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Diagnosing facial pain: non oro-dental causes

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Abstract

Patients with facial pain most commonly present first to the dental surgeon. Whilst in the vast majority of cases a dentally related cause is elicited, there are a number of patients in which the diagnosis may be unclear. This paper will examine the clinical presentation of non oro-dental causes of facial pain and outline the process leading to their diagnosis and management.

Introduction

Whilst dental and oral mucosal disease are the major cause of facial pain¹ in a number of patients presenting to the dentist no clear oro-dental cause can be elicited. Studies have shown that non dento-oral causes are responsible for seven per cent of chronic oro-facial pain.² In these cases the practitioner must resist pressure, from a distressed patient who firmly believes the pain is of dental origin, to perform restorative treatment or extractions unless pathology is clearly identified. It is necessary therefore to consider other causes of facial pain simulating that of dental disease.

Classification of orofacial pain

ORODENTAL – orodental lesions including oral mucosal disease

LOCAL DISORDERS – maxillary sinus, salivary gland disease, temporomandibular joint dysfunction, myofascial syndrome, nasopharynx, elongated styloid process

NEUROLOGICAL – (Neuropathic) trigeminal neuralgia/muscular sclerosis, glossopharyngeal neuralgia, herpes zoster, migraine

VASCULAR – cranial arteritis

PSYCHOGENIC – psychological disorders

REFERRED PAIN – from distant sites- heart (angina), oesophagus (GORD), cervical spine (dysfunction), cerebrum (facial migraine), aural disease

As in other neurological complaints, a detailed history supported by a thorough clinical examination reveals the diagnosis in the majority of cases. The site, quality, radiation, duration, aggravating and relieving factors of the pain are key indicators. Sharp, intense pain whilst commonly due to pulp disease also occurs in trigeminal neuralgia and in some cases of multiple sclerosis, whereas a dull constant pain is seen in chronic sinusitis or may represent the prodrome of herpes zoster. In 'facial' migraine pain usually lasts for over 30 minutes whereas in atypical facial pain it may be constant.

It is useful to determine the patient's appreciation of the intensity of pain by rating it from 1 (no pain) to 10 (unbearable). Site is also important. Pain centred on the ear is frequently misdiagnosed. Most cases are due to aural disease but if the Ear Nose and Throat surgeon can find no pathology in the ear he/she may attribute the pain to the temporomandibular joint (TMJ). Pharyngeal infection is the most frequent cause of pain when swallowing but an ulcerative lesion at the base of the tongue is sometimes responsible. Pain may be due to oro-pharyngeal candidiasis in a frail elderly or immune-compromised patient or from a squamous cell carcinoma, particularly where there is a history of smoking. Rarely, an elongated styloid process may impinge on the soft tissues in head movements or when swallowing and produce similar pain. Precipitating factors may point to the diagnosis. For example, psychological stress may be a factor in temporomandibular joint dysfunction (TMD), tension headache and migraine and contact with a 'trigger' point may cause pain in trigeminal neuralgia and myofascial pain syndrome.

This paper examines the non dento-oral causes of facial pain other than bone lesions and trauma which will not be discussed.

Conditions of major concern to dental practitioners

TEMPOROMANDIBULAR JOINT DYSFUNCTION (TMD) AND MYOFASCIAL SYNDROME

Recently published *Diagnostic Criteria for TMD*³ define the criteria for pain-related TMDs, myalgia, myofascial pain, arthralgia and headache related to TMD.

It is important to distinguish TMD from myofascial pain, the latter occurring more frequently. The patient with myofascial syndrome has pain and tenderness over the masticatory muscles with a 'trigger' point of maximum tenderness. Muscle fatigue during mastication is also common.⁴

Myalgia is defined as pain of muscular origin that is affected by joint movement. Replication of the pain occurs with provocative testing of masticatory muscles. Myofascial pain is pain of muscle origin spreading beyond the site of tenderness on palpation but within the boundaries of the muscle. Discussion of the causes of these conditions is well covered in the dental literature and is outside the scope of this article.^{5,6,7}

Where clinical examination suggests TMD, imaging is indicated. A panoramic dental radiograph reveals joint morphology and allows comparison of the two sides but

magnetic resonance imaging (MRI) is the 'gold standard' as it graphically shows the disc and its attachments.

