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Comparison the Effect of Kermanshahi Massage with and without Plastic Masking (Shrink Therapy) on Symptoms of the Trigger Points in the Upper Trapezius Muscle

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Abstract

The Kermanshahi method of massaging (KM) has been conducted traditionally by this family for many years. This study compared the effect of KM in addition to plastic masking with KM on pain and disability caused by myofascial trigger points (MTrPs). In this randomized controlled trial, 48 females aged 18 to 70 complaining of pain in the upper trapezius area with MTrPs were randomly divided into two groups. Both groups received four sessions of KM at one-week intervals, and one of the groups received plastic masking treatment after the massage (group 2). The patients' pain severity was measured using the visual analogue scale (VAS) before each session, and shoulder and neck pain and disability indices (SPADI and NPDS) were measured before the 1st and 4th sessions. Twenty participants in each group completed the study. The participants' mean age and standard deviation were 47.69 ± 13.08 years. A significant decrease in VAS, SPADI, and NPDS scores was observed in both groups after the interventions ($p < 0.001$). The percentage of SPADI score reduction in group 2 (50.42 ± 27.15%) was significantly higher than the group 1 (24.92 ± 25.6%) ($p = 0.002$). KM can be used as an effective method to reduce neck and shoulder pain and disability in patients with upper trapezius MTrPs. In this study, plastic masking had a slight preference over the control group. Conducting similar studies with larger sample sizes and different methods of plastic masking is recommended.

Keywords: Massage; Persian medicine; Traditional medicine; Pain; Trigger points

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Introduction

Myofascial pain is a soft tissue pain syndrome with local and recurring pain caused by trigger points (TrPs) in the skeletal muscles [1]. This disorder is frequently observed separately or along with other underlying causes in musculoskeletal pains, as the frequency of the disorder in orthopedic clinics and specialized pain clinics was reported up to 21 and 93 percent, respectively [2,3]. TrPs usually cause pain, tenderness, and reduction of range of motion (ROM) [2].

Diagnosing this syndrome requires the palping of at least one distinctive trigger point in the skeletal muscle [4]. Myofascial trigger points (MTrPs) are small nodular areas in taut bands sensitive to palpation, characterized by referred pain and twitch response or contractile response provoked by touch [1].

Signs and symptoms of myofascial pain may start following a trauma or be insidious. Feeling deep localized pain (aching) with mild to intense pain in an area, autonomic dysfunctions such as sweating, tearing, and flushing, vasomotor and body temperature changes may be observed. The pain pattern depends on the involved muscles. Involvement of neck muscles may be accompanied by neuro-autonomic symptoms such as imbalance, dizziness, and tinnitus. Tension headache, recurring pain, eye symptoms, and torticollis in TrPs in the head and neck area are also frequent [2]. Muscle coordination disorder, joint stiffness, and fatigue are other common symptoms, and paresthesia, numbness, blurred vision, and limb tremors are concurrent with neurological symptoms that may be present. In more advanced stages, sleep disorders, mood changes, and irritability may also occur [2]. Facilitation of acetylcholine release in the motor end plate causes sustained muscle fiber contraction, local ischemia, release of nerves and blood vessels stimulant substances, and pain [3].

Various methods, including prescribing analgesics [5], massage therapy [6-8], laser [9], lidocaine injection [10], thermotherapy [11], and Transcutaneous Electrical Nerve Stimulation (TENS) [12], are common treatments for trigger points.

Massage is among the most common developing alternative medicine methods in the world, with numerous published results of related clinical trials. The purpose of muscle massage is to relieve pain, reduce stiffness, restore normal muscle function, and improve fatigue [7,8].

Persian medicine (PM) defines massage as ‘pressing’ (Ghamz) and ‘rubbing’ (Malesh). Massage is among the recommended treatments by PM for muscle spasms, and it has been stated that massage leads to cleansing the body waste and improving the nutrition and function of muscles by increasing the blood supply to the muscle [13,14].

