Original Article

A comparison of the Effectiveness of Acupuncture and Ultrasound Treatment in Patients with Neck Pain from Myofascial Pain of the Upper Trapezius: A Randomized Controlled Trial

Suwimon Sangiamsak
Rayong Hospital, Rayong, Thailand

ABSTRACT

Objectives: To compare the effectiveness of acupuncture and ultrasound treatment in patients with neck pain from myofascial pain of the upper trapezius

Study design: A randomized controlled trial

Setting: A general hosital, Thailand

Participant: Patients with myofascial pain syndrome of the upper trapezius muscle.

Methods: Sixty patients with myofascial pain syndrome of the upper trapezius muscle were enrolled. Thirty patients were randomly assigned to the experimental group which received acupuncture treatment at points GB20, SI11, DU14, SI15, GB21, and EX-HN15, along with electrical stimulation. The acupuncture points were stimulated in pairs: GB20 with EX-HN15 and GB21 with SI11. Continuous wave electrical stimulation was applied at a tolerable current level for 25 minutes. The thirty patients in the control group were treated with ultrasound diathermy using a Sonopuls 190 at a frequency of 1 MHz and an intensity of 0.8-1 watts/sq cm. Treatment duration was 5-10 minutes. Both groups received treatment twice a week for a total of four weeks. The outcome measures were the numeric rating scale (NRS) and the Thai version of the Neck Disability Index (Thai-NDI) scores, assessed before the intervention and at week 4 following treatment.

Results: There were no significant differences in demographic characteristics between the two groups. Following treatment, mean pain scores decreased from 7.13 (SD = 1.36) to 3.43 (SD = 1.72) in the acupuncture group and from 7.17 (SD = 1.42) to 4.50 (SD = 2.30) in the ultrasound therapy group. The between-group difference was statistically significant (p = 0.046). Both groups showed reductions in Thai-NDI mean scores after treatment, from 18.90 (SD = 7.19) to 10.10 (SD = 6.25) and from 21.70 (SD = 6.93) to 12.77 (SD = 6.40) in the experimental and control groups, respectively, with no statistically significant difference observed between the two groups.

Conclusions: Acupuncture treatment demonstrated positive effects as shown by lower post-treatment pain scores (NRS). Therefore, it can be considered an appropriate method for the management of myofascial pain of the upper trapezius muscle.

Keywords: acupuncture, ultrasound, neck pain, myofascial pain syndrome

ASEAN J Rehabil Med. 2026; 36(2): 57-64.

Introduction

Neck pain is one of the most common symptoms related to the musculoskeletal system, with the prevalence of neck pain reaching as high as 75.0%.[1] Besides being a personal issue, neck pain also negatively impacts quality of life, family, social interactions, healthcare expenses, and results in substantial work productivity loss.[2] Neck pain can stem from various causes. It is frequently associated with myofascial pain syndrome (MPS), a common clinical entity, especially in the upper trapezius muscle. The prevalence of MPS in patients presenting with pain ranges from 30.0% to 93.0%, with neck pain occurring in up to 55.0% of cases.[3] MPS is characterized by hyperirritable spots located within taut bands of skeletal muscle, known as trigger points, which elicit localized pain and exhibit referred pain patterns. Additionally, autonomic phenomena may also be present.[4]

Treatment options are classified into pharmacological and non-pharmacological approaches. Pharmacological treatments include nonsteroidal anti-inflammatory drugs (NSAIDs), tramadol, antidepressants, and anticonvulsants. Non-pharmacological treatments encompass interventions such as dry needling which has traditionally been used as one of the fastest and most effective methods to inactivate myofascial pain trigger points and help alleviate associated pain. Trigger point injections are similar to dry needling; however, they involve injecting various solutions, typically a local anesthetic. Studies suggest that trigger point injections have similar efficacy to dry needling but cause less discomfort.[5] Postural, mechanical, and ergonomic modifications are also options, but there is little direct data to support that approach in treating myofascial pain. Occupational muscle pain syndromes are theorized to occur as a result of repetitive microtrauma and myofascial

Correspondence to: Suwimon Sangiamsak, MD, FRCPhysiatrT; Rayong Hospital, 138 Sukhumvit Road, Thapradu, Muang, Rayong 21000, Thailand; E-mail:suwimonoko@hotmail.com

Received: August 31, 2025 Revised: October 17, 2025 Accepted: November 14, 2025

shortening. Correction of awkward postures is a standard part of treating these disorders, although long-term efficacy studies are lacking.[4] Other modalities include transcutaneous electrical nerve stimulation (TENS), which uses an electrical current to stimulate nerve fibers and provide pain relief. TENS can be used as an adjunct therapy to help alleviate MPS, but should not be considered a monotherapy. Laser therapy has also been used in the treatment of musculoskeletal pain, including MPS; however, its exact therapeutic mechanism remains unclear.[5]

