Enhanced CPD DO C OralSurgery



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An Update on Headaches for the **Dental Team**

Abstract: Pain is often the reason for which patients seek help from the dental team. Although dental pain is likely to be the most common cause, chronic pain conditions, such as headaches, may also show similar symptoms to toothache, resulting in mismanagement and a delay in diagnosis. Many patients experience headaches, which are often debilitating. Despite this, dentists have a lack of knowledge about both headaches and neurovascular pain. The dental team should be able to identify when the pain is likely to be of neurovascular origin rather than toothache, and the team should be able to provide advice and an appropriate referral, if necessary. This should help reduce unnecessary dental treatment and improve the pain relief to these patients.

CPD/Clinical Relevance: This article provides information on how to initially manage neurovascular pain primary care. Dent Update 2021; 48: 743-750

Pain in the head and neck region is often the driving factor for patients to seek care from the dental team. It is not rare for chronic orofacial pain conditions to manifest with similar symptoms to dental pain. This can often lead to a misdiagnosis and inappropriate treatment resulting in complications for both the clinician and the patient.1 Diagnosis and management of these patients can be particularly challenging; however, a correct diagnosis is mandatory to ensure patient safety and care.

Headaches are predicted to affect up to 46% of the worldwide population and they have been ranked as being

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one of the top 10 most disabling disorders.² Therefore, the implications for healthcare, and the patients, should not be underestimated. The International Headache Society updated their classification in 2018.3 It is those that fall into the group of 'primary headaches' which are most relevant and may be encountered by the dental team; however, an awareness of the other types may also be beneficial. A general overview of the classification is shown in Table 1.

Owing to the high number of patients who experience headaches and that the pain experienced may mimic dental pain, it is important that dental teams are able to correctly identify these disorders because they will be non-responsive to routine care, and, if appropriate, may need referral on for urgent care. In general, dentists have a poor knowledge of headaches and often struggle with this. Two papers highlight the high proportion of patients who attended orofacial pain clinics for primary headaches that, ideally, could have been signposted to neurologists sooner rather

than the patients experiencing years of pain and multiple inappropriate dental and ENT procedures.4,5

With this article, we aim to improve the knowledge of the dental team, especially general dental practitioners, in relation to primary headaches and discuss how they can be differentiated from odontogenic causes of pain. This should help reduce misdiagnosis and the number of irreversible procedures being carried out, which are routinely used to treat odontogenic pain. We also aim to provide general dental practitioners with the knowledge on how to initially manage neurovascular pain in primary care.

Migraines

Migraines have been ranked as the third most prevalent disease in the world, so it is likely that dentists will encounter these patients who experience them.3 Two main types exist, those with an aura and those without. Other types of migraines have been discussed in a previous paper suitable for dentists.² The diagnostic criteria for migraines have been defined by

October 2021 DentalUpdate 743

Primary headaches	Migraine Tension-type headache Trigeminal autonomic cephalalgias Other primary headache disorders
Secondary headaches	Headache attributed to trauma or injury to head and/or neck Headache attributed to cranial and/or cervical vascular disorder Headache attributed to non-vascular intracranial disorder Headache attributed to a substance or its withdrawal Headache attributed to infection Headache attributed to disorder of homeostasis Headache or facial pain attributed to disorder of the cranium, neck, eyes, ears, nose, sinus Headache attributed to psychiatric disorder
Painful cranial neuropathies, other facial pain and other headaches	Painful lesions of the cranial nerves and other facial pain Other headache disorders

Table 1. An overview of the international classification of headache disorders.³

the International Headache Classification (Table 2). Migraines are more common in females, occur in all ages from childhood and have a unilateral distribution of pain (Figure 1). They can last for days and may be triggered by certain foods, alcohol, stress, the contraceptive pill or hormonal changes during the menstrual cycle. Approximately, 20% of patients will experience an aura prior to the headache. Auras may be visual and examples include zig-zag patterns, flashes of light or loss of vision. They may also be sensory, such as tingling or numbness, which can spread over the face, lips and tongue.

It is also of note to the reader that migraines may cause an increased risk of cardiovascular events, most commonly stroke, especially in women who smoke and take oestrogen supplements. They have also been linked to cerebrovascular disorders, such as seizures. All of which should also be taken into account when managing these patients.8

The patient should also be questioned sensitively about depression and anxiety; both of these have been linked to migraines, likely to be due to the common pain receptors involved in both. A presence of these disorders has been shown to reduce compliance with prescribed medications and advice on management.⁸

Common differential diagnoses

- Odontogenic pain
- Sinus pain
- Temporomandibular joint disorder

Migraines most commonly cause pain in the V1 distribution, but they may also cause pain in the V2 and V3 distribution, occasionally independent of pain in V1.^{1,9} Owing to the distribution of pain presenting in the V2 and V3 region, dentists may be confused and misdiagnose the pain has having a dental or sinus origin. Migraine presenting with isolated facial pain in V2 and/or V3 region is considered extremely rare, and its phenotype has not been described in full.

