

## SHORT-TERM EFFECTS OF COURT-TYPE TRADITIONAL THAI MASSAGE ON PRESSURE PAIN THRESHOLD AND PAIN INTENSITY IN PATIENTS WITH CHRONIC TENSION-TYPE HEADACH

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**ABSTRACT:** This study aimed to evaluate the short-term effects of the court-type traditional Thai massage (CTTM) on pressure pain threshold and pain intensity to treat patients suffering from chronic tension-type headaches (CTTHs) comparing with amitriptyline taking. A randomized controlled trial was conducted. Sixty patients diagnosed with CTTH were evenly divided into the treatment and control group. The treatment group received a 45-minute course of court-type traditional Thai massage the control group was prescribed to take 25 mg of amitriptyline once a day before bedtime lasted. The results were evaluated in short-term day 1 after intervention, The measurement consisted of Visual Analog Scale (VAS), Tissue hardness and pressure pain threshold (PPT). The results demonstrated that there was a significant decrease in pain intensity for the CTTM group at different assessment while a significant difference occurred between-group comparison ( $P < 0.05$ ). Moreover, the PPT of the CTTM group was significantly increased ( $P < 0.05$ ). It can therefore be concluded from the findings that CTTM seems to be an effective therapy for stress-related variables and increased the PPT as well as reducing pain intensity for the CTTHs.

*Keywords: Effects, Traditional Thai Massage, Tension-type Headache*

### 1. INTRODUCTION

Tension-type headache (TTH) is the most common form of primary headache [1]. The International Classification of Headache Disorders (Headache Classification Subcommittee of the International Headache Society (HIS) 2004) that strongly suggest a neurobiological basis, at least for the more severe subtypes of tension-type headache, the division into episodic and chronic types [1]. The lifetime prevalence of TTH was as high as 78% in a population-based study in Denmark [2]. Globally, the percentages of the adult population with an active headache disorder are 42% for tension-type headache [3]. However, for some individuals, the difference based primarily on the frequency of attack with the episodic tension-type headache (ETTH) or chronic tension-type headache (CTTH), difference between these two types of headache is that the former involves pain that lasts no longer than 15 days per month, whereas the latter causes pain that continues at least 15 days per month for over six months[1]. However, the aggregate societal impact is large because the disorder is highly prevalent. The individual impact of CTTH is greater than that of ETTH, but the disorder is greater than that of ETTH, but the disorder is less common [4].

TTH treatment involves both pharmacologic and non-pharmacologic approaches [1]. Non-pharmacologic approaches have been widely used and proven effective but with fewer risks and undesirable side effects, a survey by the WHO on headache treatment indicated that the three most popular types of alternative or complementary therapies were physical therapy (44%), acupuncture (39%), and naturopathy (25%) [5]. Among complementary therapies, traditional Thai massage is an alternative treatment. It can be classified into two types: the popular type traditional Thai or Chaloeisak massage and the Court-type Traditional Thai Massage (CTTM) employing polite gestures and emphasizing pressing on points for treatment purposes[6] - [8]. Despite the popularity of traditional Thai massage, there have been some studies investigating its effects on alleviating TTHs carried out in Thailand, including the single-group studies employing a quasi-experimental design of Wattakeecharoen, [9] Udompittayason, [10] Meechana, [11] and the randomized controlled clinical trials of Kruapanich et al [12]. and Sooktho [13]. The results yielded inconclusive evidence on the likelihood of traditional Thai massage in reducing TTHs, thus calling for further research. A pilot study on the effectiveness of the court type traditional Thai massage in CTTH treatment on a

sample of 10 subjects using the inclusion criteria developed by the HIS. The subjects received two massage therapies for 45 minutes each over a period of one week with evaluations being done before and after each treatment. The findings showed that the majority of the patients were compared before and after the treatment revealed a significant reduction in CTTH symptoms after the treatment at  $p < 0.05$  (Visual Analog Scale (VAS) before and after the treatment were 6.80 and 2.70 respectively). It was also found that the post-treatment angles of movement in all directions were enhanced at  $p < 0.05$  [14]. Nevertheless, to ensure the short-term effects of CTTM on pressure pain threshold (PPT) and pain intensity in treating CTTHs, it is necessary to carry out a randomized controlled trial and compare the results with those obtained from the prescription of amitriptyline.

## 2. MATERIALS AND METHODS

### 2.1 Design

A randomized controlled trial was conducted at the Department of Traditional Thai Medicine, BamnetNarong Hospital, AmphurBamnetNarong, Chaiyaphum Province, Thailand. This study was approved by the 1<sup>st</sup> Ethics Review Committee For Research Involving Human Subjects, Health Science Group, Chulalongkorn University (COA No. 052/2557).

