Active myofascial trigger points in head and neck muscles of patients with chronic tension-type headache in two primary health care units in Tshwane

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Introduction

In clinical practice, the generalist doctor is frequently required to manage a patient with a chronic primary headache disorder. Management of chronic tension-type headache (CTTH), with a one-year period prevalence of 0.9–2.2% in European and American studies, can in particular be challenging. It is generally accepted that chronic pain disorders, such as CTTH, require a multi-modal management approach. A better understanding of the potential myofascial pain components in patients with CTTH will assist primary care physicians in the assessment and management of this common disorder.

The association between tension-type headache and myofascial pain syndrome (MPS) has been studied for many years. Researchers have observed an increased tenderness with palpation of pericranial muscles and surrounding tissue, such as ligaments and tendons. Active MTrPs have been postulated as a well-defined hyperirritable and painful area in a taut band of skeletal muscle. Active MTrPs are associated with headache disorders, such as CTTH, in primary health care settings on the African continent. This study therefore aimed to investigate the prevalence of active MTrPs in specific head and neck muscles/muscle groups in patients with CTTH.

Methods: A prospective, cross-sectional and descriptive study was done in two primary health care facilities situated in Tshwane, South Africa. The sample included 97 adult patients with CTTH. Five head and neck muscles/muscle groups were examined bilaterally for active MTrPs. Outcome measures were the prevalence and distribution of active MTrPs in these patients.

Results: Active MTrPs were found in 95.9% of the patients, the majority (74.2%) having four or more active MTrPs. The temporalis muscles and suboccipital muscle group exhibited the highest number of active MTrPs (prevalence 87.6% and 80.4% respectively).

Conclusion: Our study suggests a strong association between MPS and CTTH in patients, presenting in the primary health care setting. This indicates the importance of a musculoskeletal assessment of neck and pericranial muscles in patients with CTTH. This can assist in determining the most appropriate treatment strategy in these patients.

Keywords: chronic pain disorders, chronic tension type headache (CTTH), myofascial pain syndrome (MPS), myofascial trigger points (MTrPs), primary headache
A prospective, cross-sectional descriptive study was conducted in two urban primary healthcare settings located in the south-western district of Tshwane (Pretoria).

Adult patients (18 years and older) presenting to these facilities with chronic headache which had lasted longer than three months, were screened over an approximately two-year period using their headache history and a focused clinical examination. Those who fulfilled the criteria for CTHH according to the International Classification of Headache Disorders (ICHD), 2nd edition\textsuperscript{12} (3rd edition\textsuperscript{14} was published subsequent to this study being conducted) were invited to participate in the study. All subjects had headache on at least 15 days per month for longer than three months. Headaches of the participants were bilateral with a pressing quality. A 0–10 pain intensity numeric rating scale (NRS) was used to assess the severity of headaches during the preceding four weeks. In keeping with the ICHD criteria for CTHH, the average headache intensity ratings by study patients varied from 1 to 6 on the NRS (which equates to mild to moderate pain). Patients were excluded from the study if the clinical evaluation was suggestive of a secondary cause of the headache, or another type of primary headache disorder such as migraine. Patients who were unable to adequately describe their pain experience due to cognitive impairment were also excluded.

Ninety-seven patients participated in the study. This was the minimum calculated sample size to determine active MTrP prevalence to an accuracy of 10% or smaller with 95% confidence.

All subjects gave written informed consent prior to participation in the study, which was approved by the Research Ethics Committee of the University of Pretoria.

A questionnaire was administered, which included basic demographic data as well as questions relating to headache characteristics and the use of analgesia.

This was followed by a musculoskeletal assessment to determine the presence and location of active MTrPs. Specific head and neck muscles/muscle groups, namely temporalis, upper trapezius, occipitofrontalis, suboccipital, sternocleidomastoid and temporalis muscles produced referred pain which reproduced the patient’s usual headache. In addition, they demonstrated that active as compared with latent MTrPs in the head and neck muscles examined were associated with greater headache intensity and frequency.\textsuperscript{13,14} Both Fernandez-de-las-Penas et al. and Danish researchers observed that active MTrPs were significantly more frequent in patients with CTHH than in control persons.\textsuperscript{15,16} A group of Korean researchers also found a significantly greater number of active MTrPs in patients with CTHH as compared to those with episodic tension-type headache, with no active MTrPs in the control group. This study was performed in a headache clinic based in a tertiary hospital.\textsuperscript{16}

The relationship between MTrPs and CTHH has not yet been explored in the primary health care setting. This study therefore aimed to determine the prevalence of active MTrPs in specific head and neck muscles, in patients with CTHH presenting to primary health care facilities in Tshwane, South Africa.

**Methods**

A prospective, cross-sectional descriptive study was conducted in two urban primary healthcare settings located in the south-western district of Tshwane (Pretoria).