Initial management is similar for both conditions, namely restriction of jaw movements, periodic application of a heat pack and analgesia- alternating paracetamol and a non-steroidal anti inflammatory agent two hourly. If muscle tenderness is present, diazepam 5 mg at night may provide relief due to its muscle relaxant and anxiolytic properties. If these conservative measures fail, further management should be at the discretion of a dental practitioner versed in TMD.

In myofascial syndrome, where pain persists, muscle stretch exercises are commonly recommended and injection of one per cent lignocaine at the trigger point may relieve the pain.

HEADACHE ATTRIBUTED TO TMD

Diffuse pain in the temple or migraine may be secondary to TMD. Diagnosis is confirmed if pain occurs with provocation testing of the masticatory muscles.

PARANASAL SINUS DISEASE MAXILLARY SINUSITIS

Perhaps one of the greatest challenges to the dental practitioner is to determine in a patient with heavily restored teeth whether diffuse pain in the maxilla is dental in origin. Sinus pain may present as a headache or facial pain at some distance from the sinuses, and ethmoid and sphenoidal sinusitis may cause headache in the skull vertex or parietal region.

In acute maxillary sinusitis, pain may mimic that of dental origin. There may be feeling of fullness or pain centred over the apices of posterior teeth which may be tender to percussion and the maxilla may be tender to palpation. Fever, nasal congestion and a purulent discharge are frequently present. In chronic sinusitis there is often a history of recurrent infection nasal obstruction or discharge and frontal headache. The patient may relate that running or bending over aggravates the pain. Chronic sinusitis is mainly the result of infection involving the nasal airway but it may emanate from pulpal disease. Allergy and an abnormal airway causing obstruction of the ostium of the sinus and accumulation of secretions are other common causes.⁹

In doubtful cases, a detailed history and clinical examination should be supplemented with pulp vitality testing and periapical radiographs. Sinus infection is more likely where the roots of posterior teeth are in close proximity to the sinus floor, if several teeth are tender or if the pain is bilateral. Management is aimed at improving drainage of secretions using intra-nasal steroids, analgesia and a 14-day course of antibiotics. Surgery may be necessary where endoscopy reveals stenosis of the ostium due to nasal polyps or mucosal thickening.

Pain and tenderness in the supra-orbital region may indicate frontal sinusitis. Accompanying peri-orbital oedema constitutes a medical emergency as infection can spread to cerebral structures.

NEOPLASMS OF THE SINUSES include nasopharyngeal carcinoma which is common in Asian communities. There may be nasal obstruction or discharge and neurological symptoms including paraesthesia or hearing loss but rarely facial pain. Where such symptoms are present the dentist should refer the patient to a medical practitioner for further investigation.

SALIVARY GLAND DISEASE

Here, pain is generally localised and restricted to meal-time when the flow of saliva is obstructed by stenosis of the major duct from tumour or salivary calculus. Examination may reveal an enlarged and tender gland and there may be restricted mandibular movement. Diagnosis is aided by a sialogram and CT imaging. If a tumour is suspected, fine needle aspiration is indicated.

TRIGEMINAL NEURALGIA

Trigeminal neuralgia (TN) is most commonly caused by an aberrant loop of a cerebellar vessel, frequently the superior cerebellar artery, compressing the nerve trunk as it enters the pons. This causes demyelination of the nerve trunk resulting in hyper-excitability of nerve fibres. Ectopic impulses are generated if the sensory receptors in the trigger zone are stimulated. The maxillary division of the trigeminal nerve is most frequently affected. Intense 'lightning' pain is specific to the trigger zone which may be situated on the gingivae, cheek, or alar of the nose. Pain may occur during jaw movements as in eating, exposure to the wind or contact with the trigger zone. Between stimulae the patient is asymptomatic though there may be a small area of dysaesthesia that corresponds to the trigger zone. Clinical diagnosis is confirmed if repeat stimulation within 60 seconds does not produce further pain. This phenomenon is due to the nerve being refractive to challenge for a short period. Magnetic resonance angiography (MRA) should be performed and may demonstrate vascular derangement at the nerve entry to the pons.

