

Facial pain – A diagnostic challenge

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Background

Facial pain is one of the most common neurological complaints together with headache, and back and abdominal pain. In most cases, the aetiology can be ascertained from a detailed history and examination. However, the source of pain may be obscure as oral and facial structures frequently have multiple innervations, and referred pain to the ear is common. The oral cavity, particularly dental structures, is the most common source of facial pain; patients should be referred for a dental assessment when pain is precipitated or aggravated by thermal change or eating.

Objective

The aim of this article is to provide a framework for assessment of patients presenting with facial pain.

Discussion

This paper examines the aetiology, diagnosis and management of non-dental/oral mucosa causes of facial pain.

Facial pain

Recurrent unilateral headache is a common complaint seen in general practice and is the reason for referrals to specialists. It may be an early symptom of underlying neurological or other systemic disturbance, but facial pain often results from disorders associated with one or more cranial nerves. A recent study showed that in 87% of cases, facial pain was due to dental causes or diseases of the oral mucosa.¹ Causes of facial pain are listed in Box 1.

As with other neurological complaints, a complete history and clinical examination, including of the cranial nerves, will reveal the diagnosis in the majority of cases. A history of pain with thermal change or on biting suggests a dental cause. In these cases, examination usually reveals an oral lesion. However, a dental opinion should be obtained when in doubt.

Box 1. Causes of facial pain

- Dental, oral, pharyngeal:
 - Infections
 - Trauma
 - Neoplasm
 - Other inflammatory conditions
- Facial bone disease
- Temporomandibular joint dysfunction
- Salivary gland lesions
- Paranasal sinus disease
- Neurological disorders
- Vascular disorders
- Psychogenic disorders

Pathological states that simulate pain of dental origin

Localisation of the site where the pain originates is frequently difficult as there is considerable variation in, and overlapping of, sensory nerve distribution in the face. Referred pain is common in the head and neck, especially in the region of the ear.² Here, pain may arise from the ear itself, or be referred from an ulcer at the base of the tongue (via the auricular temporal branch of the mandibular nerve)³ or from a degenerative lesion of the upper cervical vertebrae (via the greater or lesser occipital or great auricular nerves [cervical nerves C2 and C3]). The lesion must be on the side where the pain is experienced if the pain is unilateral⁴ or, if it is bilateral, it is likely to be due to systemic disease (eg chronic meningitis) or psychogenic in origin.

Maxillary sinusitis

Acute maxillary sinusitis may present as pain in the region of the upper molar teeth, which may also be tender to percussion. Chronic sinusitis can result from infection, allergy or airway abnormality. It is often characterised by nasal obstruction and discharge, malaise and halitosis, the latter due to mouth breathing. Pain in the malar region can be diffuse and be associated with frontal headache and tenderness over the sinus and upper molar teeth. It may be aggravated by running and bending over. Sinusitis can be a sequel to dental pulpitis

of an upper molar if periapical infection spreads to the floor of the sinus.

Management

Infection should be treated with a 14-day course of antibiotics. Allergic sinusitis usually responds to intranasal corticosteroids. Occasionally, when pain is persistent, at the patient's insistence, tooth extraction or costly root canal therapy is undertaken. Inevitably, this fails to relieve the pain. Apart from the dental implications, these invasive procedures may enhance the pain and establish a chronic refractive pain pattern. Frontal sinus pain is felt above the orbit. It is a medical emergency requiring urgent decompression if accompanied by peri-orbital oedema.

Trigeminal neuralgia

The severe, lightning pain of trigeminal neuralgia commonly occurs in the maxillary or mandibular divisions of the trigeminal nerve. Characteristically, the pain induces a sudden wince, leading to the descriptive term *tic douloureux*. Pain is typically felt in a small area of the face, but may appear to originate from the teeth or other oral structures. However, there is often limited localisation early in the onset. Sometimes there is a continuous dull ache at the trigger zone, or the patient may be asymptomatic between pain paroxysms. The pain may be precipitated by eating, drinking or by jaw movements, thereby simulating acute dental pulpitis.

Pain may also be triggered by talking, air moving across the face (eg being out in the wind) or light touch to the skin of the face, sometimes in defined areas. After stimulation, there may be a refractive period of approximately 60 seconds during which time repeated contact with the trigger zone does not produce a response. The condition may have a relapsing and remitting pattern, particularly early in the illness.

Aetiology

The condition is frequently caused by an aberrant loop of an artery, most commonly

the superior cerebellar, compressing the trigeminal nerve trunk, which causes demyelination of the nerve at its entry to the pons. The resultant hyperactivity of the nerve is transferred to demyelinated pain fibres and causes ectopic action potentials in these fibres, causing paroxysmal severe pain.