There is also a well-established link between temporomandibular joint disorders and migraines owing to the similar neurophysiological processes involved in both conditions. 10 Although this may complicate the diagnosis of the patients' pain, if this is found to be the case, it is suggested that they should be managed using a simultaneous approach to both conditions, rather than managing each orofacial pain condition separately. 11.

Treatment

General dental practitioners

General dental practitioners may give patients advice on acute treatment, which

aims to offer patients a reduction in the pain and other symptoms experienced with a treatment goal of reducing the disability associated with migraines. The evidence favours NSAIDS (aspirin, diclofenac, ibuprofen, naproxen), triptans, ergotamine derivatives and opioids, such as butorphanol. A combination of medications is also well supported in the literature with a triptan and NSAIDS being more effective than pairing a triptan with paracetamol.¹² Despite the evidence supporting the benefits of using opioids in migraines, NICE does not recommend that they should be prescribed to patients because of side effects and the risk of dependence.¹² Of note, NSAIDs can result in gastrointestinal and cardiovascular adverse effects so they should be used with caution. In addition, triptans should be avoided in patients with coronary artery disease, poorly controlled hypertension and other peripheral vascular diseases. Newer medications are being developed to overcome the vascular contraindications of triptans.

Specialist referral treatment

Treatment to prevent migraines, normally provided by a specialist in the field, is considered based on the frequency of migraines experienced and the level of disability. The following medications have an established evidence base for their efficacy in preventing migraines: antiepileptic drugs, triptans and hypotensives, including beta-blockers (metoprolol, propranolol and timolol). In comparison, antidepressants and other betablockers, such as atenolol, may also be considered, but there is less evidence to support the use of these drugs.13 Although gabapentin may have been previously recommended, guidelines updated in 2019 by NICE have advised that it should not be offered to patients.1,12

Emerging treatments for the prevention of migraines include injectable therapies, which can be administered both subcutaneously and intravenously, such as botulinum toxin A and monoclonal antibodies;

Migraine without aura	A. At least five attacks fulfilling criteria B–D B. Headache attacks lasting 4–72 hours C. Headache has at least two of the following four characteristics: 1. Unilateral location 2. Pulsating quality 3. Moderate or severe pain intensity 4. Aggravation by or causing avoidance of routine physical activity (eg walking or climbing stairs) D. During headache, at least one of the following: 1. Nausea and/or vomiting 2. Photophobia or phonophobia	
Migraine with aura	A. At least two attacks fulfilling criteria B and C B. One or more of the following fully reversible aura symptoms: 1. Visual 2. Sensory 3. Speech and/or language 4. Motor 5. Brainstem 6. Retinal C. At least three of the following characteristics: 1. At least one aura symptom spreads gradually over >5 minutes 2. Two or more aura symptoms occur in succession 3. Each individual aura symptom lasts 5–60 minutes 4. At least one aura symptom is unilateral 5. At least one aura symptom is positive 6. The aura is accompanied or followed within 60 minutes, by a headache	
Episodic tension-type headache	 A. At least 10 episodes of headache occurring on <1day/month on average (<12 days/year) and fulfilling the following criteria B. Lasting from 30 minutes to 7 days C. At least two of the following four characteristics: Bilateral location Pressing or tightening (non-pulsating) quality Mild or moderate intensity Not aggravated by routine physical activity such as walking or climbing stairs D. Both of the following: No nausea or vomiting No more than one of photophobia or phonophobia. 	
Chronic tension-type headache	A. Headache occurring on >15 days/month on average for >3months (>180 days/year, fulfilling criteria B–I B. Lasting hours to days, or unremitting. C–D. As above	
Cluster headaches	A. At least five attacks fulfilling criteria B–D B. Severe or very severe unilateral orbital, supraorbital and/or temporal pain lasted 15–180 minutes when untreated C. Either or both of the following: 1. At least one of the following symptoms or signs ipsilateral to the headache: (a) conjunctival injection and/or lacrimation (b) nasal congestion and/or rhinorrhoea (c) eyelid oedema (d) forehead and facial sweating (e) miosis and/or ptosis 2. A sense of restlessness or agitation D. Occurring with a frequency between one every other day and eight per day	

Table 2. Diagnostic criteria as defined by the International Headache Society.³

October 2021 Dental Update 745

Migraine Tension-type Cluster Headache Headache

Figure 1. Pattern of distribution of pain in primary headaches. Figure adapted from Chong and Renton.²

however, there are still questions over their long-term safety.¹³ Neuromodulation is also an emerging active treatment for migraines that may be suitable for patients who are not responding to drug therapy or who have contraindications.^{13,14}

