check

Independent learning program for GPs

Unit 484 July 2012

Dental health

The Royal Australian College of General Practitioners

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The five domains of general practice

- Communication skills and the patient-doctor relationship
- Applied professional knowledge and skills
- Population health and the context of general practice
- Professional and ethical role
- Organisational and legal dimensions

The Royal Australian College of General Practitioners

While dental health can be encountered in general practice in a variety of ways, it has traditionally not been a significant focus of medical training amid the myriad health issues that require attention. Patients can present to GPs with dental pathology and may require triage, initial management and referral. In addition, the GP must be cognisant of the overlap between dental health and medical health. Dental pathology has been linked to various systemic diseases, and various medical conditions and medications can affect dental health. An awareness of this relationship between dental and medical health and emphasising its importance to the patient, where appropriate, may help to improve their overall health status. Collaboration between GPs and dentists, and an awareness of their respective roles – along with open lines of communication and referral where appropriate – are important in promoting and achieving the shared goal of good health in our patients.

The authors of this unit are:

- Su-yan Barrow, RDH, MA, MPH, PhD, senior lecturer at Melbourne Dental School, The University of Melbourne and research coordinator at Dental Health Services Victoria. Her clinical research interests include oral health epidemiology, social determinants of health and cultural competency in healthcare.
- Felicia Valianatos, DMD Diploma (Bucharest), Advanced General Dentistry Certif (Bucharest), ADC Certif (Melb), Fellow RACDS, Fellow ICD, honorary clinical lecturer at The University of Melbourne and Oral Health Services Manager at MonashLink Community Health Service Ltd.
- Kerrilee Ann Punshon, BDSc (Melb), FRACDS (SND), specialist special needs dentist in private practice at the Special Needs Department, Royal Dental Hospital of Melbourne, who is currently teaching in the DClinDent (Special Needs) program at The University of Melbourne and a casual lecturer at RMIT and La Trobe universities. She is President of ASSCID (Australian Society of Special Care in Dentistry) and a committee member of the ANZASND (Australia and New Zealand Academy of Special Needs Dentistry), and Victorian Coordinator of the Special Olympics Healthy Athletes Program.
- Kerrod Hallett MDSc, MPH, FRACDS, FICD, paediatric dentist, Director of Department of Dentistry at The Royal Children's Hospital Melbourne, Research Fellow at Murdoch Childrens Research Institute and Clinical Associate Professor at The University of Melbourne. His current research interests include risk factors for early childhood caries and novel antimicrobial therapy for the control of caries.

The learning objectives of this unit are to:

- develop an increased awareness of the relationship between dental and medical health
- understand some of the effects of commonly used medications on dental health
- advise patients on some simple strategies to improve their dental health in the presence of various medical conditions such as xerostomia (dry mouth), gastro-oesophageal reflux and bruxism
- improve recognition of orofacial and dental pain in elderly patients with multiple medical problems
- appropriately refer patients with odontogenic infections (infections from dental causes) in a timely manner
- confidently manage an individual with an avulsed tooth to achieve the best outcome under the circumstances.

We hope this unit of *check* will assist you to confidently recognise patients with potential dental problems and increase your awareness of the relationship between dental and medical health.

Kind regards,

Catherine Dodgshun MBBS, DRANZCOG, FRACGP

Medical Editor

CASE 1

TONY HAS A DRY MOUTH

Tony, aged 55 years, is a car mechanic who presents with a dry mouth. He is a longstanding smoker, who has smoked 20 cigarettes a day since the age of 18 years. At an appointment with you 4 weeks ago, Tony expressed the desire to stop smoking. You commenced counselling for smoking cessation and discussed the use of bupropion with him. Tony decided he would like to start this medication so you prescribed bupropion for him.

Tony says that his mouth has been dry since commencing bupropion and that he eats sweets to alleviate the dryness. He admits that he has lost motivation to regularly brush and floss his teeth since he became depressed after his wife died a year ago. Tony is on no other medications and has no relevant past medical history.

Figure 1 shows the appearance of Tony's teeth and lower gum.

Figure 1. Tony's teeth and lower gum

Photograph courtesy of Dr Gwen-Cohen Brown, Dental Hygiene Program, New York City College of Technology.

QUESTION 1

Describe the findings apparent in *Figure 1*.

QUESTION 2

What are the likely contributing factors to the appearance of the inside of Tony's mouth?

QUESTION 3

What is the likely cause of Tony's dry mouth?

QUESTION 4

What advice could you give Tony to alleviate his dry mouth?

QUESTION 5

What are some of the effects of smoking on the oral cavity?

CASE 1 ANSWERS

ANSWER 1

Figure 1 shows accumulations of food debris in the interproximal spaces (spaces between the teeth) and biofilm (a layer of bacteria also known as plaque that adheres to teeth, gums and the interproximal spaces).

ANSWER 2

Saliva is important for flushing away the food debris that causes the build up of biofilm. The reduced salivary flow (hyposalivation) that usually occurs in a dry mouth can lead to an accumulation of biofilm. Poor oral hygiene combined with a lack of the cleansing and shielding effects of adequate salivary flow lead to inflamed oral tissues that are prone to infection. This increases the chance of periodontal disease (disease of the gums and supporting tissues of the teeth).[1,2,3]

ANSWER 3

The symptom of dry mouth is also known as xerostomia. It is due to dysfunction of the salivary glands. Xerostomia can result from physiological factors or be secondary to other causes.[3,4] It can be an adverse effect of over 400 prescribed, or over-the-counter medications.[5,6] These medications include some antihistamines, decongestants, analgesics, antidepressants, diuretics and antihypertensives.[6] Bupropion can lead to a dry mouth, and it is likely that this is a cause of Tony's dry mouth. [7,8]