Ultrasound diathermy (USD) is a therapeutic device that uses high-frequency sound waves to produce deep heating effects which is widely used in the treatment of patients with myofascial pain. It has been found to help reduce pain, increase pain thresholds, and improve joint range of motion.[5] More over, it has been shown to reduce pain more effectively than a placebo or no treatment, and is considered safe.[6] Ultrasound probes are composed of piezoelectric crystals that use high-frequency alternating currents to transform electrical energy into mechanical oscillation energy that is applied via a transducer or applicator placed in direct contact with the patient's skin. The waves are absorbed primarily by connective tissue, e.g., ligaments, tendons, fascia, scar tissue. The thermal and nonthermal effects of therapeutic ultrasound induce biological responses, including muscle relaxation, tissue regeneration, and a decrease in inflammation.[6] A study by Esenyel M, et al. reported that ultrasound treatment and trigger point injections were found to be equally effective.[7]

Acupuncture aims to restore bodily balance and is notable for its effectiveness in relieving pain.[8] The World Health Organization has recognized neck pain as a condition that can be treated with acupuncture, which is also considered safe. Acupuncture has been found to affect the autonomic nervous system, which controls the function of various organs and influences the secretion of several substances in the body, including endorphins and endogenous opioids. These substances help alleviate pain and reduce inflammation effectively.[9] For patients with neck pain, selected acupuncture points are often located along the gallbladder meridian, the small intestine meridian, and the governing vessel, since these meridians pass through the neck area. Additional extra-meridian points in the neck region may also be used. Therefore, acupuncture targeting points on these meridians can help alleviate neck pain in patients.[8] Nowadays, electroacupuncture is often used to enhance the effectiveness of acupuncture. Electroacupuncture is a technique that uses a device generating electrical currents through the acupuncture needle to stimulate blood and qi circulation, providing patients with continuous stimulation. One of the main indications for electroacupuncture is pain relief.[10] In a 2007 study, Trinh K, et al. conducted a systematic review on the effects of acupuncture for individuals with neck pain and found that acupuncture relieved pain more effectively than sham treatment.[11] Moreover, acupuncture has been shown to achieve therapeutic outcomes comparable to those of trigger point injection.[12]

In Thailand, USD is widely available and commonly used. There are also a large number of patients seeking services in rehabilitation departments, further intensifying the demand for treatment. Due to the high demand, rehabilitation department schedules are often tightly packed. This problem frequently leads to increased waiting times and to treatment sessions that are less frequent than clinically desirable, which may limit the continuity and effectiveness of patient care. Acupuncture, which is provided at acupuncture clinics within the Department of Thai Traditional Medicine, is considered an alternative medicine approach of interest, which may help treat patients with myofascial pain of the upper trapezius muscle. It can serve as a first-line option, allowing patients to receive treatment more quickly and effectively. This study aims to compare the effectiveness of acupuncture and ultrasound treatment in patients with neck pain from myofascial pain of the upper trapezius.

Method

Study design

This study was an open-label randomized controlled trial conducted at the Department of Rehabilitation Medicine, Rayong Hospital, Thailand. The Human Research Ethics Committee of Rayong Hospital approved it for human research (ethical approval number RYH REC No. E22/2567), and it was registered in the Thai Clinical Trials Registry on April 12, 2024 (Number TCTR20240412006). This study followed the recommendations of the Consolidated Standards of Reporting Trials (CONSORT) guidelines for reporting randomized controlled trials.

Participants

Participants in this study were patients with MPS of the upper trapezius muscle. Inclusion criteria were: (1) presence of trigger points, especially in the upper trapezius muscle diagnosed with MPS by a rehabilitation medicine physician, (2) pain intensity level of 5 or higher on a scale of 0-10, (3) age 18 and above, (4) no communication barriers, and (5) willingness to participate in the research. Exclusion criteria included (1) a history of cancer-related pain, (2) pain related to abnormalities in the nervous system, such as nerve compression in the neck or wrist, and brachial plexus injuries, (3) infection in the treatment area, (4) a history of easy bleeding, and (5) conditions affecting learning and memory. The number of participants included in this study was determined based on studies by Afniratri et al.[13] The sample size was calculated using the G Power program, with the numeric rating scale (NRS) as the primary outcome variable.[13] The required sample size was determined to be 27 participants per group, a total of 54, which is sufficient to detect a clinically meaningful difference with 80.0% power at a 5.0% significance level and to account for a potential combined dropout rate of 10.0%.

Therefore, the sample size obtained was 60 participants. All participants provided written informed consent.

Randomization

Eligible patients who consented to participate in the study were allocated into one of two groups using a simple randomization method, in which each participant randomly selected a sealed envelope containing the assigned treatment group.

