Efficacy of Parietal Acupoint Therapy: Scalp Acupuncture for Neck/Shoulder Stiffness with Related Mood Disturbance

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ABSTRACT

Objectives: Yamamoto New Scalp Acupuncture is a quick and effective microsystem of acupuncture used for treating various symptoms for which the somatotopic area is the scalp. This article describes Parietal Acupoint Therapy (PAPT), which is another approach, using a different scalp somatotopy, and to evaluate PAPT's effect on neck/shoulder stiffness and related mood disturbances.

Materials and Methods: *Subjects:* Forty-six volunteers suffering from chronic neck/shoulder stiffness with various symptoms (headache, dizziness, and related mood disturbance) participated in this study and were randomly divided into 2 groups: treatment (26 subjects) and control (20 subjects). *Interventions:* PAPT, PC points, and PL points were used. *Outcome Measures:* Immediately before and after treatment, to evaluate the patients' psychobiologic and mood states, salivary alpha amylase (sAA) levels were determined and the Profile of Mood States Second Edition (POMS 2)—Short Form scale was administered. Neck/shoulder stiffness was evaluated using a visual analogue scale (VAS) score immediately before and after, and at 3 and 7 days post-therapy.

Results: sAA levels were not significantly different in either group after versus before the intervention. There were significant decreases in mean scores in the POMS 2 subscales Anger/Hostility ($P < 0.001$), Confusion/Bewilderment ($P < 0.001$), Depression/Dejection ($P < 0.01$), Fatigue/Inertia ($P < 0.001$), Tension/Anxiety ($P < 0.001$), and Total Mood Disturbance ($P < 0.001$) post-therapy in the treatment group, but not in the control group. The mean VAS score significantly improved in the treatment group post-therapy, which persisted during the observation period.

Conclusions: PAPT treatment on PC points ameliorated neck/shoulder stiffness and related mood disturbance. PAPT has the potential to be as effective as other scalp acupuncture types.

Keywords: microsystem acupuncture, Parietal Acupoint Therapy, neck/shoulder stiffness, mood disturbance

INTRODUCTION

MICROSYSTEM ACUPUNCTURE could be defined as a method based on somatotopies that are correlated with various organs and their respective functions within the body. The therapeutic efficacy of microsystem acupuncture for various diseases is well-known, and microsystem acupuncture

has been shown to be as effective as traditional Chinese acupuncture. Microsystems exist in specific small areas of the body, such as in the auricle, oral cavity, scalp, hands, and feet.

In the early 1950s, the French doctor Paul Nogier, MD, discovered the first microsystem, in auricular acupuncture. He asserted that the ear was the only body part with acupoints that corresponded to the entire body. However, microsystems had

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already been discovered in the early 1900s, when Ralph Alan Dale, EdD, PhD, drew on ancient research and suggested the possibility of the existence of an energetic hologram in every part of the body. After additional, steady research, he developed a theory and the principles of the microacupuncture system.¹

Since then, the microsystems in various part of the body—such as the scalp, ear, mouth, hands, and feet—have been integrated and established. Today, the therapeutic effects of those microsystems are known.

For instance, for auricular acupuncture, following Paul Nogier's discovery, clinical and basic studies have confirmed its efficacy for the treatment of pain,^{2–5} mental disorders,^{6,7} and refractory epilepsy via the activation of the parasympathetic nervous system.⁸

In the 1970s, Jochen Gleditsch, MD, established oral acupuncture, which is another effective acupuncture microsystem. He studied the effectiveness of oral acupuncture for the treatment of various diseases found in clinical settings during a 25-year period, and, in 1995, he described the oral cavity microsystem.⁹ The immediate efficacy of oral acupuncture for craniomandibular disorder in particular has been well-documented.^{10,11}

In 1971, Tae Woo Yoo, OMD, PhD, discovered Korean Hand Acupuncture. To date, 14 meridians for acupuncture in the body have been mapped. This type of acupuncture has been reported to be effective in the improvement of patients with irritable bowel syndrome¹² and for pain relief.¹³