**Statistical analysis**

Data were analysed using Stata\textsuperscript{®} Release 8.1 Intercooled statistical software (StataCorp LP, College Station, TX, USA). Frequency distributions of CTHH patients’ demographic parameters and active MTrP categories were done to determine the percentage of patients with active MTrPs in the respective muscles/muscle groups. The Chi-square, Fisher’s exact and Student’s t-tests were used to assess the influence of study variables, such as age, gender and frequent use of analgesic agents, on active MTrP frequency. Statistical analysis was conducted at the 95% confidence level and a p-value of less than 0.05 was considered statistically significant.
Results

The socio-demographic profile of the sample of 97 patients is shown in Table 1. Of note is that 86.6% (n = 84) of the patients presenting with CTTH were female. The mean age was 39.1 years with a standard deviation of 12.9.

One or more active MTrPs were identified in head and neck muscles of 95.9% (n = 93) of study patients, with the greater majority (74.2%) having four or more active MTrPs (Table 2).

Table 1: Demographic characteristics of CTTH patient sample

<table>
<thead>
<tr>
<th>Socio-demographic variable</th>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>13</td>
<td>13.4</td>
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<tr>
<td></td>
<td>Female</td>
<td>84</td>
<td>86.6</td>
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<tr>
<td>Age (years)</td>
<td>18–29</td>
<td>26</td>
<td>26.6</td>
</tr>
<tr>
<td></td>
<td>30–39</td>
<td>29</td>
<td>29.9</td>
</tr>
<tr>
<td></td>
<td>40–49</td>
<td>18</td>
<td>18.6</td>
</tr>
<tr>
<td></td>
<td>50–59</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td>5</td>
<td>5.2</td>
</tr>
<tr>
<td>Employment status</td>
<td>Employed</td>
<td>61</td>
<td>62.9</td>
</tr>
<tr>
<td></td>
<td>Unemployed*</td>
<td>36</td>
<td>37.1</td>
</tr>
<tr>
<td>Race</td>
<td>Black</td>
<td>55</td>
<td>56.7</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>11</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>26</td>
<td>26.8</td>
</tr>
<tr>
<td></td>
<td>Mixed race</td>
<td>5</td>
<td>5.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>97</td>
<td></td>
</tr>
</tbody>
</table>

*Included students and pensioners.

Table 2: Number of active MTrPs per CTTH patient

<table>
<thead>
<tr>
<th>Number of active MTrPs per patient</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td>1–3</td>
<td>21</td>
<td>21.7</td>
</tr>
<tr>
<td>≥ 4</td>
<td>72</td>
<td>74.2</td>
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<tr>
<td>Total</td>
<td>97</td>
<td></td>
</tr>
</tbody>
</table>

The average number of active MTrPs per patient was 4.9 (SD 2.43). Figure 1 illustrates the distribution of active MTrPs in the head and neck muscles that were examined. The most active MTrPs were found in the temporalis (87.6%) and suboccipital muscle group (80.4%) and in most muscles, active MTrPs occurred bilaterally.

Patient variables such as gender (p = 0.42), age (p = 0.44) and employment status (p = 0.88) were not shown to influence the presence of active MTrPs in head and neck muscles. The prevalence of active MTrPs was compared in the group of patients with CTTH who frequently used analgesic medication (65.98% of the sample) and those who did not. No significant difference was found in the presence of active MTrPs between these groups (OR 2.00; 95% CI 0.26–15.11) and p = 0.49. Patients with fewer (0–3) active MTrPs per patient with CTTH were compared with those with a greater number (4–10) trigger points. Here there was also no significant difference in the frequent and infrequent analgesic-use groups (OR 1.42; 95% CI 0.55–3.67) and p = 0.47.

Discussion

In this study of adult patients with CTTH presenting in two primary health care units, a substantial majority of patients were found to have one or more active MTrPs in the head and neck muscles that were examined. The overall prevalence of active MTrPs within our group of CTTH patients is higher than that found in previous tertiary hospital-based studies, in which 65–85% of patients with CTTH were shown to have active MTrPs. This high prevalence of active MTrPs in primary care patients with CTTH is not entirely unexpected since previous studies have confirmed that that MTrP pain is strongly associated with chronic tension-type and migraine headaches. Gerwin reported previously that 100% of patients with mixed tension-type/migraine headaches had active MTrPs.
Previous studies of active MTrPs in CTTH patients specifically reported the average number of active MTrPs found per patient. Comparisons in this regard are complicated by the fact that each study examined a different number of head and neck muscles. Studies of CTTH patients done in Spain and Korea found an average of 1.9 and 2.4 active MTrPs per CTTH patient respectively, when examining three to four head and neck muscles bilaterally.5,6 In a subsequent study led by the same Spanish researcher, a mean number of seven active MTrPs per CTTH patient were found when examining six head and neck muscles bilaterally.21 In the current study, which examined five head and neck muscles bilaterally, a mean number of 4.9 active MTrPs per CTTH patient was found. Of note is that a regional pain problem can be due to a single trigger point, although it is more commonly associated with multiple trigger points.3