### 2.2 Subjects

The patients aged 18-65 years at BamnetNarong Hospital diagnosed with CTTH according to the criteria of IHS [1] with the inclusion and exclusion criteria below. The sample consisted of 60 patients with CTTH as identified by the score on the VAS of 4 or above [12]. They were randomly assigned to the treatment group or the control group, each with 30 subjects.

The main inclusion criterion was CTTH diagnosed by criteria of IHS [1], for any of the following: Headache occurring on  $\geq 15$  days per month on average for over six months, Headache lasts hours and could also be continuous, Suffer from at least two of the following symptoms: a. bilateral location, b. pressing/tightening (non-pulsating) quality, c. mild or moderate intensity, d. not aggravated by routine physical activity such as walking or climbing stairs, experience headache without the following symptoms: a. no more than one of photophobia, phonophobia or mild nausea, b. neither moderate nor severe nausea nor vomiting, not attributed to another disorder, suffer from headaches at least twice a week, experience pain with a severity of greater than or equal to 4 on the VAS, be willing to participate, no prior

experience with the CTTM, amitriptyline and other treatments or prior experience dating back more than 1 week.

Patients were excluded for any of the following: other types of headache not classified as CTTH, history of the following illnesses or disorders: a. cervical disorders, such as cervical spondylosis, or herniated disc, b. neurological disorders, such as hemiplegia or paresis, c. skin diseases, such as chickenpox or herpes zoster, no communicative ability or inability to follow instructions and a fever of  $38.5^{\circ}\text{C}$ .

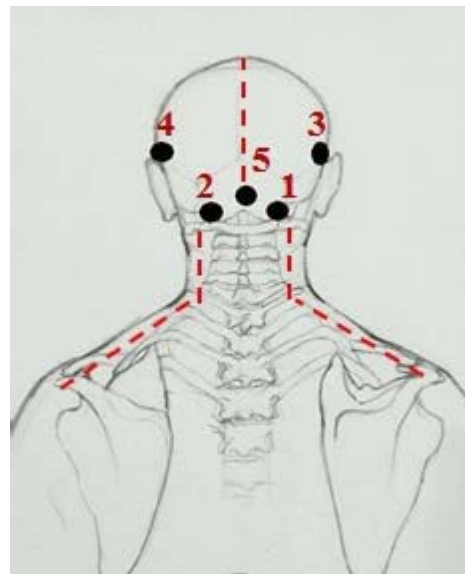


Figure 1: The massage points 1–5 on the back of the head of CTTH patient [15].

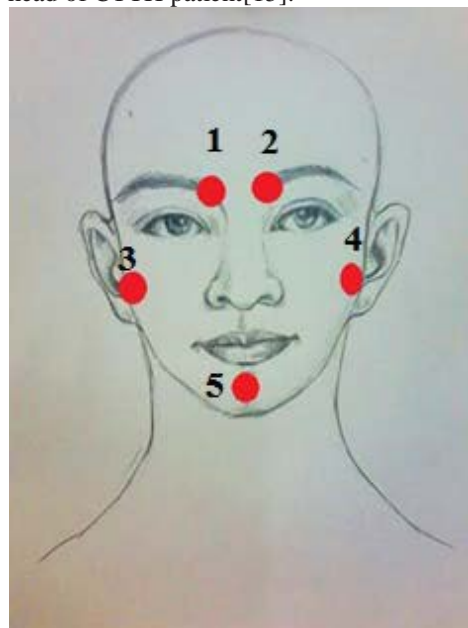


Figure 2: The massage points 1–5 on the forehead of CTTH patient [15].

### 2.3 Assessment

Outcome measures including the VAS, tissue hardness meter and algometer, were assessed before the first treatment, assessed was conducted again in short-term day 1.

#### 2.4 Measurement instruments

The VAS is an instrument for measuring perception of current pain, rated from 0 (no pain) to 10 (most severe pain ever experienced). In this study, the VAS was assessed before the first treatment as well as after the treatment at short-term day 1. Tissue hardness and PPT were measured using a Tissue Hardness meter-and-algometer (OE-220, ITO /JAPAN). Tissue hardness measurement involved pushing the force sensor of the device on the skin over the trapezius muscle until the beep sound was noted, then stop pushing and read the recorded number giving the percentage of tissue hardness. PPT was measured using the algometer mode of the device. The 1-cm<sup>2</sup> sensor knob was gradually pushed down on the skin over the muscle until the patient feel a little discomfort without pain. At this time, the patient was informed to push the hand-held switch with a beep sound to stop the procedure and read the recorded force for PPT. The reliability of measurement were tested at the beginning of the study and found high for tissue hardness (ICC = 0.97) and PPT (ICC = 0.92) [15]. The tissue hardness and the PPT were assessed before the first treatment as well as after the treatment at short-term day 1.