ANSWER 4

To help alleviate the sensation of dry mouth and to maintain lubrication of the oral cavity, you could advise Tony to:

- increase his fluid intake of non-sugary beverages
- take frequent sips of water
- rinse his mouth out before and after meals with plain water
- use sugar-free chewing gum (to stimulate salivary flow)
- use artificial saliva (a number of brands are available over the counter)
- use an alcohol-free mouthwash such as 0.2% chlorhexidine gluconate diluted in 5 ml water twice daily
- eat soft, moist foods, which are cool or at room temperature
- consider moistening dry foods with broths, soups, sauces, gravy and butter or margarine (within the limits of appropriate intakes of saturated fat and salt in the diet)
- avoid alcohol and carbonated beverages
- restrict his intake of caffeine
- minimise his intake of spicy or salty foods (as these may cause pain in a dry mouth)
- use a humidifier (to increase the humidity) in the home, especially at night.

Maintaining good oral hygiene is particularly important for Tony. You should instruct him to brush twice a day with a soft-bristled toothbrush, use dental floss and/or interdental cleaners at least once a day to remove debris from between the teeth to minimise decay and periodontal disease. Tony should be referred to a dentist. The dentist could instruct Tony on how to brush, use dental floss and/or interdental cleaners and might recommend additional fluoride products to help fight tooth decay.

ANSWER 5

Smoking is a risk factor for periodontal disease and oral cancer. Individuals who smoke have increased calculus (tartar), greater bone loss, and increased pocket depths, but they have the same levels of plaque accumulation and the same or less gingival inflammation.[9]

Effects of smoking appear to be related to the local effects in the oral cavity (heat, dryness, and increased plaque and calculus deposits) and suppression of the immune system, which alters the host response to periodontal pathogens.[10]

CASE 2

JEAN PRESENTS WITH PAIN IN HER MOUTH

Jean, aged 70 years, presents to your clinic with pain in her mouth near an 'open wound', which has not healed for several months.

Jean is a new patient at your clinic. She has a past history of osteoporosis, for which she has been taking alendronate for the past 3 years. She also has a history of rheumatoid arthritis, for which she is on weekly oral methotrexate with folic acid therapy. She is also currently on prednisolone, due to a recent exacerbation. Jean has been otherwise well and does not smoke or drink alcohol.

Jean wears full upper and part lower dentures. She has worn dentures for 5 years after she lost many of her teeth due to poor oral hygiene and dental caries.

On examination, Jean is afebrile. Oral examination reveals an erythematic ulceration with jagged edges approximately 8 mm in diameter surrounding exposed yellow, necrotic appearing bone on the hard palate with evidence of purulent discharge. The lesion appears to be caused by a poor fitting maxillary denture. No cervical lymphadenopathy is present.

QUESTION 1

What is your working diagnosis?

QUESTION 2

How might Jean's prescribed medications contribute to her presenting condition?

QUESTION 3

How would you manage Jean?

QUESTION 4

How could this condition be prevented?

CASE 2 ANSWERS

ANSWER 1

Your working diagnosis is osteochemonecrosis following intraoral trauma from denture irritation. This can occur in a person who is susceptible, such as someone on bisphosphonates,[11] where it is known as bisphosphonate-related osteonecrosis of the jaw (BRONJ), or bisphosphonate osteonecrosis (BON). It is also likely that infection is complicating Jean's presentation. As well as the possible iatrogenic, traumatic and infective etiologies, it is also important to consider neoplastic causes in the differential for a non-healing oral ulcer.

According to the American Association of Oral and Maxillofacial Surgeons, patients may be considered to have BRONJ if all the following three characteristics are present:

- current or previous treatment with a bisphosphonate
- exposed, necrotic bone in the maxillofacial region that has persisted for more than 8 weeks
- no history of radiation therapy to the jaws.[12]

BRONJ should be suspected where patients exhibit all of these characteristics except where the area of exposed, necrotic bone has been present for less than 8 weeks.

BRONJ is a rare, but serious adverse event of bisphosphonate therapy. It is more common in patients receiving high doses of intravenous bisphosphonates for malignancy, than those taking oral bisphosphonates for the treatment of osteoporosis. However, the risk

of BRONJ increases for patients who have a dental extraction while on oral bisphosphonate therapy.[13]

ANSWER 2

Jean is on three medications (bisphosphonates, methotrexate and corticosteroids), which can contribute to her presentation. In this case the bisphosphonate is the most likely.

In patients with osteoporosis, it is expected that bisphosphonates will arrest bone loss and increase bone density, decreasing the risk of pathological fracture.[14] Bisphosphonates bind to bone and incorporate into the osseous matrix. During bone modelling, bisphosphonates are taken up by osteoclasts and internalised in the cell cytoplasm where they inhibit osteoclastic function and induce apoptotic (programmed) cell death.[15]

Osteochemonecrosis occurs due to a complex interplay of bone metabolism, local trauma, and increased demand for bone repair, infection and hypovascularity.[16] Constant stress from mastication can cause microfractures to occur. Repair of these microfractures may be impaired due to the action of bisphosphonates, which reduce blood supply and have tumoricidal effects.

Other conditions, medications or situations that can contribute to the development of osteochemonecrosis in patients on bisphosphonates include poorly controlled diabetes, concurrent use of corticosteroids, chemotherapeutic drugs, immunosuppressive medications such as methotrexate, advanced age, alcohol abuse and smoking.[17]

ANSWER 3

Jean should be promptly referred to an oral and maxillofacial surgeon. The surgeon may want to to perform a soft tissue incisional biopsy to be able to exclude differential diagnoses.

