



Angus Kingon

MDS, FRACDS, FDSRCS(Eng), FICD, is an oral surgeon in private practice, Ourimbah and Pymble, New South Wales. amkingon@bigpond.com

Solving dental problems in general practice

Background

Dentistry is a small component of the undergraduate medical curriculum, however many patients with oral disease seek advice from their doctor. Problems include dental pain, abscesses, avulsed teeth and fractured jaws. Some patients associate the concept of dental treatment with negative emotions (ie. fear), and doctors are generally seen as caring professionals who might provide reassurance and guidance.

Objective

Solving dental problems often requires operative treatment which doctors cannot provide. Options may seem limited to antibiotics and analgesics, however neither treatment may be effective, and antibiotic treatment may be inappropriate. This article aims to provide practical advice to doctors regarding patients with dental problems.

Discussion

Common dental problems such as acute pain, bleeding tooth sockets, and trauma are rarely life threatening but are time consuming for the medical practitioner and require immediate solutions. Suggestions for diagnosis and early management are offered.

■ **Patients with acute dental pain and other oral problems commonly present to emergency departments and general practices – especially after hours – due to difficulty in locating a dentist or for other reasons such as financial issues.**

Dental pain

The features of dental pain and associated symptoms can help differentiate underlying pathology (*Table 1*). Some severe pain can be easily managed (eg. alveolar osteitis),¹ but for some patients the pain can be life threatening (eg. rapidly spreading infections originating from a decayed tooth).² Acute dental pain can mimic trigeminal neuralgia; teeth can shear during maxillofacial trauma, and despite apparently normal clinical and radiological examination, the smallest movement produces excruciating pain as teeth fragments stimulate the pulp. Initial management for common painful oral problems are shown in *Table 1*.

The avulsed tooth

If the injury has been sustained by a permanent tooth, the aim is to replace the tooth in the original position at the earliest opportunity, ideally at the location of the accident. The root should not be handled, but gross contamination should be removed by rinsing in saline. The risk of further damage to the periodontal ligament must be minimised and the vitality of the dental pulp maintained if possible as the periodontal ligament acts as a physiological barrier to prevent bone growing into the root.³

Factors influencing success of tooth replantation are:

- the extraoral period
- the medium in which the tooth is stored following the injury
- the stage of root development.

The best chance of healing without complications occurs when teeth are replaced within 15 minutes of injury.⁴ If replacement is delayed, the risk of root resorption may be minimised by endodontic treatment. In a child, the risk of dentoalveolar ankylosis may have an adverse effect on local growth.³

Milk, saline and saliva are storage media which are often readily available.³ Milk is a good choice if the tooth is placed in it within

12 minutes of the injury occurring. Saline is only good for 2 hours as it contains no nutrients. Tap water has an adverse effect within 20 minutes³ and is not recommended. Saliva is better – that of the victim is best, but even that of another person is preferable to water.

If the root apex is open, revascularisation is possible. If closed, endodontics should ideally be commenced on the day of the injury, and immediate referral to a dentist is essential. Immediate management of the patient with an avulsed tooth is outlined in *Figure 1*.

The bleeding tooth socket

The approach to treating this problem in an otherwise healthy patient is summarised in *Figure 2*.

Many patients take drugs which may theoretically compromise oral haemostasis, but in practice, haemostasis can usually be achieved

