British Acupuncture Council

ACUPUNCTURE AND FACIAL PAIN

About facial pain

Facial pain commonly results from temporomandibular joint (TMJ) disorder. Many practitioners refer to TMJ disorder, or syndrome, as a single disorder but there are various sub-diagnoses (e.g. myofascial pain, temporomandibular joint inflammation). The disorder is common and most often occurs in people aged between 20 and 40 years (NICE 2009). Around 33% of the population has at least one temperomandibular symptom and 3.6% to 7% of the population has TMJ disorder with sufficient severity to cause them to seek treatment (Wright 2009).

TMJ disorder is an umbrella term covering acute or chronic pain, especially in the muscles of mastication, or inflammation of the temporomandibular joint (Zakrzewska 2007). The temporomandibular joint is susceptible to many of the conditions that affect other joints in the body, including ankylosis, arthritis, trauma, dislocations, developmental anomalies, neoplasia and reactive lesions. Symptoms usually involve more than one of the numerous TMJ components: muscles, nerves, tendons, ligaments, bones, connective tissue, and the teeth. Symptoms can include difficulty in biting or chewing, jaw pain or tenderness of the jaw, clicking, popping, or grating sound when opening or closing the mouth, reduced ability to open or close the mouth, a dull, aching pain in the face, dizziness, headache or migraine (particularly in the morning), neck and shoulder pain, blinking, ear pain, hearing loss and tinnitus.

Treatment of a patient with chronic facial pain includes analgesics, NSAIDs, an occlusal splint (bite guard), cognitive behavioural therapy, physiotherapy and surgery (Al-Jundi 2008).

References

Al-Jundi MA, John MT, Setz JM et al. Meta-analysis of treatment need for temporomandibular disorders in adult nonpatients. Journal of Orofacial Pain 2008; 22(2): 97-107.

NICE (2009) Interventional procedure overview of total prosthetic replacement of the temporomandibular joint (IP 419). National Institute for Health and Clinical Excellence. www.nice.org.uk

Wright EF, North SL. Management and Treatment of Temporomandibular Disorders: A Clinical Perspective. J Man Manip Ther. 2009; 17(4): 247–54.

Zakrzewska JM. Facial pain: neurological and non-neurological. J Neurol Neurosurg Psychiatry 2002;72:ii27-ii32 doi:10.1136/jnnp.72.suppl_2.ii27.

How acupuncture can help

This Factsheet focuses on the evidence for acupuncture in the management of facial pain resulting from musculoskeletal conditions such as temporomandibular joint (TMJ) disorder. There are also factsheets on Bell's palsy, dentistry pain, headache, migraine, neuropathic pain (including trigeminal neuralgia) and sinusitis.

There have been 4 systematic reviews on the management of facial pain in TMJ disorder (Jung 2011, La Touche 2010a, Cho 2010, La Touche 2010b). All found evidence that acupuncture may be effective, but all stated that more (and larger, longer) high quality studies are needed to confirm acupuncture's effect in TMJ disorder. Many of the reviewed trials used sham acupuncture control groups (and some reviews analysed only this sort) despite the fact that 'sham' acupuncture interventions are not inert placebos, hence potentially underestimating the effect of 'real' acupuncture (Lundeberg 2011). So far the indications are that acupuncture is superior to sham, to physical therapy and to no treatment, and similar to splinting. Also it is effective for both acute and chronic pain.

One randomised controlled trial (RCT) published since these systematic reviews found that acupuncture is an effective complement or an acceptable alternative to decompression splints in the treatment of myofascial pain and temporomandibular joint pain-dysfunction syndrome (Vicente-Barrero 2012). Another found that it reduced pain in TMJ disorder more than sham acupuncture (Itoh 2012). However, both of these trials are very small, so the systematic review caveats still hold.

A sample of RCTs from 2007-9 (i.e. prior to the systematic reviews) is included in the table below, to give further examples of the research in this area (Shen 2009,Sima 2009,Shen 2007,Wang 2009).

In general, acupuncture is believed to stimulate the nervous system and cause the release of neurochemical messenger molecules. The resulting biochemical changes influence the body's homeostatic mechanisms, thus promoting physical and emotional well-being.

Research has shown that acupuncture treatment may specifically help in the management of facial pain by:

- acting on areas of the brain known to reduce sensitivity to pain and stress, as well as promoting relaxation and deactivating the 'analytical' brain, which is responsible for anxiety and worry (Hui 2010; Hui 2009)
- increasing the release of adenosine, which has antinociceptive properties (Goldman 2010)
- inducing antinociception by activating the opioid pathway (Almeida 2008a) or the L-arg/NO/cGMP pathway (Almeida 2008b)
- exciting or inhibiting the anterior temporalis muscle via reflex pathways and thus smoothing jaw opening and closing (Wang 2007)

Lundeberg T et al. Is Placebo Acupuncture What It is Intended to Be? Evid Based Complement Alternat Med. 2011;2011:932407

About traditional acupuncture

Acupuncture is a tried and tested system of traditional medicine, which has been used in China and other eastern cultures for thousands of years to restore, promote and maintain good health. Its benefits are now widely acknowledged all over the world, and in the past decade traditional acupuncture has begun to feature more prominently in mainstream healthcare in the UK. In conjunction with needling, the practitioner may use techniques such as moxibustion, cupping, massage or electro-acupuncture. They may also suggest dietary or lifestyle changes.