Intervention

One group was treated by an acupuncture physician using acupuncture at points GB20, SI11, DU14, SI15, GB21, and EX-HN15, along with electrical stimulation using a Greatwall brand KWD-808 I Multipurpose health device. The acupuncture points were stimulated in pairs: GB20 with EX-HN15 and GB21 with SI11. Continuous wave electrical stimulation was applied at a tolerable current level for 25 minutes. The other group was treated by a physical therapist with USD using the Sonopuls 190 at a frequency of 1 MHz and an intensity of 0.8-1 watt/sq.cm. The treatment duration was 5-10 minutes per session. Both groups received treatment twice a week for a total of four weeks. Patients were also instructed to perform upper trapezius muscle stretching exercises 5-10 times, twice a day. During the four-week data collection period following this intervention, additional treatments such as other medications were not allowed, except for acetaminophen.

Outcome measurement

The primary outcome measures were the NRS and the Thai version of the Neck Disability Index (Thai-NDI) scores, both self-reported and assessed before the intervention and at week 4 after treatment. Participants documented the number of acetaminophen tablets consumed and the number of days on which stretching exercises were performed. Throughout the study, they were also monitored for any adverse effects related to the intervention.

Statistical methods

This study analyzed the demographic characteristics of both groups using the mean (standard deviation), percentage, and median (interquartile range). The paired t-test was used to measure NRS and Thai-NDI scores before and after treatment within each group. The independent t-test was used to compare NRS, Thai-NDI scores, and amounts of drug use between groups. The chi-square test was used to compare muscle stretching between groups. Statistical significance was set at $p < 0.05$.

Results

Figure 1 shows the study flowchart. Among the sample group of 60 patients, divided equally into acupuncture and USD treatment groups (30 participants each), the general characteristics were as follows. The majority were female (83.3%), with a mean age of 49.9 years (SD = 11.3). Half of the participants were between 41 and 60 years old (50.0%). The most common occupation was that of a government official or company employee (33.3%). The average BMI was 22.9 kg/m², with approximately 25.0% classified as overweight (BMI between 23.0 and 24.9 kg/m²). In terms of education, most participants held a bachelor's degree or higher (61.7%). The average duration of symptoms was 4.5 months, with most individuals (53.3%) reporting symptoms for three months or longer. The most common area of pain was bilateral at 58.3%. Comparison of general and clinical characteristics between the acupuncture and USD treatment groups revealed no statistically significant differences, as shown in Table 1.

Comparison of pre- and post-treatment results found that in the acupuncture group, the mean NRS before treatment was 7.13 (SD = 1.36), which decreased significantly to 3.43

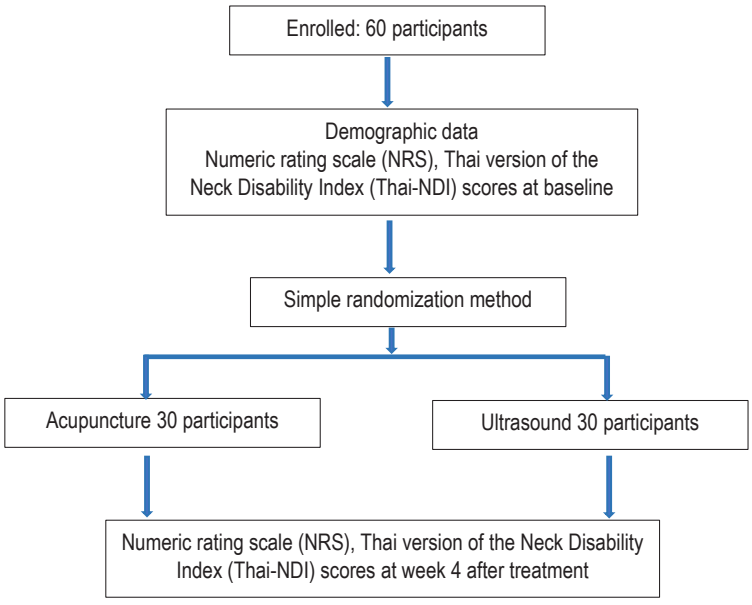

Figure 1. Flow diagram of the participants

(SD = 1.72) after treatment ($p < 0.001$). The mean score for the Thai-NDI scores before treatment was 18.90 (SD = 7.19), dropping to 10.10 (SD = 6.25) after treatment, also a statistically significant decrease ($p < 0.001$). In the USD group, the mean NRS before treatment was 7.17 (SD = 1.42) and decreased to 4.50 (SD = 2.30) after treatment, a statistically significant difference ($p < 0.001$). The mean Thai-NDI scores before treatment were 21.70 (SD = 6.93) and decreased to 12.77 (SD = 6.40) after treatment, also a statistically significant difference ($p < 0.001$), as shown in Tables 2 and 3.

