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Microcurrent Point Stimulation Applied to Lower Back Acupuncture Points for the Treatment of Nonspecific Neck Pain

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Abstract

Objectives: Although acupuncture and microcurrent are widely used for chronic pain, there remains considerable controversy as to their therapeutic value for neck pain. We aimed to determine the effect size of microcurrent applied to lower back acupuncture points to assess the impact on the neck pain.

Design: This was a cohort analysis of treatment outcomes pre- and postmicrocurrent stimulation, involving 34 patients with a history of nonspecific chronic neck pain.

Subjects and Settings: Consenting patients were enrolled from a group of therapists attending educational seminars and were asked to report pain levels pre-post and 48 hours after a single MPS application.

Interventions and Measurements: Direct current microcurrent point stimulation (MPS) applied to standardized lower back acupuncture protocol points was used. Evaluations entailed a baseline visual analog scale (VAS) pain scale assessment, using a VAS, which was repeated twice after therapy, once immediately post-electrotherapy and again after a 48-h follow-up period. All 34 patients received a single MPS session. Results were analyzed using paired *t* tests.

Results and Outcomes: Pain intensity showed an initial statistically significant reduction of 68% [3.9050 points; 95% CI (2.9480, 3.9050); $p = 0.0001$], in mean neck pain levels after standard protocol treatment, when compared to initial pain levels. There was a further statistically significant reduction of 35% in mean neck pain levels at 48 h when compared to pain levels immediately after standard protocol treatment [0.5588 points; 95% CI (0.2001, 0.9176); $p = 0.03$], for a total average pain relief of 80%.

Conclusions: The positive results in this study could have applications for those patients impacted by chronic neck pain.

Keywords: acupuncture, standard protocol, microcurrent point stimulation, neck pain

Introduction

Neck pain is a major public health problem, in terms of both personal health and overall well-being[1–3] as well as indirect expense.[4,5] For instance, the total cost of neck pain in The Netherlands in 1996 was estimated to be about 1% of the total health care expenditure or 0.1% of the Dutch gross domestic product.[5]

Acupuncture, a physical intervention that involves placement of small needles in the skin at different acupoints, has

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been practiced for thousands of years and is commonly used for many types of chronic pain.[6–9] Science has long hypothesized for a scientific explanation of the analgesic successes of acupuncture. The literature supports that acupuncture relieves pain by regulating the autonomic nervous system,[10] activating the release of beta-endorphins,[11] regulating the central nervous system,[12] and producing local effects on the peripheral nervous system.[13] The efficacy of acupuncture for neck pain has been supported in the literature.[14–16]

Electroacupuncture has been used as an adjunctive pain management in acupuncture for decades,[17] and may be applied invasively or noninvasively. It has been reported to analgesically outperform traditional acupuncture needles.[18]

Traditionally, the modality of choice for electroacupuncture has been alternating current (AC).[19–21] However, there are two known types of electrical currents, AC and direct current (DC). DC is unidirectional and is applied microamp or millionth of amp (10–6 amperes) range and is called microcurrent.[22–26] AC moves back and forth and is applied in the milliamperage range (10–3 amperes), and is usually called transcutaneous electrical nerve stimulation or electroacupuncture.[19] It is theorized that AC and DC electrocurrents have different modulating affects on the autonomic nervous system and the bodies healing processes.[22,24,26]

DC microcurrent therapies involve applying weak DCs (80 μA to <1 mA), and are now being increasingly recognized as an adjunct for pain relief and autonomic nervous system regulation.[24,25] There is no consensus in the literature identifying the best practice measures for application of DC microcurrent to acupuncture points for chronic neck pain patients. Although sufficient evidence supports the application of AC electroacupuncture and acupuncture needles for neck pain, there is no ''standardized acupuncture protocol'' and limited repetitive evidence in the literature to support the use of DC electrotherapies for the treatment of neck pain. The purpose of this pilot study was to ascertain the impact of DC microcurrent point stimulation (MPS) on the neck pain levels of a cohort of patients immediately postapplication and 48 h later after a single MPS application.