Biobehavioural therapy such as cognitive behaviour therapy should also not be ignored. In more recent years, there has been a growing body of evidence to support their use for chronic pain, as well as migraines.¹³ Further evidence has shown that using these techniques alongside drug therapy is more effective than using drugs alone.¹⁵

Tension-type headaches

Tension-type headaches (TTH) are the most common type of headache experienced by patients and are thought to affect up to 78% of the population.^{2,3} Their diagnostic criteria can also be seen in Table 2. The mild to moderate pain tends to be bilateral and feels like a pressing or tightening pain (Figure 1). This is a non-pulsating pain, in comparison to a migraine, which often has a pulsating type pain.2 TTH can be further classified into episodic and chronic (Table 2). In very rare cases, a tension headache can show similar symptoms to concerning conditions such as a subarachnoid haemorrhage, TIA or stroke.

Common differential diagnoses

 Temporomandibular joint disorders including headache attributed to TMD

The pain experienced during a TTH is commonly confused and, therefore, diagnosed as temporomandibular joint disorder pain caused by bruxism, as often, in both conditions, the temporalis may be tender to palpate.¹⁶

The relationship between bruxism and TTH should be acknowledged by the dental team and recent evidence supports an association between the two.17 A proposed modern theory is that TTH may result from referred pain from trigger points in head and shoulder muscles. Bruxism may be a factor in the development of trigger points in the head and neck region. It is these trigger points that are responsible for central sensitization, which has noted to be present in TTH.17 Further to this, patients who suffer from TTH also report heavier tooth contact, muscle tension, stress, and more pain in their head region.18

Treatment

General dental practitioners

The mild to moderate pain experienced by patients can be managed with analgesics, which may be prescribed by their general dental practitioner if deemed suitable. The effectiveness of analgesics is reduced if the patient frequently experiences TTH. As a first-line treatment, acetaminophen (paracetamol) may be prescribed, which is favourable owing to the reduced gastric side effects, and as a second-line, ibuprofen can be prescribed.

Specialist referral treatment

For patients suffering from chronic TTH, drug therapy can be used to reduce the frequency and severity of headaches. Tricyclic antidepressants are most widely used, with amitriptyline found to be the most effective. ^{19,20} Mirtazapine may also be used. Other types of antidepressants, such as SSRI and tetracyclics, are not indicated in these patients. Botulinum toxin A has also been licensed for use; however, there is much conflicting evidence supporting this as a treatment modality, and further research is needed to be undertaken in this area. ²⁰

As with migraines, a combination of pharmacological and non-pharmacological treatments (physical and/or psychological therapy, such as CBT) has been shown to be more effective than using one treatment alone. ^{19,20} Although the links to bruxism have been discussed, dentists should not routinely use an occlusal splint to treat TTH owing to the lack of supporting evidence for it as a treatment modality. ^{19,21}

Trigeminal autonomic cephalalgias

The trigeminal autonomic cephalalgias (TACs) are composed of a group of short-lasting and unilateral headaches that also present with cranial autonomic features, which are lateralized and ipsilateral to the headache. These include cluster headaches, paroxysmal hemicrania, short-lasting unilateral neuralgia headache attacks and hemicrania continua. Despite these headaches being rare, these patients may present in a dental setting and because of the extremely debilitating nature of these headaches, it is important they be appropriately managed.

The presenting pain is an intense unilateral pain with neuralgic multiple stabbing events, which lasts several hours and spontaneously regresses, leaving the patient with pain-free interludes. The pain episodes often occur several times

	Migraine	Tension-type headaches	Cluster headaches	Acute pulpal pain	Chronic pulpal pain	Periodontal pain
Pain type	Pulsating	Pressing Tightening Non-pulsating	Orbital	Throbbing, Aching	Tender, Aching	Tender Aching
Pain severity	Moderate to severe	Mild to moderate	Severe	Mild to severe	Mild	Mild
Location	Frontotemporal Unilateral	Frontal Bilateral	Orbital Unilateral	Tooth Unilateral	Tooth Unilateral	Tooth Gingivae Unilateral
Duration	472 hours	30 minutes– 7 days	15–180 minutes	Seconds to daily	Constant	Varies
Frequency	1/month	1-30/month	1–8/day	Variable	Daily	Daily
Autonomic features	Yes	No	Yes	No	No	No
Triggers	Stress, food, alcohol, hormones, lack of sleep	Stress, muscle tension	Alcohol, nitrates	Electrical or thermal stimulation, percussion of tooth	Varies	Lateral pressure Apical pressure

Table 3. Differentiating between neurovascular and odontogenic pain.²⁷

a day at the same times, usually early mornings, and with clusters of pain, most commonly occurring in spring and autumn.¹ There are associated autonomic signs that include: drooping of the eyelid (ptosis); redness of the cheek or eye; pupil constriction (meiosis); and nasal congestion. The presence of nasal congestion often leads patients to seek ENT opinions, resulting in inappropriate ENT procedures.