Comparison between groups found that the NRS in the group receiving acupuncture averaged 7.13 (SD = 1.36) before treatment, while the group receiving USD had a pre-treatment mean score of 7.17 (SD = 1.42). There was no statistically significant difference between the two groups at baseline. After treatment, both groups showed reduced pain scores, with means of 3.43 (SD = 1.72) and 4.5 (SD = 2.3), respectively, a statistically significant difference (p = 0.046). Regarding the Thai-NDI scores, the acupuncture group had a mean pre-treatment NDI score of 18.9 (SD = 7.19), while

Table 1. Comparison of patient demographic data and baseline characteristics of the groups

Patient characteristic	Total (n = 60)	Acupuncture (n = 30)	Ultrasound (n = 30)	*p*-value
Sex[1]				1.00
Male	10 (16.7)	5 (16.7)	5 (16.7)	
Female	50 (83.3)	25 (83.3)	25 (83.3)	
Age, mean (SD)	49.9 (11.3)	50.3 (12.7)	49.4 (9.9)	0.761
18-40[1]	18 (30.0)	10 (33.3)	8 (26.7)	
41-60[1]	30 (50.0)	12 (40.0)	18 (60.0)	
> 60[1]	12 (20.0)	8 (26.7)	4 (13.3)	
Occupation[1]				0.460
Government official/company employee	20 (33.3)	11 (36.7)	9 (30.0)	
Housekeeping/retired	19 (31.7)	10 (33.3)	9 (30.0)	
Trade/manual labor	15 (25.0)	5 (16.7)	10 (33.3)	
Agriculture/gardening	6 (10.0)	4 (13.3)	2 (6.7)	
BMI, median (IQR)	22.9 (20.5-25.3)	22.5 (19.8-26.6)	23.1 (20.8-25.0)	0.882
< 18.5 underweight[1]	3 (5.0)	1 (3.3)	2 (6.7)	
18.5-22.9 optimum[1]	27 (45.0)	14 (46.7)	13 (43.3)	
23.0-24.9 overweight[1]	15 (25.0)	7 (23.3)	8 (26.7)	
25.0-29.9 class1 obesity[1]	12 (20.0)	5 (16.5)	7 (23.3)	
≥ 30.0 class 2 obesity[1]	3 (5.0)	3 (10.0)	0 (0.0)	
Education level[1]				0.717
Primary education/no schooling	5 (8.3)	3 (10.0)	2 (6.7)	
Secondary education/associate degree	18 (30.0)	10 (33.3)	8 (26.7)	
Bachelor's degree/higher than bachelor's degree	37 (61.7)	17 (56.7)	20 (66.7)	
Duration of symptoms, median (IQR)	4.5 (1-24)	4.5 (2-24)	4 (1-13.5)	0.457
≤ 3 months (acute)[1]	28 (46.7)	13 (43.3)	15 (50.0)	
> 3 months (chronic)[1]	32 (53.3)	17 (56.7)	15 (50.0)	
Position[1]				0.942
Right	14 (23.3)	7 (23.3)	7 (23.3)	
Left	11 (18.3)	5 (16.7)	6 (20.0)	
Bilateral	35 (58.3)	18 (60.0)	17 (56.7)	

[1], Number (%); IQR, interquartile range SD, standard deviation; BMI, body mass index;

Table 2. Comparison of the numeric rating scale (NRS) and the Thai version of the Neck Disability Index (Thai-NDI) scores at baseline and at week 4 after treatment

Scores	Baseline		Week 4		*p*-value[a]
	Mean	SD	Mean	SD	
Acupuncture (n = 30)					
NRS	7.13	1.36	3.43	1.72	< 0.001*
Thai-NDI	18.90	7.19	10.10	6.25	< 0.001*
Ultrasound (n = 30)					
NRS	7.17	1.42	4.50	2.30	< 0.001*
Thai-NDI	21.70	6.93	12.77	6.40	< 0.001*

*Statistically significant: $p < 0.05$, statistic used; [a], Paired t-test

Table 3. Scoring intervals of the Thai version of the Neck Disability Index (Thai-NDI) scores at baseline and at week 4 after treatment

Thai-NDI	Baseline		Week 4	
	n	%	n	%
Acupuncture (n = 30)				
0 -4 no disability	0	0.0	5	16.7
5-14 mild disability	11	36.7	19	63.3
15-24 moderate disability	11	36.7	5	16.7
25-34 severe disability	8	26.7	1	3.3
> 35 complete disability	0	0.0	0	0.0
Ultrasound (n = 30)				
0-4 no disability	0	0.0	2	6.7
5-14 mild disability	6	20.0	19	63.3
15-24 moderate disability	12	40.0	7	23.3
25-34 severe disability	10	33.3	1	3.3
> 35 complete disability	2	6.7	1	3.3

Table 4. Comparison of the numeric rating scale (NRS) and the Thai version of the Neck Disability Index (Thai-NDI) scores between the acupuncture group and the USD group

Scores	Acupuncture (n = 30)		Ultrasound (n = 30)		*p*-value[a]
	Mean	SD	Mean	SD	
NRS					
Baseline	7.13	1.36	7.17	1.42	0.926
Week 4	3.43	1.72	4.50	2.30	0.046*
NDI					
Baseline	18.90	7.19	21.70	6.93	0.130
Week 4	10.10	6.25	12.77	6.40	0.108

*Statistically significant at $p < 0.05$, statistical use; [a],Independent t-test

the USD group had a pre-treatment mean of 21.7 (SD = 6.93). The difference between groups was not statistically significant. After treatment, both groups had reduced NDI scores, with mean values of 10.10 (SD = 6.25) and 12.77 (SD = 6.40), respectively, but was not statistically significant as shown in Table 4.

