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Scalp Acupuncture for the Management of Musculoskeletal and Neurological Conditions: A Case Series

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ABSTRACT

Background: Neurological and musculoskeletal conditions are a leading cause of disability worldwide, posing significant challenges despite conventional therapies, often resulting in chronic pain and functional limitations. Scalp acupuncture (SA), a needling technique combining traditional acupuncture methods with Western medical knowledge of neuroanatomy, offers a promising low-cost, low-risk alternative treatment modality. Its applications have been shown to span various musculoskeletal and neurological conditions, yet current literature is limited, necessitating further research to integrate SA into clinical practice effectively.

Objective: We aim to evaluate the clinical effectiveness of SA in 4 cases of refractory musculoskeletal and neurologic conditions including phantom limb pain, complex regional pain syndrome (CRPS), cervical paraspinal pain, and facial paralysis.

Methodology: This is a retrospective case series of 4 patients who were either referred to the James J. Peters Veterans Administrations Outpatient Pain Medicine Clinic or consulted for inpatient pain management. Patient exhibited symptoms refractory to conservative management, namely pain and/or paralysis/tremor. Pain scores were assessed using the Visual Analogue Scale (VAS).

Results: All 4 patients experienced immediate post-treatment relief of symptoms after 1 acupuncture treatment, including improved VAS score. Long-term effects were not uniformly assessed, but improvements were also seen at all follow-up visits documented varying from 2 weeks to 4 months' post-treatment. No adverse events were reported.

Conclusion: SA demonstrates efficacy as an adjunctive treatment for a diverse range of musculoskeletal and neurological pathologies, offering immediate and long-term pain relief and improved quality of life.

Keywords: Acupuncture; Pain medicine; Phantom pain

INTRODUCTION

Neurological and musculoskeletal conditions are a leading cause of disability worldwide, with musculoskeletal conditions alone affecting more than 1.63 billion people and ranking as the second-highest cause of disability globally [1]. Despite conventional therapies, chronic pain and functional impairment often persist with many patients experiencing ongoing symptoms, highlighting the need for alternative approaches to improve quality of life. A recent emphasis has been placed on complementary and adjunct measures to treat the complex nature of these chronic conditions.

Scalp acupuncture (SA) is a low-cost, easily accessible, low-risk technique often providing immediate symptomatic relief. Initially developed approximately 70 years ago, SA combines traditional acupuncture needling methods with modern neuroanatomical and neurophysiologic understanding through the insertion of needles into specific scalp layers to modulate corresponding cerebral functional regions [2]. Over recent years, SA has been increasingly applied for a range of indications including paralysis, pain management, aphasia, and Parkinson's Disease. However, the existing body of literature regarding efficacy of such treatments is limited and therefore there exists a need for broader investigation and evidence-based review for incorporating SA into clinical practice.

The aim of this case series study is to contribute to the growing body of evidence for the utility of SA in reducing pain and improving functional outcomes amongst refractory sequelae of disabling neurologic and musculoskeletal conditions. Secondary objectives include evaluating the safety profile and tolerability of SA, identifying potential factors associated with treatment response, and assessing duration of treatment effect. By illustrating the clinical utility of SA in these various patient populations, this study seeks to educate healthcare providers, equip practitioners with alternative treatment modalities, and promote future evidence-based research endeavors for patients who may benefit from this widely-applicable technique.

METHODS

Design: The article presents a retrospective case series utilizing chart review. All subjects had verbal informed consent obtained for acupuncture treatment. Given that this was a retrospective review of only 4 patients, no institutional review board approval was necessary.

Setting: All patients were treated within the James J. Peters Veterans Administrations healthcare system in Bronx, New York between December 2023 to February 2024. 3 patients were treated at an outpatient pain medicine clinic, and 1 patient was treated on an inpatient spinal cord injury unit.

Patients: Four patients were referred by various sources to a pain medicine service. The patients were diagnosed with neurologic or musculoskeletal conditions refractory to traditional conservative management. Inclusion criteria included age of 18 years or older and documented history of neurologic or musculoskeletal condition refractory to conservative management. Exclusion criteria included contraindications to acupuncture including bleeding disorders, spinal instability, neutropenia, and skin infections.

Intervention:

SA was performed by a licensed acupuncturist trained in the technique, targeting scalp acupuncture points corresponding to the affected areas. Needle placement included:

1. Bilateral upper 1⁄5 motor and sensory cortex with contralateral sensory reinforcement
2. Bilateral foot motor sensory areas

After insertion, manual stimulation using rapid in and out movements was applied for 2 minutes. Subsequently, electrical stimulation at 15Hz was applied for 15 minutes. To locate the motor and sensory areas, the following steps were followed:

1. Locate the midpoint of the midline and mark 0.5cm posterior.
2. Mark a second line from the midpoint of the eyebrow to the occipital protuberance.
3. From the intersection of the eyebrow-occiput line with the hairline, draw a line obliquely up to the 0.5 cm point behind the midline. This represents the motor area, which can be divided into five sections.
4. The sensory area is located just posterior to the motor area.