Imaging

Magnetic resonance imaging (MRI) is typically normal although there is a small incidence of definable pathology (eg intracranial tumours, vascular anomalies). Pain simulating trigeminal neuralgia may occur in young adults with multiple sclerosis due to the presence of a demyelinating plaque at the root entry of the trigeminal nerve into the pons. High-resolutions T2-CISS (constructive interference in steady state) sequences and magnetic resonance angiography (MRA) on 3T MRI scanners may show the tortuous artery compressing the trigeminal nerve at its entry to the pons. These particular sequences may be useful in defining surgical treatment options, but are not otherwise indicated.

Medical management

Pharmacological therapy should be initiated if history and clinical examination strongly suggest trigeminal neuralgia. It is common practice to commence with carbamazepine 100 mg twice daily and increase the dose as required.⁵ Patients should be reviewed frequently as drug toxicity may occur. Monitoring serum levels is of little value. Newer anticonvulsant agents (eg gabapentin, pregabalin and lamotrigine) are generally effective, well tolerated and have low toxicity.⁶ The use of infiltrative local anaesthesia or a regional nerve block (bupivacaine plus a corticosteroid) close to the trigger zone may provide short-term pain relief where other drug therapies fail.

Surgical treatment

The most favoured treatment is microvascular decompression, which

is an open microsurgical retro-sigmoid craniotomy to access the trigeminal nerve root. The aberrant loop of the artery, most commonly the superior cerebellar, is identified, gently moved from the nerve root and kept away by use of small pledgets of teflon felt. This procedure was reported to have a 90–95% success rate, but a moderate relapse rate was seen long term in follow-up studies.⁶

In other surgical procedures, a needle is placed percutaneously via the foramen ovale using an image intensifier. These procedures include balloon compression, radiofrequency lesioning or glycerol injection partially lesioning the trigeminal ganglion. A similar goal may be achieved by stereotactic radio-surgery using focused radiation to create a lesion within the nerve root.

Glossopharyngeal neuralgia

The glossopharyngeal and fibres of the vagus nerves supply sensation to the posterior third of the tongue and oropharynx. Glossopharyngeal neuralgia is an uncommon condition producing severe lancinating pain in the oropharynx or base of the tongue when swallowing. Rarely, the pain may be felt in the posterior mandibular region. The causation and quality of pain are similar to those of trigeminal neuralgia. Glossopharyngeal neuralgia should be considered if a sharp pain occurs when swallowing. However, pharyngeal disease or an ulcer at the base of the tongue is a far more common cause of this type of pain. It frequently responds to administration of carbamazepine.

Facial migraine

Uncommonly, migraine may present with prodromal symptoms followed by pain in the peri-orbital region, which may diffuse to the cheek and mandible. Management is as for typical migraine.

Postherpetic neuralgia

Herpes zoster commonly affects a branch of the trigeminal nerve in the elderly and immunocompromised or immunosuppressed patients. In a recent

study, 25% of participants who were 85 years and older had been affected by the disease.⁵ Post-herpetic neuralgia occurs in 10% of all patients with *Herpes zoster* infection and 75% of those over the age of 70 years. Burning, aching or, occasionally, lightening pain with tenderness over the affected dermatome may persist for many months after the vesicular lesions of shingles have resolved. In established pain, carbamazepine, amitriptyline or gabapentin may minimise this distressing symptom. Tramadol or a regional nerve block may be effective where the pain is refractive.

Elongated styloid process (Eagle's syndrome)

This anatomical variant may result from calcification of the stylohyoid ligament.^{7a} It produces a sharp, occasionally bilateral, pain when the process impinges on the soft tissues of the neck (eg swallowing, jaw, head movements). There may be neck tenderness at the tip of the process. The incidence of an elongated styloid process (>2.5 cm) is 4% and many cases are asymptomatic.⁷ The diagnosis can be confirmed by an orthopantomogram (OPG) radiograph or plain skull films. Although it is an uncommon cause of pain on swallowing, some patients report multiple specialist and dental consultations before the correct diagnosis is made. Conservative treatment may temporarily relieve symptoms, but ultrasonic osteotomy is the treatment of choice where pain is troublesome.

Cranial (temporal) arteritis

This inflammatory disease (giant cell arteritis) affects the media of medium-sized cranial arteries. It may present as claudication when chewing, together with a constant unilateral headache and diffuse pain around the ear. Pain experienced while eating results from involvement of the media in the masseteric artery. A temporal artery biopsy should be obtained, but histopathology often fails to identify a lesion in the presence of disease as 'skip' lesions may occur. Waiting for a positive

result before commencing treatment can result in permanent ocular damage due to concurrent inflammation of the ophthalmic arteries. The presence of tenderness and hypersensitivity over the superficial temporal artery, together with a raised erythrocyte sedimentation rate (ESR), warrants immediate commencement of oral prednisolone (commonly 50 mg daily). The dose of prednisolone is titrated depending on ESR and clinical response, and it is frequently necessary to continue drug therapy for more than six months.