Medical imaging in the form of an orthopantomogram (OPG) could be requested prior to referral. However, radiological changes are typically not evident until there is significant bone involvement.[12] A dentist who suspects the condition is likely to request panoramic and periapical X-rays. Radiographs are considered essential to help exclude differential diagnoses such as malignant lesions. For the purposes of treatment planning, computerised tomography (CT) scanning is performed.

The objective of treatment is to alleviate pain and return Jean to her former oral health. An oral and maxillofacial surgeon is likely to perform curettage of necrotic bone. Following curettage of necrotic bone, soft tissue closure is recommended,[11] as the necrotic area acts as a portal of entry for bacteria.[16] Systemic antibiotic premediation should be prescribed immediately prior to debridement of the osteochemonecrosis site and followed for 10–14 days post-debridement.[11] A microbiological culture is obtained to guide the appropriate antibiotic regimen. The microbes most commonly found in BRONJ have responded to the penicillin group of antibiotic.[12] Although penicillin is usually the first choice antibiotic in dentistry, amoxycillin and/or clindamycin provide better bone penetration and a wider spectrum of coverage.[16] Anti-microbial mouth rinses such as alcohol-free 0.2% chlorhexidine gluconate diluted in 5 ml of water in a minimum frequency of twice daily is also recommended[11] to reduce the bacterial load.[16] The site should be monitored every 2–3 weeks until it is healed.[11]

Evidence does not support the routine discontinuation of bisphosphonates after prolonged use prior to commencing dental treatment, as bisphosphonates are retained in the mineralised bone matrix for some time.[11,16] However, the antiangiogenesis effect of bisphosphonates may be reduced if they are discontinued, which may assist the healing of the overlying mucosa following dental treatment.[16]

Jean's dentures should be evaluated and adjusted as needed to minimise soft tissue trauma and pressure points, and where possible a soft liner should be applied for fit and stability.[11,16] Jean will need to be referred to a dentist for relining of her existing dentures.

ANSWER 4

Prevention of BRONJ represents the best approach. Preventive measures include:

- undergoing a comprehensive dental examination prior to a patient commencing bisphosphonate therapy. Dental surgery should be completed prior to commencing bisphosphonate therapy[11]
- avoiding dental surgery where possible during bisphosphonate therapy
- regular dental reviews during bisphosphonate therapy. Patients on bisphosphonates should be reviewed every 3–6 months depending on their oral health status
- maintaining good oral hygiene
- ensuring that dentures fit well
- using soft liners with dentures.

Patients should be educated that the risk of BRONJ is small, but to be alert for symptoms such as severe jaw pain, numbness of the jaw, oral odour, denture sore spots, infection and impaired healing that could suggest the condition.[13]

CASE 3

ARIEL HAS A BURNING PAIN IN HER STOMACH

Ariel, aged 45 years, works as a part-time receptionist. She reports to you that she has experienced a 12-month history of 'burning pain' in her stomach and mid chest occurring about twice a week. The burning pain occurs mainly at night and is causing her sleep to be interrupted. She also has a sour taste in her mouth, and has noted pain in the teeth at the back of her mouth when she drinks cold beverages. Ariel has used over-the-counter antacids, which relieve the symptoms temporarily. She has no loss of appetite, weight loss or vomiting and her bowel actions have been normal.

Ariel is overweight with a body mass index of 29 kg/m^2. She enjoys two glasses of wine each night most nights of the week. Ariel has never smoked and does not use anti-inflammatory medications. She has no relevant past medical problems and no relevant family history.

Ariel brushes her teeth twice each day, but only uses dental floss when food is stuck between her teeth.

QUESTION 1

What is the likely diagnosis?

QUESTION 2

How would you manage Ariel's underlying condition?

FURTHER INFORMATION

You commence Ariel on a trial of esomeprazole. You advise her to avoid consuming large meals and avoid lying down after eating. You engage the principles of motivational interviewing to assist Ariel in losing weight and reducing her alcohol consumption.

QUESTION 3

What impact could Ariel's underlying condition have on her oral cavity and teeth?

FURTHER INFORMATION

You refer Ariel to a dentist to review her oral health status.

QUESTION 4

What suggestions could you make to Ariel to improve her oral health, in light of her underlying condition, while awaiting her appointment with the dentist?

CASE 3 ANSWERS

ANSWER 1

Ariel has symptoms that suggest gastro-oesphageal reflux disease (GORD).

Regurgitation and heartburn are the typical symptoms of GORD.[18] But if complications such as oesphageal erosions or stricture occur, then other symptoms like haematemesis or dysphagia, may occur.[19] Extra-oesphageal manifestations such as oropharynegal, dental, laryngeal and respiratory effects, and sleep disturbance have also been linked to GORD.[20] These can manifest as symptoms of sore throat, globus pharyngeus, waterbrash, dental erosions, laryngitis or cough.[21]

Differential diagnosis may include motility disorders of the oesphagus, biliary tract disease and coronary artery disease.[22, 23]

ANSWER 2

As Ariel has symptoms of GORD more than twice a week, medication in the form of a proton pump inhibitor such as esomeprazole, lansoprazole, omeprazole or pantoprazole is advised. This could be commenced with instructions to take it once daily, half-to-one hour before the evening meal (her symptoms are mostly present at night) as a therapeutic trial to control symptoms and heal any erosive disease.[24]

If Ariel had alarm symptoms such as haematemesis or weight loss, atypical symptoms, severe or frequent symptoms, a short history of symptoms or was of an older age then referral for upper gastrointestinal gastroscopy would be indicated in the first instance.[24]

Ariel should be clinically assessed after 8 weeks (or earlier if alarm symptoms develop) to check her response to treatment. If she still has symptoms at this stage, she should be referred for upper gastrointestinal endoscopy.

