Original Article

A Comparative Randomized Controlled Trial Study: The Effects of Court-Type Thai Traditional Massage versus Diclofenac on Knee Pain in Patients with Osteoarthritis of the Knee

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Background: Osteoarthritis (OA) is the most common degenerative joint disorder, resulting in significant mobility and health care expenses. It affects more than 60% of Western World adults over the age of 65 years.

Objective: To compare the effectiveness of the court-type traditional Thai massage and Diclofenac on patients with osteoarthritis of the knee.

Materials and Methods: The RCT phase II was performed. Participants were 60 adult patients with OA of the knee, randomized to one of 12 weeks regimes of the court-type traditional Thai massage (45 min weekly) or to Diclofenac 25 mg 1x3 pc. Outcome measures contained visual analog pain scale, timed up-and-go test, active knee range of motion, and the Western Ontario and McMaster Universities Arthritis Index after twelve weeks.

Results: The results showed that the knee OA pain in both groups was significantly reduced.

Conclusion: There was no significant difference between the groups comparison. The study asserts that the court-type traditional Thai massage is an efficient and practical treatment method for relief of knee OA pain.

Keywords: Court-type traditional Thai massage, Osteoarthritis, Knee pain, Randomized controlled trial

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Osteoarthritis (OA) is a joint inflammation that result from cartilage degeneration, which is frequently found in hip, knee and spinal joints[1]. Among peripheral joints, knee joint is the most commonly found with OA because it is weight bearing and prone to have injury during physical activities and sports[2]. There are two types of OA, primary and secondary OA[3]. The primary OA refers to osteoarthritis caused by degeneration to the bones and joints. The degeneration is due to either over use or abuse of the joints in daily life such as overweight and repeated squatting activities. The secondary OA refers to the disease with joint pain with articular cartilage destruction such as intra-articular fracture, ligamentous injury, and infection[5].

Specially, elderly people have been found with high prevalence of OA of the weight bearing joints such as knee and hip where females were a little more frequently affected than males[1]. Accordance with recent studies in Thailand, it has been found that over six million elders, who were over 65 years old, have OA[2]. Moreover, fifty percent of the patients were treated with analgesics and non-steroidal anti-inflammatory drugs (NSAIDs). However, these medicines have been prescribed cautiously since they may have adverse effects on stomach and intestine[3]. The current study focuses on the primary osteoarthritis as it covers the majority of the patient population[4]. Main symptoms of the disease are always identified by joint pain, mild degree of joint stiffness in the morning, and crepitation on movement in the affected joint. Also, NSAIDs and analgesics have been recommended for treatment. Diclofenac, one of the NSAIDs, has been commonly used for treatment of musculoskeletal complaints, especially arthritis, rheumatoid arthritis, polymyositis, dermatomyositis, osteoarthritis, dental pain, TMJ, spondylosis, ankylosing spondylitis, and gout arthritis[8]. However, long-term use of this medication may lead to adverse effects such as gastro-intestinal ulcers[6]. Therefore, to reduce the side effects of NSAIDs, non-medication therapies such as acupuncture, ultrasound therapy,

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therapeutic exercise, and traditional Thai massage have been suggested as alternative therapies for patients with osteoarthritis[7].

Court-type traditional Thai massage (CTTM) is an alternative therapy claiming to effectively reduce knee pain[9,10]. CTTM, a local wisdom in Thai traditional treatment, has been practiced for relieving musculoskeletal pain throughout the country[11]. Many studies on CTTM indicated that it is safe, effectively improves blood circulation, and relives the pains of muscle and joints[12]. However, its effect on treatment for patients with knee OA has not been reported with a high quality blinded randomized controlled trial. Therefore, we conducted a randomized controlled trial to assess the effectiveness of court-type traditional Thai massage compared to an NSAID. The results of this study may contribute to the knowledge of alternative therapy for patients with knee OA.

Materials and Methods

The study was a randomized controlled trial approved by the Ethical Committee of the Traditional Thai and Alternative Medicine, Department of Traditional Thai and Alternative Medicine Development, Ministry of Public Health No. 156 (11-2533).

Inclusion criteria

Inclusion criteria included: 1) female patients with knee OA pain, 2) age 50 to 65 years old, 3) being diagnosed with mild to moderate degree of primary-type knee OA by orthopedist according to standard criteria, and 4) volunteered to participate and sign an informed consent form.

Exclusion criteria

Participants who had one of the following conditions were excluded: 1) fracture or injury that affects the knee joint, 2) cancer, diabetes, paralysis, infectious disease, 3) currently using any pain killer or NSAID treatment, 4) severe osteoarthritis, and 5) body mass index (BMI) is more than 25 kg/m^2.