The trapezius is a large muscle extended from the back of the head to the waist and, on the outside, to the scapula and shoulder and is significantly prone to myofascial disease. This muscle has three upper, middle, and lower sections with different functions. Patients with trapezius MTrPs often complain about the back, neck, and shoulder pains, accompanied by fatigue and a feeling of heaviness on the back and neck. Patients do not indicate joint movement restriction; however, they feel pain when turning their heads to the sides. Since MTrPs cause diffuse pain, they may be mistaken for other diseases, including radiculopathy, cervical disc protrusion, or arthritis. Spreading pain to the upper neck, back of ears, jaw, and behind the eyes, occasional dizziness, and diffused pain to the shoulder, lower neck, and backside are among the symptoms of trapezius involvement [1].

The Kermanshahi method of massaging (KM) is among the methods conducted traditionally by this family for many years in Iran and has experimentally proven as an effective method for myofascial pain caused by MTrPs. Masking the pain area with plastic is also a treatment method conducted by this family after massage using a thin layer of HDPE (High-Density Poly Ethylene) plastic with a thickness of 0.00125 cm. This method is also known as “Shrink Therapy.” Experiments indicated that conducting this method after a KM massage reduces the pain caused by MTrPs. Considering the frequency of MTrPs in upper trapezius of patients who suffer from pain and shoulder and neck movement disorder [15], and since no study was conducted on the effect of massage and plastic masking, the present study was designed and conducted to investigate the effect of KM and plastic masking on the patients with pain and disability due to the presence of TrPs in the upper trapezius area.

Methods

After approving the project, the research ethics code was obtained from the Ethics Committee of Iran University of Medical Sciences (IR.IUMS.REC.1399.954), and the protocol was registered at IRCT (IRCT20090527001957N10).

This randomized clinical trial was conducted in Behesht Clinic of Persian Medicine (Tehran, Iran) from March to June 2023. The inclusion criteria of the study included written informed consent, female patients, ages between 18 and 70, pain in the upper trapezius area (from shoulders to upper back and neck), presence of TrPs in the palpation of the upper trapezius, and written diagnosis of an orthopedist or neurologist. The exclusion criteria were pain intensities so high that the patient required other treatments, pregnancy, breastfeeding, neurological symptoms of upper limbs, any form of nerve damage or spinal cord compression, severe psychological diseases, cancer, surgery on neck and shoulders, history of fracture and dis-

location in the neck and shoulders, history of severe cervical vertebrae disorders (such as disc herniation), hemophilia, diabetic neuropathy, epilepsy, deep vein thrombosis (DVT), anaphylaxis, use of anticoagulants (such as warfarin), wounds in the related areas, fever and severe headache, and symptoms of meningitis.

After explaining the purposes and research method and obtaining the written informed consent, the patients were randomly divided into two groups using the block randomization method by "random allocation software". Closed envelopes containing the names of groups (A or B) and patient numbers on them were used for random allocation. Concealment was not possible due to the type of intervention, and the study was conducted as open-label.

The intervention included massage and plastic masking conducted by a female massage therapist trained by a Kermanshahi massage trainer, as follows:

Patients were positioned in a forward-leaning sitting position, supported with a pillow to relax the target muscle. MTrPs were identified using routine criteria [16] by the massage therapist and massage was done as follows:

- Muscles were palpated for a nodule along a taut band within each muscle.
- A light effleurage (gentle massage to spread the chamomile oil) from the neck toward the lower back, along the spine, and around the trigger points for 3 minutes was done.
- Mild to moderate pressure massage was done
- Compression was performed by compressing trigger points in the trapezius muscle with tolerable intensity using a thumb for 60 seconds for each trigger point with the thumb. Light effleurage from the neck toward the lower back, along the spine, and around the trigger point for 1 minute.
- Using the thumb, we apply pressure along the scapula bone from the neck down and move the thumb for 2 minutes.
- Light effleurage from the neck toward the lower back, along the spine, and around the trigger points for 1 minute.
- Using the thumb, we apply pressure along the scapula bone from the waist to the neck and move the thumb for 2 minutes.
- Light effleurage from the neck toward the lower back, along the spine, and around the trigger point for 1 minute.
-Massage of the trapezius muscle was done for two minutes with a moderate pressure. The pressure was at a level where the patient did not feel any annoying pain and did not experience weakness or fainting due to the pressure, a piece of plastic matching the size of the patient's body was prepared as its area covered more than the width of four fingers around the TrPs. Then, the area was covered with chamomile oil, and a plastic sheet was placed on the body. The patients were asked to keep the plastic sheet on their bodies for one hour.

The intervention was conducted once a week for three weeks.

The patients' pain (as the primary outcome) was measured using the visual analog scale (VAS) on a scale of 0 to 10 at the beginning and in weeks 1, 2, 3, and 4 (before each massage). The Neck Pain & Disability Scale (NPDS) and the Shoulder Pain and Disability Index (SPADI) questionnaires were used to measure the pain intensity and shoulder and neck disability (secondary outcomes). Roach et al. (1991) developed the SPADI questionnaire, which included 13 items evaluating two domains. Five items measured the pain level, and eight measured the severity of the disability. Each item was scored on a 0 to 10 scale, and after the completion of the questionnaire by the patient, the scores were summed and reported as a fraction of 100. A study by Ebrahim Zadeh et al. at the University of Mashhad evaluated the Persian version of this questionnaire and confirmed its validity and reliability [17].

The NPDS questionnaire evaluates the intensity of pain and disability caused by neck pain, and the Persian version of the questionnaire was also validated. The questionnaire measures individuals' pain and disability in movement and various activities using 20 questions on a visual scale of 0 to 10. Accordingly, the total score of the questionnaires ranged from 0 to 200 [18].

Both mentioned questionnaires were used at the beginning and end of the study (week 4).

Individuals who indicated symptoms that required further investigation, those unwilling to continue cooperating with the project, or those with severe diseases that required additional interventions were excluded from the study.

The obtained data were analyzed using the SPSS software version 27. The quantitative variables were described using mean and standard deviation, and qualitative variables were described using the frequency percentage. The quantitative variables were compared between two groups using the t-test or Mann-Whitney U test. Changes in VAS scores during the study were evaluated in each group using the Freedman test. A paired t-test or Wilcoxon test was used to determine the within-group changes of quantitative variables.

Results

Out of the 115 patients with pain in the upper trapezius area who met the inclusion criteria of the study, 67 indicated exclusion criteria, 48 entered the study and were randomly allocated in two groups. Four patients of each group (a total of 8 patients) did not complete the study and were excluded from the analysis