In scalp acupuncture, several microsystems have been explored and developed since the 1950s in China. Jiao Shunfa, MD, Fang Yunpeng, MD, and Tang Songyan, MD, 3 major contributors, respectively, discovered different charts and scalp acupuncture groups. In the 1970s, Jiao established the concept of combining modern neurologic anatomy and physiology principles with traditional acupuncture techniques. Zhu Ming Qing, LAc, also developed his scalp acupuncture method in the 1970s, which was based on the origins of modern scalp acupuncture in the work of Huang Xuelong, MD, who introduced the concept of a relationship between the scalp and the cerebral cortex. He founded his method, Zhu's scalp acupuncture, and published a book in English in 1992.¹⁴

Toshikatsu Yamamoto, MD, PhD, established Yamamoto New Scalp Acupuncture (YNSA) in 1973 and distinguished it from traditional Chinese scalp acupuncture.¹⁵ YNSA is a somatotopic representative microsystem that shows the entire body anatomically and functionally on the scalp. YNSA has been recognized as an effective therapy for use during rehabilitation¹⁶ for pain relief in patients who have suffered stroke¹⁷ or have chronic pain.¹⁸ The efficacy of YNSA in migraine-related pain relief has been reported to be similar to that of traditional Chinese acupuncture.¹⁹

Osamu Fujii, DDS, PhD, who has worked with Yamamoto for more than 2 decades at the YNSA association in Japan, discovered another somatotopic area on the scalp. In 2002, he gave the first presentation on Parietal Acupoint Therapy (PAPT) at the 20th annual meeting of the Japan Dental So-

ciety of Oriental Medicine (November 9th–10th in Osaka). Since then, PAPT has continued to be developed and used to treat various symptoms, especially chronic disorders of the musculoskeletal system. However, so far, this type of treatment has not been introduced in clinical practice. Here, this article describes PAPT, in detail for the first time, and reports a study on the effect of PAPT on neck/shoulder stiffness and related psychological distress.

MATERIALS AND METHODS

Parietal Acupoint Therapy

PAPT is a method that uses different somatotopic areas than those used in YNSA. The specific points on the body were mapped on the midline from 5 cm anterior of the coronal suture to over the lambdoid suture, with a 2-cm width on the scalp. From front-to-back, specific acupoints, which are brainstem points, line up consecutively as follows: PC 1–PC 8 (cervical spine), PT 1–PT 12 (thoracic spine), PL 1–PL 5 (lumbar spine), and PS 1–PS 5 (sacral spine). Brain points and cerebellar points exit outside brainstem points bilaterally (Fig. 1). These are the basic points representing functions of the locomotor system and of the sensory system and correspond to areas of anatomical innervation. Figure 2 shows the evidence-based sensory dermatome map that was presented by Keegan and Garrett in 1948.²⁰

Procedure

Forty-six female volunteers (age range: 21–59) with chronic neck/shoulder stiffness and varied symptoms—such

FIG. 1. Anterior-to-posterior spread of acupoints along the midline of the scalp. Brainstem points: PC 1–PC 8, cervical spine; PT 1–PT 12, thoracic spine; PL 1–PL 5, lumbar spine; and PS 1–PS 5, sacral spine. Brain and cerebellar points exit outside brainstem points bilaterally.

FIG. 2. Sensory dermatome map based upon Keegan and Garrett (1948).²⁰ Each Parietal Acupoint Therapy acupoint corresponds to an anatomical area of innervation.

as headache, dizziness, visual problems, and resulting psychologic stress—were selected and divided into 2 groups (i.e., the treatment and control groups). For the therapy, sterilized disposable needles (J-Type 0.25 × 30 mm; SEIRIN Co., Japan) were used. Five-to-seven needles were inserted into palpated points at a depth of 10–15 mm in the PC 3–PC 6 areas in the treatment group and in the PL 2–PL 5 areas in the control group. Patients were instructed to stay seated and rest for 30 minutes after the therapy. Evaluation of salivary alpha amylase (sAA) levels was conducted and the Profile of Mood States Second Edition (POMS 2)—Short Form was administered immediately before and after the treatment. Pain and

stiffness were assessed with a visual analogue scale (VAS) immediately before and after and at 3 and 7 days after therapy.

