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Effect of Thai Tok Sen therapy on upper trapezius muscle thickness from ultrasonographic evidence

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Introduction

Nowadays, there are lots of people who are suffering from working, and clinical symptoms such as muscle spasms, local and referred pain, and stiffness on the shoulder are presented [1]. Especially, prolonged sitting in front of a computer desk or computer working longer than 8 hours daily provoked specific pain in the neck and shoulders [2]. There are various traditional medical treatments for people who are suffering from working; especially Thai massage (TM) [3,4]. Traditional TM has been

Abstract

Typical signs and symptoms with pain, muscle spasm or taut band, and trigger point with referred pain to the head are mostly found in the upper shoulder area of people who suffered from office syndrome. Although there have various medical treatments, the efficacy of results was controversy results because of different techniques and treatment programs. An inheritance Thai treatment with Tok Sen (TS) or Hammering Therapy has been specifically performed with a therapeutic Thai massage in the Northern part of Thailand for a long time without any scientific evidence support. Possibly mechanism of Tok Sen should be related to the vibration effect on the muscles directly. Thus, the hypertrophic muscle from the spasm or taut band should be resolved.

Preliminary report of four cases who suffered from office syndrome. Tok Sen Massage was performed by a therapist who had legally well-trained. Devices of Tok Sen are composed of a rubber hammer and wooden round head at 7 inches diameters of circle surface. The force and rhythm of hammering along the upper trapezius muscle were moderately intensity and smooth along and transverse direction of the upper trapezius muscle for ten rounds. The thickness of the upper trapezius muscle and pain sensation were evaluated by ultrasonography and a Visual Analog Scale (VAS). After Tok Sen therapy, the thickness of upper trapezius muscles decreased when compared to before therapy as same the pain score results.

shown the main effects on relaxation [4] and the pressure pain threshold (PPT) [5]. The reviewed document in 2015 reported that traditional TM possibly helps in the case of chronic pain [6]. In addition, thumb compression and deep transverse friction massage can release muscle tension, and reduce damage and scar formation [7]. Tok Sen or Wood Hammering has been performed during TM in part of the Northern area of Thailand that has been inherited from a gentleman of Lanna Knowledge. In aspect theory, Tok Sen therapy is believed that can open the wind and energy flow in the body [8]. A previous

report showed that a combination of Tok Sen with the Physical Therapy program benefits people with office syndrome [9]. A possible mechanism of Tok Sen is a vibration effect on the muscle helping to release the adhesive bond to the myofascial fibers and release the muscle tension. But there is no evidence to support this hypothesis. Therefore, this report showed academic evidence of Tok Sen therapy on muscle thickness-related pain sensation.

Study program

This report represented the scientific evidence of Tok Sen therapy in four cases under the main project which was approved by the Ethics Review Committee for Research Involving Human Subjects, Faculty of Associated Medical Sciences, Chiang Mai University, (AMSEC-64EX-103). Four cases recruited in the study had shoulder pain for more than 2 weeks and had at least one local trigger point or taut band on the shoulder blade. No anyone presented cervical disorders, such as cervical spondylosis, or herniated disc, a neurological disorder such as hemiplegia or paresis, skin diseases such as herpes zoster, deep vein thrombosis or varicose veins, severe osteoporosis, loss of sensation, non-communication, a fever of 38.5°C, or uncontrolled hypertension. They signed an informed consent form before the baseline examination.

Tok Sen (TS) therapy

This technique was performed by a therapist who had legally well-trained and certified in the Tok Sen course from Thai Traditional and Alternative Medicine, Thailand. Devices of Tok Sen are composed of a rubber hammer and wooden round head (7 square inches of surface area of the head and 7 inches long of the handle) (Figure 1A). The force and rhythm of Tok Sen along the upper trapezius muscle were moderately intensity and smooth under a limited pain threshold individually. Tok Sen has performed along and transverse direction of the upper trapezius muscle to the side of the C-7 spinous process for ten rounds (Figure 1B).



Figure 1: Tok Sen device (A) and Tok Sen Therapy (B).

Ultrasonography and pain sensation evaluation

The thickness of the trapezius muscle followed a previous protocol [10]. Participants were enquired to sit on the chair with their forearms supported. The trapezius muscle thickness was evaluated by a well-trained ultrasonographer. A linear probe of ultrasound with the frequency of 9 MHz and Gray-scale B mode was used with an Ultrasound (DAWEI DW-330) (Dawei Medical (Jiangsu) Co., Ltd, China). The thickness of the upper trapezius muscle presenting a specific taut band and trigger point with referred pain to the neck or head after manual palpation was measured as defined as the greatest distance between two hyperechogenic fascial layers. Ultrasonography was measured before and after complete Tok Sen Therapy. Whereas, pain sensation on the shoulder was evaluated by a 10 cm horizontal Visual Analog Scale (VAS), rated from 0 (no pain) to 10 (most severe pain). Pain sensation was also assessed before and after the completed therapy. The participants were instructed to mark the line indicating their sensation of pain. The reliability of data obtained with VAS is reported to be high ($r=0.99$) [11] with high construct validity [12].