Multiple sclerosis

This demyelinating disease may mimic trigeminal neuralgia and cause intermittent lancinating facial pain. It should always be considered, particularly in a younger adult who has other neurological deficits. MRI is usually diagnostic in this condition.

Temporomandibular joint dysfunction

Musculoskeletal causes of orofacial pain are common. It is important to differentiate temporomandibular joint dysfunction (TMD) from myofascial pain, which is more frequent.

The diagnosis of TMD must be made from positive findings, which include:⁹

- pain with mandibular movements, particularly when eating. Pain in the region of the temporomandibular joint (TMJ) on awakening may be due to teeth grinding. Clenching may also produce pain and tenderness in the muscles of mastication
- restricted jaw movements (individuals normally have a pain-free opening of 35–45 mm)
- tenderness over the joint
- crepitus or clicking during mandibular movements

In myofascial pain syndrome, there is frequently pain and tenderness over the masticatory muscles. A trigger point and muscle fatigue on chewing may be present.

Patients presenting with pain around the ear are sometimes referred to a dentist, with a provisional diagnosis of

TMJ dysfunction when aural causes are excluded. However, dental treatment is not indicated unless the above clinical findings are present. TMD is not a diagnosis of exclusion.

Imaging

MRI is the 'gold standard' as it shows the articular disc and its attachments graphically. An OPG reveals joint morphology and makes for easy comparison of the two sides.

Management

Initially, myofascial pain and TMD should be treated conservatively by resting the joint (restricting opening and chewing), application of heat and use of simple analgesia. The combination of paracetamol, alternating two-hourly with a non-steroidal anti-inflammatory agent, is frequently effective. Diazepam, 5 mg, at night when muscle tenderness is present may provide relief through its skeletal muscle relaxant and anxiolytic effects.

The patient should be referred for dental assessment if there is no response to conservative measures. A removable acrylic (occlusal) splint, worn at night, may relieve myofascial pain, inflammation¹⁰ and, in cases of bruxism, prevent wear of the teeth from grinding. However, many authorities are of the opinion that these splints are of little value in most cases of TMD. Their empirical use when TMD is suspected should therefore be discouraged.

Some investigators believe TMD may precipitate migraine, and masticatory muscle hyperactivity often occurs in a migraine attack.¹¹ Some dentists, therefore, insert an occlusal splint, arguing it may relieve the headache and rest the muscles of mastication. Although this may occur, splints rarely prevent headache recurrence.

Joint arthrocentesis

This safe, outpatient procedure is effective in many cases of TMD where there are no major morphological changes. The joint is lavaged and a steroid solution inserted.

Dilatation of the joint space and removal of the fine elements of joint destruction, together with the severing of adhesions, provides symptomatic relief in more than 70% of cases where there is no major structural change. However, the duration of pain relief is variable.¹²

Temporomandibular joint surgery

Open joint surgery is reserved for patients who do not respond to the above management, or those with marked joint derangement. Patients are increasingly being managed with pain control and other non-surgical options. Even when there is restricted, painful jaw opening, the preferred treatment is arthroscopy and arthrocentesis.¹³

Psychological component of facial pain

A mental health and social history is essential when assessing facial pain, as depression and anxiety may increase pain severity and make its management more difficult. Conversely, persistent facial pain may amplify a neurosis or psychosis. Depression and anxiety are more common in elderly women living alone, although it is seen at all ages. In addition, there is a small number of patients in whom a diagnosis cannot be made. Low-dose tricyclic antidepressants taken before retiring, together with a supportive environment, often lead to significant pain reduction in these patients.

Regional nerve blocks in diagnosis and management

In undiagnosed facial pain, nerve block may relieve the pain and aid in determining the site from which it originates. The source is likely to be local if an injection of a short-acting local anaesthetic (lignocaine) close to the pain site provides temporary relief. A long-acting agent, including bupivacaine with adrenaline, should then be administered. This will provide time for the inflamed nerve to recover from repeated stimulation at the peripheral nerve endings. Adding a steroid to the anaesthetic solution may provide relief in

excess of the duration of the anaesthetic. If no improvement is gained, the pain is likely to be central in origin.

In a recent study, administering an occipital nerve block produced pain relief in all patients with occipital neuralgia and in 75% of cases of trigeminal neuralgia. The mean duration of relief was 27 days. This is a particularly useful and safe technique in elderly patients with occipital neuralgia in whom poly-pharmacy increases the risks of adverse drug interactions.¹⁴

Conclusion

Facial pain is a common presentation in clinical practice. The great majority of cases are due to diseases of the oral cavity, but the remainder often prove to be a diagnostic challenge. However, almost all cases can be diagnosed correctly and the pain controlled with a systematic approach using investigations judiciously.

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