Ariel may also benefit from advice to:

- avoid consuming large meals[24]
- avoid lying down for 3 hours after eating
- drink most fluids between meals, rather than with them[24]
- reduce her consumption of alcohol
- avoid caffeinated products, fatty foods, chocolate, spicy foods, citrus fruits and juices, and tomato-based products, which may contribute to symptoms in those with an inflamed oesophagus[25]
- raise the head of the bed 15–20 cm by safely securing timber blocks under the bedposts.[18]

ANSWER 3

GORD-associated manifestations in the oral cavity include dental erosions, mucosal ulceration, halitosis and loss of taste. Either xerostomia or increased salivary flow may be present.[26]

Gastro-oesophageal reflux can result in dental erosions by dissolving of the inorganic material of the teeth (hydroxyapatite crystals in enamel).[27] The extent of erosion depends on the frequency and the quality of exposure, along with the duration of disease. Exposed dentin is often sensitive to temperature changes and may present as the symptom of temperature sensitivity. The bicarbonate component of saliva, which is dependent on salivary flow rates, helps protect the teeth from dental erosions caused by acid. In addition, saliva helps form a protective enamel pellicle (protein film on the surface enamel).

In order to address the dental implications of GORD symptoms, Ariel should be referred to a dentist. The dentist will obtain information regarding Ariel's medical history, dietary history, occupational and recreational history, dental history, oral hygiene methods and conduct an intra-oral examination, head and neck examination and diagnostic tests of salivary function.[28]

ANSWER 4

To prevent worsening and halt the progression of dental erosions, Ariel could be advised to:

- adhere to the recommended treatment of GORD
- take an antacid immediately after she notices any symptoms of reflux
- hold milk in her mouth after she notices any symptoms of reflux[29]
- rinse her teeth with a fluoride solution or, if not practical, with plain water immediately after she notices any symptoms of reflux in the mouth
- chew sugar-free gum. Use of chewing gum involves regular chewing and swallowing. Chewing increases the flow rate and buffering capacity of saliva[30] and swallowing increases peristalsis[31]
- maintain good oral hygiene with brushing twice daily and flossing at least once per day
- use a bicarbonate containing toothpaste daily, which acts as a buffer to acid in the oral cavity
- use alkaline toothpastes or gels, applied with the fingertip before going to bed to protect against erosion from reflux during sleep[29]
- apply low concentrations of fluoride to her teeth on a frequent basis
- rinse her mouth out regularly with a neutral pH mouthwash or neutral sodium fluoride mouth rinse[32]
- avoid brushing her teeth immediately after an acid challenge
- avoid the use of strongly abrasive toothpastes.[33]

A dentist might deploy various non-invasive or invasive strategies depending on the degree of tooth wear. Invasive strategies can range from restorative treatment such as placing of banding composites in a few isolated areas of dentition to full mouth reconstruction in the case of a devastated dentition.[28]

CASE 4

BEN PRESENTS WITH TENDERNESS IN HIS JAW AND EAR AREA

Ben, aged 32 years, has recently returned from overseas following an 18-month work assignment. He reports that he has been feeling stressed and experienced muscle spasms in the head, neck and ear regions over the past 12 months. He has also noticed pain in these regions upon waking in the morning and on chewing.

On examination, Ben has tenderness of the temporalis and masseter muscles on both sides and tenderness of the temporomandibular joints. He exhibits limitation of mouth opening.

QUESTION 1

What is your working diagnosis?

QUESTION 2

What are the causes of this dental condition?

QUESTION 3

What dental effects does this condition have?

QUESTION 4

What treatment would you recommend for Ben?

CASE 4 ANSWERS

ANSWER 1

Ben's symptoms and signs suggest clenching or grinding of the teeth, which is also known as bruxism. This condition can lead to disorders of the temporomandibular joint, muscles of mastication and dental disorders.[34] In this case and at this stage, it may be difficult to ascertain if Ben has bruxism or temperomandicular joint dysfunction without further assessment.

ANSWER 2

The cause of bruxism is often multifactorial and the following causes have been implicated:

- stress and anxiety[35]
- dental conditions such as malocclusion[36]
- habit.

ANSWER 3

In the presence of bruxism, many more than the usual number of tooth contacts are made each day, and the intensity and duration are altered.[37]

In patients subject to bruxism, tooth wear is usually significant. Excessive tooth grinding can change the contacts of canine and incisal teeth. This can then affect the guidance given to the mandible

when the upper and lower teeth come together and the mouth closes. If bruxism or clenching is not treated, the teeth that contact each other become worn with a relatively flat plane or occlusion.[38] Cracks and pits form on the worn edges and may become plaque traps. The canines and central and lateral incisors most commonly receive the heaviest and earliest lateral wear. Dental X-rays reveal bone loss and widening of the periodontal ligament space on the teeth that have worn.[34]

ANSWER 4

One of the most important aspects of management of bruxism is educating the patient about the condition and its sequelae. Educating the patient usually reduces daytime bruxism, but bruxism during sleep is still a problem.[39]

Treatment of bruxism involves treating the underlying cause or causes. In Ben's case, this will involve managing his stress and anxiety. Psychological support, communication strategies, biofeedback methods and sleep therapy have been shown to be particularly useful in many patients where a significant behavioural component is involved.[40,41]

Bruxism requires referral to a dentist. Even bruxism that is short-lived can result in damage to the enamel surfaces and periodontal structures of the teeth. A mouth guard can be fashioned, which is worn at night to protect the teeth from abnormal occlusal wear due to bruxism. The night guard is adjusted so that all mandibular teeth make simultaneous contact with the maxillary teeth during functional activity of the mandible.[39] In selected cases, the dentist might perform occlusal adjustment (modification of the occluding and incising surfaces of the teeth), which aims to make the teeth come together in a harmonious interdigitated position.[38]

Pharmacotherapeutics have not been proven to be effective for the treatment of bruxism.[42] However, in some cases it might be appropriate to prescribe a muscle relaxant, such as diazepam, before bedtime for short-term use. But, if the etiological factor of the patient's bruxism is the side effect of their antidepressant medication, an alternative medication can be prescribed to counteract the bruxism.