Traditional acupuncture takes a holistic approach to health and regards illness as a sign that the body is out of balance. The exact pattern and degree of imbalance is unique to each individual. The traditional acupuncturist's skill lies in identifying the precise nature of the underlying disharmony and selecting the most effective treatment.

The choice of acupuncture points will be specific to each patient's needs. Traditional acupuncture can also be used as a preventive measure to strengthen the constitution and promote general wellbeing.

An increasing weight of evidence from Western scientific research (see overleaf) is demonstrating the effectiveness of acupuncture for treating a wide variety of conditions. From a biomedical viewpoint, acupuncture is believed to stimulate the nervous system, influencing the production of the body's communication substances – hormones and neurotransmitters. The resulting biochemical changes activate the body's self- regulating homeostatic systems, stimulating its natural healing abilities and promoting physical and emotional wellbeing.

About the British Acupuncture Council

With over 3000 members, the British Acupuncture Council (BAcC) is the UK's largest professional body for traditional acupuncturists. Membership of the BAcC guarantees excellence in training, safe practice and professional conduct. To find a qualified traditional acupuncturist, contact the BAcC on 020 8735 0400 or visit www.acupuncture.org.uk

ACUPUNCTURE AND FACIAL PAIN

The evidence

Research	Conclusion
Systematic reviews	
Jung A et al. Acupuncture for treating temporomandibular joint disorders: a systematic review and meta-analysis of randomized, sham-controlled trials. J Dent. 2011;39(5):341-50. Epub 2011 Feb 25.	A systematic review that assessed the clinical evidence for or against acupuncture and acupuncture-like therapies as treatments for temporomandibular joint disorder (TMD) It included 7 randomised clinical trials of acupuncture as a treatment for TMD compared to sham acupuncture. Five of the seven showed favourable effects for acupuncture and meta-analysis revealed significant overall superiority of acupuncture over sham for pain VAS (weighted mean difference -13.6; 95% confidence interval (CI) 21.2 - 6.1). Nevertheless, the reviewers concluded that the evidence for acupuncture as a symptomatic treatment of TMD is limited, and that rigorous studies are needed to establish beyond doubt whether acupuncture has therapeutic value for this indication.
La Touche R et al. Acupuncture in the treatment of pain in temporomandibular disorders: a systematic review and meta-analysis of randomized controlled trials. Clin J Pain. 2010a;26(6):541-50.	A systematic review that performed a qualitative and quantitative analysis of the scientific literature of acupuncture in the treatment of pain associated with temporomandibular disorders (TMDs). A total of 4 randomised controlled trials were selected and these showed positive results, such as reducing pain, improving masticatory function, and increasing maximum interincisal opening. Pooling the data (a total of 96 people) showed that acupuncture is more effective than placebo in reducing pain intensity in TMD (standardised mean difference [SMD] 0.83; CI 0.41-1.25). The reviewers concluded that their results suggest that acupuncture is a reasonable adjunctive treatment for producing a short-term analgesic effect in patients with painful TMD symptoms. However, they also concluded that these findings must be confirmed by future trials that improve the methodological deficiencies of the studies evaluated.
Cho SH, Whang WW. Acupuncture for temporomandibular disorders: a systematic review. J Orofac Pain. 2010;24(2):152-62.	A systematic review that assessed the effectiveness of acupuncture for the symptomatic treatment of temporomandibular disorders (TMD). It included 19 randomised controlled trials. There was moderate evidence that classical acupuncture had a positive influence beyond that of placebo (3 trials, 65 participants); had positive effects similar to those of occlusal splint therapy (3 trials, 160 participants); and was more effective for TMD symptoms than physical therapy (4 trials, 397 participants), indomethacin plus vitamin B1 (2 trials, 85 participants), and a wait-list control (3 trials, 138 participants). Two trials addressed adverse events and reported no serious adverse events. The reviewers concluded that their review noted moderate evidence that acupuncture is an effective intervention to reduce symptoms associated with TMD, but that there is a need for acupuncture trials with adequate sample sizes that address the long-term efficacy or

	effectiveness of acupuncture.
La Touche R et al. Effectiveness of acupuncture in the treatment of temporomandibular disorders of muscular origin: a systematic review of the last decade. J Altern Complement Med. 2010b;16(1):107-12.	A systematic review that evaluated the effectiveness of using acupuncture treatment for temporomandibular disorders (TMD) of muscular origin. A total of four randomised controlled trials were included. All of them described results that were statistically significant in relation to short-term improvement of TMD signs and symptoms of a muscular origin except one, which found no significant difference between acupuncture and sham acupuncture. The reviewers concluded that research into the long-term effects of acupuncture in the treatment of TMD is needed.

