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Myofascial Trigger Points in subjects with non-specific neck pain- Preliminary study

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Abstract
Background: In recent years, non-specific neck pain has become a frequent complaint due to poor head postures. It is characterized by Myofascial Trigger Points (MTrPs) in palpable taut bands of skeletal muscle that refer pain to a distance, and that can cause distant motor and autonomic effects.
Objective. The aim of the study was to assess the prevalence of active and latent MTrPs in subjects suffering from non-specific neck pain in two hospitals, Sri Lanka.
Method: This cross- sectional descriptive study was carried out among 31 patients with non-specific neck pain, presented to the department of physiotherapy, Teaching Hospital Peradeniya and National Hospital, Kandy, Sri Lanka. Participants were referred by a physician for non-specific neck pain and MTrPs were determined by a physiotherapist. MTrPs diagnosis criteria were the presence of a palpable taut band in a skeletal muscle; presence of a hyper-sensible tender spot in the taut band; local twitch response; reproduction of the referred pain pattern in response to compression; and spontaneous presence of the typical referred pain pattern and/or patient recognition.
Results. The prevalence of MTrPs among patients with non-specific neck pain was 100%. Each of the 31 patients exhibited at least two MTrPs in the analyzed muscles. The mean number of MTrPs on each patient was 4.71± 2.036. MTrPs of the upper trapezius muscles were the most prevalent, in 96.8% of the participants. MTrPs in the suboccipital muscles, sternocleidomastoid, levator scapulae reached a prevalence of 58.1%, 45.2%, 35.5% respectively. 76.74% of total number of MTrPs in all analyzed muscles were active MTrPs.
Conclusions. MTrP is a common source of pain in subjects presenting non-specific neck pain. Our study determined the presence of both active and latent MTrPs in this population with a higher prevalence of active MTrPs compared to latent MTrPs in all individual muscles.

Key Words. Non-specific neck Pain, Myofascial Trigger Point, Prevalence, Active, Latent, Sri Lanka

Introduction

People have a 67% likelihood of developing neck pain at least once in their lives[1]. Repetitive motions and the use of smart phones and tablets in abnormal head postures can stress the head, neck, and shoulder areas. Abnormal head posture can cause mechanical dysfunction of the cervical joint, which can lead to pain, fibrosis of soft tissue, adaptive shortening, loss of flexibility, and mechanical deformation reflecting the condition of hypo-mobility, where there is no movement inside the normal joint capsule[2].
Additionally, unbalanced soft tissue around the head and neck structure can place limits on the range of motion of the head and cause neck pain[3]. When muscles (and other soft tissues) are overused, acute

conditions such as pulls, tears, muscle spasm occur from repetitive motion (also known as micro-trauma). It leads to hypoxia or lack of oxygen supply to the injured area. Usually body responds to these occurrences by producing tough, dense scar tissue in the injured area. These scar tissues restrict healthy tissues, preventing them from moving freely. As more scar tissue builds, muscles will be weaken and shorten, nerves might be trapped and, the tension that is placed on the tendons might even cause tendon inflammation or tendonitis. The patient may describe a lumpiness or painful bump in the trapezius or cervical paraspinal muscles and pain radiating into the upper extremities, accompanied by numbness and tingling, making discrimination from radiculopathy or peripheral nerve impingement difficult. The patient experiences typical patterns of radiating pain referred from trigger points[4].

Trigger points are known to elicit local pain and/or referred pain in a specific, recognizable distribution. Palpation in a rapid fashion (snapping palpation) may elicit a local twitch response, a brisk contraction of the muscle fibers in or around the taut band; the local twitch response also can be elicited by rapid insertion of a needle into the trigger point. Restricted range of motion and increased sensitivity to stretch of muscle fibers in a taut band are noted frequently. The muscle with a trigger point may be weak because of pain; usually, no atrophic change is observed. Patients with trigger points may have associated localized autonomic phenomena (eg, vasoconstriction, pilomotor response, ptosis, hyper-secretion [5].