#### 2.5 Intervention

Sixty patients aged 18-65 years who were diagnosed with CTTH according to the criteria of the International Headache Society (IHS) participated. They were randomly allocated into a treatment group and control group. After the preliminary diagnosis, the randomization, and signing of the consent form, the patients were given a 1 day treatment according to the group to which group they belonged. The details are as follows.

The 30 patients who were randomly allocated in the treatment group received the CCTM. Lasting 45 minutes for each session, the treatment. The CCTM involved using thumb pressures along the massage meridian lines and points of CCTM.

In details, the method for alleviating TTH using CCTM comprised of seven steps lasting 45 minutes, starting from the shoulders (15 minutes), both sides of the upper back (5 minutes), the area connecting the neck and the shoulders (10 minutes), the tips of the shoulders (3 minutes), the back of the head (5 minutes) (Figure 1), the middle line of head (2 minutes), and the forehead (5 minutes) (Figure 2).

The other 30 patients who were randomly allocated into the control group were given Amitriptylene by a licensed medical practitioner. They were prescribed to take 25 mg once daily. Each of them was informed that the medication could cause drowsiness, and recommended that strict adherence to the prescribed time of consumption was required.

#### 2.6 Randomization

The patients meeting the inclusion criteria were assigned to either the treatment group (receiving CTM) or the control group (taking amitriptylene) using the simple random sampling technique. The randomization was performed using a lottery by the researcher assistant.

#### 2.7 Statistical Analysis

The data was analyzed in terms of mean and standard deviation (SD) for continuous variables and percentage for categorical variables. The study aimed to analyze each session of treatment separately at different time points: before the first treatment, after day 1.

An analysis of Paired t-tests were used to compare the within-group variables at baseline with outcome measures short-term day 1 after the treatment or control period within each respective group, and analysis of covariance (ANCOVA) was also be conducted to compare the differences between the two groups as well as estimate the adjusted difference between the two groups at 95% confidence level.

### 3. RESULTS

Details of demographic data and health status were presented in table 1. The average age 37 to 50 year classify from class interval of CTM group was 13(43.30) and of the control group was 13(43.30). Most baseline characteristics were equally balanced between the two groups. Table 2 shows compare the within-group VAS means of the CTM group and the control group at baseline, short-term day 1. The results showed a statistically significant decline in the VAS means for both the groups ( $P < 0.05$ ). Tissue hardness and PPT not statistically significant for both the groups. Table 3 shows compare between groups the CTM group and the control group were compared at baseline, short-term day 1, it was found that after adjustment for baseline levels, the means for VAS and PPT were statistically different at short-term day 1 ( $P < 0.05$ ). The VAS mean of the CTM group was 5.03 compared to 5.13 for the control group with the difference between the two groups equaling 0.32 (95% confidence interval, 0.07-0.57,  $P < 0.05$ ). The PPT mean of the CTM group was 3.40 compared to 2.89 for the control group with

the difference between the two groups equaling 5.38 (95% confidence interval, 5.53 - 0.55,  $P < 0.05$ ).

Table 1 Demographic and baseline clinical characteristic

Characteristics	CTTM	Control	P-value
Gender			
Female	26(86.70)	29(96.70)	<0.05
Male	4 (13.30)	1 (3.30)	
Aged (year)			
23–36 years	6 (20.00)	1 (3.30)	0.350
37–50 years	13(43.30)	13(43.30)	
51–64 years	11(36.70)	16(53.30)	
<i>Mean = 49.75; SD = 10.93; median= 48</i>			
<i>Classify from class interval</i>			
Baseline of clinical outcome measure			
Visual analog scale (VAS 0–10 cm); mean $\square \pm$ SD	6.30 $\pm$ 1.20	6.06 $\pm$ 0.94	0.105
Tissue hardness (%); mean $\pm$ SD	59.89 $\pm$ 11.04	57.16 $\pm$ 8.50	0.159
Pressure pain threshold (kg/cm2); mean $\pm$ SD	3.17 $\pm$ 0.69	2.85 $\pm$ 0.79	0.264

Note: CTTM is court-type traditional Thai massage.

Table 2 Comparison of the outcome measures between baseline (pre-test) and post-test assessments in the CTTM and control groups (paired t-tests).