The rest of this article focuses on updating the reader on cluster headaches because this is the most common form of TAC, the other forms being covered in previous papers aimed at dentists.^{2,22}

Cluster headaches

These are usually unilateral and located around or above the eye (Figure 1). The pain is severe and has a number of presentations, such as burning, tightening or throbbing. The diagnostic criteria can be seen in Table 2. They may also be further classified into being episodic or chronic in nature. If the

patient experiences multiple episodes of cluster headaches with breaks of less than 3 months, they are classified as chronic. Triggering factors include alcohol, nitrate-containing food, nitroglycerine and strong odours, such as paint or nail vanish.²²

The pain experienced by patients is often described as the worst pain they have ever experienced. Cluster headaches have also been termed 'suicidal headaches' because patients have been known to develop suicidal thoughts.² Cluster headaches more commonly affect men and those over the age of 50 years.⁶

Interestingly, these patients most commonly initially seek help from dentists and there are multiple studies that have found inappropriate treatment for patients in an attempt to relieve the pain of misdiagnosed TACs.^{1,22}

Common differential diagnoses

- Odontogenic pain
- Temporomandibular joint disorder
- Trigeminal neuralgia

Owing to the episodic pattern of pain and the areas commonly affected by

TACs, they are often misdiagnosed as toothaches. During the attacks themselves, pain has been known to be experienced in the teeth and jaw.^{22,23}. The jaw pain experienced may be confused with temporomandibular joint disorder.

Treatment

Although the management of cluster headaches is out of the remit of general dental practitioners, it is useful for dentists to be aware of their management. As with other types of headaches, the management of these patients is subdivided into prevention and acute management.

For acute management, the evidence supports subcutaneous or intranasal sumatriptan, intranasal zolmitriptan and oxygen.²⁴ For prevention, verapamil is most commonly used. Lithium, melatonin and topiramate may also be used, but the evidence is more limited regarding their use.^{24,25} While waiting for preventive treatment to work, prednisolone may be prescribed.

October 2021 Dental Update 747

OralSurgery

Owing to the side effects of steroids, a unilateral greater occipital nerve block may be performed using either lidocaine or methylprednisolone, which has effects lasting up to 4 weeks.^{2,24}

Sinister headaches

Recent onset of a headache or sudden worsening of headache in a middle-aged patient is rare. If it is associated with sensory or motor neuropathy, nausea, loss of consciousness or other aberrant signs, immediate referral to the patients' general medical practitioner or advice to attend A&E is advised, as exclusion of ischaemic of haemorrhagic stroke and/or neoplasia must be undertaken urgently. Exclusion of a recent history of head injury must be excluded and any patient with comorbid poorly controlled or undiagnosed hypertension may indicate a potential stroke risk.

Misdiagnosis

Common features of neurovascular pain that may mimic odontogenic pain and complicate diagnosis include:²⁶

- A deep, throbbing, spontaneous pain, which may last up to a few days and be pulsatile in nature, may be experienced, similarly to how pulpal pain is described;
- The pain is predominantly unilateral;
- Headache is often accompanied by a toothache;
- Periodic and recurrent nature of pain;
- Some autonomic signs may bear a resemblance to a dental abscess, such as oedema of the eyelids.

Differentiating between neurovascular and odontogenic pain

There are a number of ways in which the conditions described in this article can be differentiated from odontogenic pain. Table 3 gives an overview of the differentiating features between neurovascular and odontogenic pain to aid general dental practitioners in correct diagnosis.²⁷

A good knowledge base of the signs and symptoms of primary headaches, as well as those related to odontogenic pain, will allow an initial diagnosis from the pain history provided by the patient. Specifically, the way the patient describes the type of pain, the location, triggers, duration and frequency of the pain will all help form an initial diagnosis just from the patient's history (Table 3). It is also imperative that the general dental practitioner establishes whether any autonomic features have also been experienced. This will be a key distinguishing factor supporting a neurovascular cause of pain. Secondary to this, a clinical examination supported with radiographs will allow dental pathology to be identified, which will help dentists form a definitive diagnosis.

Conclusion

Headaches may present in various ways, and it is likely that these patients will present to dentists, especially as the pain may be experienced in their teeth and jaws. Dentists have a responsibility to correctly diagnose pain in the head and neck region. If headaches are suspected, an appropriate referral to an orofacial pain service or neurology clinic is favoured, rather than unnecessary, irreversible dental treatment.

Compliance with Ethical StandardsConflict of Interest: The authors declare

Conflict of Interest: The authors declare that they have no conflict of interest.

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OralSurgery

October 2021 Dental Update 749

OralSurgery

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1. C	6. D				
2 . D	7. A				
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4. C	9. B				
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