

Management of acute dental pain: a practical approach for primary health care providers

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SYNOPSIS

A detailed history and examination will identify the cause of dentally-related pain in most emergency situations. Sharp, shooting pain can be caused by inflammation in the pulp or exposure of the dentine. Dull throbbing pain has several causes including ulcerative gingivitis, dental caries and food impaction. Simple treatment will usually alleviate the symptoms until patients can be seen by a dentist. Prescription of antibiotics is usually not indicated.

Index words: dental infections, sinusitis, temporomandibular joint.

(Aust Prescr 2001;24:144–8)

Introduction

General medical practitioners are often called upon to manage acute dental pain in emergency situations, for example, out of hours or in rural Australia, where it may not be possible for a dentist to provide immediate treatment. Common acute oral problems are usually easy to diagnose. Simple management can alleviate pain and further discomfort until a dentist can be called upon.

Most problems can be identified by the history and examination. Several dental conditions have typical symptoms with different types of pain.

History and examination

When investigating acute dental pain, the history should focus on the pain's:

- location
- type
- frequency and duration
- onset
- exacerbation and remission (for example the response to heat or cold)
- severity
- area of radiation.

Associated pathology and referred pain should also be considered.

The following structures need to be examined carefully in order to be sure that the pain is of dental origin:

- tongue
- buccal mucosa
- floor of the mouth
- hard palate
- teeth and periodontal tissues (see Fig. 1)
- tonsils
- temporomandibular joints
- airway
- ears
- salivary glands
- lymph nodes.

Which tests can assist in diagnosis?

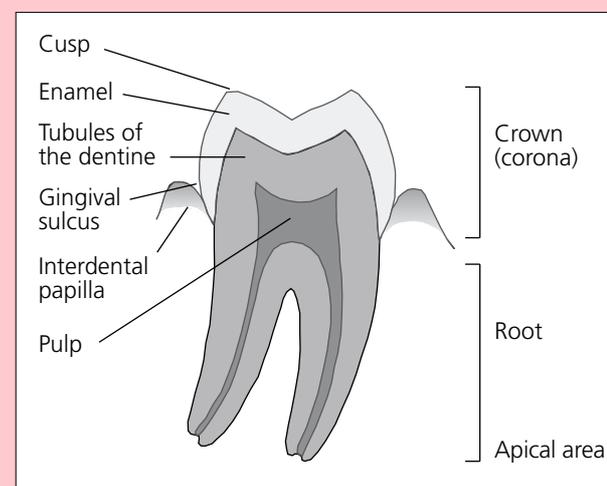
There are several simple tests that may assist in diagnosis of dental pain.

Pulp sensitivity test

Dry ice, or an ordinary ice stick (made in a plastic or glass tube), is placed on the cervical third (neck region) of the tooth crown. A response to the stimulus indicates that the pulpal tissue is capable of transmitting nerve impulses. No response may indicate pulp necrosis.

Fig. 1

Diagram of a lower molar tooth



Percussion test

Using an instrument handle, the tooth is tapped in the longitudinal axis. A painful response suggests possible periapical inflammation.

Probing

Placing a fine, blunt probe gently into the gingival sulcus surrounding the tooth enables the health of the gingival tissues to be assessed. Bleeding and/or sulcus depths greater than 3–4 mm indicate gum disease.

Mobility test

Holding a tooth firmly on the buccal (cheek) and lingual sides between the fingers enables mobility to be assessed. All teeth have a small amount of mobility (<0.5 mm), but visible movement suggests loss of bone support around the root of the tooth.

Palpation

Careful palpation around the area of concern may reveal tenderness and the type and extent of swelling.

Radiographic examination

If it is possible to obtain a screening radiograph, such as an orthopantomograph (OPG), this may assist in the diagnosis and localisation of the cause of the pain. The radiograph should show clearly the apical and periapical structures of teeth and associated tissues. The relationship of the maxillary molars and premolars to the floor of the maxillary sinus can be examined, and radiographs may reveal recurrent caries or periapical radiolucencies associated with an established infection (Fig. 2).