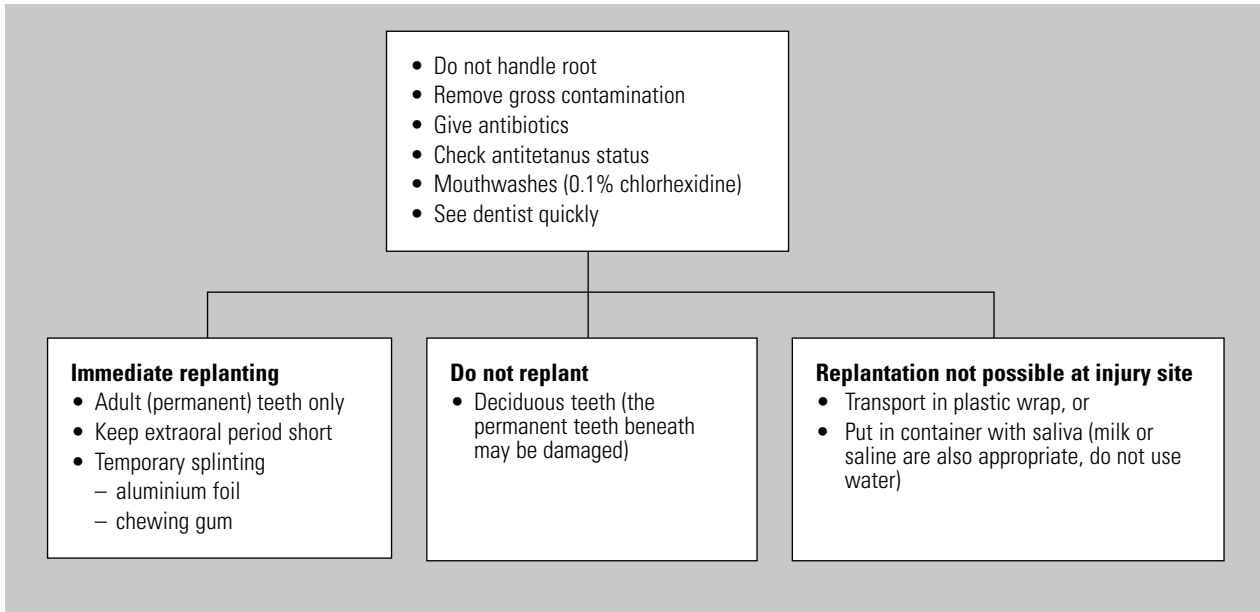
by local pressure applied with gauze. Patients on dual antiplatelet therapy should not have these drugs ceased for invasive dental surgery.⁵ Patients on aspirin and nonsteroidal anti-inflammatory drugs can safely undergo minor, routine outpatient procedures without modifying their platelet altering medication.⁶

The management of dental patients taking warfarin has changed in recent years. Patients who have teeth extracted in hospital without altering their anticoagulant regimen, and whose international normalised ratio is not greater than 4.0, do not have clinically significant postoperative bleeding.⁷ Complications resulting from cessation of anticoagulation therapy may be greater than the small risk of postoperative haemorrhage. It is best to take a multidisciplinary approach in planning dental procedures for all anticoagulated patients.

Table 1. Clues to causes of dental pain and suggestions for initial management

Symptoms		Likely cause	Initial management suggestions	Ongoing care
Sensitive to hot/cold/sweet stimuli	Disappears on removal of stimulus	Reversible pulpitis	<ul style="list-style-type: none"> • Avoid foods which provoke pain • Analgesics • Antibiotics not indicated • Cover any obvious cavity (eg. temporary filling material, chewing gum) • Toothache drops • Administer local anaesthetic to buy time if symptoms severe 	<ul style="list-style-type: none"> • See a dentist as soon as possible • Simple restoration may suffice
	Persists on removal of stimulus	Irreversible pulpitis	<ul style="list-style-type: none"> • Avoid foods which provoke pain • Analgesics • Antibiotics not indicated • Cover any obvious cavity (eg. temporary filling material, chewing gum) • Toothache drops • Administer local anaesthetic to buy time if symptoms severe 	<ul style="list-style-type: none"> • See a dentist as soon as possible • Root canal therapy or extraction probably needed
Not sensitive to hot/cold/sweet stimuli		Suggestive of non-vital tooth	<ul style="list-style-type: none"> • Analgesics 	<ul style="list-style-type: none"> • See a dentist urgently
Tender to pressure		Possible early abscess formation	<ul style="list-style-type: none"> • Antibiotics may be indicated 	<ul style="list-style-type: none"> • Root canal therapy or extraction
Tender/painful swelling in region of recent toothache		Dental abscess	<ul style="list-style-type: none"> • Analgesics • Antibiotics probably indicated • If swelling is causing dysphagia/dyspnoea, admit to hospital for aggressive intravenous antibiotic therapy and appropriate supportive management 	<ul style="list-style-type: none"> • See a dentist urgently • Root canal therapy or extraction • Monitor closely – can be life threatening if cellulitis develops¹
Pain worsens when head proclined		Possibly originating from maxillary sinus (pus/exudate moves in sinus)	<ul style="list-style-type: none"> • Antibiotics, inhalations and nose drops generally effective for acute maxillary sinusitis 	
Pain persists 1–4 days after dental extraction		Alveolar osteitis ² (also known as 'dry socket')	<ul style="list-style-type: none"> • Antibiotics not indicated • Flush socket with sterile saline • Insert sedative dressing if available 	<ul style="list-style-type: none"> • See a dentist urgently • Socket irrigation and sedative dressing

Figure 1. Management of the patient with an avulsed tooth



Differentiating postoperative swelling from infection

Patients commonly present to a doctor 2–3 days after oral surgery with concerns about swelling. Separating oedema and infection can be difficult at this stage, but early postoperative infections are rare in otherwise healthy individuals and antibiotics are not indicated.