Outcome Assessment:

Outcome measures included subjective reports of pain intensity using the Visual Analog Scale (VAS). Follow-up assessments were conducted at various time points including immediate-response and up to 4 months post-treatment.

CASES

Case 1:

60-year-old male with bilateral below knee amputations presented with 20-year history of phantom limb pain despite undergoing various conservative management. The patient's pain episodes, characterized by sharp and electric sensations, occurred every five minutes and lasted for seconds, significantly impacting his sleep and quality of life. Initial assessment revealed severe pain, rated at a 10/10 on the VAS. On physical examination, patient appeared in mild distress with visible discomfort. When examining the residual limbs, patient had bilateral lower extremity involuntary muscle contractions and reflexive withdrawal movements. Following treatment with SA with electrical stimulation, the patient experienced immediate relief, reporting improved pain score of 0/10. Subsequent follow-ups at 2-month and 4-month intervals indicated sustained pain relief, with the patient reporting consistent control of his pain at a level of 0/10 or 1/10. The patient underwent biweekly SA sessions to proactively manage and prevent recurrence of phantom limb pain episodes, highlighting the efficacy and potential long-term benefits of this therapeutic approach.

Case 2:

78-year-old female presented with persistent, excruciating left wrist pain since a fall >6 months prior. Work-up was negative for fracture. Patient was initially managed conservatively with occupational therapy, bracing, and a home exercise program. She trialed pregabalin without significant relief. Patient continued to endorse hypersensitivity, burning, stiffness, weakness impairing her ADLs, and was diagnosed with complex regional pain

syndrome (CRPS). Patient reported her pain level as consistently maximal on the VAS, subjectively "greater than 20". SA trialed: 2 points R Shen Men, R upper 2/5 sensory area with manual stimulation for 10 minutes; foot motor sensory connected to R upper 2/5 sensory area with 200Hz of electricity for 20 minutes. Immediately after the first treatment, patient's pain decreased to 4/10. On re-evaluation 1 month later, patient's pain remained at a 4/10 level, with significant improvement in her ability to perform her ADLs independently and plans to continue receiving SA.

Case 3:

65-year-old male with Parkinson's disease presented to the pain management clinic with debilitating musculoskeletal pain localized to the paraspinal cervical region, accompanied by his baseline resting tremors. The patient had previously failed conservative and interventional treatments including Levodopa/carbidopa optimization, ibuprofen (discontinued due to worsening gastroesophageal reflux disease symptoms), gabapentin, diclofenac gel, lidocaine patch, physical and occupational therapy, and cervical epidural steroid injections. At the initial visit, the patient rated his current and average pain levels as 8/10 on the VAS, describing the quality as "dull" and "intermittent," which worsened with tremors. SA was performed, and immediately post-treatment, the patient reported his pain as 0/10 and experienced a dramatic decrease in tremors. At the same visit, he was initiated on acetaminophen 650 mg every 6 hours as needed for multimodal analgesia. During the 2-week follow-up, the patient reported his pain as 1/10, indicating that SA effectively controlled his pain. Tremors however returned to baseline after 1 week. The plan included repeat SA treatment in 2 weeks, while maintaining the acetaminophen dose.

Case 4:

62-year-old male with history of cauda equina syndrome secondary to myxopapillary ependymoma and recent diagnosis of Ramsay Hunt Syndrome (RHS) initially presenting as left facial paralysis with accompanying left facial vesicular rash. Patient completed 14-day course of acyclovir and 5-day course of oral prednisone. Eighteen days after initial presentation, patient noted persistent facial droop. At this time, pain medicine was following the patient for left-sided otalgia. Physical exam notable for asymmetric smile with mild left-sided droop, mild flattening of left nasolabial fold, decreased strength left eye closure, and asymmetric eyebrow raise reduced on left with House-Brackmann scale grade IV facial paralysis. In the setting of facial paralysis secondary to RHS, pain medicine performed SA. The patient was treated with needles to contralateral upper 1/5, middle 2/5, and lower 2/5 motor area of the face for 10 minutes (Figure 1). Facial paralysis with noted subjective improvement from patient, and objective improvement to grade III House-Brackmann scale.