What are the common types of dental pain?

Common types of oro-facial pain likely to cause a patient to seek emergency care are categorised in Figure 3. The character of the pain can point to a diagnosis.

Short, sharp, shooting pain

This type of pain can be generalised or confined to one region of the mouth. The pain may be due to fluid movement through open tubules in the dentine or there may be some initial inflammatory changes in the dental pulp. It can be caused by caries, dentine exposure on root surfaces, split cusp, lost or fractured restoration or a fractured tooth.

Patients complain commonly of a sharp pain associated with hot, cold or sweet stimuli. The pain is only present when a stimulus is applied. In the case of a cracked cusp, grainy bread or hard food may create a sharp pain, that may be spasmodic, on biting or chewing.

With gingival recession, recent scaling, or tooth wear due to a high acid diet or gastric reflux, there may be generalised dentine sensitivity. However, with caries, fractured fillings and cracked cusps, the pain tends to be localised to the affected tooth.

Intermittent sharp, shooting pains are also symptomatic of trigeminal neuralgia, so care must be taken not to mistakenly label toothache as neuralgia.

Treatment

For root sensitivity the use of a desensitising toothpaste and a reduction in acid in the diet will help resolve the symptoms. The use of a fluoride mouth-rinse may also help. In the case of caries, a lost filling or fractured tooth, coverage of the

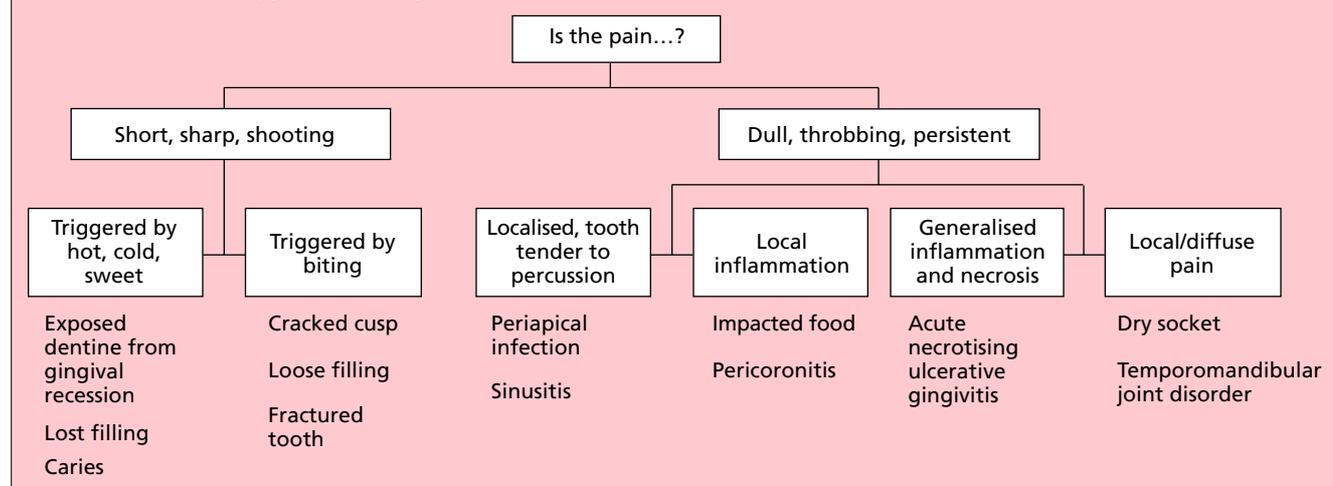
Fig. 2

An orthopantomograph (OPG) showing extensive dental caries (radiolucent areas) affecting the crowns of several teeth, and abscess formation (radiolucent areas) around the periapical regions of the roots. Arrows show caries and abscess formation on two mandibular teeth.