Masticatory muscle exercises may be useful in some cases in managing the masticatory musculature component of pain and dysfunction that is related to bruxism.[41]

In cases of bruxism where temporomandibular joint dysfunction is also present, specific exercises can help to treat it.

CASE 5

ESTHER HAS FACIAL SWELLING

Esther, aged 75 years, presents to your practice with a painful swelling of the lower left side of her face. Esther had a mild toothache a few days ago and woke up with the swelling today. She now feels unwell and dizzy.

Esther has a osteoporosis, for which she has been on alendronate for 5 years. She also has type 2 diabetes mellitus, which is well controlled with metformin.

On examination, Esther has a temperature of 37.9°C, her pulse rate is 104 beats/minute and her blood pressure is 126/72 mm/Hg. Her extremities are sweaty and cold. She has a firm, non-fluctuant swelling of the lower left side of the face with redness of the overlying skin and bilateral cervical lymphandenopathy. On oral examination, one of her teeth on the lower jaw on the left side has a large filling. The gingiva around the tooth is red and there is a firm swelling adjacent to the tooth. The tooth is very tender to percussion.

Esther's finger prick blood glucose level is 13.1 mmol/L.

QUESTION 1

What maxillofacial tissues may be the cause of Esther's swelling?

QUESTION 2

What other symptoms indicating the spread of infection do you need to ask Esther about? What potential life threatening complications may arise from this condition?

FURTHER INFORMATION

Esther has dysphagia from this morning.

QUESTION 3

What are the general principles of treating odontogenic infections (infections from dental causes)?

QUESTION 4

In general, what are the indications for antibiotic treatment in odontogenic infections?

QUESTION 5

What microorganisms are commonly responsible for odontogenic infections? What antibiotics are used for the treatment of odontogenic infections?

QUESTION 6

How would you manage Esther?

CASE 5 ANSWERS

ANSWER 1

Dental disease is a common underlying cause of inflammatory swellings occurring in and around the jaws. Differential diagnoses include infections originating in the skin, salivary glands and lymph nodes. In Esther's case, the history of toothache indicates that her infection is likely to be from a dental cause.

ANSWER 2

Ask Esther if she has dysphagia, or any difficulty breathing or opening her mouth. These symptoms indicate spread of infection in the deep fascial planes of the neck and the need for urgent surgical treatment.[43]

Cellulitis may spread rapidly posteriorly in the parapharyngeal space to obstruct the airway. Infection may spread distally to involve the mediastinum. Systemic spread of infection may result in septic shock.

ANSWER 3

The general principles of treating odontogenic infections are:

- drainage of pus and surgical removal of the cause
- antibiotics – in Esther's case, the infection is spreading rapidly and requires intravenous antibiotics
- supportive therapy including intravenous fluids and adequate analgesia.

ANSWER 4

Antibiotics are an adjunct rather than alternative treatment to draining the pus and surgical removal of the cause, which are the mainstay of treatment.[44] Their aim is to retard the systemic spread of odontogenic infections and localise the pus to allow drainage.

Indications for antibiotic therapy include the presence of:[43–46]

- cellulitis – this is distinctly different from oedema (soft, non-tender, pale, normal skin temperature) or abscess (localised pus collection, which may feel fluctuant and may point to the skin or intra-orally). In an otherwise healthy patient, oedema does not require antibiotic therapy and an abscess does not usually require antibiotic therapy if the pus is drained and the cause is surgically removed
- underlying medical conditions such as those causing immunocompromise
- systemic spread
- a compromised airway
- a cause that cannot be immediately removed.

ANSWER 5

Odontogenic infections are caused by a mixed microbial flora, dominated by anaerobic species (*Porphyromonas sp, Prevotella sp,Peptostreptococcus sp, Fusobacterium sp*) and some facultative anaerobic bacteria (bacteria that are capable of growing with or without oxygen) from the streptoccocus group. The type of microbial flora will influence the choice of antibiotics.[45]

The selection of antibiotics must be judicious to prevent development of resistance. In general, a single drug is preferred. The narrowest spectrum antibiotic should be selected in a high enough dose to ensure efficacy, but low enough to prevent a toxic reaction. A 5-day duration of antibiotic therapy has been proven sufficient for most superficial infections.[45]

Odontogenic infections usually respond well to penicillin or lincosamides. Antibiotics of choice are phenoxymethylpenicillin, amoxycyllin, or clindamycin for patients who are allergic to penicillin. Metronidazole is usually added for unresponsive superficial infection or deep infections. Deep or rapidly spreading infections require intravenous antibiotics in a hospital setting.[46]

ANSWER 6

Esther has features of local posterior spread (dysphagia) and systemic spread (malaise, fever, tachycardia, cold extremities). Additionally, Esther may be immunocompromised due to her diabetes.

Esther should be sent immediately to a hospital for management by an oral and maxillofacial surgeon. In hospital, she will require blood tests including blood cultures, medical imaging, drainage of the pus, debridement, surgical removal of the cause (the offending tooth) and antibiotics. Esther's spreading infection suggests mixed bacterial flora and broad spectrum intravenous antibiotics should be administered. It is likely that Esther would require 3 weeks of antibiotics.

Esther will also need management of her diabetes. She will need a random blood glucose taken, monitoring of her blood sugar levels and consideration of medication alterations during this time. She is likely to need specific medical input into this from either an endocrinologist, physician or her GP, depending on local services.

