The treatment of sports-related muscle tension headaches with acupuncture and moxibustion

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Abstract
Muscle tension headaches are a common occurrence in athletes, who may suffer impact trauma to the head and neck (for example in soccer or rugby), or else be required to repeatedly extend their head and neck upwards as part of their sport (for example in tennis or basketball). This article describes the treatment of muscle tension headaches with acupuncture and moxibustion, and includes their aetiology, diagnosis and TCM pattern identification. Also included is a discussion of how motor points can be combined with points based on a traditional Chinese medical approach for improved clinical results. The theory is illustrated with a case study from the author’s own practice.

Introduction
According to Western biomedicine there are three types of primary headaches, that is headaches that are not a result of another disease process. These are migraines, cluster headaches and tension headaches. Tension headaches are the most common type of primary headache: lifetime prevalence in the general population ranges in the literature from 30% to 78% (International Headache Society, 2008). There is no single cause for tension headaches, although muscle tension is regarded as a contributory, if not primary cause of most tension headaches.

With regard to athletes, muscle tension headaches (MTHs) tend to occur during or after sports related activities. These headaches commonly involve referral patterns from facet joint degeneration and soft tissue indurations of the cervical and shoulder region. The MTH can usually be reproduced or intensified by palpating the soft tissue of the neck and shoulders. Although it is important to treat the intrinsic factors causing MTHs, they are almost always combined with other extrinsic factors, and both must be addressed for complete resolution of the problem.

Aetiology
Intrinsic factors causing MTHs include poor postural alignment and organ (zangfu) disharmonies, particularly of the Liver and Gall Bladder. A common feature of athletes suffering from MTH due to incorrect posture is the tendency to lean forward with rounded shoulders, causing the body to pitch forward. To compensate for this, the athlete’s neck will extend, increasing the lordotic curve of the cervical spine, which results in muscle tension. Postural misalignment is not, in itself, responsible for MTH.

When combined with other factors, however, poor posture becomes a significant contributor to MTH.

Organ (zangfu) patterns that frequently accompany MTH include Liver and Gall Bladder qi stagnation, qi and blood deficiency and blood stasis. The pain of a MTH is often described as a constant, dull ache affecting one side (although it may also occur bilaterally), often following the pathway of the Gall Bladder channel across the head. The athlete may report that certain neck movements send sharp shooting pains into the base of the skull and eye region. MTHs are also often accompanied by symptoms indicating specific organ pathologies, such as light-headedness and dizziness and digestive disturbances such as nausea. The athlete may also report mental or emotional disturbances, such as an impaired ability to concentrate, and irritability or depression.

There are three primary extrinsic factors that contribute to MTHs in athletes. The first is impact trauma from a direct blow to the head or neck, causing upper cervical misalignment which results in myospasm and, subsequently, MTH. Common examples of sporting impact traumas include heading the ball in soccer (see Figure 1), or the kind of direct impact with other players that occurs in rugby or American football. The second aetiological factor is seen in “overhead” sports, where athletes repeatedly look upward for the ball, such as basketball, volleyball or tennis. These sports, where the player is required to repeatedly extend the cervical spine, require intense contraction of the neck and shoulder muscles in order to support the head, and frequently result in MTHs. The third extrinsic cause of MTHs occurs if environmental factors such as wind, cold and damp invade the body. This type of pathogenic invasion is more likely when the athlete’s body is vulnerable.
due to preexisting patterns of imbalance (as noted above), particularly if the athlete’s defensive (wei) qi is compromised.

**Prognosis**

Western biomedicine approaches the treatment of sports-related MTHs by addressing the physical cause, that is, the structural component of the pain. In TCM terms this structural imbalance would be seen as just one aspect of the causative internal imbalance, other aspects of which need to be addressed to ensure successful long-term resolution of the problem. For example, Liver qi stagnation manifesting in the Gall Bladder channel is a common factor in cases of MTH. This pattern, if left untreated, may contribute to poor clinical results even where the structural component of the headache has been addressed. According to the clinical experience of the author, who worked in sports medicine prior to training as an acupuncturist, treating only the structural cause of MTHs in athletes provides only temporary (and often inconsistent) results. Using acupuncture and moxibustion to balance the interior (zangfu) and exterior (skin, muscles and channels) of the body - in conjunction with lifestyle changes and therapeutic exercises - will provide excellent and lasting results.