Fig. 3

Causes of common types of dental pain



exposed dentine with a temporary restoration will usually relieve the symptoms.

Dull, throbbing, persistent pain

This type of pain may have several causes. These include tooth problems, food impaction, pericoronitis, acute necrotising ulcerative gingivitis, temporomandibular disorder, or even maxillary sinusitis.

Painful tooth problems

The most common dental cause of dull, throbbing persistent pain is caries. In many cases this is recurrent and associated with an existing restoration. Where the pulp is affected irreversibly, necrosis may follow with possible development of a periapical infection. A fractured cusp involving the pulp, or a large deep restoration may also be associated with this type of pain. Affected teeth may be tender to percussion in the later stages of periapical inflammation.

There is considerable variation in the pain reported by patients, but it commonly starts as a sharp stabbing pain that becomes progressively dull and throbbing. At first the pain may be caused by a stimulus, but it then becomes spontaneous and remains for a considerable time after removal of the stimulus. The pain may radiate and be referred to other areas of the mouth. This type of pain tends to cause the patient to have difficulty sleeping and may be exacerbated by lying down. Heat may make the pain worse whereas cold may alleviate it. The pain may be intermittent with no regular pattern and may have occurred over months or years. If there is periapical infection present, patients may no longer complain of pain in response to a thermal stimulus, but rather of sensitivity on biting.

Treatment

Treatment of affected teeth will involve either root canal therapy or tooth removal. In some patients, periapical inflammation can lead to a cellulitis of the face characterised by a rapid spread of bacteria and their breakdown products into the surrounding tissues causing extensive oedema and pain. If systemic signs of infection are present, for example, fever and malaise, as well as swelling and possibly trismus (limitation of mouth opening), this is a surgical emergency. Antibiotic treatment alone is not suitable or recommended (see box).

If pus is present, it needs to be drained, the cause eliminated, and host defences augmented with antibiotics. The microbial spectrum is mainly gram positive including anaerobes. Appropriate antibiotics would include a penicillin or a ‘first generation’ cephalosporin, combined with metronidazole in more severe cases.

Paracetamol or a non-steroidal anti-inflammatory drug is the recommended analgesic in the initial treatment of dental pain.

Food impaction and pericoronitis

Soft tissue problems that may cause dull, throbbing, persistent pain include local inflammation (acute gingivitis associated with food impaction) or pericoronitis.

Chronic periodontitis with gradual bone loss, rarely causes pain and patients may be unaware of the disorder until tooth mobility is evident. There is quite often bleeding from the gums and sometimes an unpleasant taste. This is usually a generalised condition, however, deep pocketing with extreme bone loss can occur around isolated teeth. Food impaction in

Should antibiotics be prescribed?

While antibiotics are appropriate in the management of certain dental infections, they are not indicated if the pain results from inflammatory (non-infective) or neuropathic mechanisms. The degree of pain is not a reliable indicator of acute infection.

There is evidence that Australian dentists and doctors are using antibiotics empirically for dental pain, rather than making careful diagnoses of the causes of the pain.¹ Most dental emergency situations involve patients with acute inflammation of the dental pulp or the periapical tissues. Prescribing antibiotics for these conditions will not remove the cause of the problem nor destroy the bacteria within the tooth.

Antibiotics should be limited to patients with malaise, fever, lymph node involvement, a suppressed or compromised immune system, cellulitis or a spreading infection, or a rapid onset of severe infection.

these areas can cause localised gingival pain. Poor contact between adjacent teeth and the presence of an occluding cusp forcing food into this gap can also cause a build-up of food debris and result in gingival inflammation.

Acute pericoronitis involves bacterial infection around an unerupted or partially erupted tooth and usually affects the lower third molar (wisdom tooth). The condition is often aggravated by the upper molar impacting on the swollen flap of soft tissue covering the unerupted tooth. There may be trismus.