Recurrent pain is frequently preventable by medication, most commonly carbamazepine, and this should be commenced if there is a strong clinical suspicion of TN even if the MRA is not diagnostic.⁹ However, as anti-epileptic drugs may produce side-effects the initial dose should be low and the patient reassessed frequently. Liver function tests and blood leucocyte count should be monitored, but observing carbamazepine drug levels is of little value. The newer anti-epileptic drugs such as gabapentin and lamotrigine are effective and have a more favourable side effect profile. In cases where drug therapy fails to relieve the pain and imaging confirms nerve compression, surgical decompression using an open posterior craniotomy is reported to have relieved pain in 90 per cent of the cases. However, as the Cochrane Neuromuscular Group pointed out, there were no randomised controlled studies to support these observations.¹⁰

MULTIPLE SCLEROSIS

It is important to consider the possibility of multiple sclerosis in a young adult presenting with neurological symptoms including intermittent facial pain that mimics trigeminal neuralgia. In this condition the pain is caused by demyelination of sensory nerve fibres. The diagnosis is demonstrated by MRI.

GLOSSOPHARYNGEAL NEURALGIA

In this condition, which is much less common than trigeminal neuralgia, a sharp, lancinating pain occurs in the oro-pharynx when swallowing. Diagnosis is usually based on history and clinical examination and the pain is commonly relieved by carbamazepine. Pharyngeal disease and ulceration at the base of the tongue are far commoner causes of this type of pain.

ELONGATED STYLOID PROCESS

This uncommon anatomical variant, sometimes referred to as Eagle's Syndrome, may cause sharp neck pain in certain head movements or when swallowing.^{11,12} The diagnosis is confirmed by imaging and where the condition is troublesome, ultrasonic osteotomy is the preferred treatment.

REFERRED PAIN

In the head and neck identification of the site from where pain emanates may prove difficult due to the variation in distribution and overlapping of sensory nerves.¹³

PAIN AROUND THE EAR

A detailed history and otoscopic examination is imperative and will usually reveal the diagnosis if the cause is otological.

Causes of pain around the ear

EAR DISEASE **External ear:** otitis externa, perichondritis, furunculosis, wax accumulation, trauma, neoplasm, H zoster infection (Ramsay Hunt Syndrome)

Middle ear: otitis media (mainly from acute upper respiratory tract infection), eustachian tube dysfunction, acute mastoiditis, barotrauma

PERIOTIC: skin infection, lymphadenitis, salivary gland lesions

MUSCULOSKELETAL **Myofascial syndrome**
TMJ Dysfunction

VASCULAR: Temporal arteritis

PAIN REFERRED FROM DISTANT SITE

PAIN REFERRED FROM DISTANT SITE: An ulcer at the base of the tongue, posterior floor of mouth or a lower third molar infection may cause pain in the ear through involvement of the auriculotemporal branch of the mandibular nerve.¹⁴

A degenerative lesion in the upper cervical vertebrae can also cause pain transmitted through the greater, lesser occipital or great auricular nerve (branches of cervical nerves C2 and C3). This sometimes occurs in rheumatoid or osteoarthritis affecting the neck.

Myocardial ischaemia (angina pectoris) Discomfort may radiate to the arms, neck, mandible or teeth due to the common origin in the posterior horns of the spinal cord of sensory neurones supplying the heart and these organs.

Gastro Oesophageal Reflux Disease (GORD)/Hiatus hernia Gastric juice is irritant to the oesophageal mucosa and when gastric reflux occurs, mucosal erosion or an ulcer may form in the oesophagus or oesophageal spasm result. The pain is similar to that experienced in angina and commonly occurs at night. It is more common in smokers and is usually relieved by ant-acid preparations or proton pump inhibitors.

Facial migraine Migraine may be characterised by pain in the face below the level of the eyes. It is often incorrectly diagnosed as sinusitis.¹⁵ In facial migraine there is usually a history of similar attacks with associated nausea, vomiting and photophobia. Treatment is similar to that for classical migraine with simple analgesics or sumatriptan if attacks are recurrent. Medication is most effective if taken when symptoms first occur.

CRANIAL (Temporal) ARTERITIS

In this condition, giant-cell arteritis affects the media of medium sized cranial arteries. Symptoms include a constant headache and claudication (pain) whilst eating due to involvement of the masseteric arteries in the inflammatory process. If the ophthalmic arteries are affected vision may be impaired, ultimately leading to blindness should the condition remain undiagnosed. Where these symptoms are present and there is tenderness over the course of the superficial temporal artery (Sta), blood should be taken and an acute phase reactant, C reactive protein (CRP) measured. If the level is significantly elevated a diagnosis of cranial arteritis is made and the patient should be commenced on prednisolone immediately. STa biopsy is usually performed but as 'skip' lesions can occur in temporal arteritis this may prove negative. Delay in commencing steroids can result in permanent ocular damage. The patient is monitored closely and the daily dose of steroid adjusted according to symptomatic improvement and CRP.