Paticipants

Participant were recruited from the Applied Thai Traditional Medical Service Center, Phon Hospital, Thailand (Figure 1) from May 2012 to October 2013. Sixty patients with diagnosis of having primary-type knee OA, by an in charge orthopedist based on standard criteria for knee OA diagnosis, volunteered to participate. Each patient was assigned into either an intervention (CTTM) group or a control (NSAID) group using simple random sampling method. The patients of the intervention group (n = 30) were treated by court-type traditional Thai massage whereas the patients of the control group (n = 30) were treated with Diclofenac 25 mg 1x3 pc.

Study intervention

After the patients underwent screening procedures by using medical history and physical examination from a physical therapist, the researchers read each participant an informed consent form and obtained written consent to be conducted the treatment. Next, each patient was randomly allocated in one of the two groups. The summary of participant flow is shown in Figure 1.

The intervention group

The patients in this group were treated with the court-type traditional Thai massage once a week for 12 consecutive weeks. There were four phases for each session of the CTTM which took 45 minutes They were summarized as followings.

Phase 1: This phase consists of four steps of the CTTM which lasted 45 minutes.

Step 1: Basic thumb pressure massage along the Thai meridian lines for the legs which covers tibialis anterior, peronei, quadriceps, and iliotibial band. This was aimed to stimulate the blood flow throughout the legs as well as release the tension of the muscles (Figure 2). The thumb pressure of massage was deep enough but not exceeding the threshold of pain. Massage along each meridian line was repeated 3 rounds.

Step 2: Thumb pressure was applied on 3 points which are located on quadriceps tendon and patella ligament (Figure 3). This procedure was believed to stimulate blood circulation to the knee joint and relieve knee pain.

Step 3: Thumb pressure massage was applied on

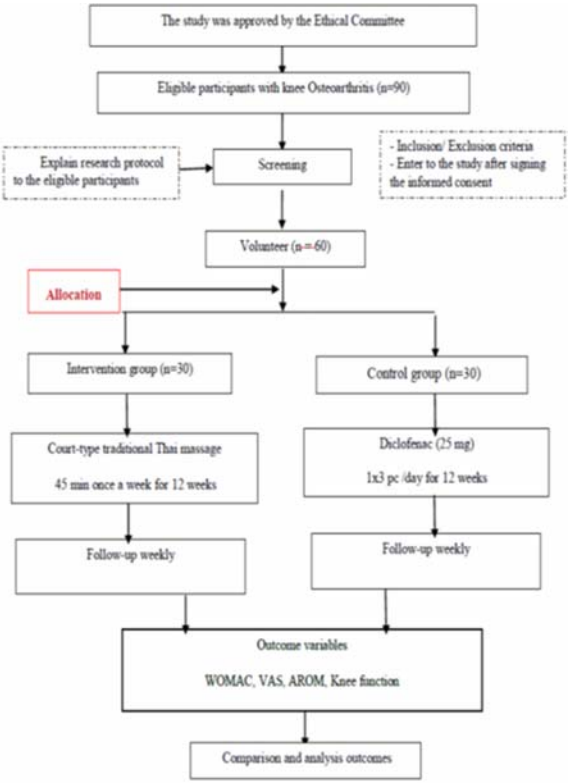

Figure 1. Participant flowchart.

four points at the side of the thighs. These points are on gluteus medias, gluteus minimus, piriformis, and distal part of ilio-tibial band respectively (Figure 4). This procedure was believed to release tension of quadriceps and gluteal muscles.

Step 4: Thumb pressure massage was applied on four points which were located on pectineus, adductor magnus, vastusmedialis, and popliteus muscles respectively (Figure 5).

Phase 2: Hot compress treatment, a treatment with warm and wet towel on the knee for 5 to 10 seconds, is used after taking the pressure massage.

Phase 3: Three repetitions of semi squat exercise were instructed. Each repetition, the patients stood with back straight and then gradually bended their knees to 90 degrees and hold for ten seconds.

Phase 4: At the end of each session, the patients were suggested to refrain from having foods which were believed to cause more pain based on the practice guideline of Thai traditional medicine such as poultry products, bamboo shoots, and fermented food.

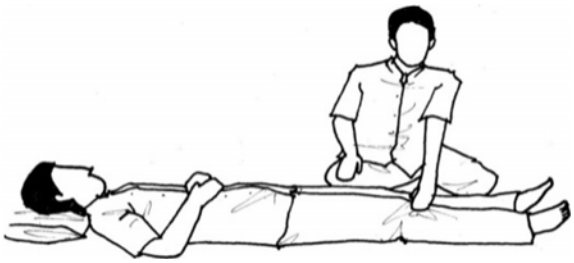

Figure 2. Basic massage of the leg.