**Assessment**

The patient will usually report the pain of an MTH as a diffuse, constant, dull aching sensation, most frequently unilateral and referring to the eye or temple region. The patient will often have slightly restricted range of motion (ROM) in cervical flexion, extension, lateral flexion and / or rotation. Movement of the neck will often increase the intensity of MTH symptoms. Palpation of various acupuncture points will usually reproduce MTH symptoms. Special attention should be given to the muscles of the sub-occipital triangle that surround Fengchi GB-20. The following points in particular should be palpated:

Yuzhen BL-9 and Naokung GB-19, and the area in between; these points are occipital attachment sites for the neck extensor muscles.

Jianjing GB-21 corresponds with the motor point of the upper trapezius (see below).

Fengchi GB-20, palpated toward the tip of the nose.

Sub-occipital triangle. The sub-occipital triangle is comprised of four muscles surrounding the acupuncture point Fengchi GB-20, which attach the occiput to the first and second cervical vertebrae. These muscles are particularly susceptible to excessive tension and contraction, both from sports and activities such as working at a computer with poor posture for prolonged periods. These muscles can be palpated in three different directions:

1. Palpate deeply toward ipsilateral Tongziliao GB-1 to check for reactive tenderness in the oblique capitis superior muscle.
2. Palpate deeply toward contralateral Tongziliao GB-1 to check for reactive tenderness in the rectus capitis posterior minor and major muscles.
3. Palpate deeply toward Chengjiang REN-24 to check for reactive tenderness in the oblique capitis inferior muscle.

NB: Caution should be exercised in the diagnosis of headache. Headaches of acute onset with severe pain, headaches following impact trauma to the head, or headaches associated with neck stiffness and fever should immediately be referred for further investigation.

**TCM Pattern Identification**

The following TCM patterns are commonly seen in sports-related MTHs:

- Wind-cold-damp obstruction: External wind-cold-damp enters the channels, causing a dull (with damp) or sharp (with cold), fixed pain, which is worse with exposure to windy, cold, wet weather and better with warmth. There may also be a feeling of heaviness in the head.
• Liver and Gall Bladder qi stagnation: Stagnation of qi in the Liver or Gall Bladder channels cause headaches which are worse with stress or emotional upset. The pain, which is worse with heat or pressure, tends to be distending and unilateral, and can radiate to the temple or vertex.

• Qi and blood deficiency: Deficiency of qi and blood results in lack of nourishment to the muscles and tendons, manifesting as a dull, aching, hollow pain. There may be muscle spasms, weakness, dizziness and vertigo. The pain is worse with exertion and better with rest or light massage.

• Blood stasis: Local blood stagnation in the muscles or tendons (caused by either trauma or deficiency) leads to sharp pain in a fixed location, which is worse with movement or pressure.

Acupuncture treatment and the use of motor points

For the best long-term treatment outcomes, point prescriptions based on traditional Chinese medical patterns should be combined with motor points of the deep paraspinal and myotomal musculature. This approach enhances treatment strategies by linking spinal nerve segments, thus improving the long-term response of the patient to treatment.

Motor points are specific types of ashi points found in the central part of the muscle fibres, approximately where the motor nerve enters the muscle. This location provides the best mechanical efficiency to affect the entire muscle. A motor point is the most electrically excitable area, containing the greatest concentration of nerve endings. The motor point has the greatest influence on electrical activity and, as a result, treating it with acupuncture has a significant impact on reducing pain. From a TCM perspective, motor points directly affect the flow of qi and blood.

In terms of diagnosis, the tenderness of a motor point reveals a disruption in electrical activity (e.g. Jianjing GB-21, the motor point of the upper trapezius, is frequently sore on palpation of someone with stiff shoulders). At points along the spine, the motor points of the deep paraspinal muscles correspond with the Huatuojiaji (M-BW-35) points, and these points can be extremely useful in the treatment of MTHs (if one extrapolates them up into the cervical spine - traditionally they are found only along the thoracic and lumbar spine). One can also needle empirical motor points that have been clinically demonstrated to have an effect on distal pain sites of the musculoskeletal system. Empirical motor points, unlike trigger points, resolve pain at a distal site rather than referring pain to a distal site when palpated or needed (see case history below for examples). The following points should be used in the treatment of MTHs:

Huatuojiaji Points M-BW-35
C2-C5

Motor Points
Upper trapezius, rhomboid minor and major, gluteus medius, piriformis, splenius capitis and cervicis.