Randomised controlled trials

Vicente-Barrero M et al.The efficacy of acupuncture and decompression splints in the treatment of temporomandibular joint pain-dysfunction syndrome. Med Oral Patol Oral Cir Bucal. 2012 May 1 Epub ahead of print.	A randomised controlled trial that evaluated the results of applying acupuncture or occlusal decompression splints in the treatment of 20 patients diagnosed with the temporomandibular joint pain-dysfunction syndrome. Patients treated with decompression splints showed reductions in subjective pain and pain upon pressure on temporal, masseter and trapezius muscles, as well as increased mouth opening after the treatment. Patients treated with acupuncture showed pain reduction in the short term and improvements in all of the evaluated parameters (stronger pressure was required to produce pain; mouth opening was improved). The researchers concluded that acupuncture is an effective complement or an acceptable alternative to decompression splints in the treatment of myofascial pain and temporomandibular joint pain-dysfunction syndrome.
Itoh K et al. Effects of trigger point acupuncture treatment on temporomandibular disorders: a preliminary randomized clinical trial. J Acupunct Meridian Stud. 2012;5(2):57-62.	A randomised controlled trial that compared the effects of trigger point acupuncture with that of sham acupuncture treatments on pain and oral function in 16 patients with chronic temporomandibular disorders (TMDs). After treatment, pain intensity was less in the trigger point acupuncture group than in the sham treatment group, but oral function remained unchanged in both groups. Pain intensity decreased significantly between pre-treatment and 5 weeks after trigger point ($p<0.001$) and sham acupunctures ($p<0.050$). There was a significant difference between groups ($p=0.0152$) in favour of trigger point acupuncture. The researchers concluded that, compared with sham acupuncture therapy, trigger point acupuncture therapy may be more effective for chronic temporomandibular joint myofascial pain.
Shen YF et al. Randomized clinical trial of acupuncture for myofascial pain of the jaw muscles. J Orofac Pain. 2009;23(4):353-9.	A randomised controlled trial that evaluated the effectiveness of acupuncture in treating symptoms associated with myofascial pain of the jaw muscles in 28 patients who were allocated to receive real or sham acupuncture. Patients receiving real acupuncture experienced a significant reduction in jaw pain ($p=0.04$), jaw/face tightness ($p=0.04$) and neck pain ($p=0.04$), and a significant increase in pain tolerance of the masseter muscle ($p=0.001$). No significant pain reductions were observed in the sham acupuncture group. The researchers concluded that a single acupuncture session using one acupoint (large intestine 4) significantly reduced most

	myofascial pain endpoints when compared to sham acupuncture.
Simma I et al. Immediate effects of microsystem acupuncture in patients with oromyofacial pain and craniomandibular disorders (CMD): a double-blind, placebo-controlled trial. 20. Br Dent J. 2009;207(12):E26.	A randomised controlled trial that assessed the immediate effects of acupuncture in 23 patients presenting with oromyofacial disorders and pain in the head and neck area. Patients were randomised into acupuncture or placebo laser therapy groups. Pain reduction measured by a visual analogue scale (VAS) was significantly more pronounced after acupuncture than after placebo treatment (p=0.031). The sum of pain scores across 14 palpated muscles was considerably more reduced after acupuncture as compared to sham laser treatment. The researchers concluded that acupuncture may bring about immediate pain relief in patients with oromyofacial disorders, increasing the chance to initiate other therapeutic measures.
Wang XH, Zhang W. Acupuncture combined with magnetic therapy for treatment of temple-jaw joint dysfunction. [Article in Chinese] 21. Zhongguo Zhen Jiu. 2009;29(4):279-80.	A randomised controlled trial that compared the clinical therapeutic effects of acupuncture combined with magnetic therapy and simple magnetic therapy on temple-jaw joint dysfunction in 82 patients. The cured and markedly effective rate of 90.4% in the observation group was significantly better than 66.7% in the control group (p <0.01), and the total effective rate of 98.1% in the observation group was significantly better than 86.7% in the control group (p<0.05). The researchers concluded that the therapeutic effect of acupuncture combined with magnetic therapy is significantly better than that of simple magnetic therapy on temple-jaw joint dysfunction.
Shen YF, Goddard G. The short-term effects of acupuncture on myofascial pain patients after clenching. Pain Pract. 2007;7(3):256-64.	A randomised controlled trial that assessed the short-term pain reduction from real acupuncture compared to sham acupuncture in 15 patients with chronic myofascial pain using an 11-point (0 to 10) numeric rating scale, visual analogue scale (VAS), and pain rating of mechanical pressure on the masseter muscle. There was a statistically significant difference in pain tolerance (p=0.027), pain (p=0.003), neck pain (p=0.011) and headache (p=0.015) with real acupuncture compared with sham acupuncture. The researchers concluded that pain tolerance in the masticatory muscles increased significantly more with acupuncture than sham acupuncture.
Physiology and animal studies	
Hui KK et al. Acupuncture, the limbic system, and the anticorrelated networks of the brain. Auton Neurosci 2010; 157: 81-90.	Studies have shown that acupuncture stimulation, when associated with sensations comprising deqi, evokes deactivation of a limbic-paralimbic-neocortical network, as well as activation of somatosensory brain regions. These networks closely match the default mode network and the anti-correlated task-positive network. The effect of acupuncture on the brain is integrated at multiple levels, down to the brainstem and cerebellum and appears to go beyond either simple placebo or somatosensory needling effects. Needling needs to be done carefully, as very strong or painful sensations can attenuate or even reverse the desired effects. Their results suggest that acupuncture mobilises the functionally anti-correlated networks

