy on Lateral Epicondylitis: A Randomized, Placebo-control, Double-blinded Study

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ABSTRACT: Symptoms of lateral epicondylitis (LE) are attributed to degenerative changes and inflammatory reactions in the common extensor tendon induced by microscopic tears in the tissue after repetitive or overload functions of the wrist and hand extensor muscles. Conventional treatments, provided on the premise of inflammatory basis of LE, have shown 39–80% failure rate. An alternative approach suggests that symptoms of LE could be due to active tender points developed in the origin of hand and wrist extensor muscles after overuse or repetitive movements. Oscillating-energy Manual Therapy (OEMT), also known as V-spread, is a craniosacral manual technique that has been clinically used for treating tender points over the sutural lines in the skull. Considering symptoms of LE may result from active tender points, the purpose of this study was to investigate the effect of OEMT on pain, grip strength, and functional abilities of subjects with chronic LE. Twenty-three subjects with chronic LE (>3 mo) between ages of 24 and 72 years participated in this study. Before their participation, all subjects were screened to rule out cervical and other pathologies that could possibly contribute to their lateral elbow pain. Subjects who met the inclusion criteria were randomized into treatment and placebo treatment groups by a second (treating) therapist. Subjects were blinded to their group assignment. Subjects in the treatment group received OEMT for six sessions. During each treatment session, first a tender point was located through palpation. After proper hand placement, the therapist focused the direction of the oscillating energy on the localized tender point. Subjects in the placebo group underwent the same procedure, but the direction of the oscillating energy was directed to an area above or below the tender points, not covering the affected area. Jamar Dynamometer, Patient Specific Functional Scale (PSFS), and Numeric Rating Scale (NRS) were used to measure grip strength, functional status, and pain intensity and limited activity due to pain, respectively. The screening therapist who was blinded to the subjects’ group assignment performed pretest, posttest, and six-month follow-up measurements. Subjects in the treatment group showed both clinically and statistically significant improvement in grip strength (p = 0.03), pain intensity (p = 0.006), function (p = 0.003), and limited activity due to pain (p = 0.025) compared with those in the placebo group. Follow-up data, collected after six months, showed no significant difference between posttest and follow-up measurements in functional activity (p = 0.35), pain intensity (p = 0.72), and activity limitation due to pain (p = 0.34). Of all the subjects contacted for follow-up assessment, 91% maintained improved function and 73% remained pain free for at least six months. OEMT seems to be a viable, effective, and efficient alternative treatment for LE.


Lateral epicondylitis (LE), also known as tennis elbow, is a pathology characterized by pain over the lateral aspect of the elbow, occurring in 1–3% of the population. Although about 40–50% of tennis players report experiencing LE in their lifetime, less than 5% of all LE cases overall is related to playing tennis. The highest incidence of diagnosed LE,
about 64%, was associated with work-related activities, which involve repetitive and high-load wrist and hand functions.\textsuperscript{3–5}

In spite of extensive research on this ailment, there is no general agreement on the precise etiology and pathophysiology of LE. Cyriax attributed the symptoms of LE to tissue inflammatory responses to microscopic tears of common extensor tendon at its attachment to the lateral epicondyle.\textsuperscript{6} This theory is still viewed as a common cause of LE.\textsuperscript{2,7–9} It is believed that macro- or microscopic tear in the muscular or tendinous tissue initiates an inflammatory response, which can be the source of symptoms in patients with LE.\textsuperscript{2} Others have indicated that the symptoms of LE could also be due to other factors such as tissue deterioration, degenerative changes,\textsuperscript{10,11} and scar tissue formation\textsuperscript{9} after injuries induced by repetitive and high-load motions, which were beyond the adaptive capacity of the involved tissues.\textsuperscript{1,10,11}