Trigger points are classified into two types (active or latent), depending on their clinical characteristics. Active trigger point causes pain at rest and it tenders to palpation with a referred pain pattern which is similar to the patient's complaint. Latent trigger point does not cause spontaneous pain, but it decreases the movement and muscle strength. When pressure is applied directly over the point, patients with muscle restrictions or weakness may identify their pain originating from a latent trigger point [6].

Although the incidence of Myofascial Trigger Points (MTrPs) has been studied in many different populations in various studies, very limited number of studies could be found in literature which were on non-specific neck pain[7][8]. Therefore, our aim was to describe the differences in the presence of MTrPs in the upper trapezius, sternocleidomastoid, levator scapulae and sub-occipital muscles between subjects with non-specific neck pain.

Body Text

Methodology

Patients with non-specific neck pain (age between 18- 75 years) referred to the department of physiotherapy, Teaching Hospital Peradeniya and National Hospital, Kandy who experience non-specific neck pain during the study period (February 2021- August 2021) was eligible for this study. Patients with neck pain due to specific causes (disc protrusion, radicular syndrome, whiplash, congenital deformity of the spine, spinal canal stenosis and neoplasm), inflammatory rheumatic disease, active oncologic disease, severe affective disorder, addiction and psychosis, physiotherapy or manual therapy for neck pain in the previous six months, surgery of the neck were excluded. Non-specific neck pain was defined as generalized neck and/or shoulder pain with mechanical characteristics including: symptoms provoked by maintained neck postures or by movement, or by palpation of the cervical muscles [8]. This study was approved by Ethical review committee, Faculty of Medicine, University of Peradeniya. Participation of all enrolled patients was voluntarily in this trial and written informed consent was obtained.

On admission, study participants were randomly selected based on inclusion and exclusion criteria. Their clinical history was taken by a trained investigator along with a detailed physiotherapy assessment. Patients were examined for MTrPs by an experienced physiotherapist who was blinded to the subjects' condition. MTrPs diagnosis criteria were the presence of a palpable taut band in a skeletal muscle; presence of a hyper-sensible tender spot in the taut band; local twitch response elicited by the snapping palpation of the taut band; reproduction of the typical referred pain pattern of the MTrP in response to compression; and spontaneous presence of the typical referred pain pattern and/or patient recognition of the referred pain as familiar. If the first four criteria were satisfied the MTrP was considered as a latent MTrP. If all five criteria were present the MTrP was considered as an active MTrP [8][9].

The Statistical Package for the Social Sciences software (25.0 version) was used for the statistical analysis. Qualitative data were represented by absolute and relative frequencies, and quantitative data were analyzed by computing the mean and standard deviation (SD).

Results

A total of 31 subjects, 9 men and 22 women, aged 44.94 ± 9.811 (26-60 years) were studied. The onset of the neck pain symptoms ranged from 3 to 18 months and mean value was 7.58 ± 4.06 months. The mean of neck pain at rest was 2.29 ± 1.553 and neck pain during movement was 4.81 ± 1.558 on 100mm visual analogue scale. Seven subjects had reported radiating pain while the rest 24 subjects were complaining of localized type of pain. Fifteen subjects of the sample reported tension-type headache with their neck symptoms mostly when their neck pain was aggravated (figure 01).