In hospital, the ongoing need for bisphosphonates, which place her at risk for developing BRONJ, should be assessed.

CASE 6

PHYLLIS NEEDS DENTAL TREATMENT

Phyllis, aged 92 years, is a widow living in an aged care facility. She has been a patient of yours for many years. Phyllis has Alzheimer disease. She communicates verbally, but is often very confused. She sits in a chair when not in bed. Phyllis' medical history includes a previous stroke with residual dysphagia, hypertension, osteoarthritis, a left hip replacement for arthritis and poor hearing. Her current medications are donepezil, perindopril, soluble paracetamol and vitamin D. She also takes a daily multivitamin.

As a poor eater, Phyllis has difficulty maintaining her weight with a body mass index of 16.4 kg/m^2. She is on a diet of thickened fluids and soft food because of her dysphagia. Her intake of sugary drinks and food is high. As she has difficulty swallowing, Phyllis pockets food in her mouth and large amounts of soft, sticky food and drink often sit around her mouth. Phyllis can be intolerant to oral healthcare and gets agitated when she does not want to do something. Nursing staff find her oral healthcare challenging.

Phyllis' son, Ian, arranges for the dentist to visit her. The dentist notes that Phyllis has poor oral hygiene, with thick plaque and calculus coating her teeth. Her gums are swollen and bleeding and she has some broken teeth.

QUESTION 1

What features might suggest that Phyllis has pain from a dental cause?

FURTHER INFORMATION

When you are next visiting Phyllis, Ian is present. He asks you why Phyllis' teeth have deteriorated so much when she has cared for her teeth throughout her life and attended the dentist regularly in the past.

QUESTION 2

What would you say to Ian to explain Phyllis' deterioration in her teeth?

FURTHER INFORMATION

Phyllis' dentist decides that she may benefit from extraction of some of her teeth. The dentist discusses the extractions with Ian, who holds Phyllis' medical power of attorney. Ian gives permission for the dentist to call you to discuss the possibility of using medications to assist Phyllis in being calm and relaxed for the procedure, given her medical conditions.

QUESTION 3

What are the principles of prescribing to consider when patients with dementia are prescribed medications to help them relax and be less anxious during dental treatment?

CASE 6 ANSWERS

ANSWER 1

A recent review of the literature suggests that health professionals in general are not adept at identifying orofacial or dental pain in patients who have advanced dementia.[47] While it is common to see broken teeth in patients who have dementia, there are no reliable ways of identifying which patients have dental pain, or when they have dental pain. Current tools (eg. Visual Analog Scale) for identifying pain don't appear to be sufficiently sensitive to identifying oral pain. Tools should incorporate specific orofacial or dental pain indicators such as the patient holding or rubbing the painful orofacial area, limiting their mandibular movements, modifying their oral behaviour and being uncooperative or resistant to oral care.[47]

In Phyllis, possible indicators of orofacial or dental pain are being resistive to oral hygiene care, having difficulty with eating and maintaining weight. As Phyllis is known to have resistive, agitated behaviours and dysphagia, these observations could be easily attributed to other unrelated factors, which make dental pain more difficult to identify.

Often the most useful indications of the presence of orofacial or dental pain is in hindsight – by treating the patient and assessing if they are more settled afterwards.

ANSWER 2

The deterioration in Phyllis' teeth is likely to be due to a number of factors:

Behavioural factors

Phyllis can resist oral healthcare, which makes it more difficult for her carers. The percentage of older Australians who do have natural teeth is rising rapidly.[48] This means that more will need oral healthcare for natural teeth as they become frail and dependent.

Oral hygiene factors

Problems with oral hygiene lead to both periodontal disease and tooth decay. It is difficult for nursing staff to brush Phyllis' teeth thoroughly on a daily basis. Toothpaste contains fluoride, and lack of daily toothbrushing with toothpaste not only leads to problems with oral hygiene, but does not allow exposure to fluoride in toothpaste.

Dietary factors

Phyllis is on a soft diet. She has frequent exposure to sugary foods and drinks. She also has dysphagia so these foods stay on her teeth for much longer. When sugars are metabolised by plaque, acids are produced, which damage the hard tissues of the teeth. This can lead to tooth decay. Patients who require crushed medications are often given medication in jam or fruit puree, which can also contribute to decay.[49]

Salivary factors

Often people with dysphagia produce less saliva than normal, despite saliva pooling in their mouths giving the appearance of adequate saliva. Saliva has a protective role in preventing tooth decay. It also acts as a lubricant to help flush food and drinks quickly through the mouth. It neutralises acids to reduce risk of tooth decay and contains calcium and phosphate ions, which are required to remineralise surfaces of teeth damaged by acids.

Dehydration also reduces saliva quality and quantity. Caffeine, alcohol and many prescription medications can reduce saliva flow, reducing the buffering capacity of saliva against sugars that are harmful to the teeth. Medications with an anticholinergic or diuretic action and polypharmacy also alter saliva quality.[49]

The dietary modifications and more frequent intake of food required in patients with dysphagia often leads to a higher risk of dental disease. Patients with dysphagia need excellent daily oral care and regular professional dental maintenance to avoid dental disease. A dentist may recommend special oral health products, and needs to work with dieticians, speech pathologists and general practitioners to minimise the risk of oral disease.