Comparison of acetaminophen usage and muscle stretching between the acupuncture group and the USD group found no statistically significant differences between the two groups as shown in Table 5.

Discussion

Pre- and post-treatment results revealed significant declines in both NRS and Thai-NDI scores in the acupuncture group after treatment ($p < 0.001$). This finding is consistent with a study by Li et al., which found that acupuncture therapy was effective in decreasing pain and improving physical function.[14] Similarly, a meta-analysis study by Saraspuri, et.al. concluded that acupuncture therapy was effective in reducing pain in cases of upper trapezius myofascial pain syndrome, and that a significant improvement was observed in pain measured with the Visual Analogue Scale (VAS).[15]

Table 5. Comparison of the use of acetaminophen and muscle stretching between the acupuncture group and the ultrasound diathermy group

	Acupuncture (n = 30)	Ultrasound (n = 30)	*p*-value
Acetaminophen, mean (SD)	1.07 (3.2)	1.33 (2.4)	0.719[a]
0 tablet[1]	25 (83.3)	21 (70.0)	
≥ 1 tablet[1]	5 (16.7)	9 (30.0)	
Stretching exercise[1]			0.121[b]
Everyday	14 (46.7)	21 (70.0)	
5-6 days/week	3 (10.0)	3 (10.0)	
3-4 days/week	6 (20.0)	4 (13.3)	
1-2 days/week	7 (23.3)	1 (3.3)	
No	0 (0.0)	1 (3.3)	

[1]Number (%); [a]Independent t-test; [b]Chi-square test

Additionally, a growing body of evidence supports the efficacy of acupuncture in treating myofascial pain.[4] It was found that electroacupuncture is a reliable method for relieving myofascial pain. Electroacupuncture, which involves passing an electrical current through the needle, is believed to be more effective in alleviating pain than manual acupuncture. The mechanisms of action of electroacupuncture indicate that endogenous opioid peptides in the central nervous system mediate the analgesic effects produced by this treatment. Electroacupuncture applied at acupuncture points to stimulate muscle nociceptors in turn activate the body's endogenous antinociceptive system.[16]

Similarly, in the group treated with USD, both the NRS and the Thai-NDI scores showed a statistically significant reduction after treatment ($p < 0.001$). This finding is consistent with the results of a randomized, single-blind, placebo-controlled study on the effectiveness of ultrasound therapy for myofascial pain syndrome of the upper trapezius which also found that conventional ultrasound therapy is effective in treating this condition.[17] USD is a frequently used physical agent in soft tissue lesions, which increases blood flow in tissues through its thermal effect, enhances permeability in membranes, and promotes tissue healing. It also reduces muscle spasms and increases the ability of collagen fibers to grow. In addition to its physiological effects and segmental analgesia, which include nonthermal effects, it also has a micromassage effect that enables the movement of interstitial fluid in tissues.[17, 5]

When comparing treatment outcomes between acupuncture and ultrasound therapy, acupuncture was found to be more effective, as indicated by lower post-treatment pain scores on the NRS ($p = 0.046$). Mean pain scores declined from 7.13 (SD = 1.36) to 3.43 (SD = 1.72) in the acupuncture group and from 7.17 (SD = 1.42) to 4.50 (SD = 2.30) in the ultrasound therapy group, with the acupuncture group showing greater improvement. After treatment, the pain score in the acupuncture group decreased to a mild pain level, demonstrating significant improvement, whereas the post-treatment

pain score in the ultrasound therapy group remained at a moderate pain level, reflecting less improvement.[18, 19]