More than 40 treatment methods have been recommended for LE.\textsuperscript{12} Common treatment approaches for LE include a single or a combination intervention including ultrasound, stretching, strengthening exercises, steroid injection, iontophoresis, friction message, and counterforce bracing. Overall, conventional treatments emphasizing the reduction of tissue inflammatory reactions, have failed in 10–30% of the cases.\textsuperscript{2,11,13} The use of ultrasound to reduce pain and improve healing time in LE\textsuperscript{14} has produced conflicting results.\textsuperscript{15–21} The effects of counterforce bracing on LE have been questioned.\textsuperscript{22} Counterforce bracing has been shown to be less effective than stretching and strengthening exercises,\textsuperscript{23} and to be no better than placebo braces.\textsuperscript{24} Steroid injections, which are widely used in chronic LE,\textsuperscript{25,26} have a 69% success rate reported in a 52-week follow-up study.\textsuperscript{27} Different surgical procedures are used in LE\textsuperscript{2,5,26,29} with an 8–17% reported failure rates.\textsuperscript{29,30} Microscopic muscle fiber tears, as the assumed pathophysiology of LE,\textsuperscript{9} are expected to heal in three to five days after the injury,\textsuperscript{31} whereas the tendon injuries, due to decreased vascularization, may take up to five weeks to heal.\textsuperscript{31} LE due to the inflammation secondary to soft tissue tears as the cause should therefore resolve within a five-week period. However, many cases of LE extend beyond the normal tissue healing timeline into the chronic stages.

As an alternative pathophysiology, Chop\textsuperscript{28} suggests that some of the symptoms of LE could be due to trigger point developed in the origin of the muscles attached to the lateral epicondyle after overuse or localized fibrositis. Chaitow\textsuperscript{32} attributes development of such trigger points to increased sensitivity of neural receptors in the muscle and its related connective tissue in response to overuse or sudden changes in muscle length after prolonged contractions in a shortened position. Localized trigger points could elicit pain when palpated, overloaded during a strong contraction, or stretched during wrist and elbow movements.\textsuperscript{32,33} A previous study by the authors showed that treating the tender points in the lateral elbow area with Neuroprobe could effectively reduce symptoms of LE.\textsuperscript{34}

Oscillating-energy Manual Therapy (OEMT), also known as V-spread, is a standard technique for treating tender points and dysfunctional sutures in the skull in osteopathic manual medicine. In osteopathic literature, this technique is being defined as “Using force transmitted across the diameter of the skull to accomplish sutural gapping.”\textsuperscript{35}

This technique involves inducing a gentle oscillating impulse (energy), through a specific hand placement, across the cranium.\textsuperscript{36} Upledger\textsuperscript{37} described the hand placements as being two electrodes, passing a back-and-forth biomagnetic energy between them. Recipients of such treatment report feeling an impulse going back-and-forth between the practitioner’s hands placed on their limb. The nature of such impulse, if they are actually generated by the practitioner, has not been investigated through scientific methods. Some have speculated that the oscillating energy is due to changes in direction of tissue fluid induced by hand placement.\textsuperscript{38} Chaitow\textsuperscript{36} indicated that the oscillating energy could be due to application of a very light (in grams) alternating force to the contact areas by the practitioner. Others have speculated that the oscillating energy could be due to interaction between the patient’s and the practitioner’s biomagnetic fields.\textsuperscript{39}

Despite anecdotal evidence from clinicians, the effects of OEMT on somatic tender points have not been scientifically investigated. The purpose of this study was to investigate the effects of OEMT on LE. Considering previous reports, attributing the symptoms of LE to somatic tender points,\textsuperscript{2,34} and the effects of OEMT on tender points, we hypothesized that OEMT would also improve grip strength, pain intensity, functional ability, and limited arm activities due to pain in patients with chronic LE. The results of this study could validate the effects of OEMT on somatic tender points and could provide evidence for a viable alternative treatment for LE.

**METHODS**

**Design of the Study**

A randomized, placebo-controlled, double-blinded design was used in this study. Two separate physical therapists performed measurements and treatments. One (the examiner therapist) conducted all the examination and measurements and the other (treating therapist) performed the treatments. Subjects were first examined by the examiner therapist; then subjects were randomly assigned into treatment or placebo groups by the treating therapist. Randomization was performed by having subjects to draw a card out
of a set of cards marked as “Group A” or “Group B.” Subjects in group A received real treatments. Both subjects and the measuring therapist were blinded to the subjects’ group assignments. The treating therapist was blinded to the treatment outcomes throughout the entire data collection period.