Patients, materials, and methodology

This study entailed the use of MPS in 34 patients (24 female, 10 male; mean age 46 years, SD 9.76) with chronic nonspecific neck pain averaging 7.33 years (mean 7.33 years, SD 11.62), presenting to us for therapy of their neck problem. Inclusion criteria were simple: patients who were currently suffering from chronic neck pain for greater than 3 months, with a recorded >4 visual analog scale (VAS) Pain Scale score. The diagnoses of pain, location, severity, sex, previous interventions, or surgeries were not considered exclusion criteria. Informed consent was obtained to partake in treatment and the study assessments. Patient pain scores were recorded pretreatment and twice post-treatment: immediately after application and again 48 h later.

Patients, who consented to be part of the study, were enrolled from a group of professional therapists attending educational seminars run by one of us (K.A.). They were provided with a full background in acupuncture and MPS

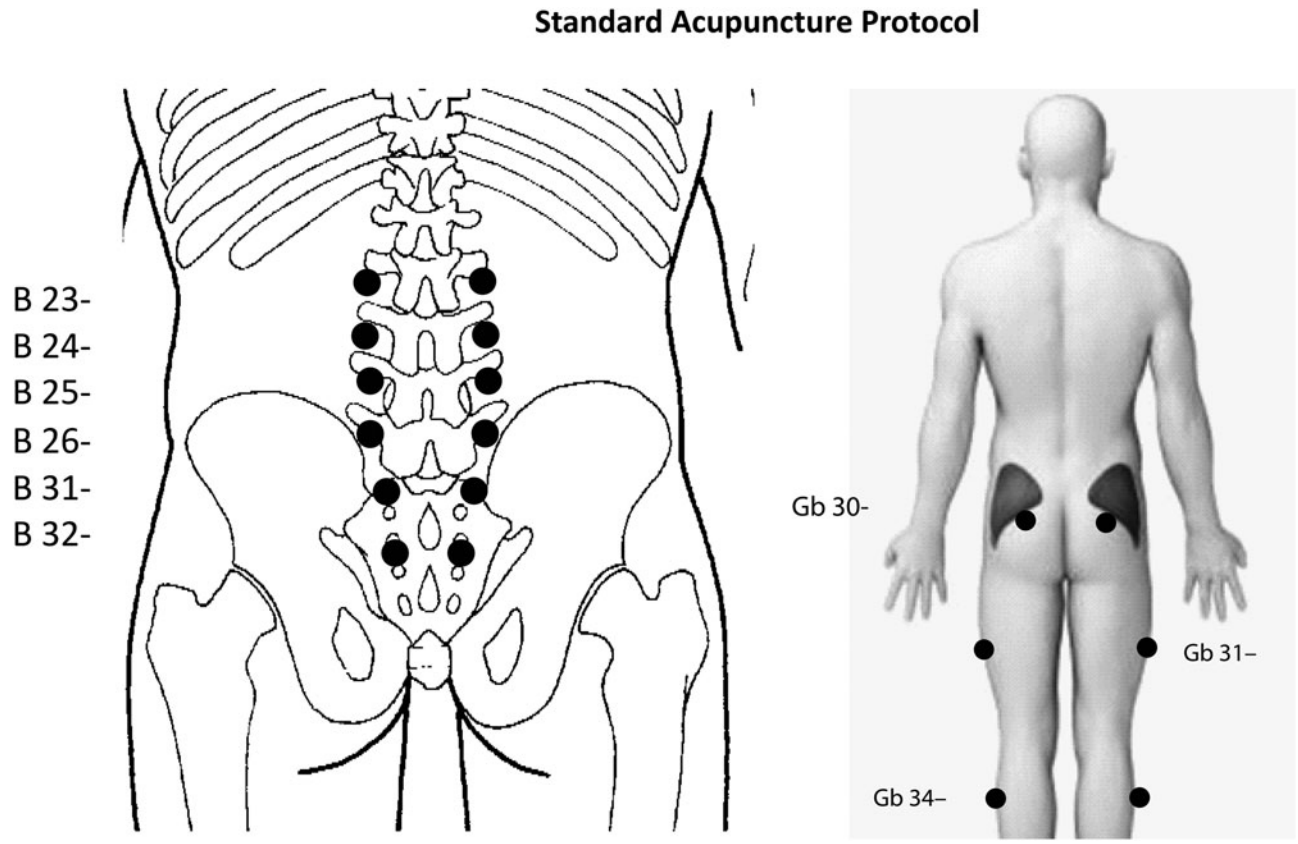

FIG. 1. Lower paraspinal acupuncture points urinary bladder (BL) (*left*) and gall bladder (Gb) points (*right*).