Treatment

Food debris should be removed and drainage established, if pus is present. Irrigation with chlorhexidine and rinsing the mouth with hot salty water is recommended. Early referral to a dentist is indicated. Cellulitis can develop, requiring urgent referral to a surgeon.

Acute necrotising ulcerative gingivitis

Acute necrotising ulcerative gingivitis is a rapidly progressive infection of the gingival tissues that causes ulceration of the interdental gingival papillae. It can lead to extensive destruction. Usually young to middle-aged people with reduced resistance to infection are affected. Males are more likely to be affected than females, with stress, smoking and poor oral hygiene being predisposing factors. Halitosis, spontaneous gingival bleeding, and a 'punched-out' appearance of the interdental papillae are all important signs.

The patients quite often complain of severe gingival tenderness with pain on eating and tooth brushing. The pain is dull, deep-seated and constant. The gums can bleed spontaneously and there is also an unpleasant taste in the mouth.

Treatment

As there is an acute infection with mainly anaerobic bacteria, treatment follows surgical principles and includes superficial debridement, use of chlorhexidine mouthwashes and a course of metronidazole tablets. Treating the contributing factors should prevent a recurrence.

Dry socket

A dull throbbing pain develops two to four days after a mandibular tooth extraction. It rarely occurs in the maxilla. Smoking is a major predisposing factor as it reduces the blood supply. The tissue around the socket is very tender and white necrotic bone is exposed in the socket. Halitosis is very common.

Treatment

The area should be irrigated thoroughly with warm saline solution. If loose bone is present, local anaesthesia may be necessary to allow thorough cleaning of the socket. Patients should be shown how to irrigate the area and told to do this regularly. Analgesics are indicated, but pain may persist for several days. Although opinion is divided as to whether or not dry socket is an infective condition, we do not recommend the use of antibiotics in its management (see box).

Temporomandibular disorders

Temporomandibular disorders may lead to pain that is confused with toothache. Patients usually complain of unilateral vague

pain occurring in the joint area and in the surrounding muscles of mastication. If the patient bruxes (clenches or grinds) at night, then pain in the temporal area on waking is common. Patients who clench during the day may find they get symptoms at the end of the day. The symptoms are often cyclical, resolving then recurring again. On questioning, patients will frequently be able to reveal stressful incidents that may have triggered this process. Palpation of the muscles of mastication will elicit tenderness, usually unilaterally. There may also be tenderness around the temporomandibular joints, limitation in mouth opening and obvious wear of the teeth. This wear may contribute to dentine sensitivity, as the enamel is worn away by the tooth grinding. Wear facets will be seen on restorations as well as natural teeth. Quite often, neck and shoulder muscles are tender to palpation. There may be joint pain with clicking and grating.

Treatment

Reassurance about the self-limiting nature of the problem and its reversibility may be all that is needed. Anti-inflammatory drugs and muscle relaxants can also help. Construction of a night-guard and muscle exercises may be indicated subsequently. These exercises may include gentle passive stretching, or resistance and clenching exercises.²

Sinusitis

This is caused by infection of the maxillary sinus, usually following an upper respiratory tract infection. However, there can be a history of recent tooth extraction leading to an oro-antral fistula. Patients usually complain of unilateral dull pain in all posterior upper teeth. All these teeth may be tender to percussion, but they will respond to a pulp sensitivity test. There are usually no other dental signs.

The pain tends to be increased on lying down or bending over. There is often a feeling of 'fullness' on the affected side. The pain is usually unilateral, dull, throbbing and continuous. Quite often the patient feels unwell generally and feverish.

Treatment

Pain originating from the sinus arises mainly from pressure. Decongestants can help sinus drainage. Antibiotics probably have only a minor role in mild cases. Referral to an otorhinolaryngologist for endoscopic sinus surgery may be indicated in chronic cases.³

Managing dental trauma

Avulsed tooth

Avulsed deciduous (baby) teeth are generally not reimplanted, as they may become fused to the alveolar bone and impede subsequent emergence of the permanent successor.