Target Tissue Needling
After determining a diagnosis through palpation, needle the points that are either found to be sensitive, or that reproduce the MTH symptoms.

Yuzhen BL-9 and Naokong GB-19 and adjacent ashi points: Needle from superior to inferior down through the tender palpable tissue.

Jiangjing GB-21: Oblique needle insertion threaded from Tianliao SJ-15 toward Jiangjing GB-21 safely avoids the pleural cavity. Aim for approximately 0.5 of an inch beneath the surface of the skin.

Fengchi GB-20: Needle 0.5 to one inch towards the tip of the nose, Suliao DU-25.

Sub-occipital triangle: Needle Fengchi GB-20 0.75 to one inch in the direction that created most reactive tenderness on palpation:
1. Reactive tenderness towards the ipsilateral Tongziliao GB-1: Needle toward Tongziliao GB-1 up to one inch to affect the oblique capitis superior muscle. Caution: Insert needle slowly due to the close proximity of the vertebral artery.

2) Reactive tenderness towards contralateral Tongziliao GB-1: Needle toward contralateral Tongziliao GB-1 up to one inch to affect the rectus capitis posterior major and minor muscles.

3) Reactive tenderness toward Chengjiang REN-24: Needle toward Chengjiang REN-24 up to one inch to affect the oblique capitis inferior muscle.

Acupuncture point combinations for TCM patterns:
To expel wind-cold-damp from the channels and collaterals, disperse stagnation and alleviate pain: Houxi SI-3, Jianjing GB-21, Fengchi GB-20, Dazhui DU-14, Lieque LU-7, Fengmen BL-12, Feishu BL-13, Waiguan SJ-5.

To remove obstructions in the taiyang channel, relax neck spasms and move stagnation in the Liver and Gall Bladder channels: Huatuojiaji (M-BW-35) points of T9 and T10, Ganshu BL-18, Danshu BL-19, Kunlun BL-60, Shenmai BL-62, Qixu GB-40, Wangu GB-12, Jiangjing GB-21, Fengchi GB-20, Tianzhu BL-10.

To remove obstructions in the taiyang channel, relax neck spasms and move stagnation in the Liver and Gall Bladder channels: Huatuojiaji (M-BW-35) points of T9 and T10, Ganshu BL-18, Danshu BL-19, Kunlun BL-60, Shenmai BL-62, Qixu GB-40, Wangu GB-12, Jiangjing GB-21, Fengchi GB-20, Tianzhu BL-10.

To reinforce qi and blood and nourish the muscles and tendons: Zusanli ST-36, Sanyinjiao SP-6, Geshu BL-17, Pishu BL-20, Qihai REN-6, Guanyuan REN-4, Ququan LIV-8, Taichong LIV-3.
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To eliminate blood stagnation in the channels: Hegu L.I.-4, Fengchi GB-20, Tianzhu BL-10, Geshu BL-17, Tianzong SI-11, Huantiao GB-30, Yanglingquan GB-34, Qixu GB-40, Taichong LIV-3.

Moxibustion
Stick (or pole) moxibustion is the indirect application of moxa to specific points, and includes sparrow pecking method (que zhuo jiu) or a back and forth motion known as ironing (yun re jiu). The moxa stick is held close to the inserted needle in order to treat deficiency patterns and to expel wind-cold-damp from the channels and collaterals.

- To expel wind-cold-damp from the channels and collaterals: Pole moxa over Fengchi GB-20, Dazhui DU-14, Fengmen BL-12, Feishu BL-13.
- To tonify qi and blood: Pole or direct moxa on: Zusanli ST-36, Sanyinjiao SP-6, Gongsun SP-4, Geshu BL-17, Pishu BL-20, Qihai REN-6, Guanyuan REN-4.

Case Study
A 34 year-old male office worker came for treatment with a headache that had started two days after a forceful collision with another player during a weekend soccer match. Whilst he appeared physically fit - tall with a lean build - his posture was poor, leaning forward with rounded shoulders. His headache was initially localised at the back of the head, but was now constant and was worse with physical exertion or sitting for more than thirty minutes at a computer. The pain tended to travel from behind the head to the temples and eye region. His digestion and fluid intake were normal, although he reported a recent increase in caffeine intake due to a project deadline at work. His sleep had also recently been disturbed, waking between eleven o’clock and one o’clock in the morning, which he put down to the stress at work. His pulse was wiry, and his tongue had a normal body with a thin white coat, with a slightly red tip and edges. His cervical range of motion was limited by ten degrees in left cervical rotation, and 25 degrees in right lateral flexion. He also reported a sharp stabbing pain at the limit of his range of right lateral flexion. Using a Likert Pain Scale of one to ten (with ten being the most severe), the patient rated the pain of the headache as a seven.