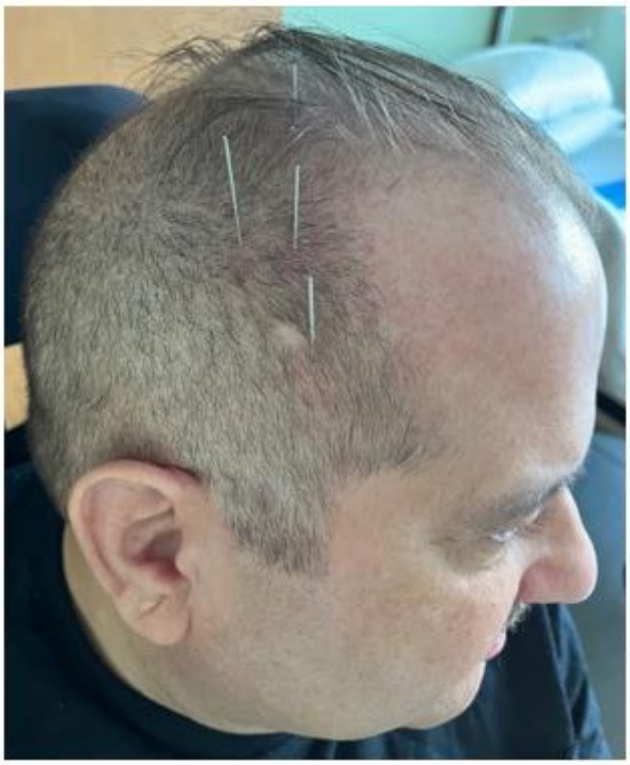

Figure 1: Placement of scalp acupuncture needles.

DISCUSSION

Through these 4 varied cases of musculoskeletal and neurological conditions, SA provided effective immediate and long-term relief of symptoms, was tolerable by patients, and did not reveal any adverse effects. As shown in Table 1, VAS scores improved immediately with benefits persisting at follow-up. Though diagnoses and pathologies differed, SA aided in restoring functional capacity to varying degrees in all 4 patients. Further, administration of treatment did not take greater than 15 minutes in any patient case. This case series emphasizes the broad scope of musculoskeletal and neurologic conditions that SA can offer beneficial outcomes in, with particular efficacy in pain management and quality of life. In all cases, neither the site of pain nor the pathology of neurologic and/or musculoskeletal dysfunction limited the application of the modality. Patients with phantom limb pain, resting tremor due to Parkinson's disease, cervical paraspinal pain, CRPS, and facial paralysis were treated similarly and experienced notable improvement in VAS scores, function, and quality of life.

	Diagnosis	Pre-treatment score	Immediate post-treatment score	Follow-up score	Adverse events
Case 1	Phantom limb pain	VAS: 10/10	VAS: 0/10	VAS: 1/10 (4 months)	None
Case 2	CRPS	VAS: 10/10	VAS: 4/10	VAS: 4/10 (1 month)	None
Case 3	Cervical paraspinal myofascial pain	VAS: 8/10	VAS: 0/10	VAS: 1/10 (2 weeks)	None
Case 4	Facial palsy	House-Brackmann scale grade IV	House-Brackmann scale grade III	Not obtained	None

The results of this widely applicable intervention proves consistent with prior reports studying the effect of SA on various musculoskeletal conditions. For example, a 2015 study by Correia et al. surveyed 20 patients with chronic head or neck pain, and all 20 patients had statistically significant improvement after SA both immediately and at 8 weeks post-treatment [3]. Additionally, a 2013 study by Allam et al. found that 30 women with chronic osteoarthritis of various anatomical sites (cervical, lumbosacral, knee, shoulder) treated with SA had a statistically significant mean VAS score change 1-hour post-treatment of 1.77 ± 0.43 [4]. Lastly, a 2002 study by Schokert et al. evaluated 104 patients with various musculoskeletal complaints who underwent SA, revealing mean pretreatment mean VAS scores of 63/100 and mean posttreatment VAS scores of 19/100 [5]. Though these larger scaled studies provide evidence-based guidance on treating the painful sequelae of a host of musculoskeletal conditions with SA, there remains a need for more robust studies on the chronic pain conditions included in our case series, including CRPS and phantom limb pain.

Regarding the use of SA in paralysis, a 2022 randomized control trial by Xie et al. concluded that SA and traditional acupuncture of the affected limb combined with modern rehabilitation strategies significantly improved limb motor function of patients with ischemic stroke, more so than just traditional acupuncture and modern rehabilitation [6]. Thus, SA appears to play a beneficial role in paralysis; however, the mechanism requires further study.

One reason for the positive effect across varying pathologies in this case series could be the widely applicable mechanism of action of acupuncture, the release of endogenous opioid peptides [7]. Further, needle insertion may activate descending pain control inhibition and modulate sensory impulses consistent with the gate control theory [8]. Regarding effectiveness in CRPS, SA is thought to work upon the primary central pain mechanism hallmarked by cortical reorganization within the cerebral cortex leading to persistent activity of primary nociceptive neurons causing pain. SA is proposed to act upon the neurophysiologic relationship between the scalp and central nervous system, causing a rewiring phenomenon of the central pain and improving CRPS symptoms [9].

CONCLUSION

SA is shown to be an effective adjunct tool in the management of a variety of debilitating musculoskeletal and neurologic conditions, including cases of facial paralysis, phantom limb pain, resting tremor, cervical paraspinal pain, and CRPS. SA offers a cost-effective, low-risk, easy-to-apply in-office modality with oftentimes immediate and long-term pain relief, as well as improved quality of life. Future prospective studies and randomized controlled trials are needed to evaluate the use of SA to establish evidence-based guidelines for use in clinical practice.

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