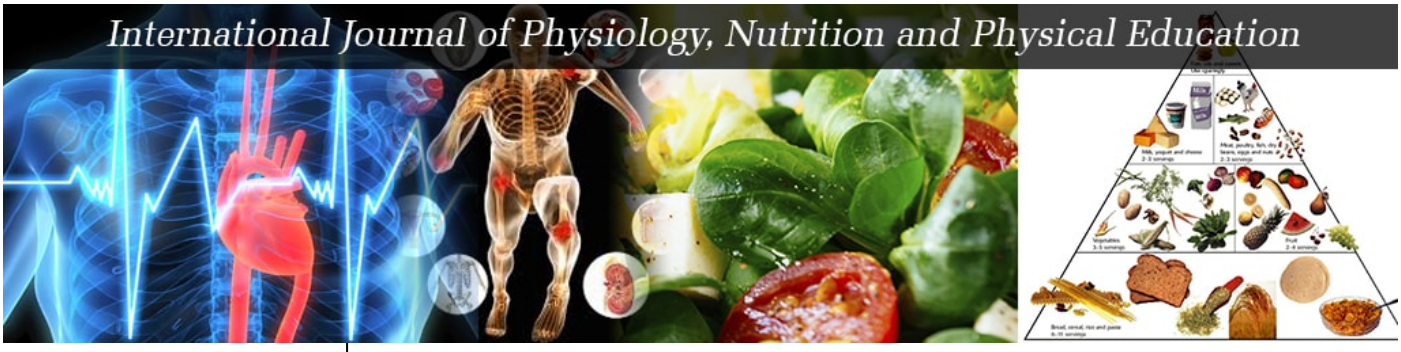

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Association between sternocleidomastoid, masseter, temporalis, trapezius and suboccipital muscle trigger points and cervicogenic headache: A cross-sectional study

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Abstract
Background: Cervicogenic headache (CeH), predominantly termed as a secondary headache, as it leads to referred pain patterns from cervical spine and its muscles as well as cervical dysfunction. The presence of myofascial trigger points (MTrPs) in head and neck muscles have enormous potential to precipitate referred pain patterns. Thus playing an important etiologic role. The purpose of this study was to find out the association between myofascial trigger points in sternocleidomastoid (SCM), Masseter, Temporalis, Trapezius and Sub-occipital muscle (recti capitis posteriories major and minor, oblique inferior and superior) in subjects with cervicogenic headache.
Method: 135 subjects were screened out of which sixty subjects were included based on the inclusion and exclusion criteria. All the subjects were assessed for the presence of sternocleidomastoid (SCM), masseter, temporalis, trapezius and sub-occipital muscle (recti capitis posteriories major and minor, oblique inferior and superior) trigger point.
Results: Study showed a good association between visual analogue scale (VAS) and trigger points in trapezius muscles (phi = 0.43; p = 0.009); Good to moderate association between type of the headache and trigger points in trapezius muscle (phi = 0.599; p = 0.000) and good association between type of the headache and trigger points in sub-occipitals. (phi = 0.365: p = 0.046). However, the study showed a good significance between dominance and SCM trigger points (phi = 0.357; p =0.054).

Keywords: Cervicogenic headache, fascial muscles, myofascial trigger points, myofascial pain, pain

Introduction
Headaches, are undeniably an extremely common problem [1]. They have become one of the most frequent disorders globally, with India being no exception [2]. Headache was identified as the leading cause for patient to seek medical care [1]. Across the globe, 46% of population suffer from headaches [3], with a prevalence of 93% and 99% in men and women respectively [1].

Headaches not only causes disability but also has an enormous impact on the public-health problems thus rendering individuals as sufferer as well as society. Due to its episodic nature, the public health significance of headache is always overlooked [4] and in spite of its impact, the pathogenesis is not clear [5].

International headache society (2004), broadly classified it as primary or secondary. Cervicogenic Headache (CeH) is a secondary headache with its prevalence of 4.1%. Subjects that experience chronic headaches, the prevalence rate goes upto 15% to 20% [1].

Clinically the cause for cervicogenic headache could be due to joint, disc or ligament involvement that arises from the upper cervical spine. However, the referred pain pattern that could arise from the imbalances in cervical musculature has received particular interest in recent years [6].

As nociceptive somatic afferents that emerge from upper cervical roots (C1-C3) converge with trigeminal nerve along the same neurons, it is hypothesized that the message to supraspinal structures can be misinterpreted and thus can cause localized pain in other structures distant from the site of painful stimulus (referred pain) [7].

Convergence between trigeminal afferents that arises from the upper cervical spinal nerves in the trigeminocervical nucleus caudalis, in addition to convergence of sensorimotor fibers involving intercommunication between the spinal accessory nerve, the cervical roots and descending tract of the trigeminal nerve. This neural network could be stated as the physiological basis for a well-recognised pattern of referred pain that originating from the fascial muscles and head [8].