Salivary Alpha-Amylase

Levels of sAA were measured using the Dry Chemistry System (Nipro Corp., Japan) in accordance with the manufacturer's instructions.^{21,22} The handheld analyzer consists of a monitor and a disposable sampling test strip, which enables the measurement of sAA to be performed quickly and easily. Saliva was sampled by placing a test strip directly under the tongue of the participant for 30 seconds.

The strip was then inserted into the analyzer immediately and the saliva was transformed to the reagent strip on the reverse side of the strip sleeve by compression. The reagent strip contained the substrate 2-chloro-4-nitrophenyl-4-O- β -D-galactopyranosylmaltoside (Gal-G2-CNP), which acts as a substrate of sAA. The sAA reacts with Gal-G2-CNP, which is colorless, to yield CNP, which is yellow in color. This reflection was measured using an optical unit, and, after 20 seconds, it was converted into enzyme activity (kU/L) and displayed automatically.

POMS Second Edition—Short Form

The short Japanese version of the POMS 2 is a self-report measure in which the questions are classified into 7 mood subscales: (1) Anger/Hostility; (2) Confusion/Bewilderment; (3) Depression/Dejection; (4) Fatigue/Inertia; (5) Tension/Anxiety; (6) Vigor/Activity, and (7) Friendliness. The POMS 2 consists of 35 items, which are scored on a 5-point scale (from 0 [not at all] to 4 [extremely]). Total mood disturbance was calculated from 6 subscale scores, excluding the Friendliness subscale.²³ The POMS total score and subscales have been shown to correlate with other psychosocial measures, providing both convergent and discriminant validity.²⁴

Visual Analogue Scale Scores

VAS scores for stiffness of the neck and shoulders were given on a 10-cm horizontal line, where left was 0 and indicated no feeling, and right was 10 and indicated strong feeling.

Statistical Analyses

All statistical analyses were performed using the statistical software R (version 3.3.2). Data are presented as means $\pm$ standard deviation. Analyses of sAA and each scale of the POMS 2 were performed using the Wilcoxon rank-sum test. The time courses of changes in the VAS score during the study were assessed by 2-way repeated-measures analysis of variance with Holm–Bonferroni adjusted *post hoc* tests. Any *P*-values <0.05 were considered to represent statistically significant differences.

Additional Notes

All procedures used in the research were approved by the Ethical Committee of the Japan Community Health Care Organization of Yokohama Central Hospital, Kanagawa, Japan. All participants agreed with the study protocol and signed written informed consents.

RESULTS

No significant differences were observed between the 2 groups in sAA level at baseline, and there were no significant changes in either of the 2 groups after therapy (Table 1). In the

TABLE 1. SALIVARY ALPHA AMYLASE LEVELS^a
BEFORE AND AFTER THE THERAPY

Group	Case	Before	After	<i>P</i> -value
Treatment	26	20.16 $\pm$ 23.62	17.62 $\pm$ 23.70	> 0.05
Control	20	20.25 $\pm$ 24.81	18.20 $\pm$ 16.95	

^aSalivary alpha-amylase (kU/L).

