

Pain relief utilizing impedance controlled microcurrent therapy

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Abstract

Objective: The research aim was to evaluate the effectiveness of impedance controlled computerized microcurrent (ICCM) therapy for managing neuromuscular pain in temporomandibular joint disorders (TMD) and bruxing patients. It was hypothesized that ICCM therapy would reduce pain in patients with neuromuscular pain in TMD, and in bruxing patients. **Design:** Patients (n=20) experiencing neuromuscular pain from TMD and bruxing were treated with ICCM therapy. Pain scales were obtained before and after each therapy session (scale of 0-5, with 0 being defined as no pain and 5 as the worst). Individual patient pre-treatment assessments varied from a pain scale rating of 2 to 4, overall. However, individual patient post-treatment pain scale varied from 0 to 2 after the 1-4 week treatment time period, with the exception of one patient who did not experience any change in her pain features. Both a neural stimulator and a muscle stimulator were used for pain therapy; no other therapy was allowed during this pilot study. Cranial-electro stimulation (CES) was given to each patient with ICCM neural stimulator,

using ear lobe clip electrodes. Muscle stimulation was applied to each patient's muscles that were painful with the ICCM muscle stimulator, using a movable metal electrode over the painful tissue sites. **Results:** ICCM therapy was able to reduce pain levels in 95% of the patients. Greater range of head and neck motion, absence or a reduced frequency of headaches, and improved bite function were also noted. No adverse effects were observed. **Conclusions:** ICCM therapy shows promise in reducing pain and other symptoms in the TMD and bruxing patients. Further studies on larger samples should validate the results of this pilot study.

Introduction

The concept of investigating microcurrent therapy to manage pain is not new. It has been explored for decades, since the publication of the Nobel Prize winning "Gate Control Theory" in 1965.¹ This theory considers a convergence of different kinds of signals, afferent and efferent, which monitor and regulate incoming afferents. Counter-irritation by electrical stimulation could then be understood to modulate pain perception. Becker²

demonstrated that electrical stimulation does more than mask pain. In numerous articles, he postulated that control signals for regenerative healing may be due to bioelectrical activity. Treatment with impedance controlled computerized micro-current (ICCM) was demonstrated to decrease pain with Post-Polio Syndrome³ and Radiation-Induced Fibrosis in head and neck cancer patients.⁴ Pain is a subjective experience and is only useful as a warning signal when it is the symptom of an acute disorder or where it can be used for diagnostic purposes. However, a placebo effect is always a possibility in the treatment of pain. This principle guided Nebrensky and Meyer⁵ in conducting a double blind study, using micro-stimulation treatment for chronic back pain, which confirmed the effectiveness of ICCM therapy. Micro-current exerts its influence effectively on tissues at an electric current levels in the range of 50-600 μ A. It has no relation to muscle stimulation that causes a visual or physical manipulation of a muscle by the application impedance controlled computerized micro-current of electrical current.

This research aimed at evaluating the effectiveness of ICCM therapy in managing neuromuscular pain in TMD and bruxing patients. It was hypothesized that ICCM therapy would reduce pain in patients with TMD and neuromuscular head and neck pathologies. Micro-currents can stimulate mitochondria to synthesize adenosine triphosphate (ATP), as demonstrated by

Cheng,⁶ which activates DNA for protein synthesis. The gentle electrical stimulation improve cellular capacitance, so ions can be exchanged through the cell membrane, allowing the cell to produce its by-products: collagen, elastin, increased ATP, DNA and protein synthesis, thus accelerating the rate of cellular repair and replication. The energy balance is critical in achieving chemical balance for healthy tissue. Cells must maintain a proper electrical charge to function properly. This objective is accomplished by offering ions of proper amplitude and polarity. When these criteria are met, the correctly charged ion will pass through the membrane into the cell. When a cell has proper capacitance or "net charge," it can perform ion exchange. If an ion exchange is altered by injury, pathology or aging, ICCM therapy increases fibroblast activity and blood flow, therefore delivering ions that meet the tissues needs and accelerating healing.

Materials and Methods

Instruments used in this study Twenty consecutive patients, aged 8-75 years, experiencing neuromuscular pain from TMD and bruxing were treated with ICCM therapy. The TMJ questionnaire by Grummons⁷ was used before and after the study. All 20 patients demonstrated Angle's Class I or II type malocclusions, and 5 were being treated actively with orthodontic appliances. Examples of two extreme differences in



Fig. 1 Intraoral photographs of a TMD patient with Class I malocclusion and good interdigitation



Fig. 2 Intraoral photographs of a TMD patient with Class II division 2 malocclusion and poor masticatory function



Fig. 3. Electro-Acupulse for neurologic treatment

patients' dental occlusion can be seen in Figures 1 and 2. Figure 1 is of a patient with an Angle Class I malocclusion, with a mandibular crowded dentition, and multiple prosthetic restorations in good function. Figure 2 is of a patient with an Angle Class II Division 2 malocclusion, with a severe deep bite, in poor function, where orthodontic treatment, orthognathic surgery, and arthroscopic TMJ surgery had been recommended. Both patients suffered severe TMD, and head and neck pain, and both rated their pain at the "distressing to horrible" range, making it necessary to take prescription pain medications and/or over the counter drugs. Pain scales were taken before and after each therapy session.