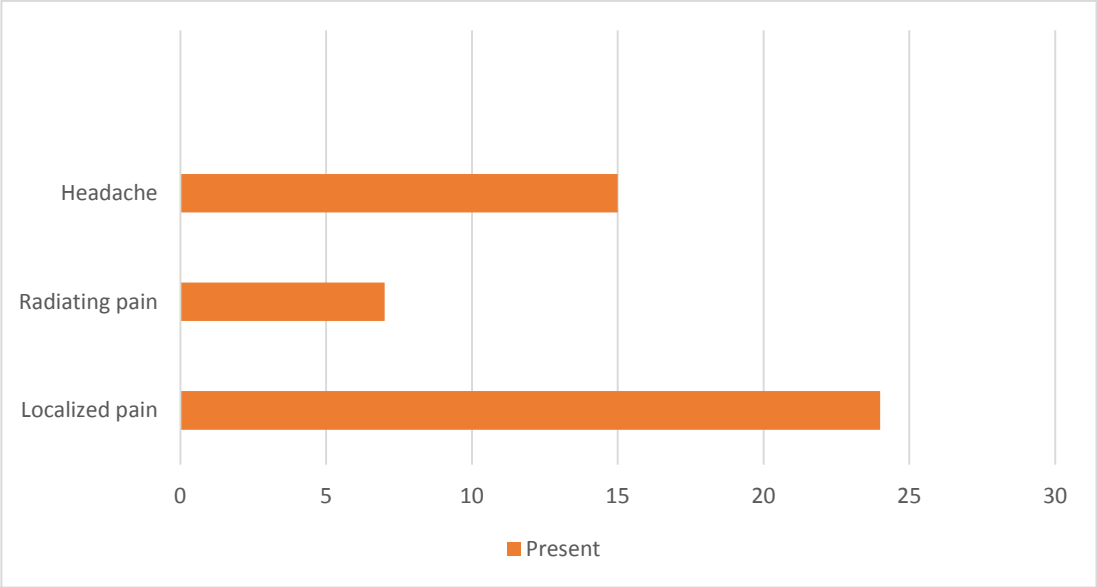

Figure 1. Presence of symptoms

The prevalence of MTrPs among patients with non-specific neck pain was 100%. Each of the 31 patients exhibited at least two MTrPs in the analyzed muscles and total trigger points number ranged from 2- 10. The mean number of MTrPs on each patient was 4.71± 2.036. The prevalence of the MTrPs included in this study is summarized in Table 1.

Table 1.Distribution of subjects with active or latent MTrPs (Right and Left sides)

Muscle	**Levator scapulae**		**Sternocleidomastoid**		**Upper trapezius**		**Sub occipital muscles**	
Side	Right	Left	Right	Left	Right	Left	Right	Left
Total	10	7	12	10	28	29	18	15
Active (% of the total)	5 (50%)	6 (85.7%)	11 (91.6%)	10 (100%)	19 (67.9%)	16 (55.1%)	18 (100%)	14 (93.3%)
Latent	5	1	1	0	9	13	0	1

Within this neck pain group, MTrPs in the analyzed muscles presented either right side or left side or both sides. Above table describes the number of MTrPs presented in each side and the distribution of active and latent MTrPs. A high prevalence of total number of MTrPs (44.19%) was noted in upper trapezius muscle (right: 21.71%, left: 22.48%) following by sub-occipital muscles (total: 25.58%), sternocleidomastoid (total: 17.05%) and levator scapulae (total: 13.18%) respectively. 76.74% of total number of MTrPs in all analyzed muscles were active MTrPs. Figure. 2 shows the active and latent MTrPs distribution over both sides together in analyzed muscles.