Subjects

A total of twenty-three subjects with unilateral LE, recruited through advertisement in the North-East Georgia community, between the ages of 24 and 72 years participated in this study (Table 1). Almost all subjects were involved in heavy or repetitive arm movements either as part of their job or during recreational activities.

MATERIAL

The following instruments were used in this study:

1. A Calibrated Jamar Hand Dynamometer was used to measure grip strength in the affected arm in the standardized recommended position. The reliability and validity of this method have previously been established. Grip strength was measured three times. The average value of the measurements was used for data analysis.

2. An adopted PSFS was used to measure changes in subjects’ functional abilities. The scale requires the subjects to list three of their activities most affected by the injury. The level of difficulty for each activity is rated on a scale of zero to ten, with zero indicating having most difficulty and ten denoting their ability of performing the task as before the injury. The sum of the scores for the three activities quantifies their functional status at each testing period. Good-to-excellent reliability and validity have been reported for the PSFS in patients with neck, low back, and knee injuries. Using the PSFS in patients with knee problems, a minimum of 2.5 points in the PSFS score is considered as Minimum Clinically Important Difference. The reliability of the PSFS for elbow injuries has not been previously reported. Therefore, a within-study reliability assessment was conducted, the results of which are reported in Results.

3. The NRS was used to assess subjects’ pain intensity and limitation of activities due to pain during the last 24 hours before testing. For pain intensity, subjects rated their pain level on an 11-point scale, with zero indicating no pain and ten indicating intolerable pain. According to Spadoni et al., pain reduction greater than 3.0 units in the NRS are considered clinically significant. A similar 11-point scale was used for assessment of activity limitation due to pain, with zero representing severely limited and ten representing no limited activities due to elbow pain. These NRS scales are modeled after pain questions from the SF36 and are identical to those used by Westaway et al. in their study validating the use of the PSFS with neck patients.

PROCEDURE

Reliability Assessment for PSFS

A test—retest reliability of the PSFS adapted for use with elbow injuries was conducted in ten subjects (seven males and three females). After the initial functional assessment, subjects were asked to complete a second PSFS survey at a different scheduled time before initiation of their treatment.

Screening Process and Group Assignment

Before their participation, all subjects were screened by an orthopedic clinical specialist for proper diagnosis of LE and for ruling out other pathologies that could possibly contribute to lateral elbow pain. Each subjects’ diagnosis was confirmed through conformation of area of pain to the origin of the wrist and hand extensors on the lateral epicondyle. Distal radiation of symptoms into the forearm was acceptable. Proximal upper extremity or neck symptoms, however, were considered as exclusion criteria. Additionally, three commonly used clinical pain provocation tests, Cozen’s, Mill’s, and third finger extension tests, were used to confirm diagnosis of LE. Subjects with a history of cervical pathology, nerve entrapment syndromes, nonunion fractures, surgical treatments for LE, and steroid injection for elbow pain during the last six months before the study were excluded.

Subjects who met the inclusion criteria and agreed to participate in the study were randomly assigned into a treatment or a placebo groups. Regardless of

<table>
<thead>
<tr>
<th>TABLE 1. Descriptive Statistics</th>
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<table>
<thead>
<tr>
<th>Groups</th>
<th>Number of Subjects</th>
<th>Age</th>
<th>Duration of Symptoms (in Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Treatment</td>
<td>6</td>
<td>5</td>
<td>51.7 (9.4)</td>
</tr>
<tr>
<td>Placebo</td>
<td>8</td>
<td>4</td>
<td>52.4 (7.17)</td>
</tr>
</tbody>
</table>

Min = Minimum; Max = Maximum.
their group assignment, all the subjects were told that if their symptoms did not improve, they would receive an alternative treatment after being post-tested. All subjects signed an informed consent form approved by the Institutional Review Board of North Georgia College and State University.