Acupuncture appears to effectively alleviate pain and reduce inflammation.[9] In addition, a meta-analysis indicated that patients receiving acupuncture had significantly lower pain scores compared to a placebo group.[15] Moreover, it was found that relevant acupuncture (over points relevant to myofascial neck pain) was superior to both NSAID treatment and irrelevant acupuncture (superficial needling over points not related to neck pain) in a group of 46 patients with chronic myofascial pain. Interestingly, a remarkably close correspondence has been found between acupuncture points and trigger points, with 71.0% of trigger points sharing location and pain distribution patterns with acupuncture points.[4] This may be attributed to the similarities between acupuncture and dry needling, where needles are inserted into myofascial trigger points. The insertion and movement of the needles can elicit localized twitch responses, which may interrupt motor end-plate noise and lead to pain reduction. The occurrence of a localized twitch response is similar to the "de qi" sensation experienced during acupuncture treatment.[20] USD is a technique that has been proposed to treat myofascial pain by converting electrical energy to sound waves in order to provide heat energy to muscles.[5] Multiple studies of ultrasound on MPS have been conducted; however, most have demonstrated mixed results. In one recent RCT study on the treatment of latent MPS of the trapezius, ultrasound decreased the basal level of electrical activity and reduced the sensitivity of the trigger points.[5] Another study compared the use of pressure release, hydrocortisone phonophoresis, ultrasound therapy, and a placebo for the treatment of upper trapezius myofascial trigger points. All three treatment groups demonstrated a statistically significant decrease in pain and an increase in pain threshold and range of motion ($p < 0.001$). Pressure release and phonophoresis had superior therapeutic effects compared to ultrasound.[21] Similarly, another study concluded no statistically significant difference in reduction of pain or analgesic usage between ultrasound plus massage, sham ultrasound plus massage, and exercise versus control.[22]

When comparing treatment outcomes between acupuncture and ultrasound treatment, Thai-NDI scores showed that both groups experienced a reduction in NDI scores after treatment, with no statistically significant difference observed between the groups. The Thai-NDI scores are used to measure the ability of the neck to manage daily life. A comprehensive approach, including maintaining good posture through stretching and relaxation exercises as well as lifestyle changes, is essential in addition to treatment for therapeutic efficiency.[4]

There are many theories that may explain how acupuncture works. The gate control theory of pain postulates that specific nerve fibers transmit a pain signal to the brain via the spinal cord, and that input from other nerve fibers can inhibit the pain signal transmission. Acupuncture is thought to stimulate inhibitory nerve fibers for a short period, thus reducing transmission of the pain signal to the brain. Endorphin Model clinical studies have reported that inserting acupuncture needles into specific acupuncture points triggered the production of endorphins in cerebrospinal fluid in patients who underwent acupuncture treatments.[9, 15] Recent research has found that traditional Chinese medicinal acupuncture therapy has a greater direct effect on the up-regulation of μ-opioid receptor binding availability in the central nervous system compared with a placebo (sham acupuncture). This finding may help explain some of the analgesic effects seen with acupuncture therapy.[9] Research in a neurotransmitter model in animals has shown that acupuncture can modulate the levels of serotonin, norepinephrine, and neurons that secrete γ-aminobutyric acid. It is postulated that through the neurotransmitter model, acupuncture can be efficacious for the treatment of depression, anxiety, and addiction.[9] Other theories postulate that acupuncture indirectly influences the autonomic nervous system. The current scientific theories provide a basis for stating that acupuncture affects the nervous system; however, its effects cannot be explained by a single mechanism.[9] Acupuncture analgesia involves the cerebral cortex, hypothalamus, thalamus, and limbic system.[9,15] Additionally, in reducing pain intensity, acupuncture operates through four domains: local inflammatory reaction, meridian intercellular transduction, cutaneous somatovisceral reflex, and neural transmission to the brain.[15]

Acupuncture is based on the idea that living beings have an inner energy, known as Qi (pronounced "chee"), and it is the flow of this inner energy that sustains them. According to traditional Chinese medical philosophy, balanced Qi is vital to optimal health and the imbalance or interruption in the flow of Qi causes illness and disease. Although acupuncture was developed for the prevention of illness, it also helps manage disease symptoms by reintroducing a balanced flow of Qi, its main focus.[9] Based on an ancient philosophy, acupuncture serves to circulate energy (Qi) through 12 meridians all over the body. Pain may occur when circulation in meridians is blocked; hence, it requires stimulation at several points to restore the fluency of energy circulation (Qi).[9,15] The overall effectiveness of acupuncture has been found to help reduce pain, promote muscle relaxation, improve psychological well-being, and especially facilitate the restoration of body balance (by restoring the balanced flow of Qi). Acupuncture treatment has demonstrated favorable outcomes and can be considered both an appropriate treatment option and a valuable alternative therapy.

Adverse events related to ultrasound therapy may include skin irritation, although this is a minor and rare side effect. Several studies suggest that therapeutic ultrasound is a safe treatment.[6] A study conducted in the United Kingdom examining more than 34,000 acupuncture treatments found no serious adverse events (e.g., hospitalization, permanent disability, or death) associated with acupuncture therapy. The

rate of minor adverse events (such as nausea, fainting, prolonged aggravation of existing symptoms, and psychological or emotional reactions) was reported to be between 0 and 1.1 per 10,000 treatments. Acupuncture involves puncturing the skin, so slight bruising, bleeding, or soreness at the acupuncture site may occur due to needle penetration through capillaries. However, these adverse effects are mild and self-limited. Modern acupuncture needles are thin, flexible, and made of solid surgical stainless steel. Unlike hypodermic needles, acupuncture needles are finely tapered, allowing them to slide smoothly into the skin. Some acupuncture needles are even thinner than an average strand of human hair. In developed countries, acupuncture uses single-use, disposable needles that are packaged and sealed by the manufacturer under sterile conditions. Patients are often surprised to learn that acupuncture is associated with minimal or no discomfort. Some experience a slight pinch as the needles are inserted, but many feel no pain at all.[9] In this study, no side effects or serious complications were observed in either group.