The presence of MTrPs in head and neck muscles have the enormous potential to precipitate referred pain patterns to the head [7]. The primary reason for the referred pain pattern is due the presence of active MTrPs. The distinguishable feature between an active and latent MTrP is the elicitation of the familiar pain, when pressure is applied to the MTrP. Latent MTrPs elicits referred pain only when mechanical stimulation is applied. Disturbance of normal patterns of motor recruitment and movement efficiency could be due to the presence of latent trigger points [7].

Table 1: Referred pain patterns [7, 9]

Sr. No.	Muscle with TrP	Referred pain pattern
1.	Upper trapezius muscle	Ipsilateral from the posterior-lateral region of the neck, behind the ear, and to the temporal region
2.	Sternocleidomastoid muscle	Pain over the occiput, frontotemporal area, retro auricular area, forehead, and cheek
3.	Temporalis muscle	Temporoparietal region
4.	Sub-occipital muscle (recti capitis posteriories major and minor, oblique inferior and superior)	occipital, temporal, and frontal bones
5.	Masseter	Temporal

If this study found a significant association between myofascial trigger point and CeH, this study will be a preliminary evidence on emphasizing the association of myofascial trigger point in patients suffering from cervicogenic headache. It would eventually facilitate the treatment of trigger point release in patients suffering from CeH and thus relieve the symptoms

Method

Ethical committee approval was obtained from the institute and data was collected in the out-patient department. 115 subjects were screened. A questionnaire was given to the subjects suffering from headache to screen for Cervicogenic headach [26]. Among them 60 met the inclusion criteria. Participants were selected according to the inclusion criteria and a screening questionnaire to determine patients with CeH Inclusion criteria [7, 8, 12]. included 1. subjects between age group 18-60 years 2. Major diagnostic criteria of cervicogenic headache by international headache classification 3. Presence of joint tenderness over one of the upper cervical spine (C1-C3) 4. Frequency of Headache- at least 1 per week over a period greater than 2 months. Exclusion Criteria [7, 8, 12]. included 1. Episode of neck trauma 2. Cervical radiculopathy 3. Previous surgical history on neck or shoulder area 4. Neurological conditions 5. Fibromyalgia 6. Patient with severe symptoms 7. Psychological problems. All the participants were requested to sign the consent form stating their voluntary acceptance to participate in the study. Demographic detail were collected from all the selected participants. The purpose of the study was explained to all the participants. Clinical examination for sternocleidomastoid, masseter, temporalis, trapezius and suboccipital muscles (recti capitis posteriories major and minor, oblique inferior and superior) was done on patients with CeH. Assessment of MTrPs was done by maintaining standard examination position and procedure. Palpation is the only method capable of diagnosing myofascial pain, in clinical setting. Studies have supported the idea that experienced raters can obtain an acceptable agreement when diagnosing MTrPs by palpation. As a result, the therapist underwent a vigorous training programme and was supervised under an experienced faculty who had 3 years of experience.

Testing procedure for Identifying trigger points [18-22]

1) Masseter muscle trigger point palpation

Patient position: Patient in sitting position.

Palpation: The superficial portion of the masseter muscle is examined. Therapist uses the pincer method to easily locate trigger points. Inorder to lengthen the muscles during examination, the subject is asked to open the jaw in a relaxed position. To detect presence of trigger points the therapist gloved finger is rubbed across the muscle in the direction perpendicular to the muscle fibers.

2) Sternocleidomastoid muscle trigger point palpation

Patient position: seated or supine

Palpation: Therapist uses pincer palpation, where the patient is examined in seated position (lower end of the sterna division) or supine and head tilted towards the same side (deeper clavicular division).

3) Sub-occipital muscle trigger point palpation (recti capitis posteriories major and minor, oblique inferior and superior)

Patient position: supine

Palpation: Flat palpation was used to evoke deep tenderness without evidence of palpable bands or local twitch responses. While palpating sub-occipital area for muscular tension and tenderness, the therapist supports the patient's head with his hand and flexes the head on the neck.

4) Temporalis muscle trigger point palpation

Patient position: sitting position

Palpation: Patient should drop the lower jaw inorder to take up slack in the muscle. Flat palpation is used.

5) Trapezius muscle trigger point palpation

Patient position: supine lying

Palpation: Pincer palpation is incorporated to examine the

central trigger points. Flat palpation is used to locate the taut band and nodular trigger points.

The presence of MTrPs will be determined by using the diagnostic criteria as described by Simons and Gervin.[23]

1. Point tenderness over taut muscle band
2. Local twitch response
3. Referred pain
4. Reproduction of similiar pain pattern
5. Limited range of motion
6. Muscle weakness, atrophy absent
7. Autonomic symptoms

Statistical Analysis: The data was collected and all the variables and its characteristics were described using tables and graphs. The data was then entered and coded into the software SPSS (Statistical Package for Social Sciences) in windows. Descriptive analysis was done by finding mean and standard deviation of all the grouped variables. The data was then be subjected to test of normality and Chi-Square test was used for analysis.

Results

Sixty patients with Cervicogenic Headache were examined for presence of SCM, Masseter, Temporalis, Trapezius and Sub-occipital muscles trigger points. The data including demographics and all parameters were recorded on a data collection form and then converted into tabular form. The data was then entered into the software SPSS v.16 (Statistical Package for Social Sciences) in windows. Descriptive analysis was done by finding the mean and standard deviation of all the variables. Level of significance (p-Value) was set at 0.05.