Case report

Case 1: Male subject aged 25 years old was suffering shoulder pain for 3 weeks from prolonged work. The trigger point and referred pain on the left shoulder were presented with a 5 pain score before therapy. After Tok Sen therapy on the shoulder, the pain score was reduced to 2 and the thickness of the trapezius muscle on ultrasound images was changed from 10.83 mm to 8.87 mm (Figure 2).

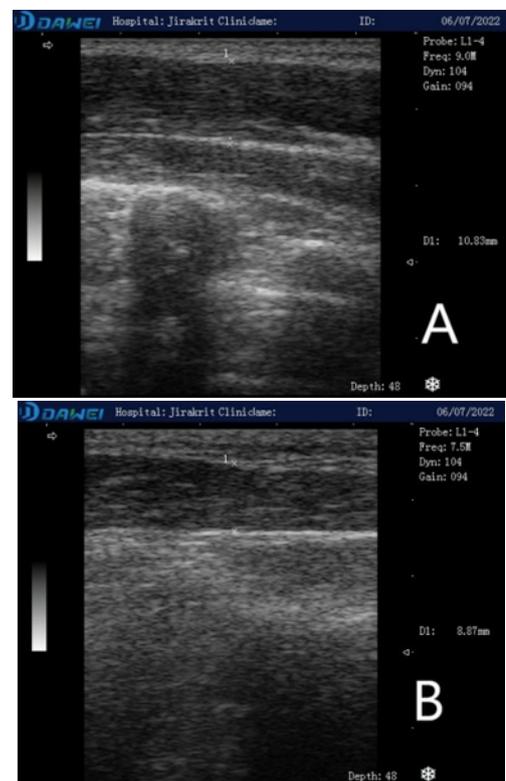


Figure 2: Ultrasonography between before (A) and after therapy (B). The thickness of the upper trapezius muscle was 10.83 mm. before and after Tok Sen therapy (8.87 mm) by ultrasound imaging.

Case 2: Female subject aged 45 years old was suffering shoulder pain for 2 weeks from prolonged computing. The taut band was manually palpable on the right shoulder with a 4 pain score before therapy. After Tok Sen therapy on the shoulder, the pain score was reduced to 2, and the thickness of the trapezius muscle on ultrasound images was changed from 9.99 mm to 9.15 mm (Figure 3).

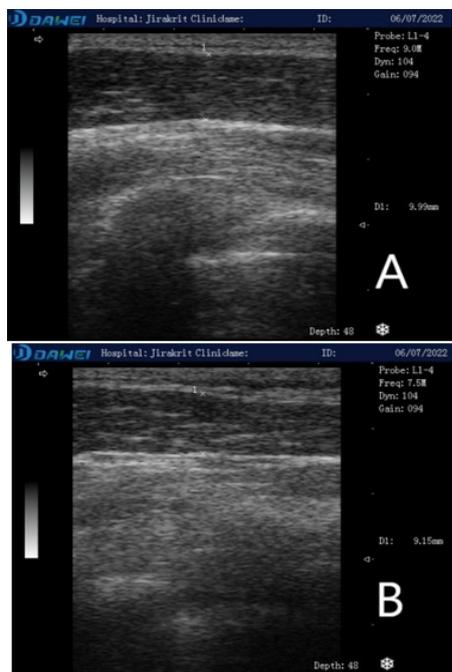


Figure 3: Ultrasonography between before (A) and after therapy (B). The thickness of the upper trapezius muscle was 10.83 mm. before and after Tok Sen therapy (8.87 mm) by ultrasound imaging.

Case 3: Female subject aged 32 years old was suffering shoulder pain for 3 weeks from prolonged cooking. The taut band was manually palpable on the right shoulder with a 5 pain score before therapy. After Tok Sen therapy on the shoulder, the pain score was reduced to 3, and the thickness of the trapezius muscle on ultrasound images was changed from 11.76 mm to 8.59 mm (Figure 4).