It is essential to reimplant permanent teeth as soon as possible. However, while the tooth is out of the alveolus it should be stored in a physiological medium, for example, normal saline, milk, or the vestibule of the mouth.

Before reimplantation, the root surface should be cleaned gently with normal saline to remove debris, but the root

should not be touched with the fingers. The tooth socket should be irrigated gently with normal saline to remove any blood clot that has formed. The tooth should then be replaced into the socket using minimal pressure, and splinted to the adjacent teeth with a flexible splint (e.g. aluminium foil, bluetack).

When a tooth is reimplanted, an antibiotic is prescribed for five days and a tetanus booster is given if immunisation is not up to date.

Fractured tooth

If the crown of a tooth is fractured by trauma and the broken fragment is available, it should be stored in a physiological medium until a dentist can assess the patient. Coverage of exposed dentine on the fractured crown with a temporary restoration is desirable to protect the underlying pulp tissue.

Placement of temporary restorations

Although it is unlikely that many general medical practitioners will have temporary filling materials available in their surgeries, dentine that has been exposed by caries, a lost filling or tooth fracture can be covered relatively easily with glass ionomer cement (GIC) or zinc oxide eugenol (ZOE) materials. Most GIC materials are dispensed in capsules but a hand-mixed material is available, consisting of a powder, liquid and conditioner. The surface of the cavity is painted with the

conditioner, then rinsed and dried, before placement of the filling. Zinc oxide eugenol materials consist of a powder and liquid (oil of cloves) that are mixed to a putty-like consistency before placement in the tooth.

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3. Wormald PJ. Treating acute sinusitis. *Aust Prescr* 2000;23:39-42.

Conflict of interest: none declared

Self-test questions

The following statements are either true or false (answers on page 158)

5. A painful dry socket is a complication of mandibular tooth extraction.
6. Penicillin V is a suitable antibiotic for treating a dental abscess once the pus has been drained.

Book review

Therapeutic Guidelines: Endocrinology. Version 2. North Melbourne: Therapeutic Guidelines Limited; 2001. 227 pages. Price (postage not included): \$31.90 (2001), \$33 (2002); students \$25.30.

David Mills, General Practitioner, Port Lincoln, South Australia

This latest version of Therapeutic Guidelines: Endocrinology is an excellent reference source for busy general practitioners. Given the rise in many endocrine-related conditions, this is timely. The layout is simple and easy to follow with more space devoted to common conditions such as diabetes and osteoporosis, although a large number of conditions are still covered. There is a concise and succinct drug summary at the start of the book called 'Getting to know your drugs' allowing easy cross-referencing from the text. There are also some brief appendices on endocrine emergencies, pregnancy and breastfeeding, and for those interested in searching further, related web sites.

The diabetes sections are well set out and reinforce the current diagnostic criteria based on American Diabetes Association/World Health Organization guidelines. Treatment targets are up to date as is the advice on treating difficult complications

such as neuropathy. Current drug therapies are outlined logically, but some drugs such as the 'glitazones' are not available on the Pharmaceutical Benefits Scheme.

Osteoporosis is now high on the agenda of many general practitioners and this section is excellent with clear, current principles on diagnosis, prevention and management. All of the drugs described are available and well known to general practitioners, making the reading very practical.

Under the sections on contraception there is good coverage of topical issues such as depot medroxyprogesterone, the etonogestrel implant and the levonorgestrel intrauterine devices. Similarly there is a comprehensive and easy to read discussion on hormone replacement therapy addressing most of the well-known controversies.

Overall this book reads extremely well and fulfils the general practitioner's need for evidence-based guidelines, in a short but easily understood form. It compares well with other general practice guidelines such as Evidence Based Medicine.

David Mills has been in rural general practice for 15 years. He is a clinical lecturer at the Department of General Practice at the University of Adelaide and sits on the South Australian Diabetes Advisory Group.