



Migraine and the trigeminal nerve



The trigeminal nerve (the fifth cranial nerve, also called the fifth nerve, or simply CNV or CN5) is responsible for sensation in the face. Sensory information from the face and body is processed by parallel pathways in the central nervous system.



The fifth nerve is primarily a sensory nerve, but it also has certain motor functions (biting, chewing, and swallowing).

The trigeminal nerve is the largest of the cranial nerves and it is thought to be one of the factors involved in the cause of migraine. Its name - **“trigeminal”** - is derived from the fact that each nerve, one on each side of the pons, has three major branches: the ophthalmic nerve (V1), the maxillary nerve (V2) and the mandibular nerve (V3). The ophthalmic and maxillary nerves are purely sensory. The mandibular nerve has both sensory and motor functions.

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Individuals can experience facial pain when they have a migraine attack. Migraine with facial pain can be triggered by problems with the teeth and jaw, and a symptom of temporomandibular joint disorder (TMD). Clenching the jaw or grinding the teeth, especially whilst asleep, can trigger attacks; some people have noted an improvement after being fitted with a dental splint to wear overnight.

Problems with the alignment of the teeth or jaw can also be implicated, but rectifying this can require substantial remedial work by a specialist and could involve the fitting of braces etc.

Your bite (occlusion) can be a factor in many types of pain or functional problems because of the inter-relationship of the overall musculoskeletal system. Since there is a relationship between the teeth, jaw joints, head and neck muscles and head posture, an improper bite often plays a significant role in the symptoms of TMD.



There are several types of headaches that have shown good response to neuromuscular dental treatment. These include sinus, frontal, temporal and occipital headaches and migraines.

TMD and migraine headaches are closely linked by the trigeminal nerve (Cranial Nerve V), which is also responsible for jaw and tooth junctions. Treating TMD frequently helps with migraine headaches by relieving the triggers that set them in motion. Even hormonal and chemically induced migraines can be reduced by turning down the nervous system activity. ^{[1].}

Trigeminal neuralgia

There are various other health conditions that can cause facial pain, such as trigeminal neuralgia. Trigeminal neuralgia is a condition that is caused by pressure on the trigeminal nerve. Common causes of the underlying pressure include pressure from an artery, which may have become distorted because of atherosclerotic changes, or from inflammation in surrounding tissues. It can also result from the nerve damage that develops in people with multiple sclerosis.

The pain of trigeminal neuralgia is very intense, a stabbing pain that lasts for a couple of minutes. Attacks can last for several hours, and occur in bouts that can last for weeks. Remission periods then occur, with no pain for long periods as the nerve settles down, or treatment is effective.

The place where the pain is felt depends on the part of the trigeminal nerve that is affected. One of the nerves leads to the upper part of the head, the forehead, the top of the scalp and the eyebrow area above the eye. Neuralgia that affects this part of the nerve does cause headaches, as the pain is concentrated in the forehead, around the eye and at the top of the skull. The second branch supplies the cheek, upper jaw, the side of the nose and the gums and teeth. Pain here can be referred up to the temple but neuralgia of this branch of the trigeminal nerve usually causes facial pain. Likewise, pressure on the mandibular branch that supplies the lower jaw and the bottom set of teeth and gums, causes lower facial pain.

Treatment

The treatment for trigeminal neuralgia is completely different from the therapy for headaches. Usual painkillers do not have any effect. The main treatment involves taking an anti-epileptic drug called carbamazepine, which has been used to treat trigeminal neuralgia since the 1960s. Low doses are tried at first, with gradual increments until the pain is under control.

This drug has many side effects, so is not an ideal treatment. Some people cannot tolerate it, or it fails to make any difference to their pain. In these cases, a neurologist needs to do a thorough investigation as to the cause and site of the problem and may need to provide different drugs that work in different ways. Lamotrigine and gabapentin can also be used. All the drugs work by changing the way nerve impulses pass along the trigeminal nerve, making it less able to transmit signals.

If drug treatment with these different types of medicine still has no effect, there are also several surgical treatments. These involve either relieving the pressure on the nerve, or blocking the nerve activity completely by freezing, heating or compressing the nerve beyond the pressure point. This can completely remove the pain, but it can leave parts of the skin on the head and face feeling numb.

For further information, advice on migraine management and for updates on the latest migraine research, please contact Migraine Action by calling **0116 275 8317**, emailing info@migraine.org.uk, or visiting the charity's website at www.migraine.org.uk. All of our information resources and more are only made possible through donations and by people becoming members of Migraine Action. Visit www.migraine.org.uk/donate to support one of our projects or visit www.migraine.org.uk/join to become a member.

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