

## Temporomandibular Pain

*Introduction.* Temporomandibular Disorder (TMD) pain is a general term for pain arising from jaw muscles and the joint between the jaw and the skull. TMD encompasses a number of different conditions that probably have distinct causes but may share a common underlying mechanism, particularly when the pain is chronic.

TMD pain is broadly divided into 2 categories, pain associated with jaw muscles (masticatory muscle pain or MMP) and pain associated with the jaw joint (temporomandibular joint pain, or TMJ). Muscle pain can occur at rest and be aggravated by chewing or speaking, and it often spreads to other nearby regions of the face. TMJ pain tends to be more localized to the joint and unlike aching muscle pain, TMJ pain is often sharp and radiating, and made worse by movement.

*Prevalence of TMD pain:* TMD pain affects up to 15 % of the population. It is most common in people between the ages of 25 and 45, and is actually quite rare among older individuals. As with many pain conditions relating to the head and face, TMD pain is twice as common in women than men. TMD pain can also vary across the menstrual cycle, with pain reported to be most intense during menstruation. Such an association between changes in oestrogen levels and pain severity or occurrence is also reported for migraine and rheumatoid arthritis. In most cases of TMD the pain resolves on its own and people do not seek treatment, however, in a minority of people the pain becomes chronic and potentially quite disabling.

*Cause of TMD Pain:* The causes of TMD remain somewhat obscure. Initiating events may include trauma or infection. There is some evidence that TMJ pain is associated with dysfunction in the joint, which may arise from arthritis, but other suggested causes such as misalignment of the jaw or teeth have little scientific support. What does seem clear is that the pain in both TMJ and MMP is maintained by a combination of processes in both the jaw muscle and joint and in the central nervous system. In both conditions the sensory nerves which relay potentially painful signals from the muscle or joint become sensitized by local mediators released in the tissues so that they respond more strongly to a noxious stimulus (peripheral sensitization). The perception of these signals in the spinal cord can also become exaggerated (central sensitization) and the normal response of the brain to damp them down may be compromised in some TMD patients, as has been suggested for patients who suffer

from migraine and fibromyalgia. The way the brain handles pain signals can be altered by many factors, including stress, depression, anxiety and changes in hormonal status, all things which are known to affect TMD pain. The involvement of central nervous system in pain processing pathways in TMD pain is also supported by the observation that people who suffer from TMD pain often also suffer from migraine, fibromyalgia or irritable bowel syndrome, all of which are complex disorders with both peripheral and central components.

*Treating TMD pain:* As the underlying causes of TMD pain are often unknown, treatments aim to relieve symptoms or promote function until such time as the condition resolves naturally. There is little high quality evidence for the effectiveness of any treatments in relieving TMD pain, including the usefulness or otherwise of common analgesics. In general, the acute and chronic pain associated with TMD is treated with drugs that target inflammatory processes or modulate the central processing of pain. Patient education, physiotherapy, cognitive behavioral therapy or treatments that target the accompanying depression or anxiety are used in treatment programs and a variety of appliances to be worn in the mouth are also offered by some health care professionals. However, there is no strong evidence which speaks to the effectiveness or otherwise of these treatments in TMD, indicating a need for some well designed and appropriate clinical trials.

*Research:* A significant amount of research into the causes of and potential treatments for TMD pain remains ongoing. Studies in animals have focused on determining what kinds of inflammatory mediators might provoke sensitization of muscle or jaw joint sensory nerves, how the properties of these nerves may change during chronic inflammation of the jaw muscle or joint and whether inflammation of these structures produces changes in the central nervous system of animals. Investigation of how sex differences arise in the way jaw muscle pain is sensed and modulated in animals is also a productive area. In humans, experimental investigations involving painful injections of various substances into the jaw muscle have provided information about the possible role of 5-HT (serotonin) glutamate and nerve growth factor in MMP and reinforced the notion of some basic differences in the way men and women process painful signals from this region. Recently, powerful *in vivo* imaging techniques have demonstrated differences in some brain regions and nerve tracts between people with TMD pain and those without, although it is not known whether these differences result from the processes underlying TMD or if they in some way make people more susceptible to TMD. Should these imaging findings hold up in large populations, they could

provide a powerful tool for investigating the underlying causes of TMD, and the effectiveness of potential therapeutic strategies.

*More information about TMD pain can be found on the following websites:*

National Institutes of Health: <http://www.nidcr.nih.gov/OralHealth/Topics/TMJ/>

MedlinePlus: <http://www.nlm.nih.gov/medlineplus/ency/article/001227.htm>

International Association for the Study of Pain: <http://www.iasp-pain.org//AM/Template.cfm?Section=Home>