ANSWER 3

Principles of prescribing in this situation are to:

- prescribe short-acting medications, such as the benzodiazepines oxazepam or temazepam. They have a quick onset and short duration of action
- start with a low dose, and consider gradually increasing the dose over subsequent visits if more is required. Take into account what medications and doses the patient is accustomed to taking when deciding on the dose to prescribe. Sometimes timing a dental appointment to coincide with regular sedating medication can avoid the need for additional medication
- monitor the patient during and after the procedure. Ensure the patient is safe and consider the risk of aspiration and falls. Ensure the patient is not given food or drink until they are alert enough to swallow safely. The patient should not be permitted to walk around, and assessment of walking or transfers needs to be evaluated as the medication takes effect and wears off.[46]

CASE 7

JOSH HAS AN AVULSED TOOTH

Josh, aged 8 years, is brought to your practice by his parents after he has fallen off his scooter at a park. Josh hit his front teeth on the concrete and one of his front teeth was knocked out. His parents found the avulsed tooth on the concrete and have brought it with them.

QUESTION 1

Why is it important to know Josh's age?

QUESTION 2

In general, what is the appropriate first aid at the scene for handling and storage of an avulsed permanent tooth?

QUESTION 3

What further information do you need to know to assess Josh?

FURTHER INFORMATION

You determine that Josh did not lose consciousness, has no other injuries and that the description of his injury is consistent with the clinical picture. Josh's mum handled the avulsed tooth by the crown, was not able to put it in any storage media for 5 minutes and then stored it in milk for the last 30 minutes. Josh's tetanus vaccinations are up-to-date.

Examination reveals that Josh has an avulsed left upper incisor and all of the tooth can be accounted for.

QUESTION 4

Why is it important to know that all of the tooth can be accounted for?

QUESTION 5

How would you manage Josh?

CASE 7 ANSWERS

ANSWER 1

Josh's age gives an indication of whether his teeth are permanent teeth or primary teeth. Usually, all the teeth in those aged 6 years and under are primary teeth. Specific primary teeth are replaced by permanent teeth at varying ages depending on the position of the tooth within the mouth and the individual. In general, oral health clinicians do not re-implant avulsed primary teeth. Examining the morphology of the tooth can also provide assessment of whether it is a permanent tooth.

ANSWER 2

If picking up the tooth, it is best to do so by the crown. Avoid rubbing or wiping the tooth, touching its root or rinsing in water (unless there is obvious surface contamination), as these actions reduce the prognosis of tooth replantation. The patient's socket is the best storage media for the tooth if it is safe and possible to reposition it (even if not fully repositioned). The tooth can be fixed in place by moulding silver foil over it and the adjacent teeth. If it is not possible or appropriate to put the tooth straight back into the socket, the next best most readily available storage media is milk.[50]

ANSWER 3

It is important to determine whether:[51]

- there was any loss of consciousness. If loss of consciousness occurred, Josh should be referred to the local emergency department for monitoring head injury
- there are any other non-dental injuries, Josh may require stabilisation and may need to be referred to the emergency department of a non-dental hospital
- the description of the injury matches the clinical picture. If it does not, consider the possibility of non-accidental injury as it takes a lot of force to knock out a permanent tooth
- Josh's tetanus vaccinations are up-to-date. If they are not, he may require a tetanus booster. This is particularly important if the accident happened outside and there was soil contamination
- the extra oral dry time (time the tooth was out of the mouth and not in any storage media) and the extra oral time in storage media (the time the tooth was out of the mouth and in storage media such as milk). The prognosis of the tooth deteriorates the longer it is out of the mouth, as the surrounding periodontal ligament is more likely to become necrotic. In general, if the extra oral time is less than 60 minutes and the tooth has been stored in suitable media, the prognosis is more favourable. However, if the extra oral dry time exceeds 60 minutes, the chance of preserving the periodontal ligament is minimal and the way the tooth is replanted is slightly different.

ANSWER 4

If all the fragments of tooth were not accounted for, it could be possible that fragments are embedded in the lip, or have been swallowed or inhaled. Josh may need an X-ray of the lip or a chest X-ray to determine their location.

ANSWER 5

Josh should be referred to a dentist at a tertiary children's hospital or the dental hospital. It is likely that a bracket and wire splint will be placed across the adjacent teeth to hold them in place for 10–14 days. Antibiotics are usually given and a soft diet is advised until the splint is removed. The tooth will normally need the first stage of a root canal treatment carried out 10–14 days post-injury. The splint should normally be removed by 14 days to prevent the tooth fusing to the bone (ankylosis).[51]

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RESOURCES FOR DOCTORS

- Dental Health Services Victoria provides information on the importance of maintaining good oral hygiene and the links between oral health and general health. This information is available at www.dhsv.org.au/oral-health-resources/guides-and-resources/#caseforaction.
- Oral and Dental Expert Group. *Therapeutic Guidelines: Oral and Dental*. Version 1. Melboune: Therapeutic Guidelines Limited, 2007.
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RESOURCES FOR PATIENTS

- Australian Dental Association is available at www.ada.org.au and its website provides information on maintaining oral hygiene and answers to a range of frequently asked questions on common dental conditions.
- Dental Health Services Victoria provide fact sheets for patients, including parents, on maintaining healthy teeth in a variety of languages. It is available at www.dhsv.org.au/oral-health-resources/fact-sheets-and-tip-cards.

Dental health

In order to qualify for 6 Category 2 points for the QI&CPD activity associated with this unit:

- **read and complete the unit of *check* in hard copy or online at the *gplearning* website at www.gplearning.com.au, and**
- **log onto the *gplearning* website at www.gplearning.com.au and answer the following 10 multiple choice questions (MCQs) online, and**
- **complete the online evaluation.**

If you are not an RACGP member, please contact the *gplearning* helpdesk on 1800 284 789 to register in the first instance. You will be provided with a username and password that will enable you access to the test.

The expected time to complete this activity is 3 hours.

Do not send answers to the MCQs into the *check* office. This activity can only be completed online at www.gplearning.com.au.

If you have any queries or technical issues accessing the test online, please contact the *gplearning* helpdesk on 1800 284 789.