The pain scale was based on a 0-5 level, with 0 being no pain and 5 being the worst pain. The following words represent the numbering of the pain description: 1= Mild, 2= Discomforting, 3= Distressing, 4= Horrible, 5= Excruciating. All patients were treated for one hour, in each of 3 to 5 treatment sessions, over a 1-4 week time frame. The first 15 minutes of ICCM treatment included cranial electrical stimulation, using the electro-acuscope (Fig. 3) which had been designed for neural stimulation by attaching ear clips to the ear lobes, with a conductive electrolyte gel between the skin and the ear clips. The electro-acusope operated at an 8 Hz frequency and a 100 μ A intensity, producing an immediate relaxed alpha-theta state (Figs. 4-6). The following 45 minutes of ICCM treatment included muscle and tendon stimulation, using the electro-myopulse instrument (Fig. 7) on the tender muscles of the head, neck and shoulders, at 0.5, 4, 8 and 10 Hz, 200-600 μ A, with alternating polarity. During the ICCM treatment, a slight tingling sensation could be felt, however, if the sensation was too strong, the intensity was reduced to as low as 200 μ A. The sequence of events for the electro-myopulse treatment is demonstrated in Figures 8-13.

Figure 8 shows the electrolyte gel being placed on a hand held probe. Fig. 9 shows the electrolyte gel being placed on the area to be treated. Figure 10 demonstrates the treatment probe being placed on the treatment site,



Fig. 4 Placing earclips on earlobes with electrolyte gel for CES



Fig. 5 Cranial electrical stimulation producing an alpha-theta state in orthodontic office setting. Please notice a water bottle which was placed near the patient, to encourage hydration during treatment.



Fig. 6 Soothing, relaxing, safe CES at 8 Htz and 100 ua with CES earclips placed



Fig. 7 Electro-Myopulse for muscle, bone and tendon treatment

while the patient is holding the hand-held probe to complete the circuit.

Figure 11 shows the application of rolling pressure with the probe on painful sites. In Figure 12, skin redness can be seen, probably due to increased blood flow in the treated site by the treatment probe. Figure 13 shows the application of TMD treatment within the orthodontic office. It should be noted that hydration is important before, during and following treatment, for the achievement of optimal results.

Results

ICCM therapy reduced the pain sensation levels in 19 of the 20 patients after the completion of the 3-5 ses-

sion regimen. All 20 patients felt less pain or no pain after the 1 hour sessions. The pain level decreased an average of 1-2 levels following each treatment session, regardless of which pain level the patient started at before the 1 hour treatment. Only one patient reported that the pain and discomfort had returned within 24 hours after each treatment. Other findings included a greater range of motion of arms, shoulders, neck and mandible; bruxing minimized or eliminated; TMJ popping and/or crepetis minimized or eliminated. Moreover, patients reported reduced number and frequency of headaches and migraines, and that they were taking less prescription and over the counter medications for pain. The patients concluded that the ICCM treatment resulted in a general improvement of their quality of life. No patients reported any adverse effects, nor were



Fig. 8 Electrolyte gel being placed on the hand held probe



Fig. 9 Electrolyte gel being placed on the area to be treated



Fig. 10 Treatment probe placed on treatment site



Fig. 11 Rolling pressure on pain site with probe



Fig. 12 Increase blood flow to treatment site, notice area redness.



Fig. 13 ICCM treatment in Dr. Marino's Orthodontic Office. Please notice a water bottle which was placed near the patient, to encourage hydration during treatment.

any adverse effects observed. ICCM therapy was found to quickly relax tender muscles to their full normal resting length, reducing spasms, causing fascia release, reducing fibrosis and improving blood flow.

Discussion

The ICCM technology presented is based on principles of biophysics, and reads vibration patterns or electromagnetic impulses of the area being treated. Biedebach⁸ discusses how ICCM manages to identify pathological and healthy areas through ICCM treatment, and the manner by which it “harmonizes” the pathological tissue

to health. Electro-cardiogram (ECG) or Electro-encephalogram (EEG), “measure” electrical imbalances in muscle, bone, tendon or nerve, while ICCM therapy measures, interprets and treats the electrical tissue imbalances to a normal vibrational frequency, and cannot “over-treat” any area of concern. The treatment sequence with ICCM occurs in real time (1/250,000 seconds). To date, there are no known adverse affects resulting from the use of ICCM technology.

ICCM therapy shows promise in reducing pain and other symptoms in the TMD and bruxing patients. Micro-current works in harmony with the body's own

electrical system, and accelerates the body's ability to function more effectively and expeditiously. The ICCM technology used in this study has three computer chips to treat individual tissue, and it feeds back the energy that the body is familiar with. This energy assists the body in repairing itself rapidly. The computer adjusts both the current amplitude and voltage (the push) automatically, which then corrects electrical imbalances in the cells. ICCM therapy measures and corrects the electrical resistance between any two given points on the body. Sites of inflammation or congestion show a difference in impedance compared with normal surrounding tissue. The electrical imbalance that causes pain in muscles and nerves is balanced and normalized using the computerized microcurrent technology. The precise low level of energy is imperceptible and feels soothing and relaxing, yet muscle and nerve tissue responds by releasing toxins and absorbing nutrients quickly, because ICCM produces energy (ATP) necessary for healing at an accelerated rate. It is common to have patients look and feel better after each treatment session.

The successful outcome of this pilot study indicate that further research on the clinical effects of ICCM on facial pain are justified.

Current Research on treatment of pain in the USA

1. Ferme Labs, Department of Energy, Study on Radiations Fibrosis treatment using ICCM.

2. University of Minnesota Medical School, Department of Radiation Oncology, Study on Xerostomia treatment using ICCM.

3. University of Michigan Medical School, Plastic Surgery Department, Study to begin soon.

Helpful Text References on Micro-Current Energy and Technology

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