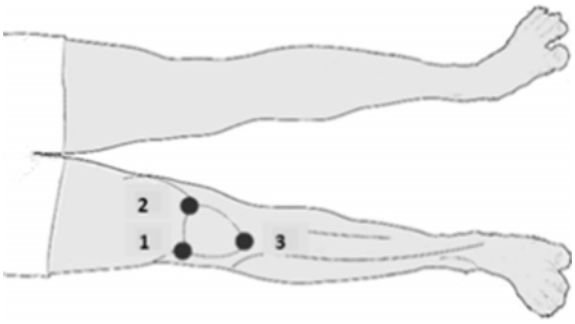

Figure 3. Three points of thumb pressure on quadriceps tendon and patella ligament.

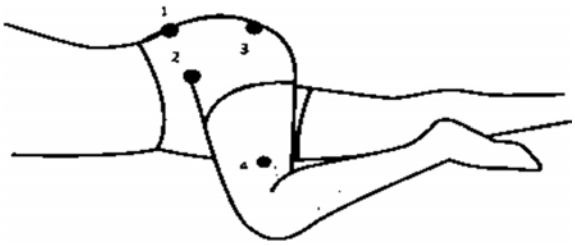

Figure 4. Four points of thumb pressure massage at the side of the thigh.

The control group

Patients in the control group were prescribed with the Diclofenac 25 mg 1x3 pc (take one tablet three times a day after meal for 12 weeks).

Outcome measures

Outcome measures of the present study consist of a 10-cm visual analog scale (VAS)[3], active knee range of motion (AROM)[14], timed up-and-go test (TUG)[15], and index of severity for osteoarthritis of the knee (ISOA)[16]. The 10-cm VAS was referred to the patient's perception of knee pain where 0 = no pain, 5 = moderate and 10 = extremely pain[17]. The knee ROM was measured in supine lying position by the physical therapist using a standard goniometer. The timed up-and-go test was employed for measurements of the time patients stood up from the seat and walked with natural speed for three meters and back to the seat[15]. The ISOA, a questionnaire developed by Podsiadlob D[15] was used to measure the severity of knee osteoarthritis and reflect the effectiveness of therapeutic interventions. The Western Ontario & McMaster Universities Osteoarthritis Index (WOMAC) (Thai version) was also used to assess pain, stiffness, and physical function of the patients[18].

Statistical analysis

Statistical analysis was done using STATA version 14 for Windows to provide descriptive and inferential statistics. Data between the groups and over time were analyzed by two-way ANOVA with repeated measures. This statistic was used to estimate the adjusted mean difference and the 95% confidence intervals for each outcome measure at each evaluation time point.

Results

A total of sixty participants, diagnosed with OA, participated and were allocated into two groups by simple random sampling technique. The average age and BMI of the patients were similar between the two groups. Fifty percent

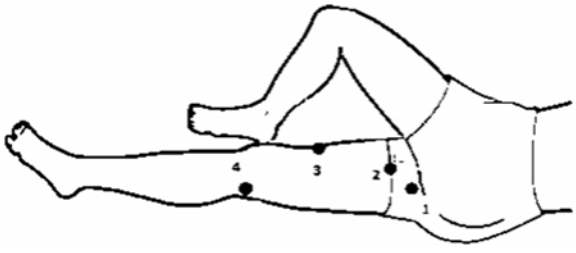

Figure 5. Four points of thumb pressure massage at the inner side of the thigh.

of the participants from each group had bilateral knee pain (Table 1).

Table 2 showed the results on four assessment tools: pain intensity, range of motion, timed up-and-go test, and index of severity for osteoarthritis of the knee focusing on the comparative study of three periods: week 1, week 6, and week 12. The results indicated that the symptoms of the patients improved significantly in week 6 and week 12 in both groups. However, there was no statistical difference between the group comparisons except for the knee range of motion.

Table 3 presented the results of life quality assessed by the WOMAC (Thai version) with 0 to 10 point scale of the test focusing on 4 main indicators: pain, stiffness, functionality and global. The results showed that the 4 main indicators were significantly decreased in both groups in week 6 and week 12. These results indicated that the quality of life of patients in the two groups was improved significantly. Between the groups, comparisons were found with a significant difference at week 12.