Limitations of this study include its open-label design, short-term follow-up period, and lack of a cost-effectiveness analysis.

Suggestions for future research projects include conducting large, randomized, blinded, controlled trials to confirm these results. A cost-effectiveness comparison between the two treatments could also be conducted to evaluate their relative value.

Conclusions

Compared to ultrasound, acupuncture twice weekly for 4 weeks can be a more effective treatment for pain relief in patients with neck pain from myofascial pain of the upper trapezius.

Conflict of interest declaration

The author confirms that there is no conflict of interest related to the manuscript.

Generative AI declaration

The author confirms that no large language models (LLMs) or artificial intelligence (AI) tools were used in the creation of this manuscript, including the writing, editing, or preparation of figures and tables, with the exception of using Copilot for assistance in checking and refining the English language.

Acknowledgments

I would like to express my gratitude to all the colleagues and participants at Rayong Hospital, Thailand.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Data availability

The data that support the findings of this study are available from the corresponding author, Suwimon Sangiamsak, upon reasonable request.

Author contribution

Suwimon Sangiamsak: conceptualization, methodology, data curation, formal analysis, investigation, writing – original draft, and writing – review & editing.

References

1. Fejer R, Kyvik KO, Hartvigsen J. The prevalence of neck pain in the world population: a systematic critical review of the literature. Eur Spine J [Internet]. 2006 Jun [cited 2023 Sep 16];15(6):834-848. Available from: https://pubmed.ncbi.nlm.nih.gov/15999284/ doi: 10.1007/s00586-004-0864-4
2. Hoy DG, Protani M, De R, Buchbinder R. The epidemiology of neck pain. Best Pract Res Clin Rheumatol [Internet]. 2010 Dec [cited 2023 Sep 16];24(6):783-792. Available from: https://pubmed.ncbi.nlm.nih.gov/21665126/ doi: 10.1016/j.berh.2011.01.019
3. Simons DG. Clinical and etiological update of myofascial pain from trigger points. Journal of musculoskeletal pain [Internet].1996 Apr [cited 2023 Sep 16];4:93-122. Available from: https://www.tandfonline.com/doi/abs/10.1300/j094v04n01_07/ doi: abs/10.1300/j094v04n01_07
4. Borg-stein J, Simons DG. Myofascial pain. Arch Phys Med Rehabil [Internet]. 2002 Mar [cited 2023 Sep 16];83(3):S40-47. Available from: https://pubmed.ncbi.nlm.nih.gov/11973695/ doi: 10.1053/apmr.2002.32155
5. Desai MJ, Saini V, Saini S. Myofascial pain syndrome: a treatment review. Pain Ther [Internet]. 2013 Jun [cited 2023 Sep 17];2(1):21-36. Available from: https://pubmed.ncbi.nlm.nih.gov/25135034/ doi: 10.1007/s40122-013-0006-y
6. Qing W, Shi X, Zhang Q, Peng L, He C, Wei Q. Effect of therapeutic ultrasound for neck pain: a systematic review and meta-analysis. Arch Phys Med Rehabil [Internet]. 2021 Nov [cited 2023 Sep 17];102(11):2219-2230. Available from: https://pubmed.ncbi.nlm.nih.gov/33722564/ doi: 10.1016/j.apmr.2021.02.009
7. Esenyel M, Caglar N, Aldemir T. Treatment of myofascial pain. Am J Phys Med Rehabil [Internet]. 2000 Jan-Feb [cited 2023 Sep 17];79(1): 48-52 Available from: https://pubmed.ncbi.nlm.nih.gov/10678603/ doi: 10.1097/00002060-200001000-00011
8. Sinlamuth O, Satharanaporn S, Thirasakthana J, Sintuhsing J, Thammapongpan N, Sopasai K, et al. Research advances in treating cervical spondylosis with acupuncture and tuina massage. Thailand Journal of Traditional Chinese Medicine [Internet]. 2023 Jun [cited 2023 Sep 17];2(1):129-141 Available from: https://he01.tci-thaijo.org > article > download (In Thai)
9. Chon TY, Lee MC. Acupuncture. Mayo Clin Proc [Internet]. 2013 Oct [cited 2023 Oct 5];88(10):1141-1146 Available from: https://pubmed.ncbi.nlm.nih.gov/24079683/ doi: 10.1016/j.mayocp.2013.06.009