	of the brain to mediate its actions, and that the effect is dependent on the psychophysical response. They discuss potential clinical application to disease states including chronic pain, major depression, schizophrenia, autism, and Alzheimer's disease.
Goldman N et al. Adenosine A1 receptors mediate local anti-nociceptive effects of acupuncture. Nat Neurosci 2010; May 30.	A study showing that the neuromodulator adenosine, which has anti-nociceptive properties, was released during acupuncture in mice, and that its anti-nociceptive actions required adenosine A1 receptor expression. Direct injection of an adenosine A1 receptor agonist replicated the analgesic effect of acupuncture. Inhibition of enzymes involved in adenosine degradation potentiated the acupuncture-elicited increase in adenosine, as well as its anti-nociceptive effect. The researchers concluded that their observations indicate that adenosine mediates the effects of acupuncture and that interfering with adenosine metabolism may prolong the clinical benefit of acupuncture.
Hui K.K.-S. The salient characteristics of the central effects of acupuncture needling: limbic-paralimbic-neocortical network modulation. Human Brain Mapping 2009; 30: 1196-206.	This study assessed the results of functional MRI (fMRI) on 10 healthy adults during manual acupuncture at 3 acupuncture points and a sham point on the dorsum of the foot. Although certain differences were seen between real and sham points, the hemodynamic and psychophysical responses were generally similar for all 4 points. Acupuncture produced extensive deactivation of the limbic-paralimbic-neocortical system. Clusters of deactivated regions were seen in the medial prefrontal cortex, the temporal lobe and the posterior medial cortex. The sensorimotor cortices, thalamus and occasional paralimbic structures such as the insula and anterior middle cingulate cortex showed activation. The researchers concluded that their results provided additional evidence that acupuncture modulates the limbic-paralimbic-neocortical network. They hypothesised that acupuncture may mediate its analgesic, anti-anxiety, and other therapeutic effects via this intrinsic neural circuit that plays a central role in the affective and cognitive dimensions of pain.
Almeida RT et al. Opioidergic orofacial antinociception induced by electroacupuncture at acupoint St36. Braz J Med Biol Res. 2008a;41(7):621-6.	The participation of opioids in the antinociceptive effect of electroacupuncture was evaluated in terms of nociception produced by thermal stimuli applied to the face of rats. Electrical stimulation induced antinociception. This effect of acupuncture occurred by opioid pathway activation.
Almeida RT, Duarte ID. Nitric oxide/cGMP pathway mediates orofacial antinociception induced by electroacupuncture at the St36 acupoint. Brain Res. 2008b;1188:54-60.	A study in rats to test the hypothesis that electroacupuncture induces antinociception by activation of the L-arg/NO/cGMP pathway. It found that stimulation at high frequency induces antinociception, which seems to be related to L-arg/NO/cGMP pathway activation.
Wang M et al. Electromyographic responses from the stimulation of the temporalis muscle through facial acupuncture points. J Chiropr Med. 2007;6(4):146-52.	A study in healthy adults that measured the electromyographic (EMG) responses of the temporalis muscle to electrical stimulation at 10 acupuncture points (acupoints) of the face and assessed whether electrical stimulation of these acupoints may improve the rhythmic activity of the muscles that open and close the jaw. It showed that the surface electrical current

	applied to facial skin acupoints may excite or inhibit the anterior temporalis muscle via reflex pathways. The result from this stimulation may be applied to treat temporomandibular joint disorder occlusion of muscular origin.

Terms and conditions

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