Palpation: In my clinical experience, ninety per cent of patients with MTH will report tenderness when motor points of the upper trapezius, rhomboid minor and major, gluteus medius, piriformis, splenius capitis and cervicis muscles are palpated. Of these muscles, palpation of the piriformis motor point reduced the patient’s headache by twenty per cent while digital pressure was held. Palpation of the sub-occipital triangle in the direction of contralateral Tongziliao GB-1 (rectus capitis posterior major and minor muscles) increased the patient’s headache pain significantly.

Figure 2: Acupuncture points and muscles of the sub-occipital triangle.
Diagnosis and treatment: In terms of Chinese pattern differentiation, the patient clearly exhibited Liver and Gallbladder qi stagnation with local blood stagnation caused by the trauma. The treatment plan in this case was to harmonise the Liver and Gallbladder, move Liver qi and disperse local blood stagnation. The following points were used to remove obstructions in the Tai Yang channel, relax neck spasms and move stagnation in the Liver and Gallbladder channels: Ganshu BL-18, Danshu BL-19, Qixu GB-40, Taichong LIV-3, Zhongfeng LIV-4, Kunlun BL-60, and Shenmai BL-62. Needle length for all of these points with the exception of Qixu GB-40 was one inch, inserted to a standard depth. A 1.5 inch needle was used at Qixu GB-40 with a needle depth of one inch. A reducing needle technique method was used, with the exception of Shenmai BL-62 and Kunlun BL-60 where even method was used. Needles were retained for fifteen minutes.

In addition, the following motor points were treated:

- Deep paraspinals of C5, located at Huatuojiaji (M-BW-35) points: Perpendicular needle insertion 0.5-1.5 inches.
- Upper trapezius: located at Jiangjing GB-21. Oblique needle insertion threaded from Tianliao SJ-15 to Jianjing GB-21 to avoid the pleural cavity.
- Splenius cervicis: located at extra point Bailao M-HN-30. Perpendicular needle insertion 0.5-1 inch.
- Rhomboid major: Empirical point. The author has found that this motor point can relax body tension and ease digestive discomfort due to Liver qi stagnation. Located 2.5 cun lateral to the lower border of the spinous process of T4 (between Jueyunshu BL-14 and Gaohuangshu BL-43). Oblige needle insertion 0.5-1 inch.
- Gluteus medius: Empirical point. The author has found this motor point reduces tension in the upper trapezius. It is located at the junction of the medial third and lateral two-thirds of a line joining the posterior superior iliac spine and the superior border of greater trochanter. Perpendicular needle insertion 2-2.5 inches.
- Piriformis: Empirical point. The author has found that this motor point reduces tension in the sub-occipital region and is located halfway between Baohuang BL-53 and Zhibian BL-54. Perpendicular needle insertion 2-3 inches.

Immediately following the first treatment, the patient’s headache was reduced to between three and four on the pain scale used during the initial evaluation. After the next treatment (three days later) he showed continued improvement and was able to move his neck freely without pain. The third treatment repeated the initial point prescription. After treatment, the patient’s headache was completely eliminated and he had regained a normal range of cervical motion. At follow-up one week later, the patient reported no headache and had returned to his regular activities.

Conclusion
Acupuncture and moxibustion are a highly effective treatment for muscle tension headaches. An effective treatment strategy should address energetic excess (shi) and deficiency (xu) within both the interior (zangfu) and exterior (skin, muscles and channels) of the body, and should take advantage of both traditional and modern approaches to treating musculoskeletal problems.

Notes
In fact there are three primary ways in which motor points can be used to treat pain. In addition to treating the Huatuojiaji (M-BW-35) points and empirical motor points, musculoskeletal problems can also be treated by using local motor points in the affected agonist and paired antagonist muscles. For TCM practitioners, a musculoskeletal injury can be thought of as reflecting an imbalance of yin and yang or, one might say, the a disturbance in the functional relationship between the agonist and antagonist muscles. For a full discussion of the use of motor points in the acupuncture treatment of musculoskeletal conditions, see the author’s Motor Point Index (Callison, 2007) and the forthcoming Sports Medicine Acupuncture textbook (currently in press).

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References