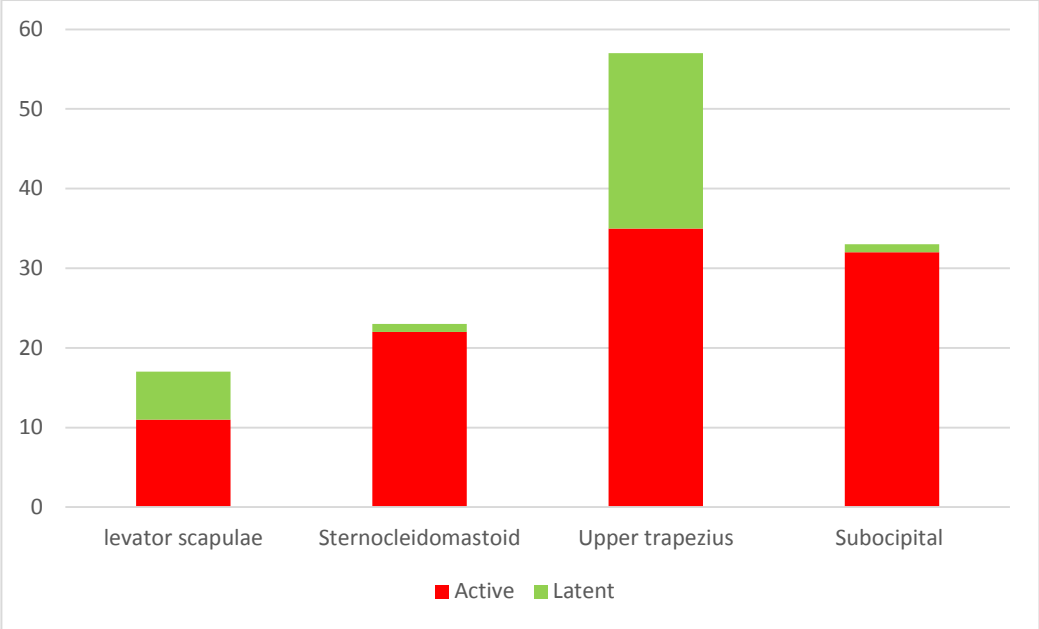

Figure 2. Distribution of active and latent MTrPs in analyzed muscles.

Some subjects had MTrPs in one side while some of them was having in both sides. Figure 3 is to highlight the presence of MTrP in at least one side of the analyzed muscle.

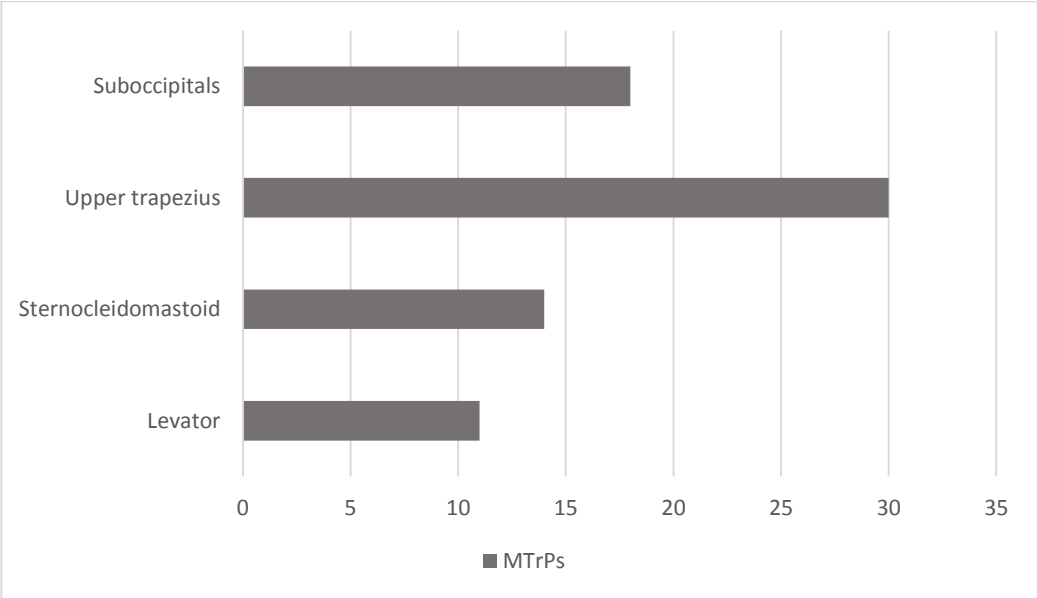

Figure 3.Distribution of MTrPs (Right/Left/Both sides) among the study group

The most prevalent MTrPs in the upper trapezius muscles were identified in 96.8% of the subjects, in the suboccipital muscles in 58.1%, and in the sternocleidomastoid in 45.2% of the subjects. MTrPs in the levator scapulae reached a prevalence of 35.5%.