Swelling

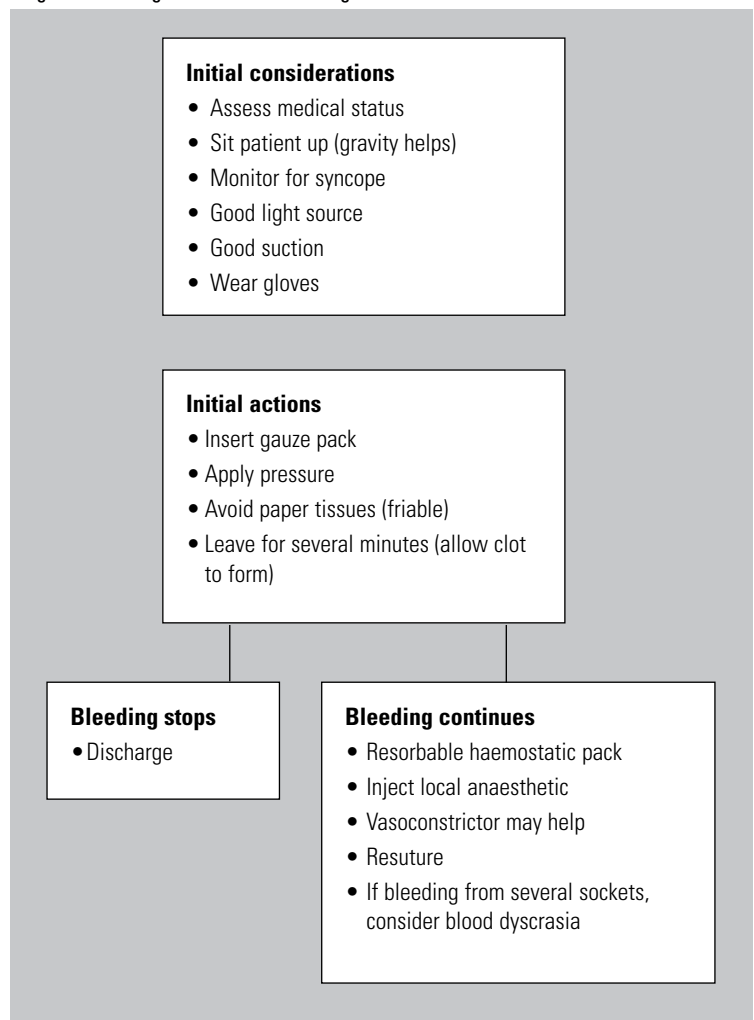
Swelling after surgery may take 3 days to develop fully. Medical practitioners may be placed in a difficult position with a distressed dental patient expecting active treatment, or at least some medication for relief. Analgesia is appropriate, but to minimise the risk of drug resistance, antibiotics should only be prescribed where there is demonstrable infection such as a painful facial swelling, or for prophylaxis.⁸ Confirm the patient has postoperative instructions and can contact the treating dentist if necessary.

The risk of airway embarrassment from oedema following oral surgery is small, although if a procedure has taken place in the posterior mouth floor or tongue it is possible for this potentially life threatening complication to occur, and close monitoring is essential. Use of a corticosteroid such as dexamethasone to minimise postoperative swelling is practised by many oral and maxillofacial surgeons, the dose and duration being dependent on the procedure and personal preference.

Infection

Postoperative administration of antibiotics is against the principles of surgical prophylaxis.¹⁰ Some physicians request that antibiotics are used for a period after dental surgery in immunocompromised patients, eg. in diabetics or patients taking corticosteroids. However, it has been reported that extension for longer than 48 hours in low doses can select for resistant bacteria.¹¹

Figure 2. Management of the bleeding tooth socket



Abscesses, which should be primarily managed by drainage of pus, are of two types:

- periodontal (where antibiotics may be indicated)
- endodontic (where antibiotics are inappropriate as they will not reach a necrotic pulp).

Accurate diagnosis may be difficult and dental assessment is necessary.