Table 1. Demographic and baseline clinical characteristics of patients

Characteristics	CTTM	Control
Number of patients	30	30
Demographic data		
Age (years), mean ± SD	58.6±3.59	56.80±4.669
Body mass index	23.99±1.14	23.55±1.141
Common symptoms		
Pain on both side of knee	15	15
Right knee pain	11	9
Left knee pain	4	6

Discussion

The findings showed that the participants of both the intervention and control group a had similar demographic data which included age, BMI and educational background. Fifty percent of the participants of each group had the pain on both knees. There was no side effect found within the study period. The findings also revealed that both the court-type Thai traditional massage and Diclofenac could decrease knee OA pain as indicated by the reduced VAS and ISOA at week 6 and week 12. The knee range of motion was also increased, resulting from the treatments in both groups.

Table 2. Comparison of the outcome measures between baseline at week 1, week 6, and week 12 in the CTTM and control group (repe ated measures ANOVA)

Outcome	Group	Baseline week 1	Post-test week 6	Post-test week 12
Pain intensity (VAS 0 to 10 cm), mean ± SE	CTTM	6.13±0.14	4.37±0.10	2.62±1.87
	D	5.98±0.13	4.31±0.11	2.63±0.10
Range of motion (°), mean ± SE	CTTM	87.74±1.97	106.12±1.85	124.50±1.87
	D	86.38±2.03	102.62±2.0	118.85±2.03
Time up-and-go test (min), mean ± SE	CTTM	7.29±0.12	6.15±0.13	5.01±0.16
	D	7.38±0.10	6.26±0.11	5.13±0.14
Index of severity for osteoarthritis of the knee	CTTM	4.12±0.06	3.33±0.06	2.54±0.06
(pain 0 to 7 cm), mean ± SE	D	4.20±0.05	3.55±0.05	2.89±0.06

CTTM = Court-type traditional Thai massage, D = Diclofenac

Table 3. Comparison of the WOMAC outcome measures between baseline at week 1, week 6, and week 12 in the CTTM and the control group (repeated measures ANOVA)

Outcome	Group	Baseline week 1	Post-test week 6	Post-test week 12
Pain (VAS 0 to 10 cm), mean ± SE	CTTM	5.22±0.06	3.34±0.11	1.47±0.07
	D	5.75±0.09	4.08±0.10	2.41±0.08
Stiffness (VAS 0 to 10 cm), mean ± SE	CTTM	5.31±0.07	3.42±0.12	1.53±0.08
	D	5.92±0.06	4.08±0.12	2.24±0.08
Functionality (VAS 0 to 10 cm), mean ± SE	CTTM	3.77±0.04	2.46±0.07	1.15±0.05
	D	4.15±0.45	2.86±0.07	1.58±0.05
Global (VAS 0 to 10 cm), mean ± SE	CTTM	4.20±0.04	2.72±0.08	1.23±0.05
	D	4.63±0.04	3.22±0.08	1.81±0.05

CTTM = Court-type Traditional Thai Massage, D = Diclofenac

However, at week 12, patients in the intervention group had significantly gained more in knee range of motion than those in the control group (Table 2). This could be explained by a direct effect of massage, exercise, and local heat therapy on flexibility of the knees. Consequently, walking speed and knee function of the intervention group showed better improvement than the control group at week 12 (Table 1). Similar results were found for WOMAC scores in both groups where patients in the intervention group exhibit less disability than those in the control group at week 12. These findings indicated that the CTTM is an efficient treatment on patients with OA knee pain.

Conclusion

Both CTTM and Diclofenac could be effective and useful for the treatment of patients with knee osteoarthritis. This study asserts that CTTM is effective for reducing pain and improving function in patients with OA of the knee. It could be one of alternative therapies for this patient population.

What is already known on this topic?

Osteoarthritis (OA) is a joint inflammation divided into 2 types: the primary OA and the secondary OA. OA tends to increase constantly because it is prevalent among senior citizens. The majority of the patients are treated with analgesics and non-steroidal anti-inflammatory drugs which have high side effects damaging the health of the elder patients. The alternative treatment is CTTM which can reduce the knee pain as effectively as NSAIDs and it does not have side effects.

What this study adds?

CTTM can be applied to treat primary OA as effectively as NSAIDs based on the results of pain intensity, range of motion and life quality. The life quality was assessed by the WOMAC (Thai version) with 0 to 10 point scale of the test focusing on 4 main indicators: pain, stiffness, functionality and global. The results showed that the 4 main indicators were significantly decreased in both groups. Therefore, CTTM can be introduced as an alternative treatment without side effects apart from NSAIDs.

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Potential conflicts of interest

The authors declare no conflict of interest.

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