In our study, the temporalis and suboccipital muscles were most likely to have active MTrPs (87.6% and 80.4% of patients respectively). The suboccipital muscles also exhibited the highest number of active MTrPs in one of the Spanish studies,21 unlike the Korean study, where the upper trapezius was more often involved (60.9% of patients) as compared with the suboccipital (26.1%) and temporalis (8.7%) muscles.16 Simons et al. have noted that the trapezius is probably the muscle that is most often affected by MTrPs.5 The relatively low prevalence of active MTrPs in the trapezius in our study may relate to differences in daily activities in our study population, compared with other study populations. It has been shown that high visual stress related to computer work resulted in an increase in trigger point development in the trapezius muscles.22 With over a third of our study sample being unemployed, computer work may feature less in the activities of our patients. In a study involving migraine headache patients, it was also the temporalis and suboccipital muscles in which the majority of trigger points were present.22

While this and previous studies have demonstrated that by far the majority of CTTH patients have active MTrPs in their head and neck muscles, it has not been firmly established whether there is a direct causal link between the presence of MTrPs and CTTH. It has, however, been proposed that active MTrPs in head, neck and shoulder muscles are a source of ongoing peripheral and central sensitisation that may be at least partially responsible for chronic pain symptoms in patients with CTTH.24 This contribution of active MTrPs to CTTH pain is supported by several other researchers in this field.4,16 It has also been suggested that early identification and interventions to address MTrPs in patients presenting with tension type headache may prevent progression to a more chronic headache disorder.6 It should, however, also be noted that the presence of MTrPs in patients with CTTH does not rule out the importance of other factors, such as psychological stress or anxiety and abnormal head posture, which may also exert their respective effects through the activation of MTrPs.12

The frequent use of analgesic medication, noted in 65.98% of our study sample, suggests an additional diagnosis of medication-overuse headache in some of these patients. In this particular study, we did not differentiate between CTTH and medication-overuse headache, because in clinical primary care practice, patients with chronic headaches mostly present with a combination of these. Indeed, the most recent ICHD (3rd edition)18 requires that patients meeting the criteria for CTTH who also overuse analgesic medication be given a dual diagnosis of CTTH and medication-overuse headache. In this study, no association was found between frequent use of analgesia and MTrP frequency in head and neck muscles.

It is notable that more than half of the patients presenting with CTTH were under 40 years of age, with most of the remainder being under 60 years. This emphasises the importance of effective management of this condition, which appears to be particularly prevalent in the population age group that is traditionally the most economically active. The predominance of female patients in the sample is in keeping with previous findings, where tension-type headache occurred more commonly in women than in men.2

A limitation of this study is the current absence of objective laboratory methods for identifying MTrPs. Their diagnosis currently relies solely on history and physical examination and is influenced by the skill and technique of the examiner.1 The reliability of MTrP diagnosis for the purpose of research should improve in future with evolving tools such as magnetic resonance elastography and high-resolution ultrasound imaging.12 There are currently also no universally accepted validated clinical diagnostic criteria for MTrPs. There is therefore a need to develop consensus on the clinical features that are necessary to diagnose MPS.

**Conclusion and recommendations**

The results of this study indicate that active MTrPs in head and neck muscles of patients who present with CTTH in primary care are highly prevalent. This suggests that the frequent association between MPS and CTTH is not limited to more severe cases managed in secondary and tertiary care institutions. Therefore, in determining an appropriate treatment strategy for a patient with CTTH, a musculoskeletal assessment of the neck and pericranial muscles is essential and can often reduce the need for costly laboratory investigations and imaging.

It is recommended that active MTrPs should be treated as early and as effectively as possible to prevent potential sensitisation and chronification of pain.26 Trigger point injections with lignocaine have been shown to be effective in providing relief of symptoms caused by active MTrPs and are currently the treatment modality with the best evidence of success when less invasive approaches such as physical therapy have failed.23,26 In a recent survey of American Headache Society members, three-quarters of responders indicated that they perform this intervention in patients with headaches, particularly in CTTH.1 With appropriate training, this intervention can be readily implemented by clinicians in the South African primary health care setting. Clinicians should simultaneously identify and address perpetuating factors such as abnormal posture, stress, mood disorders and poor sleep, which may contribute to MPS and MTrPs.6

Appropriate identification and management of MTrPs should contribute significantly to the multimodal management of this common and chronic headache disorder.

**Conflict of interest** – No conflict of interest to declare.

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