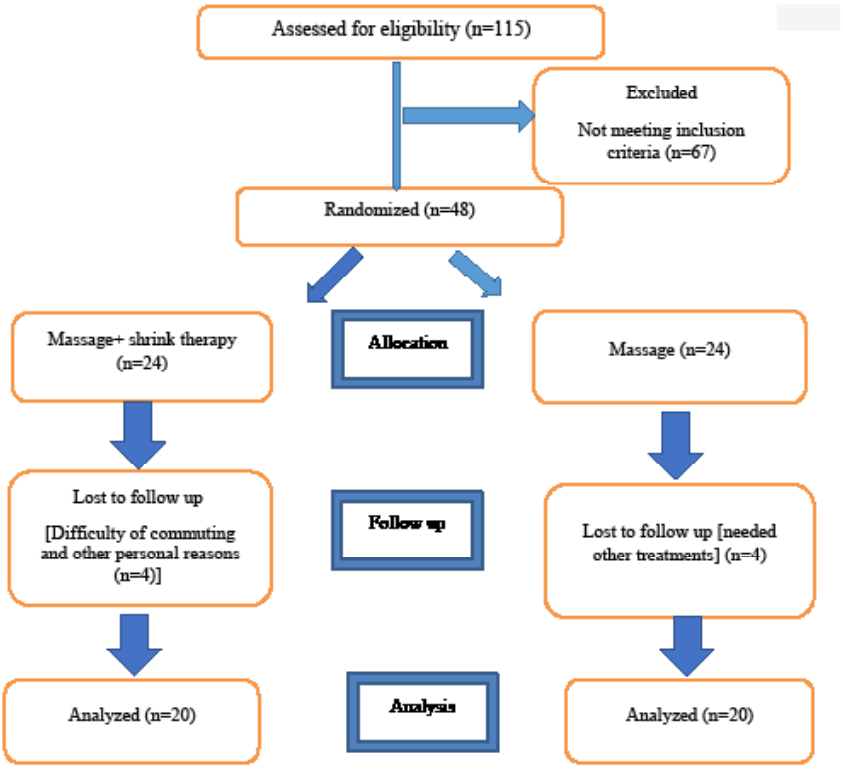

Figure 1. CONSORT flow diagram

(Figure 1 – CONSORT flow diagram).

All the participants were female, with a mean age and standard deviation of 47.69 ± 13.08 years. Two individuals (5%) were illiterate, five (12.5%) had not finished high school, 11 (27.5%) were high school graduates, and 22 patients (55%) had academic degrees. Twenty-seven patients (67.5%) were housewives, and the rest were employed.

The pain area in six patients (15%) was both shoulders, 25 patients (62.5%) in the right shoulder, and nine patients (22.5%) in the left shoulder, and all of them reported different levels of neck pain and disability according to the NPDS questionnaire.

At the beginning of the study, the pain in individuals who exited the study was as severe as the remainder (Mann-Whitney U, $p = 0.393$).

Table 1 presents the severity of pain of the two groups at different stages of the study.

According to table 1, the pain severity of both groups was significantly reduced, and the difference between the percentages of the pain decrease in the two groups was not significant.

Table 2 presents the scores of SPADI and NPDS questionnaires of the two groups at the beginning and end of the study.

According to table 2, the scores of SPADI and NPDS questionnaires of the two groups significantly reduced after the intervention, which indicated the reduction of pain and improvement of neck and shoulder movement ability in both groups. A comparison between the two groups indicated a statistically significant difference between the changes in the SPADI scores of the two groups ($p = 0.002$). The decrease in the questionnaire score in the shrink therapy group was significantly higher than in the massage group. The difference in the reduction of NPDS questionnaire scores in the two groups was not significant.

Eleven patients (55%) of the shrink therapy group complained about itching and burning sensation in the plastic area and were unwilling to continue using the method.

Discussion

Results of the present study showed a significant reduction in the pain and disability of patients with MTrPs in the upper trapezius in both KM massage groups (with or without shrink therapy); however, the changes in the shrink therapy group were significantly higher than the other group.

Considering the mechanism of MTrPs formation, the required treatments may be different. The treatment approach is multifaceted, including removing TrPs and the precipitating factors to decrease pain and improve muscle flexibility. Deactivating TrPs is conducted using various techniques including isch-

Table 1. Severity of pain of the two groups at different stages of the study

	Massage + shrink therapy (Mean ±SD)	Massage (Mean ±SD)	*p* value*
VAS score Before 1st session of massage	7.57 ± 2.45	6.73 ± 2.22	
VAS score Before 2nd session	6.37 ± 2.4	5.61 ± 2.15	
VAS score Before 3rd session	4.94 ± 1.95	5.21 ± 2	
VAS score Before 4th session	4.02 ± 2.3	4.68 ± 2.1	
p value**	<0.001	<0.001	
Changes in VAS score (baseline-4th week, percent)	38.5 4± 44.01	30.36 ± 23.92	0.142

SD: standard deviation, *p* value*: between groups comparison by Mann-Whitney U test, *p* value**: within group comparison by Friedman test.