Oscillating-energy Manual Therapy

The OEMT (V-spread) was administered based on the standard method described in many osteopathic texts. During the OEMT treatments, the subject was seated comfortably on a chair with the affected arm resting on the treatment table. First, the point of greatest tenderness on the subject’s lateral epicondyle was located through palpation. Then, the therapist (orthopedic clinical specialist, trained in craniosacral therapy) placed the index and middle fingers of one hand, spread in a V-shape, around the detected tender point, and placed the index finger of the other hand in the medial side of the elbow, diagonally across the located tender point (Figure 1). After hand placement, the therapist applied a very gentle pressure, via his finger tips, to the tissue alternatively from the medial and lateral sides a few times to initiate the back-and-forth impulse (energy) oscillation between the medial and lateral hands. At this point (upon start of the oscillating movement), the therapist stopped pressing on the tissue and allowed the oscillatory impulse to continue, with no further efforts from the therapist part, between the two points of contact on the subject’s elbow (Figure 2). At this point, the therapist could feel continued back-and-forth oscillation of the impulse (energy) between the two points of contact on the limb. The therapist focused the direction of the oscillating energy on the tender point by slightly moving the index finger on the medial side of the elbow. Treatment was repeated a few times until the treated tender point was not tender with palpation. Most of the subjects were able to sense the oscillating energy across their elbow. Most subjects described the sensation as feeling something moving back-and-forth across their elbow between the points of contact. Subjects reported an initial increase in tenderness followed by a decrease in pain over the treated area. Treatment duration varied from point to point ranging from 30 seconds to 2 minutes. Treatment was repeated several times until the treated point was not tender with palpation. The same procedure was repeated for all identified tender points during each session. Each treatment session, depending on the number of tender points explored and treated, took about 20–30 minutes. All subjects received six treatment sessions in a two- to three-week period.

Placebo OEMT Treatment

Subjects in the placebo group underwent the exact procedure explained above. The only difference was that after locating the point of greatest tenderness, therapist placed his index and middle finger, spread in V-shape, away from the located tender point and no oscillating energy was directed to the affected area. For subjects to have a sense of a treatment being provided, the therapist applied a very gentle pressure to the tissue and imparted periodic short-duration (about 5 seconds) oscillation to the nonaffected areas. Due to subtle nature of the treatment, subjects in the placebo group were also asked if they felt the oscillating energy across their limb. Most of the subjects could feel the oscillation. However, in contrast to the treatment group, this oscillating energy had a short duration and it was not focused on the tender points. Subjects in the placebo group had the same number of treatment sessions as those in the treatment group.
Data Analysis

In addition to random assignment of subjects into treatment and placebo group, to assure equality of baseline measures, independent t-tests were used to compare baseline grip strength, functional level, pain intensity, and pain limited activity between the treatment and placebo groups.

We performed repeated measure analysis to compare pretest and posttest data for grip strength, pain intensity, limited activity due to pain, and functional ability variables within treatment and placebo groups. For between group assessments, first the amount of improvement in each variable was determined by subtracting the posttest score from the pretest score. Considering group and improvement in each variable as the two factors for statistical analysis, we used two-way Multivariate Analysis of Variance (MANOVA), followed by Tukey post hoc analysis, to compare mean improvement in the four dependent variables between the treatment and placebo groups.

Follow-up Study

Follow-up data were collected six months post-treatment from subjects in the treatment group. The same questionnaire related to functional (PSFS), pain intensity (NRS), and limitation of activity due to pain (NRS) assessments was used to collect follow-up data.

RESULTS

Subjects

Descriptive statistics related to the subjects in the treatment and placebo groups are presented in Table 1. Eleven subjects were randomly assigned to the treatment; and 12 subjects to the placebo group. It should be noted that, although not intentional, the sample recruited for this study represents a population of chronic LE subjects. The typical subject reported a mean duration of symptoms greater than 12 months. Therefore, the results may be limited to treatment of chronic LE. All subjects reported previous, unsuccessful treatment, ranging from rest, physical therapy, and cortisone injections. None of the subjects, however, were involved in any other form of treatments during the course of this study. There was no significant difference (p > 0.05) in baseline values (pretest) for grip strength, pain intensity, functional level, and limited activity due to pain between the treatment and control groups.

Reliability Assessment

Intraclass correlation coefficient analysis, ICC (3,1) showed a high reliability (ICC = 0.91; 95% confidence interval = 0.57–0.98) of using PSFS survey to assess functional abilities of subjects with LE in this study. Statistical analysis of pretest data showed no significant difference in any of the baseline measures for grip strength (p = 0.22), functional level (p = 0.89), pain intensity (p = 0.85), and pain limited activity (p = 0.80) between the treatment and placebo groups.