Table 1. Descriptive Pain Statistics for the 34 Patients in the Cohort Study

	N	*Minimum*	*Maximum*	*Mean*	*Standard deviation*
Pain level before treatment (0–10)	34	2.0	9.0	5.015	1.7858
Pain level after treatment (0–10)	34	0.0	6.0	1.588	1.4432
Follow-up pain level (0–10)	34	0.0	4.0	1.029	1.1210

therapy. They were asked to report pain levels before and after and 48 h after a single MPS application. There were no controls in this study, as this was a cohort analysis, with the subjects acting as their own controls relating to prepain and postpain assessments.

MPS was applied to standard protocol using Dolphin Neurostim (Acumed Medical LTD, Ontario, Canada) device.[23] This is an FDA-approved device that applies low frequency, concentrated, microcurrent stimulation (at 10k ohms) for the relief of chronic pain.[23] MPS application time was 30 sec per point, for a total of 18 points located in the lower back, hips, and legs (Fig. 1). The device was set to negative (−) polarity.

VAS was used to evaluate the patient's pain. The VAS is an 11-point scale from 0 to 10 with 0 being no pain and 10 being the most intense pain imaginable.

The patient verbally selects a value that is most in line with the intensity of the pain that they have experienced in the past 24 h or is often reported as a rating during a specific movement pattern or functional task.[27,28] The VAS has good sensitivity[29,30] and excellent test–retest reliability.

Standard acupuncture pain protocol (SP) was developed by one of us, B.F., as treatment approach to provide a simple, easy to apply, nonpharmaceutical solution for the treatment of chronic pain. The protocol involves the application of concentrated microcurrent stimulation (MPS) to acupuncture points located in the paraspinal lumbar, hips, and legs that isolate the key nerves and muscles that influence core of the body. When these points (Fig. 1) are collectively treated with concentrated microcurrent, it has been reported that a wide variety of neuromyofascial pain syndromes can be effectively relieved in a timely basis.[31,32]

The practitioner applying the MPS therapy was the sole person imparting the intervention and is a coauthor of ''Functional Acupuncture for Pain Management,''[32] and has more than 5,000 h of practical instruction in integrative neuromyofascial pain management.

The aim of this cohort preliminary study was to evaluate whether

(1) MPS, when applied to standard protocol, can modulate VAS pain scale in patients suffering with chronic neck pain,
(2) MPS applied to standard protocol is a valid option for the nonpharmacological pain management of neck pain conditions.

Statistical analyses were done by a third party freelance statistician using SPSS software.

Results

The VAS response of an $N = 34$ patient sample with chronic neck pain having MPS applied to lower back