Outcome	Group	Baseline	Short-term day 1(Mean ± SD)	P-value
Visual analog scale (VAS 0–10 cm); mean □± SD	CTTM	6.30 ± 1.20	5.03± 1.24	<0.05
	Control	6.06 ± 0.94	5.13± 1.04	<0.05
	CTTM	59.89 ± 11.04	56.88±1 1.55	0.198
	Control	57.16 ± 8.50	56.93±8 .40	0.896
Pressure pain threshold (kg/cm2); mean± SD	CTTM	3.17 ± 0.69	3.40±0. 78	0.056
	Control	2.85 ± 0.79	2.89±0. 65	0.697

Note: CTTM is court-type traditional Thai massage. NA is not available.  $P < 0.05$  is statistically significant differences from baseline.

Table 3 Comparison of the differences between two groups

Outcome	Short-term day 1(Mean ± SD)			
	CTTM	Contr ol	Diffe rence (95% CI)	P-value
Visual analog scale (VAS 0–10 cm); mean □± SD	5.03±1 .24	5.13± 1.04	0.32 (0.07 to 0.57)	<0.05
Tissue hardness (%); mean ± SD	56.88± 11.55	56.93 ± 8.40	-5.59 (- 4.50 to 3.66)	0.625
Pressure pain threshold (kg/cm2); mean± SD	3.40± 0.78	2.89± 0.65	5.38 (5.53 to 0.55)	<0.05

Note: CTTM is court-type traditional Thai massage. NA is not available.  $P < 0.05$  is statistically significant differences from baseline.

#### 4. DISCUSSION

This study aimed to evaluate the short-term effects of the CTTM on PPT and pain intensity to treat patients suffering from CTHH comparing with amitriptyline taking. Assessment was conducted at the VAS, tissue hardness meter and PPT, were assessed before the first treatment, assessed was conducted again in short-term day 1. The headache pain intensity scores reduced from baseline at short-term day 1 for both the CTTM group and the control group, the VAS, a comparison between the two groups indicated statistically significant differences. Similar findings were also reported, Cathcart S, et al. study Pain sensitivity mediates the relationship between stress and headache intensity in chronic tension-type headache, results showspain sensitivity significantly mediated the relationshipbetween stress and headache intensity [16]. This study similar findings were Chatchawan and colleagues, on the effects of Thai traditional massage on pressure pain threshold and headache intensity in patients with chronic tension-type and migraine headaches, the results shows in both groups, headache intensity decreased significantly ( $P < 0.05$ )[17].



A comparison of the tissue hardness reduced for CTTM groups but not statistically significant for within-group and between the groups. differed findings are also reported elsewhere. Zheng et al. [18] evaluated the therapeutic effectiveness of lumbar tenderpoint deep massage in treating chronic nonspecific low backpain.

The PPT compare between groups of the CTTM group increased was significantly higher than that of the control group. The results are consistent with those of other researches carried out earlier. Walton,DM.,et al. study Clinical Pressure Pain Threshold Testing in Neck Pain: Comparing Protocols, Responsiveness, and Association With Psychological Variables, the results suggest that PPT is adequately reliable and that 3 measurements should be taken to maximize measurement properties[19]. Similar findings were also reported, Toro-Velasco et al. [20], which investigated the effectiveness of a head-neck massage protocol in alleviating CTTHs compared to placebo ultrasound. An assessment of PPT at both sides of temporalis muscles immediately and 24 hours after the treatment did not demonstrate an improvement in the patients' conditions. It should be noted, however, that Toro-Velasco et al.'s research is different from the present study in terms of research design, sample size, and the form and area of massage. and Similar findings are also reported, Chatchawan and colleagues [17], on effects of Thai traditional massage on pressure pain threshold and headache intensity in patients with chronic tension-type and migraine headaches. After the treatment and at 3 and 9 weeks of follow-up, the TTM group showed a significant increase in PPT ( $P < 0.01$ ) compared with the sham ultrasound group.

#### 4. CONCLUSION

The results showed the VAS a statistically significant decrease in headache pain intensity for the CTTM group at baseline, short-term day 1 and a statistically significant difference between the CTTM group and the control group at each assessment at baseline, short-term day 1. As for tissue hardness, the value for the CTTM group was significantly lower than that of the control group at short-term day 1, and the value for both the groups reduced at short-term day 1, although not statistically significant. Additionally, the PPT compare between groups of the CTTM group increased was significantly higher than that of the control group. It can therefore be concluded from the findings that CTTM seems to be an effective therapy for stress-related variables and increased the PPT as well as reducing pain intensity for the CTTHs.

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