Endocarditis prophylaxis

It has long been standard practice to provide antibiotic cover for patients with cardiac disease to protect against the bacteraemia

following dental procedures, and it is important this is carried out where indicated. Guidelines for recommended prophylaxis have recently been revised.¹² There is no proven value in a follow up dose 6 hours later postprocedure and dentists treating patients requiring cover should be encouraged to minimise the number of visits to avoid multiple antibiotic doses. The decision on the need for antibiotic prophylaxis depends on both the dental procedure and the cardiac condition of the patient (*Table 2, 3*). Prescribing antibiotics inappropriately puts patients at risk of a potentially fatal adverse reaction. Where there is doubt, the opinion of a specialist physician should be obtained.

Recommended antibiotics and doses are shown in *Table 4*.

Table 2. Dental procedures and endocarditis prophylaxis²⁷

The following procedures always require prophylaxis for those patients at high risk:

- Extractions
- Periodontal procedures (including surgery, subgingival scaling and root planning)
- Replanting avulsed teeth
- Other surgical procedures

Prophylaxis is not required for:

- Oral examinations
- Infiltration and block local anaesthetic injections
- Restorative dentistry
- Intracanal endodontic procedures
- Removal of sutures
- Impressions and construction of dentures
- Orthodontic bracket placement and adjustment
- Application of gels
- Intraoral X-rays
- Supragingival plaque removal

For other procedures (such as supragingival callus removal, periodontal probing or placement of orthodontic bands) prophylaxis may be required if there are multiple procedures being undertaken, the procedure is prolonged or the patient has periodontal disease

Antibiotic cover for artificial joints

Historically, orthopaedic surgeons generally appear to have favoured antibiotic cover for patients who have had an arthroplasty procedure. Bacteraemia cannot usually be demonstrated in the bloodstream 30 minutes after a dental procedure in arthroplasty patients.⁹ Late joint infections as a result of a previous dental procedure are rare.^{13,14} If all patients with artificial joints were given antibiotic prophylaxis, more patients would die from anaphylaxis than would develop joint infections.⁸ The Arthroplasty Society of Australia has recently issued a position statement⁹ which follows *Therapeutic Guidelines: Oral and dental protocol*¹⁵ (see *Resources*).

Bisphosphonates

The benefits of bisphosphonates include improved treatment for some metastatic cancers (leading to better prospects for quality of life and survival) and osteoporosis (leading to less pain, less disability and a lower incidence of fractures). Bisphosphonates are rapidly bound to bone and are toxic to osteoclasts, acting by interrupting the mevalonate branch pathway; the primary specific point is inhibition of the enzyme farnesyl synthetase.¹⁶

Bisphosphonate induced osteonecrosis of the jaws (BIONJ) was

Table 3. High risk conditions for which antibiotic cover is recommended for invasive dental procedures

Condition	Details	Comments
Prosthetic cardiac valves	All	
Prosthetic material used for valve repair	All	
Previous infective endocarditis	All	
Congenital heart disease	Unrepaired cyanotic defects	• Including palliative shunts and conduits
	Completely repaired defects	• With prosthetic material or devices • During first 6 months after procedure*
	Other repaired defects	• Residual defects at or adjacent to site of prosthetic patch/device**
Cardiac transplantation	With postsurgery cardiac valvulopathy only	
Rheumatic heart disease	Indigenous Australians only	

* Endothelialisation likely to have occurred after 6 months ** Patches or devices inhibit endothelialisation

Table 4. Oral antibiotic options for endocarditis prophylaxis*²⁷

Patient	Antibiotic	Administered	Dosage	Timing
Adult (not allergic to penicillin)	Amoxycillin	Orally	2 g	1 hour preoperatively
Adult (allergic to penicillin)	Clindamycin	Orally	600 mg	1 hour preoperatively
	Cephalexin**	Orally	2 g	1 hour preoperatively
Child (not allergic to penicillin)	Amoxycillin	Orally	50 mg/kg (maximum 2 g)	1 hour preoperatively
Child (allergic to penicillin)	Clindamycin	Orally	15 mg/kg (maximum 600 mg)	1 hour preoperatively
	Cephalexin**	Orally	50 mg/kg (maximum 2 g)	1 hour preoperatively

* Further options for IV and IM antibiotics are provided in Therapeutic Guidelines: Antibiotic; ** Not suitable if patient has immediate hypersensitivity to penicillin