10. Buranathavornsak T, Piyaman S. Acupuncture in medical practice: 40 years of Professor Yan Li's experience. Bangkok: Phumthong; 2009. 144 p. (In Thai)
11. Trinh K, Graham N, Gross A, Goldsmith C, Wang E, Cameron I, et al. Acupuncture for neck disorders. Spine [Internet]. 2007 Jan [cited 2023 Sep 17];32(2): 236-243 Available from: https://pubmed.ncbi.nlm.nih.gov/17224820/ doi: 10.1097/01.brs.0000252100.61002.d4.
12. Ga H, Choi JH, Park CH, Yoon HJ. Acupuncture needling versus lidocaine injection of trigger points in myofascial pain syndrome in elderly patients – a randomised trial. Acupunct Med [Internet]. 2007 Dec [cited 2023 Sep 17];25(4): 130-136 Available from: https://pubmed.ncbi.nlm.nih.gov/18160923/ doi: 10.1136/aim.25.4.130
13. Afniratri A, Badri S, Wardoyo SH. Effect of combination therapy using ultrasound and local point acupuncture to reduce neck pain. The 9th International Conference on Public Health [Internet]. 2022 Nov [cited 2023 Sep 21];7(1):460-465 Available from: https://theicph.com/index.php/icph/article/view/2419 doi: 10.26911/FP.ICPH.09.2022.32
14. Li X, Wang R, Xing X, Shi X, Tian J, Zhang J, et al. Acupuncture for myofascial pain syndrome: a network meta-analysis of 33 randomized controlled trials. Pain Physician [Internet]. 2017 Sep [cited 2025 Jul 25];20(6):E883-E902 Available from: https://pubmed.ncbi.nlm.nih.gov/28934793/
15. Saraspuri NPK, Tamtomo D, Murti B. Effectiveness of acupuncture therapy to reduce pain in patients with upper trapezius myofascial pain syndrome: a meta-analysis. Indonesian Journal of Medicine [Internet]. 2022 Jul [cited 2025 Jul 14];07(3):326-336 Available from: https://theijmed.com/index.php/theijmed/article/view/561 doi: 10.26911/theijmed.2022.07.03.09
16. Aranha MFM, Alves MC, Bérzin F, Gavião MBD. Efficacy of electroacupuncture for myofascial pain in the upper trapezius muscle: a case series. Brazilian Journal of Physical Therapy [Internet]. 2011 Sept/Oct [cited 2025 Jul 14];15(5):371-379 Available from: https://pubmed.ncbi.nlm.nih.gov/22002184/. doi: 10.1590/s1413-35552011005000022
17. Yildirim MA, Ones K, Goksenoglu G. Effectiveness of ultrasound therapy on myofascial pain syndrome of the upper trapezius: randomized, single-blind, placebo-controlled study. Arch Rheumatol [Internet]. 2018 Mar [cited 2025 Jul 25];33(4):418-423 Available from: https://pubmed.ncbi.nlm.nih.gov/30874250/ doi: 10.5606/ArchRheumatol.2018.6538
18. Baranidharan G, Williams A, Wilson S, Cameron P, Tan T. Outcome Measures Guidance Document. [Internet]. London: Churchill House; 2019 [cited 2025 Oct 11]. Available from: https://www.britishpainsociety.org/static/uploads/resources/files/Outcome_Measures_January_2019.pdf
19. Dworkin RH, Turk DC, Farrar JT, Haythornthwaite JA, Jensen MP, Katz NP, et al. Core outcome measures for chronic pain clinical trials: IMMPACT recommendations. PAIN [Internet]. 2005 Jan [cited 2025 Oct 11];113(1-2):9-19. Available from: https://pubmed.ncbi.nlm.nih.gov/15621359/ doi:10.1016/j.pain.2004.09.012
20. Wang CC, Huang TH, Chiou KC, Chang ZY. Therapeutic effect of superficial acupuncture in treating myofascial pain of the upper trapezius muscle: a randomized controlled trial. Evid Based Complement Alternat Med [Internet]. 2018 Dec [cited 2025 Jul 14];2018:1-7 Available from: https://pubmed.ncbi.nlm.nih.gov/30622617/ doi: 10.1155/2018/9125746
21. Sarrafzadeh J, Ahmadi A, Yassin M. The effects of pressure release, phonophoresis of hydrocortisone, and ultrasound on upper trapezius latent myofascial trigger point. Arch Phys Med Rehabil [Internet]. 2012 Jan [cited 2025 Jul 14];93(1): 72-77 Available from: https://pubmed.ncbi.nlm.nih.gov/21982324/ doi: 10.1016/j.apmr.2011.08.001
22. Gam AN, Warming S, Larsen LH, Jensen B, Hoydalsmo O, Allon I, et al. Treatment of myofascial trigger-points with ultrasound combined with massage and exercise—a randomised controlled trial. Pain [Internet]. 1998 Jul [cited 2025 Jul 14];77(1): 73-79. Available from: https://pubmed.ncbi.nlm.nih.gov/9755021/ doi: 10.1016/S0304-3959(98)00084-0