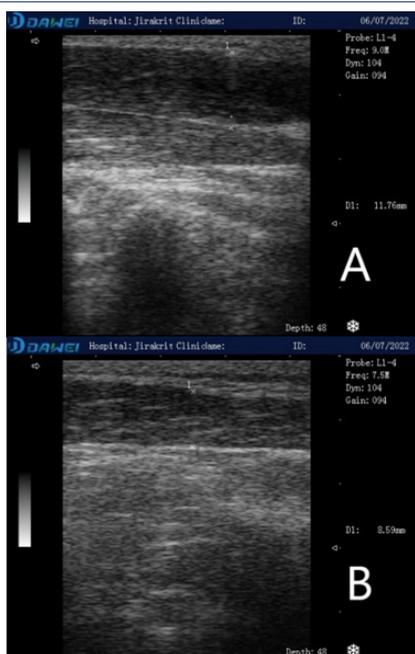


Figure 4: Ultrasonography between before (A) and after therapy (B). The thickness of the upper trapezius muscle was 11.76 mm. before and after Tok Sen therapy (8.59 mm) by ultrasound imaging.

Case 4: Male subject aged 44 years old was suffering shoulder pain for 4 weeks from prolonged car driving. Tightness on the left shoulder was manually palpable with a 4 pain score before therapy. After Tok Sen therapy on the shoulder, the pain score was reduced to 2, and the thickness of the trapezius muscle on ultrasound images was changed from 7.29 mm to 6.53 mm (Figure 5).

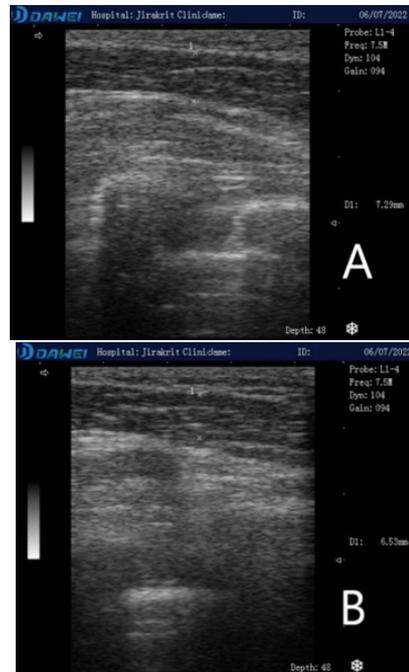


Figure 5: Ultrasonography between before (A) and after therapy (B). The thickness of the upper trapezius muscle was 7.29 mm. before and after Tok Sen therapy (6.53 mm) by ultrasound imaging.

Highlights

1. Tok Sen therapy is an inherited Lanna Knowledge in Thailand.
2. Tok Sen therapy can help to release the muscle from spasm or taut band, as also release pain.
3. Tok Sen is a simple and manual therapy with very cheap prices of devices and services price.
4. Tok Sen device is composed of various sizes and can be applied to many areas in the body with different techniques such as knocking and digging without pain.
5. Tok Sen therapy is less gain in pain and a widely distributed vibration effect on the lesion areas.
6. Forcing of Tok Sen can be modified and adjustable depending on the patients' conditions.

Discussion

This report showed scientific evidence of reducing pain sensation and muscle thickness. Tok Sen with tapping on the muscles involves muscle tension, reducing damage and scarring formation as in a previous suggestion [7,13]. But, the reasons for Tok Sen on relieving pain cannot be fully explained, and the proposed theory of Tok Sen opened the wind and energy flow [8]. Its mechanism possibly likes an external vibration effect on the muscle fibers and helps to release the muscle tension. In addition, the force of tapping and rhythm of Tok Sen performance have not been reported, but the gentle force and direct contact along the muscle alignment covering the signal points

and energy flow of the meridian line in the body was guided following a Thai traditional medicine guideline [14]. The vibration phenomenon of hammering is expected directly into the muscle fiber to release the tension. In addition, the intensity of Tok Sen was determined under the maximal individual pain threshold on the muscle of participants. The mechanism of Tok Sen to reduce pain sensation can be explained by the inhibitory effect on the nociceptive processing pain pathway [15] by relaxing at the endplate zones [16] and desensitizing nerve fiber of the taut band [17]. However, the efficiency of Tok Sen is also needed for more studies because of various gender, BMI, and age. For example, male have thicker muscles than women [18], obese or high BMI showed higher muscle volume than thin [19], and older people decreased less muscle thickness [20]. In this report, ultra sonography is used to represent muscle thickness because of the good reliability and validity [21]. It was used to evaluate the thickness of upper trapezius muscle in various disorders such as myofascial pain syndrome [22], sarcopenia [23], etc. Therefore, this report can provide scientific data on the change of thickness of upper trapezius muscle from Tok Sen therapy.

Conclusion

From the results, four cases were treated with Tok Sen therapy. It showed that Tok Sen can help to release the muscle spasm or taut band related to pain sensation. In addition, the ultrasonography showed that the thickness of muscle was reduced.

Conflict of interest: All of the authors confirmed no conflict of interest in this study.

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