Table 2. Scores of the neck and shoulder pain and disability questionnaires of the two groups at the beginning and end of the study

	Massage + shrink therapy (Mean ± SD)	Massage (Mean ± SD)	*p* value*
SPADI Baseline	62.7 5± 18.9	58.3 ± 19.28	
SPADI 4th week	31.76 ± 22.82	44.36 ± 17.19	
p value**	< 0.001	< 0.001	
Changes in SPADI score (baseline-4th week, percent)	50.42 ± 27.15	24.92 ± 25.6	0.002
NPDS Baseline	106.73 ± 42.44	106.21 ± 43.68	
NPDS 4th week	50.94 ± 41.94	72.6 ± 41.32	
p value**	< 0.001	< 0.001	
Changes in NDPS score (baseline-4th week, percent)	49.62±32.66	31.21±29.25	0.068

SD: standard deviation, *p* value*: between groups comparison by Mann-Whitney U test, *p* value**: within group comparison by Wilcoxon Signed Rank test.

emic compression, stretching, releasing with hand, needling, and different types of physical therapy. For instance, in shoulder impingement, releasing the trigger points using hands decreases pain severity and increases the pain pressure threshold [19]. Releasing the trigger points of the upper trapezius muscle also increases the motion range of the neck and reduces the pain pressure threshold [20].

Considering the availability and cost of various methods, massage could be a useful method. There are more than 80 types of massages named based on the country of origin and medical approach. Numerous studies investigated the mechanism of massages. Different types of massages are in use to reduce MTrPs

pain, and numerous studies investigated the efficacy of massage [3,6,8,21].

Comparison of the effectiveness of traditional Thai massage (TTM) with Swedish massage (SM) in patients with back pain associated (MTrPs) showed a similar improvement in pain and in both groups. More than 50% reduction of pain intensity was observed in both groups of massage [22]. This study is not comparable with the present study, but shows the effects of different types of massage on MTrPs.

A meta-analysis and systematic review in 2013 investigating the effect of massage on patients with TrPs-induced neck and shoulder pain reviewed 12 high-quality studies. Results showed that compared with inactive treatment, massage significantly reduced neck and shoulder pain for a short time, but the function of the neck and shoulders had no significant change [8].

Sa'atchian et al. (2016) presented the results of a comparison between neuromuscular facilitation exercises (NFE), massage, and waiting lists in 42 patients who were allocated randomly in 3 groups. Results showed that both massage and NFE exercises reduced the pain severity of these patients (compared with the control group); however, the difference between the changes in the massage group and NFE group was not statistically significant [22].

Another study published in 2016 investigated the effect of massage on trigger points-induced headaches. A total of 56 patients with tension headaches were allocated to massage (n=17), detuned ultrasonography (n=19, placebo), and waitlist groups (n=20). 84.7% improvement in the massage group, 50% in the placebo group, and 0% in the waitlist group was reported ($p < 0.001$) [23].

Another study published in 2005 compared Thai and Swedish massage methods in 180 backache patients with MTrPs. After six massage sessions, both groups experienced significant improvement; however, there was no significant difference between the two groups [24].

A study on Doppler ultrasound revealed that massage increases the blood flow to the area [21]. Another study showed that following an acute sports injury, massage reduces muscle inflammation and increases the biogenesis of mitochondria (improvement of energy metabolism in the muscle) on reducing [25]. Massage reduces muscle dryness by activating the focal adhesion kinase (FAK) pathway [26].Even though pressure massage causes pain in TrPs areas, contraction of muscle fibers and pain is apparently reduced by the mechanical removal of endplates with disrupted function, which caused the MTrPs by continuous release of acetylcholine. Massage is beneficial to increase blood flow and has an obvious recovery effect on muscle spasms [27]. It is also expected that due to the increase in blood perfusion, and a decrease in inflammation in the area, discharge of painful substances from the peri-axial space will occur which reduces pain [28].