Pretest and Posttest Analysis

Figures 2–6 compare the mean values of pretest and posttest measurements for grip strength, pain intensity, limitation of activity due to pain, and functional ability in treatment and placebo groups. In the treatment group, a significant improvement was found in grip strength (p = 0.04), pain intensity (p = 0.000), functional abilities (p = 0.004), and in limited activity due to pain (p = 0.000). None of these variables showed a significant change in the placebo group (p > 0.05). Detailed descriptive statistics are presented in Table 2.

Treatment and Placebo Group Comparison

The amount of improvement (posttest measures minus pretest measures) observed for each dependent variable in the treatment and placebo groups are presented in Figure 7. Post hoc analysis, following the two-way MANOVA, showed a significant difference in grip strength (p = 0.03), pain intensity (p = 0.006), limited activity due to pain (p = 0.025), and functional level (p = 0.003) between the treatment and placebo groups.

Follow-up Analysis

Of the 11 subjects contacted for follow-up assessment, ten subjects (91%) maintained improved function and eight subjects (73%) remained pain free for at least six months. Paired t-test did not show any significant difference between posttest and
follow-up measurements for functional activity (mean posttest = 29.2 ± 6.0, mean follow-up = 27.0 ± 7.7; p = 0.35); pain intensity (mean posttest = 1.41 ± 1.16, mean follow-up = 1.16 ± 1.85; p = 0.72); and limited activity due to pain (mean posttest = 8.83 ± 1.02, mean follow-up = 9.16 ± 1.19; p = 0.34).

DISCUSSION

Grip Strength

During grip, wrist extensor muscles originating from the lateral epicondyle work, as wrist fixators, in synergy with the finger flexor muscles.3,49 The impairment of these muscles due to LE, therefore, could result in decreased grip strength.15–17,19,23,50 In this study, subjects in the treatment group showed a significant improvement (p = 0.04) in grip strength (16% increase) after two weeks of treatment with OEMT. Other investigators, using conventional physical therapy treatments16,23,27,51–56 or steroid injection57,58 for treatment of LE, have reported significant improvement in grip strength after six to weeks of interventions.23,27 According to Vicenzino51 early pain relief, as was found in this study, could have motivated the subjects to use their arm more often during daily activities, resulting in improved muscle strength. Similar early recovery of grip strength, in patients with LE, has been reported by Tsui and Leung,59 using electro-acupuncture treatments. Other investigators, however, have reported no significant changes in grip strength in patients treated for LE.24,58,60–65

Controversial reports of improvement in grip strength after providing different treatments or even in studies using the same treatments57,58,60 may suggest that the possibility of improvement in grip strength could be pathology related. Pienimaki et al.50 showed that, in subjects with LE, changes in grip strength were more associated with having a positive wrist extension test than with having a positive Mill’s test in the preliminary evaluation. Contraction of wrist extensors is required to contrast with flexion moment acting on the wrist, induced by finger flexors, maintaining the functional position of the wrist during forceful grip. Reduced pain in the origin of the wrist extensor muscles enhances mechanical advantage of the finger flexor muscles, resulting in a stronger grip. Therefore, it can be speculated that grip strength measurements with LE are likely measuring pain rather than true changes in muscle strength. More
studies are needed to determine factors involved in grip strength after treatments for LE.

Pain Intensity

In this study, subjects in the treatment group showed 3.1 units of pain reduction, based on the NRS, compared with almost no improvement in pain intensity in the placebo group (Table 2). According to Spadoni et al., pain reduction greater than 3.0 units in the NRS are considered clinically significant. Therefore, our findings of 3.1 units (p = 0.000) decrease in pain intensity in the treatment group compared with almost no improvement (0.5 units, p = 0.44) in the placebo group indicate both statistically and clinically significant effect of OEMT on reducing pain intensity in subjects with LE.

Functional Improvement

In this study, the treatment group as a whole demonstrated remarkable significant improvement in functional activities (mean of 14.7 at pretest vs. 29.3 at posttest, p = 0.000) and in limited activity due to pain (mean of 5.2 at pretest vs. 8.6 at posttest, p = 0.002).