treatment group, the average POMS 2 scores in 5 of the 7 subscales indicating negative feelings were significantly improved after therapy: (1) Anger/Hostility (5.04 $\pm$ 3.14 versus 2.19 $\pm$ 2.82; $P < 0.001$); (2) Confusion/Bewilderment (5.23 $\pm$ 3.83 versus 2.85 $\pm$ 2.48; $P < 0.001$); (3) Depression/Dejection (4.15 $\pm$ 3.05 versus 2.50 $\pm$ 2.47; $P < 0.01$); (4) Fatigue/Inertia (8.23 $\pm$ 3.88 versus 4.77 $\pm$ 3.66; $P < 0.001$); and (5) Tension/Anxiety (7.65 $\pm$ 3.63 versus 4.50 $\pm$ 2.99; $P < 0.001$). In the Vigor/Activity and Friendliness subscales, no significant differences were observed (7.54 $\pm$ 3.82 versus 8.15 $\pm$ 3.69 and 11.46 $\pm$ 2.75 versus 11.08 $\pm$ 3.35, respectively; $P > 0.05$).

In the control group, there were no significant differences in scores on any of the subscales after therapy: Anger/Hostility (4.65 $\pm$ 3.47 vs. 4.15 $\pm$ 3.38; $P > 0.05$); Confusion/Bewilderment (5.30 $\pm$ 3.87 versus 4.75 $\pm$ 4.06, $P > 0.05$); Depression/Dejection (4.40 $\pm$ 3.59 versus 4.30 $\pm$ 3.57; $P > 0.05$); Fatigue/Inertia (7.75 $\pm$ 3.54 versus 6.25 $\pm$ 4.12; $P > 0.05$); Tension/Anxiety (7.40 $\pm$ 4.19 versus 6.35 $\pm$ 3.87; $P > 0.05$); Vigor/Activity (8.25 $\pm$ 3.18 versus 8.40 $\pm$ 3.23; $P > 0.05$); and Friendliness (11.05 $\pm$ 2.70 versus 11.30 $\pm$ 2.22; $P > 0.05$; Fig. 3). The mean total mood disturbance score also significantly decreased from 22.46 $\pm$ 15.51 to 8.46 $\pm$ 11.99 in the treatment group ($P < 0.001$). No difference was observed in the control group (21.65 $\pm$ 18.81 versus 19.10 $\pm$ 19.76; Fig. 4).

There was also a statistically significant improvement in VAS score in the treatment group that was observed

FIG. 3. Changes in the mean Profile of Mood States (POMS) score before and after therapy. Each value represents the mean score for the seven subscales of POMS as mean $\pm$ standard deviation (* $P < 0.01$; ** $P < 0.001$). AH, Anger/Hostility; CB, Confusion/Bewilderment; DD, Depression/Dejection; FI, Fatigue/Inertia; TA, Tension/Anxiety; VA, Vigor/Activity; F, Friendliness.

FIG. 4. Score of total mood disturbance (TMD) from a mean of 6 scores before and after the therapy, shown as mean $\pm$ standard deviation (* $P < 0.001$).

immediately after therapy and that persisted throughout the observation period ($P < 0.01$; Fig. 5).

DISCUSSION

PAPT is an approach that uses basic acupoints displaying each motor and sensory function anatomically. Prior to the present study, the current authors demonstrated that the dermal temperature of the cervical spinal area increased 30 minutes after the application of PC3–6 points, as determined by body thermography. Those findings indicated that the application of PAPT acupoints affected the target areas appropriately (Fig. 6).

FIG. 5. Graph shows mean $\pm$ standard deviation of visual analogue scores (VAS) before, immediately after, 3 days, and 7 days after the therapy. Effectiveness lasted throughout the observation period in the treatment group. * $P < 0.01$ significantly different from before therapy.

FIG. 6. Thermography image of the patient's back 30 minutes after therapy on PC 3– PC 6. Image shows increased surface temperature in the C-3–C-6 neck region.