Table 5. Immediate management of some common dental problems

Apprehensive patients (the 'dental phobic')	<ul style="list-style-type: none"> Intravenous sedation (adherence to published guidelines essential) Day stay general anaesthesia reduces visits
Bleeding gums (may be spontaneous)	<ul style="list-style-type: none"> Commonly periodontal disease or side effect of cyclosporin, calcium channel blockers Rarely indicates malignancy
Edentulous patients	<ul style="list-style-type: none"> Sore areas beneath dentures may be malignant Annual oral examination needed (by dentist if possible)
Imaging	<ul style="list-style-type: none"> Panoramic radiography is a good screening view (not sufficient for accurate diagnosis dental caries)
Paraesthesia (mental nerve)	<ul style="list-style-type: none"> Causes include malignancy, multiple sclerosis Simple cause rare if no recent procedure Diagnosis may be difficult
Temporomandibular disorders	<ul style="list-style-type: none"> Jaw clicking, pain, locking More common among females Management usually conservative, refer to dentist
Trauma to jaw with deranged occlusion	<ul style="list-style-type: none"> Almost pathognomonic of fracture Give antibiotics, assess tetanus status Refer to oral and maxillofacial surgeon

first reported in 2003,¹⁷ and recent literature has been published regarding the Australian experience of BIONJ, including its nature and frequency.¹⁸ Bisphosphonate induced osteonecrosis of the jaws is defined as 'exposed bone in the mandible or maxilla that fails to heal within 8 weeks in a patient receiving, or who has received, a systemic bisphosphonate, and who has not received local radiation therapy to the jaws'.¹⁶ It most frequently occurs following oral surgery (eg. a dental extraction), although spontaneous cases are recorded.

The risk is greater for patients on intravenous therapy, and it has been recommended that for bone cancer patients, specialist dental practitioners who are part of the multidisciplinary cancer management team offer the best treatment.¹⁹ If a patient is to be prescribed a bisphosphonate, a dental examination should be arranged first to minimise the risk of BIONJ.

Six doses of monthly intravenous bisphosphonate or 3 years of weekly alendronate or risedronate are required before a patient is at risk for BIONJ. The risk can be reduced by 75% if dental pathology or the need for oral surgery is eliminated before the drug is

commenced. The C-terminal telopeptide (CTX) blood test is becoming increasingly available in Australia, and is an index of bone turnover; an octapeptide fragment from type 1 bone collagen is released when osteoclasts resorb bone. Risk assessment suggests a value of <100 pg/mL is high and >150 pg/mL is low,¹⁵ although a recent clinical trial in Australia favours >200 pg/mL as a safe level for a bone invasive procedure.²⁰

Other conditions

The importance of good oral health has been emphasised by increasing evidence of a link between oral health and systemic disease.²¹ Other dental problems that present to doctors include:

- patients for whom dental sedation²² or treatment under general anaesthesia may be of benefit
- bleeding gums²³
- sore areas underneath full dentures
- paraesthesia affecting the mental nerve^{24,25}
- temporomandibular disorders²⁶
- maxillofacial trauma.

Suggestions for immediate management are summarised in *Table 5*. Basic imaging can often assist diagnosis; panoramic radiography provides a good screening view but is insufficient to diagnose dental caries.

Summary of important points

- Dental pain has many causes, and diagnosis is not always straightforward.
- An avulsed permanent tooth should be replaced in its socket as soon as possible, and within 15 minutes after injury to have the best chance of survival.
- Postoperative bleeding from an extracted tooth in a healthy person will normally be controlled by applying firm pressure with a gauze pad inserted over the socket and leaving undisturbed for 30 minutes.
- Bleeding gums are most commonly caused by poor oral hygiene.
- Dental intravenous sedation is a good technique for the apprehensive patient (see *Resources*).
- Antibiotics should only be used in the presence of infection and for prophylaxis, and are not indicated for postoperative oedema in otherwise healthy individuals.
- Bisphosphonates can cause osteonecrosis of the jaws, and patients commencing bisphosphonates should see a dentist first.

Resources

- Arthroplasty Society of Australia. Recommendations for patients with hip or knee joint replacement who require dental treatment. Position statement. Available at www.aoa.org.au/docs/artdden.pdf
- Therapeutic Guidelines. Therapeutic guidelines: oral and dental. Available at www.tg.com.au/index.php?sectionid=130
- Australian and New Zealand College of Anaesthetists, Royal Australasian College of Dental Surgeons. Guidelines on conscious sedation for dental procedures (professional standard 21), 2003. Available at www.anzca.edu.au/resources/professional-documents/professional-standards/ps21.html.