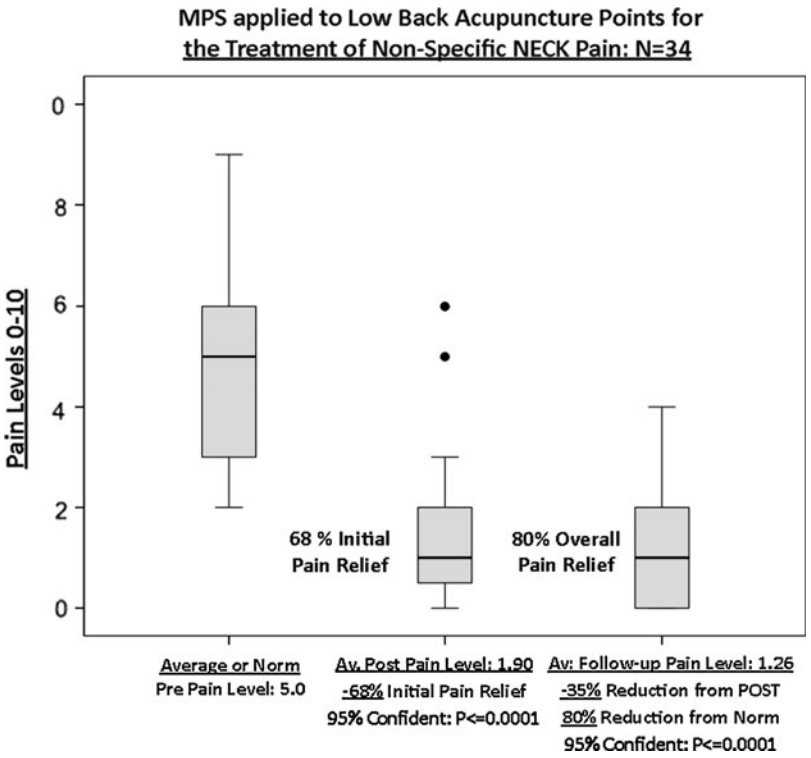

FIG. 2. Neck pain scores before, immediately after, and 2 days after treatment with MPS applied to low neck and gall bladder meridian. MPS, microcurrent point stimulation.

acupuncture points reflected an initial 68% reduction in pain [3.9050 points; 95% CI (2.9480, 3.9050); $p = 0.0001$], immediately postapplication and another 35% reduction in pain [0.5588 points; 95% CI (0.2001, 0.9176); $p = 0.03$], between post-treatment and the 48-h follow-up, for a total average pain relief of 80% (Table 1; Fig. 2).

Discussion

Chronic neck pain often equates to stress and pain that can make our daily lives miserable, and can lead to significantly impaired physical health.[2,4,5] Neck pain can be difficult to diagnose and even harder to treat.

Conventional management now includes advice to stay active and continue daily activities, exercise therapy, analgesics (e.g., paracetamol, nonsteroidal anti-inflammatory drugs, and opioids), muscle relaxants, corticosteroid spinal injections, and referral for consideration of surgery. However, there is a lack of strong evidence of effectiveness for most of these interventions.[33–35]

Literature suggests that both acupuncture and physiotherapy are similarly effective for neck pain,[36]with an average reduction of 40%–50% in mean pain scores.[37,38]

The data in this cohort study clearly show that the application of MPS to standard back protocol provided statistically significantly improved pain outcomes, both immediately postapplication and 48 h follow-up for the treatment of nonspecific neck pain. Although it is well supported that abdominal exercising and improved core strength reduce neck pain,[39,40] the consistency of neck pain outcomes produced through the treatment of acupuncture points of the standard protocol suggests that there may be a stronger relationship between neck pain and lower back and leg acupuncture points than the literature reports. It is of interest that the effect of a single application as per protocol continued to show further pain reduction at the 48-h postevaluation. How long this effect persists needs further study and will help to set guidelines for the frequency of MPS therapy.

It is suggested that low-amplitude DC current mimics human biocellular communications, and its application may produce regulation of the autonomic nervous system, resulting in body wide therapeutic benefits.[22,24] It is also further suggested that low-frequency DC microcurrent may activate the pituitary to release endorphins.[11] Both these biochemical processes may provide a plausible explanation for the prolonged pain relief after DC microcurrent and is an area where future research is required. We have already reported, in a single case study, a modification in autonomic nervous system parameters (sympathetic and parasympathetic balance) parallel to a reduction in pain score in a patient with postconcussion symptomology using MPS.[24] It is possible that this same mechanism of action is at play in this cohort analysis, as the pain was not at the same location; this has to be confirmed in other patients.

Since there were no controls within this study design, it is difficult to determine whether the point selection process or the microcurrent therapy, or a combination of both, was responsible for the significantly improved pain outcomes. Further study is needed in this direction to determine roles of efficacy between these modalities.

In conclusion, this study showed MPS provided significant (62%) overall improvements in patient pain levels immediately after initial treatment, and a further significant (30%) at the 2-day follow-up, for a total 80% pain relief overall improvement when applied to a standard protocol in patients with chronic neck pain, suggesting a possible future role for these modalities in the management of nonspecific neck pain.

Conclusions

This study showed that MPS provided statistically significant 68% improvement ($p \leq 0.0001$) in patient pain levels immediately after initial treatment, and a further statistically significant 35% ($p \leq 0.0001$) at the 2-day follow-up, for a total 80% pain relief. These significant changes help validate the potential application of MPS to standard protocol as an option to clinicians treating patients with chronic neck pain. However, long-term further investigation is warranted with a larger focus group to confirm these results and to assess their duration.

Acknowledgment

Statistical analyses were done by a third party freelance statistician using SPSS software.

Author Disclosure Statement

No competing financial interests exist.

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