Discussion

This study showed the prevalence of active and latent MTrPs in analyzed cervical musculature in patients with non-specific chronic neck pain. Based on our results, our study determined the presence of active or latent MTrPs in this population for individual muscles except left side sternocleidomastoid muscle and right side sub-occipital muscles. But there is a higher prevalence of active MTrPs compared to latent MTrPs in all individual muscles. Clinically, symptom producing active MTrPs can be presented as a hyper-irritable nodule with spot tenderness in a palpable taut band of skeletal muscle. When appropriately stimulate the spot, this site of exquisite tenderness to palpation from which a local twitch response can be elicited. It refers pain to a distance, and that can cause distant motor and autonomic effects[10]. Usually the patients give a history of onset of their pain which is associated with either an acute or chronic muscle overload. The chronic overload is associated with maintaining the muscle under prolong contraction, or a frequent repetitive movement. Leaving a muscle in a shortened position for

prolong period or especially when forceful holding in a shortened position, can activate the latent MTrPs [11].

Active MTrPs of the analyzed muscles created referred pain patterns contributing to neck symptoms shown in the study group. Literature stated that neck pain might be usually provoked by MTrPs in the upper trapezius and levator scapulae muscles[12]. Furthermore, majority of patients with neck pain in present study, showed MTrPs in the upper fibres of the trapezius muscle, in the right and/or left sides. A study done among 20 patients and 20 matched healthy control subjects in Spain, provided a preliminary evidence suggesting that active MTrPs were more common in subjects with mechanical neck pain than in healthy controls [8].

Abnormalities in the cervical musculature have been traditionally linked to different types of headache [13]. In our study, considerable number of study subjects reported tension-type headache with their neck symptoms mostly when their neck pain was aggravated. A blinded, controlled study supported evidence that active MTrPs in the upper trapezius, sternocleidomastoid, and temporalis muscles are more common in patients with episodic tension-type headache than in healthy subjects. In addition, those patients had higher prevalence of forward head posture, that is, a smaller cranio-vertebral angle, and lesser neck mobility than controls. However, intensity, duration, and frequency of headache were not significantly different between patients with active MTrPs and latent MTrPs in the same muscles. There was no correlation between headache characteristics and neck mobility or forward head posture [14]. Another study in patients with chronic tension type headache, showed that active MTrP activity was significantly related to higher headache intensity and longer headache duration than those with latent MTrPs. There was a higher occurrence of referred pain in the dominant side than the non-dominant upper trapezius muscles in either the patients group or the control group. The active MTrPs in the dominant upper trapezius muscle showed a significant correlation with characteristics of headache including intensity, frequency, and longer duration. Furthermore, referred pain area was larger in the dominant than non-dominant sides in patients but not in controls [15].

Epidemiological studies suggest that highly repetitive work and forceful arm or hand movements can cause pain in neck and shoulder region [16]. Repetitive use of the muscle in the dominant side may be a factor for developing MTrPs [10]. MTrPs release different metabolic products and algogenic substances. They stimulate nociceptors and then induce spontaneous muscle pain and related referred pain [17]. Latent MTrPs show a possibility to become active when the muscle is exposed to temporary or sustained mechanical overload[18].

Literature findings suggest that MTrPs are present in different shoulder and neck disorders, and may vary in muscle distribution and its type either active or latent [19]. Knowledge of common locations of MTrPs at the neck and shoulder can help clinicians to optimally deliver the interventions in order to manage neck and shoulder conditions. MTrP management is a popular topic in the literature since it has become a common problem in the society [20]. In the development of various treatments for MTrPs, several studies have shown that soft tissue mobilization, dry needle, cupping, and ischemic compression are the most common conventional treatment techniques [21].

Conclusion

MTrP is a common source of pain in subjects presenting non-specific neck pain. Our study determined the presence of both active and latent MTrPs in this population with a higher prevalence of active MTrPs compared to latent MTrPs in all individual muscles. The present study concludes that the MTrPs examination is important in the diagnosis, treatment and evaluating of non-specific neck pain.

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