A positive effect of OEMT treatment on function abilities was assessed using two methods: PSFS and the global limitation of activities during the previous 24 hours. It is worth noting that Westaway et al. have recommended that a generic- or condition-specific functional rating tool be used in conjunction with the PSFS when group decision making is a goal. Therefore, the authors used the 24-hour limitation of activity NRS scale to measure generic activity limitation along with the PSFS. The global scale provides a standardized and reliable method to quantify activity limitations due to pain and has demonstrated good reliability and validity with a number of pathologies.

Stratford et al. and others have demonstrated usefulness of the PSFS in assessment of functional improvements in neck, low back, and knee rehabilitation. This study is the first to demonstrate test–retest reliability of using PSFS for measuring functional changes with an elbow pathology (refer toResults). The PSFS provides what may be more impressive evidence of functional improvement. Caution, however, must be used when interpreting PSFS scores. The scale is intended to measure changes within an individual and not between groups. Nevertheless, Stratford et al. have demonstrated the tool’s usefulness in measuring meaningful functional improvement.

Effects of OEMT

This study showed that OEMT could significantly improve the symptoms of chronic LE in a relatively short period of time. It is worth noting that all the subjects had a history of previous unsuccessful conventional treatments before their participation in this study. These findings indicate that OMET could be a viable, effective, and efficient alternative treatment for LE.

Several mechanisms, although highly speculative, have been proposed to explain the effects of OEMT (V-spread) on somatic pain and dysfunction. Traditionally, this technique has been used in osteopathic craniosacral therapy for releasing restricted cranial sutures. This technique involves specific hand positioning and inducing a gentle oscillating impulse across the cranium. Upledger described the therapist hand placement as being two electrodes passing a fluctuating energy across the head, causing CSF fluctuation within the cranium. It is proposed that

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**TABLE 2. Statistics for Dependent Variables in the Treatment and Placebo Groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>Variables</th>
<th>Pretest (Mean ± SD)</th>
<th>Posttest Mean (SD)</th>
<th>p-Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment group</td>
<td>Grip strength</td>
<td>61.3 ± 38.7</td>
<td>73.6 ± 30.9</td>
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<tr>
<td></td>
<td>Pain intensity</td>
<td>5.1 ± 2.66</td>
<td>2.0 ± 1.8</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Functional level</td>
<td>14.7 ± 8.9</td>
<td>29.2 ± 6.0</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Pain limited activity</td>
<td>5.2 ± 2.8</td>
<td>8.5 ± 1.1</td>
<td>0.004</td>
</tr>
<tr>
<td>Placebo group</td>
<td>Grip strength</td>
<td>81.1 ± 26.6</td>
<td>79.2 ± 28.0</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Pain intensity</td>
<td>4.6 ± 2.3</td>
<td>4.1 ± 3.1</td>
<td>0.44</td>
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<tr>
<td></td>
<td>Functional level</td>
<td>17.6 ± 9.2</td>
<td>22.3 ± 10.3</td>
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</tr>
<tr>
<td></td>
<td>Pain limited activity</td>
<td>6.1 ± 2.2</td>
<td>6.0 ± 2.9</td>
<td>0.94</td>
</tr>
</tbody>
</table>

*p-Values reported from repeated measure analysis.

**FIGURE 7.** Level of improvements in the tested variables between treatment and placebo groups. OEMT = Oscillating-energy Manual Therapy; POEMT = Placebo Oscillating-energy Manual Therapy. Error bars present standard errors.
with appropriate hand placement, the fluctuating CSF is directed toward the treatment area to release articular restrictions.37 This mechanism of effect, although being advocated by craniosacral therapist, cannot explain the effects of OEMT on somatic tender points in other areas besides the cranium.

Dowling66 proposed a modified version of this technique called Progressive Inhibition of Neuromuscular Structures (PINSs). Dowling,66 presenting a few case studies supporting effectiveness of PINS technique in treating somatic tender points after car accidents, suggested that this technique could be used for treating tender points and somatic dysfunctions in the skull, trunk, and extremities. Dowling66 attributed the effects of PINS to the mild pressure applied to the tissue, working as a counter irritant, leading to muscle relaxation via tissue accommodation and habituation or via reflexive inhibition of motor neuron pool of the hypertonic muscle. These assumptions, however, cannot explain our findings of improved pain and function in subjects with LE. If the effects of OEMT were due to habituation or reflexive inhibition of the muscles, similar improvements would have been expected in subjects in the control group. These subjects acquired the same hand placement and application of mild pressure to the tissue, as the treatment group, but did not receive any oscillating energy.