Stimulation of A-beta nerve fibers by gentle and light massage reduces the transmission of pain impulses in the lamina of the posterior branch of the spinal nerve [29-31]. In a moderate pressure massage, parasympathetic activity and serotonin secretion increase, and substance P decreases, which are effective in controlling pain. In an intensive massage, activation of high-threshold mechanical receptors, and then activation of the A-gamma fibers or gamma motor neurons, or fusimotor neurons may occur, which take part in the process of muscle contraction [32]. In addition, releasing endogenous opioids and increasing the pain threshold in peripheral receptors occur following manual therapies [29]. Furthermore, alteration in plasma cytokine levels, modulation of neuro-inflammatory pathways, and correction of inflammatory responses are observed after manual therapy [33].

Massage has also a physiological effect which begins with the pressure on the skin and movement of the hand. It stimulates sensory nerve receptors of the skin and the vessels below, increases blood flow and lymph drainage, increases serotonin and dopamine levels, and decreases cortisol. It reduces heart rate, blood pressure, and respiration and relieves muscle spasms and swelling by stimulating the central parasympathetic. On the psychological aspect, the therapist's contact with the patient's skin reduces the stressor hormones and increases endorphin and serotonin, which causes the patient to become calm, reduces pain and fatigue, and improves the sleep process [34].

According to masters of Persian medicine, massage has special healthcare effects similar to exercise. They believed that massage prepares the waste material to discharge or remove from the organs [13]. The primary benefits of massage are helping the basal body temperature, improving the metabolism of body systems to deal with damaging factors, and better absorption and elimination of substances [13,35].

Tying the area of pain with a piece of fabric or elastic bands is not a recent phenomenon. The suggested theory explaining the mechanism behind reducing pain using this method states that besides causing heat and increasing blood circulation, this technique stimulates deep proprioceptive senses and inhibits the nociceptive sense [36]. Today, kinesio tapes are widely used in muscle injuries, especially for treating trigger points [37,38]. Kinesio tapes are flexible adhesive tapes used to cover muscles, reduce pain, and improve muscle function and even joint malalignment by increasing the blood and lymphatic flow. These tapes play significant roles in rehabilitation protocols and preventing sports injuries, and various studies indicated their

effect on myofascial pain syndrome caused by trigger points. A systematic review confirmed that kinesio taping is effective in control of pain in Myofascial Pain Dysfunction Syndrome [39]. However, another study reported the effect of this tape in reducing the pain and disability of patients with non-specific low back pain with a placebo (the Micropore® 3M® tape). Note that both bandages indicated better results than the control group (without bandages) [37]. Systematic reviews did not confirm the efficacy of kinesio typing; however, some studies reported that it led to better results than not using it. Patients who use these tapes may stay more active, which is necessary to return to daily activities. Studies also mentioned the need for more high-quality methodological studies [38].

These studies tried to achieve a similar distribution of underlying and background factors (including profession, age, and associated diseases) in both groups; however, other intervening variables (such as exercise, bad sitting posture, sleep disorders, vitamin deficiency, and nutritional factors) were not reviewed, which can be stated as one of the limitations of the studies.

The present study was a preliminary study with a small sample size, which is one of the project limitations. We recommend conducting similar studies with larger sample sizes for TrPs in various body muscles and controlling the confounding variables. The duration of plastic placement in the massage area is another subject that requires further investigation.

Conclusion

KM can be used as an effective method to reduce neck and shoulder pain and disability in patients with upper trapezius MTrPs. Plastic masking had a slight preference over the control group, but conducting similar studies with larger sample sizes and different methods of plastic masking is recommended.

Conflict of Interests

There is nothing to declare.

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