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References

1. Susaria SM, Blaeser BF, Magalnick D. Third molar surgery and associated complications. *Oral Maxillofac Surg Clin N Am* 2003;15:177–86.
2. Rocca F, Pecorari GC, Oliaro A, et al. Ten years of descending necrotizing mediastinitis: management of 23 cases. *J Oral Maxillofac Surg* 2007;65:1716–24.
3. Marin PD. The avulsed tooth – the best implant. *Ann Roy Australas Coll Dent Surg* 2000;15:243–6.
4. Andersson L, Bodin I. Avulsed teeth replaced within 15 minutes: a long-term clinical follow up. *Endo Dent Traumatol* 1990;6:37–42.
5. Australian Dental Association. Guidelines for dental surgery on dual antiplatelet therapy. *ADA Bulletin*, November 2007, p 16–8.
6. Partridge CG, Campbell JH, Alvarado F. The effect of platelet-altering medica-

tions on bleeding from minor oral surgical procedures. *J Oral Maxillofac Surg* 2008;66:93–7.

7. Salam S, Yusuf H, Milosevic A. Bleeding after dental extractions in patients taking warfarin. *Brit J Oral Maxfac Surg* 2007;45:463–6.
8. Munchhof W. Antibiotics for surgical prophylaxis. *Aust Prescr* 2005;28:38–40.
9. Scott JF, Morgan D, Avent M, Graves S, Goss AN. Patients with artificial joints: do they need antibiotic cover for dental treatment? *Aust Dent J* 2005;(Suppl 2):S45–53.
10. Goss AN. Antibiotics for surgical prophylaxis [letter]. *Aust Prescr* 2005;28:57.
11. Flynn TR, Halpern LR. Antibiotic selection in head and neck infection. *Oral Maxillofacial Clin N Am* 2003;15:18.
12. Infective Endocarditis Prophylaxis Expert Group. Prevention of endocarditis. 2008 update from Therapeutic guidelines: antibiotic version 13, and Therapeutic guidelines: oral and dental version 1. Melbourne: Therapeutic Guidelines, 2008.
13. McGowan DA. Who decides the need for antibiotic prophylaxis in patients with major arthroplasties requiring dental treatment: is it a joint responsibility? *Ann R Coll Surg Eng* 1998;80:73–4.
14. Bartzokas CA, Johnson R, Jane M, Martin MV, Pearce PK, Saw Y. Relationship between mouth and haematogenous infection in total joint replacements. *BMJ* 1994;309:506–8.
15. Therapeutic Guidelines. Therapeutic guidelines: oral and dental. Melbourne: TG, 2007.
16. Sawatari Y, Marx RE. Bisphosphonates and bisphosphonate induced osteonecrosis. *Oral Maxillofacial Clin N Am* 2007;19:487–98.
17. Marx RE. Pamidronate (Aredia) and zoledronate (Zometa) induced avascular necrosis of the jaws: a growing epidemic. *J Oral Maxillofac Surg* 2003;61:1115–7.
18. Mavrokokki A, Cheng A, Stein B, Goss AN. Nature and frequency of bisphosphonate-associated osteonecrosis of the jaws in Australia. *J Oral Maxillofac Surg* 2007;65:415–23.
19. Goss AN. Bisphosphonate update 2007. *Australian Dental Association Bulletin* 2007;359:15–8.
20. Goss AN. CTX (the cross laps test). *Australian Dental Association Bulletin* 2008;368:11.
21. Assael L. The oral systemic link: now a task for health care policy [editorial]. *J Oral Maxillofac Surg* 2007;65:1445–6.
22. Australian and New Zealand College of Anaesthetists, Royal Australasian College of Dental Surgeons. Guidelines on conscious sedation for dental procedures (professional standard 21), 2003. Available at www.anzca.edu.au/resources/professional-documents/professional-standards/ps21.html.
23. Gleeson P. Spontaneous gingival haemorrhage: case report. *Aust Dent J* 2002;47:174–5.
24. Mincey DL, Warnock ML. Primary malignant lymphoma of mandible: report of case. *J Oral Surg* 1974;32:221–4.
25. Wannfors K, Hammarstrom L. Periapical lesions of mandibular bone: difficulties in early diagnosis. *Oral Surg Oral Med Oral Pathol* 1990;70:483–9.
26. Goldstein BH. Temporomandibular disorders. A review of current understanding. *Oral Surg Oral Med Oral Pathol Oral Radiol Oral Endod* 1999;88:379–85.
27. Antibiotic Expert Group. Therapeutic guidelines: Antibiotic. Version 13. Melbourne: TG, 2006.