QUESTION 1

Constantine, aged 78 years, presents with xerostomia (dry mouth). Xerostomia:

A. is usually associated with hypersalivation

B. is commonly caused by medications

C. is commonly caused by excessive use of chewing gum

D. may be reduced by the use of alcohol-based mouth rinses

E. helps prevent accumulation of biofilm.

QUESTION 2

Jill, aged 68 years, has metastatic breast carcinoma, currently treated with monthly infusions of pamidronate. She presents with severe jaw pain and you suspect she has bisphosphonate-related osteonecrosis of the jaw (BRONJ). Which of the following is true of BRONJ?

A. BRONJ is more common in patients receiving high doses of intravenous bisphosphonates for malignancy than those taking oral bisphosphonates for the treatment of osteoporosis.

B. The risk of BRONJ is increased with recent dental extraction.

C. Current use of corticosteroids is a risk factor for the development of BRONJ for patients on bisphosphonates.

D. Exposed, necrotic bone in the maxillofacial region that has persisted for more than 8 weeks is consistent with a diagnosis of BRONJ.

E. All of the above.

QUESTION 3

You ascertain that Jill does fulfil the criteria for a diagnosis of BRONJ. You discuss treatment of BRONJ with Jill and advise her that:

A. conservative management is recommended

B. intravenous antibiotics are the mainstay of treatment

C. she is likely to require curettage of necrotic bone

D. evidence supports the routine discontinuation of bisphosphonates prior to commencing treatment for BRONJ

E. antimicrobial mouth rinses are not recommended.

QUESTION 4

Ming, aged 44 years, presents to your rural practice with symptoms of regurgitation and heartburn. He also complains of temperature sensitivity of the teeth. You diagnose gastro-oesophageal reflux with likely associated dental erosions. You commence pantoprazole, refer him to a dentist and advise him to do each of the following EXCEPT:

A. take an antacid immediately after he notices any symptoms of reflux

B. brush his teeth immediately after he notices any symptoms of reflux

C. rinse his mouth out regularly with a neutral pH mouthwash

D. use a bicarbonate containing toothpaste daily

E. chew sugar-free gum.

QUESTION 5

Sophie, aged 28 years, presents with 3 months of pain in the temples and jaws that she notices with chewing and upon waking in the morning. She describes workplace stress and says that her symptoms are also worse after a bad day at work. You suspect she has bruxism. Which of the following statements regarding the management of Sophie's bruxism are correct?

A. Educating Sophie about bruxism is likely to reduce both her daytime and night-time symptoms.

B. Psychological support is unlikely to decrease Sophie's bruxism.

C. Pharmacological therapies offer the best hope of curing Sophie's bruxism.

D. Use of a customised mouthguard is likely to prevent further wear on Sophie's teeth.

E. Long term treatment with low dose diazepam at night is recommended.

QUESTION 6

Simone, aged 32 years, presents with cellulitis of the right side of the lower face with a fever of 38.4˚C following 3 days of a toothache on the same side. She has been well in the past with no major medical problems. You suspect that she may have an odontogenic infection. In general, which of the following is true of odontogenic infections?

A. They are predominantly caused by aerobic bacteria.
B. They are a common cause of infection occurring in and around the jaws.
C. They can be treated with either antibiotics or drainage of pus and surgical removal of the cause.
D. If an abscess is present in an otherwise healthy patient, antibiotics are the mainstay of treatment.
E. In cases of cellulitis, broad spectrum antibiotics are generally preferred.

QUESTION 7

Maxwell, aged 84 years, has severe dementia. He has difficulty with eating and is uncooperative and resistant to oral care. You suspect that he may have orofacial or dental pain. Which of the following is true in general of orofacial or dental pain in patients with advanced dementia?

A. Health professionals are generally very adept at identifying orofacial or dental pain in patients with advanced dementia.
B. There are reliable ways of identifying when patients with advanced dementia have oral pain.
C. Current tools for identifying pain incorporate orofacial and dental pain indicators.
D. Treating suspected pain and subsequently assessing for pain following treatment is an unreliable indicator of the presence of orofacial or dental pain.
E. Some symptoms of orofacial or dental pain can easily be attributed to unrelated factors.

QUESTION 8

The dentist assesses Maxwell, notices several broken teeth and determines that he is likely to need a tooth extraction. With the consent of Maxwell's medical power of attorney, you discuss with the dentist the possibility of using conscious sedation for the procedure. Maxwell is 51 kg and is not normally on any sedative medication. Which of the following is the most appropriate option to induce conscious sedation in Maxwell?

A. Diazepam 10 mg
B. Oxazepam 30 mg
C. Temazepam 10 mg
D. Diazepam 5 mg and temazepam 10 mg
E. Zolpidem CR 12.5 mg.

QUESTION 9

Michael, aged 12 years, knocked one of his front incisors out after landing on concrete during a basketball match. He has no other injuries and did not lose consciousness. Michael's coach, Jim, phones you from the field. You advise him regarding management of head injury and then Jim asks you about how to handle and store Michael's avulsed tooth. What is the appropriate first aid for handling and storage of an avulsed permanent tooth?

A. Pick the tooth up by the root, wipe it to remove surface contamination, store it in an alcohol based solution.
B. Pick the tooth up by the root, rinse it in water, store it in milk.
C. Pick the tooth up by the crown, store it in the tooth socket from where it came.
D. Pick the tooth up by the crown, rinse it in water, store it in milk.
E. Pick the tooth up by the crown, do not rinse it and store it in water.

QUESTION 10

You consider whether the tooth that Michael knocked out is likely to be a primary tooth or permanent tooth. While there may be individual differences in the age at which specific primary teeth are replaced by permanent teeth, in general, what is the upper age under which all teeth are usually primary teeth?

A. 4 years
B. 6 years
C. 8 years
D. 10 years
E. 12 years.