HERPES ZOSTER

Herpes zoster (HZ) or shingles is seen especially in immune suppressed or deficient patients and the elderly. It is due to reactivation of the latent HZ virus from earlier chicken pox infection; the virus lying dormant, often for many years in the dorsal root ganglion of affected nerves. A branch of the trigeminal nerve is frequently affected. HZ should be considered where there is recent onset



of pain and tenderness in the territory of the trigeminal nerve. Pain occurs a few days before the characteristic vesicular rash appears, though in some cases vesicles may not form.¹⁶ The geniculate ganglion (facial nerve) is involved in Ramsay Hunt syndrome. Here vesicles form in the external ear and oral mucosa. There may be facial paralysis and unilateral loss of taste due to involvement of the chorda tympani nerve. Valacyclovir and famcyclovir are the drugs of choice.

BURNING MOUTH SYNDROME

This common complaint, affecting up to 2 percent of the population, may have an organic or a psychological cause. It is well described in an article by Scully and Felix.¹⁷

PSYCHOLOGICAL ASPECTS OF FACIAL PAIN It is important to consider the psychological effects of chronic pain and the patient's mental health. Mental health and social assessments are essential when evaluating facial pain. Psychosomatic facial pain is a well-documented entity and should always be considered where pain is obscure and atypical. Patients suffering from depression, anxiety or other psychological disorders who present with facial pain are likely to process their pain differently from the rest of the population. They are more prone to develop postoperative pain, prolonged pain and central processing disorders such as complex regional pain syndrome.¹⁸ Depression and anxiety, whilst common at any age, are frequently seen in elderly females living alone. **Management:** Pain in a patient with a psychological disorder is frequently difficult to manage. It is often persistent and responds more slowly to treatment especially after a surgical procedure.¹⁹ In these cases, a low dose of a tricyclic antidepressant, such as amitriptyline, taken before retiring and a supportive environment can lead to significant pain reduction. Doxepin and fluoxetine may be trialled if amitriptyline fails.

PERSISTENT IDIOPATHIC FACIAL PAIN Here, pain does not follow anatomical pathways, is usually diffuse, deep seated, constant and of varying intensity. These patients frequently have underlying psychological problems that amplify the pain. Where the pain is persistent, a neurological condition such as cerebral ischaemia, neoplasm, multiple sclerosis, syringobulbia or temporal arteritis may be the cause. Such patients require a neurological opinion and neuro-imaging.

REGIONAL NERVE BLOCKS IN FACIAL PAIN DIAGNOSIS AND MANAGEMENT

This valuable technique helps determine whether the suspected neuropathic pain has a peripheral component and may be an adjunct to pharmacological therapy in trigeminal neuralgia. If an injection of a short acting local anaesthetic such as lignocaine close to where the patient feels pain provides short-term relief it is probable that the primary lesion is local, and a long acting agent, such as bupivacaine with adrenaline, should be administered. If no improvement is gained, a further injection (such as an infraorbital or posterior superior alveolar nerve block) should be placed. The anaesthetic agent, sometimes combined with a steroid solution, provides time for the inflamed nerve to recover from repeated stimulation at its peripheral endings. This may break the pain cycle so providing relief in excess of the duration of the anaesthetic.²⁰ If no relief is obtained, the lesion is located more proximally or is central.

A recent study found that the insertion of an occipital nerve block was effective in producing relief in all patients with occipital neuralgia, 75 per cent of cases of trigeminal neuralgia but in only 20 per cent with idiopathic facial pain. The mean duration of pain relief was 27 days. The authors concluded that the occipital nerve block is an extremely useful and safe technique, particularly in the elderly where poly-pharmacy risks adverse drug interactions.²¹

BOTULINUM TOXIN (BOTOX) INJECTIONS

Recent studies have demonstrated that injection of botulinum toxin type A (Botox) at the trigger points of persistent facial pain produced relief in some cases.²² However, it is difficult to evaluate the role of Botox in these studies due to the heterogeneity of clinical features, patients' over-use of analgesics and psychological considerations together with the placebo effect (approximately 30 percent).

Conclusion

Facial pain is one of the commonest presentations in dental practice. Whilst the great majority of cases are found to relate to the oral cavity, a significant number prove to be a diagnostic challenge. However, by taking a complete history and performing a thorough clinical examination, supported by imaging and investigations, almost all can be diagnosed and resolved.

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