As with other types of microsystems acupuncture, PAPT can relieve symptoms immediately and effectively by using acupoints corresponding to the areas in which patients complain of pain or stiffness. YNSA is composed of the following four groups: (1) basic points for the kinetic apparatus; (2) sensory points for sensory organs (eyes, nose, mouth, and ears); (3) Ypsilon points for internal organs (Small Intestine, “Triple Burner,” Large Intestine, Stomach, Liver, Spleen/Pancreas, Gallbladder, Kidney, Bladder, Lungs, Pericardium, and Heart); and (4) brain points for cerebrum–cerebellum and basal ganglia (details are given in the original study).¹⁵ PAPT can be substituted for the YNSA basic points and applied by giving more consideration to innervation. YNSA Ypsilon points are applied on the basis of neck diagnosis to patients reporting more-complicated symptoms, such as disorders of internal organs, incurable pain, and stress-related problems. PAPT is effective and can provide the first treatment for any symptoms, such as pain and muscle stiffness; furthermore, the treatment combined with the use of Ypsilon points can contribute to the reduction of troublesome symptoms.

In the present study, a single treatment using the PC points in PAPT for neck/shoulder stiffness and mood disturbance was shown to be effective. All volunteers were office workers who had used visual display terminals (VDTs). Working with VDTs is stressful both physically and mentally. Neck/shoulder stiffness is thought to be the physical response to a state of stress, which is related to many factors such as VDT use, neck posture, sleeplessness, and feelings of stress.^{25,26} Patients with neck/shoulder stiffness often also report headache, dizziness, and tinnitus.²⁷ Over the long-term, these symptoms can cause psychologic impairment, with symptoms such as anxiety, fatigue, and depression. Moreover,

mood problems can delay reduction of the physical symptoms, and this vicious cycle causes more stress.

The stress response is primarily regulated by two neuroendocrine systems: the hypothalamic–pituitary–adrenocortical (HPA) and the sympathetic adrenomedullary (SAM) systems.^{28,29} As a biomarker of the stress reaction, salivary circulating free cortisol is thought to indicate a response to HPA-axis activity,³⁰ whereas sAA has been reported to increase in response to adrenergic activity caused by psychosocial stress.^{31–33} Secretion of sAA occurs in the controlled system according to neuronal reaction as well as hormonal reaction via the SAM system.

Maruyama et al. suggested that the SAM system might be more sensitive to acute physiologic stressors than the HPA system.³⁴ Levels of sAA have been reported to be highly correlated with results on the State Trait Anxiety Inventory (STAI)—which is an assessment tool for state anxiety and trait anxiety—after acute stress load and is thought to be a better index of stress.³⁵ In the present study, however, the change in sAA level before and after therapy was not statistically significant in either of the 2 groups, despite significant improvement in the POMS 2 score after therapy in the treatment group. A possible reason for this could be that, because the subjects were volunteers with chronic stress, no rise response could be observed. In fact, the duration of the sAA elevation was reported to be only ~10 minutes. Moreover, women showed lower sAA levels than men at baseline.³⁶ In future research, other stress markers should be considered for the evaluation of chronic stress.

The effect of traditional Chinese acupuncture on mood disturbance associated with chronic pain has been proven,^{37,38} and microsystem acupuncture (auricular acupuncture) has been shown to potentially relieve stress/anxiety associated with examinations³⁹ and caring⁴⁰ according STAI assessments.

Although the direct mechanism underlying the PC points for the mood state was unclear in the present study, an increase in the surface temperature of the neck was confirmed by thermography, as shown in Figure 3. Yasui et al. investigated the effects of repeated application of heat- and steam-generating sheets to the neck on cerebral hemodynamics and autonomic nervous activity by using near-infrared spectroscopy and electrocardiograms. In their study, significant reductions in neck stiffness and fatigue, with increased parasympathetic nervous activity and decreased sympathetic nervous activity, were observed.⁴¹ Those results may help determine the mechanism underlying the relief of neck/shoulder stiffness and psychologic stress that can be obtained with acupuncture.

CONCLUSIONS

This is the first report to describe PAPT. This study showed that treatment on PC points in PAPT can reduce neck/shoulder stiffness with related mood disturbances.

PAPT has the potential to heal a variety of symptoms as effectively as YNSA.

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