Table 2: Represents data of gender with respect to muscle trigger points

Gender	SCM	Masseter	Temporalis	Trapezius	Suboccipital
Chi-Square	4.282	3.522	2.582	0.931	0.339
Phi Value	0.267	0.242	0.207	0.125	0.075
p- value	0.233	0.318	0.461	0.818	0.952

Table 3: Represents data of VAS with respect to muscle trigger points.

VAS	SCM	Masseter	Temporalis	Trapezius	Suboccipital
Chi-Square	2.190	5.506	1.353	11.481	5.860
Phi Value	0.191	0.303	0.150	0.437	0.313
p- value	0.534	0.138	0.717	0.437	0.313

Table 4: Represents data of Type of headache with respect to muscle trigger points.

Type	SCM	Masseter	Temporalis	Trapezius	Suboccipital
Chi-Square	7.025	6.736	5.467	21.564	8.010
Phi Value	0.342	0.335	0.302	0.599	0.365
p- value	0.071	0.081	0.141	0.000	0.046

Table 5: Represents data of hand dominance with respect to muscle trigger points.

Dominance	SCM	Masseter	Temporalis	Trapezius	Suboccipital
Chi-Square	7.629	0.844	0.405	1.651	3.228
Phi Value	0.357	0.119	0.082	0.166	0.232
p- value	0.054	0.839	0.939	0.648	0.358

Table 6: Represents data of duration of pain with respect to muscle trigger points.

Duration	SCM	Masseter	Temporalis	Trapezius	Suboccipital
Chi-Square	5.143	3.611	1.843	2.320	0.705
Phi Value	0.293	0.245	0.175	0.197	0.108
p- value	0.162	0.307	0.606	0.509	0.872

According to the results tabulated, we found good association between VAS and trigger points in trapezius muscles (phi = 0.43; p = 0.009); Good to moderate association between Type of the headache and trigger points in trapezius muscle (phi = 0.599; p = 0.000) and good association between Type of the headache and trigger points in sub-occipitals. (phi = 0.365: p = 0.046). Also there is good significance between Dominance and SCM trigger points. (phi = 0.357; p =0.054)

Discussion

According to International Classification of Headache, Cervicogenic Headache is a secondary headache [6] that results in referred pain from cervical spine, usually unilateral [9] and hypothesized to be caused by musculoskeletal dysfunction of the neck [27]. The pain is located in the occipital and temporal region and can radiate periorbitally. Pain can also be perceived in the face, frontal and parietal region. Discomfort in shoulders can be felt. The cervical spine usually shows limitation in range of motion, and the headaches can often be precipitated with certain neck movements [27].

The purpose of the current study was to find association between myofascial trigger points in SCM, Masseter, Temporalis, Trapezius and Sub-occipital muscle (recti capitis posteriories major and minor, oblique inferior and superior) and cervicogenic headache. In our study, the population with headache were screened for CeH and assessed for trigger points in the above mentioned muscles as the referred pain pattern of the trigger points in these muscles mimic that of the CeH. Thus by finding its association we can add the treatment of trigger point release in the population suffering from CeH.

Migraine was ruled out by excluding patients with symptoms of photophobia, phonophobia nausea and vomiting. Subjects with tension type headache were excluded as it being bilateral cephalgia and cervicogenic headache being unilateral (may be bilateral but with one side dominance) and often precipitated by neck movements [27].

Studies on tension type headache have suggested that the referred pain from TrPs could be an important precipitator in the patient's perception of tension type headache. Active TrPs in the head and cervical muscles reproduced the headache in chronic tension type headache subjects [28].

Headache is due to an excess of nociceptive inputs from peripheral structures. Headache intensity is the sum of nociceptive inputs from cranial and extracranial tissues converging on trigeminal nucleus caudalis neurons. Convergence of the nociceptive afferents from the receptive fields C1to C3 roots and those of the trigeminal nerve occurs in the nucleus caudalis. Continuous nociceptive afferent input results in temporal and spatial summation thus leading to central sensitization. Inactivation of head, neck, and shoulder TrPs in headache sufferers decreases headache frequency and intensity [29].

There are few studies randomised control studies done with respect to SCM and headaches. The other muscles mentioned in our studies aren't included. This study is the first study exploring the relationship of CeH with the other muscles.

Limitations

The occupation of the population was not considered.

The age group taken was very vast, a further sub-division of age group needs to be done.

Recommendation for future research

Future randomized controlled trials are necessary to determine the validity of these results.

Conclusion

Our study, found a good association between VAS and trigger points in trapezius muscles, Type of headache and trigger points in trapezius muscle, Type of the headache and trigger points in sub-occipitals. Also there is good significance between Dominance and SCM trigger points.

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Ethical committee approval: Approved by ethical committee of the institute.

Clinical relevance:

- The current study can help facilitate the treatment of patients with cervicogenic headache by focussing on the presence of trigger points in head and neck muscles.
- Thus alleviating pain and preventing the recurrence of headaches.

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