OEMT is based on the belief that the therapist is imparting oscillating biomagnetic energy; therefore, its mechanism of effect could be speculated through the effects of such energy, projected from the therapist hands,39 on tender points and tissue healing. The effects of electromagnetic fields on tissue healing,67 synthesis of growth factor,68 bone healing,69 and connective tissue repair70 have been documented. Oschman,71 however, indicated that the healing effect of electromagnetic fields on tissue healing is frequency specific. According to Sickens and Walker,72 for optimum healing, nerves respond to 2 Hz, bones to 7 Hz, ligaments to 10 Hz, skin to 15 Hz, and capillaries to 20 and 75 Hz electromagnetic signals. Oschman asserted that electromagnetic signals ranging in frequency from 0.3 to 30 Hz, with most signal having a frequency of 7–8 Hz, can be omitted from the hands of practitioners of therapeutic touch.39 The frequency of the electromagnetic fields emitted from the practitioner’s hands corresponds well with the electromagnetic frequency for soft tissue healing. We speculate the improved symptoms of LE in this study could be attributed to the effects of such frequency-specific electromagnetic signals on soft tissue healing. Considering significant findings of this study, OEMT could be a potential effective technique for treating musculoskeletal dysfunctions. However, further research is needed to explain the mechanism of effect and to confirm the therapeutic effects of electromagnetic signals emitted from a practitioner’s hands on other musculoskeletal problems.

Conclusion

This randomized, placebo-controlled, double-blinded study has demonstrated both clinically and statistically significant improvements in grip strength, pain intensity, function, and activity tolerance in subjects with chronic LE after OEMT treatment compared with placebo treatment. These findings indicate that OEMT could be a viable, effective, and efficient alternative treatment for symptoms of chronic LE.

Limitations

Despite the significant effects demonstrated in this study, a larger sample size would improve the generalizability of the findings.

Due to subtle nature of the imparted oscillating energy, effective use of OEMT requires some training and experience. A novice practitioner in this field might have difficulty sensing the oscillating energy and properly administering the technique without adequate training. In this study, all treatments were provided by an experienced therapist. More studies are needed to establish consistency of technique across multiple practitioners.

More scientific and clinical studies are needed to explore the mechanism of effect and to further assess the effects of OEMT on somatic pain and dysfunction associated with other pathologies.

Acknowledgment

The authors would like to thank the following graduate students at North Georgia College and State University for their assistance in this research: Alexis Gaines, Matthew R. Marchman, Leon Romero, and John Stuart.

REFERENCES


Record your answers on the Return Answer Form found on the tear-out coupon at the back of this issue. There is only one best answer for each question.

#1. The subjects in this study were
   a. consecutively assigned into 2 groups all of whom had lateral epicondylitis for less than 3 months
   b. randomly placed into one of 2 groups all of whom had lateral epicondylitis for 3 months or longer
   c. divided into 3 groups: a chronic, an acute, and a sub acute group
   d. all treated with a steroid injection plus OEMT

#2. The subjects were evaluated with the following instruments
   a. Jamar Dynamometer, MMT, and EMG
   b. NRS, PSFS, and MMT
   c. MMT, EMG, and PSFS
   d. NRS, PSFS, and the Jamar Dynamometer

#3. At 6 months posttesting the subjects demonstrated ___ vs scores at the end of treatment
   a. a significant increase in function
   b. a significant decrease in function
   c. no significant change in function
   d. significant anesthesia over the lateral elbow area

#4. At 6 months posttesting the subjects demonstrated ___ vs scores at the end of treatment
   a. an increase in pain
   b. no significant change in pain
   c. a decrease in pain
   d. an increase in ROM

#5. The authors present conclusive evidence as to the pathological process responsible for the pain of lateral epicondylitis
   a. true
   b. false

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