check
Independent learning program for GPs

Unit 579
January–February 2021

Oral medicine

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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

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About this activity

Each year, more than 63,000 Australians are hospitalised with oral conditions, the third highest cause of preventable hospital admissions.[1] Although general practitioners (GPs) are ideally placed to provide both preventive oral healthcare as well as investigation and management of oral presentations, evidence suggests that they may receive inadequate training in oral health.[2]

Some oral conditions are quite common, such as temporomandibular dysfunction, signs of which are seen in up to 60–70% of the population, peaking in adults aged 20–40 years.[3] In contrast, trigeminal neuralgia has an estimated incidence of four cases per 100,000 population per year, typically commencing when patients are aged >50 years.[4] Another condition seen in this age group is oral burning syndrome, which is thought to affect 18–33% of peri- and postmenopausal patients.[5] The most common salivary disorder, which is particularly seen in the elderly population, is acute bacterial sialadenitis.[6] Oral lichen planus affects up to 2% of the population and is slightly more common in women.[7] Crohn's disease can also have oral manifestations, sometimes preceding gastrointestinal symptoms, with a prevalence of between 20% and 50%.[8]

This edition of *check* considers the investigation and management of oral conditions in general practice.

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Learning outcomes

At the end of this activity, participants will be able to:

- discuss the challenges associated with diagnosing and managing trigeminal neuralgia
- outline the approach to differentiating between the conditions that can cause symptoms of oral burning
- identify the criteria that are considered when making a diagnosis of oral lichen planus
- outline the management of acute suppurative sialadenitis, both on initial presentation and if unresponsive to treatment
- identify the screening questions used when a patient presents with symptoms of a temporomandibular disorder
- describe the symptoms that suggest a patient is presenting with specific or non-specific oral manifestations of Crohn's disease.

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Abbreviations

ASCA	Anti-*Saccharomyces cerevisiae* antibody
BMS	burning mouth syndrome
CD	Crohn's disease
CT	computed tomography
DIF	direct immunofluorescence
DRESS	drug reaction with eosinophilia and systemic symptoms
GP	general practitioner
IBD	inflammatory bowel disease
Ig	immunoglobulin
MRI	magnetic resonance imaging
MRS	Melkersson–Rosenthal Syndrome
MVD	microvascular decompression
NSAID	nonsteroidal anti-inflammatory drug
OLL	oral lichenoid lesions
OLP	oral lichen planus
OR	odds ratio
p-ANCA	perinuclear anti-neutrophil cytoplasmic antibody
SGH	salivary gland hypofunction
TMD	temporomandibular disorders
TMJ	temporomandibular joint
UC	ulcerative colitis
WHO	World Health Organization

CASE

1 Jean has severe right facial pain

Jean, aged 76 years, presents with a four-week history of episodes of 'unbearable' pain over the right zygomatic region. The pain radiates to the right maxilla. She is incredibly distressed by these episodes. Her medications are rosuvastatin 10 mg for dyslipidaemia and ramipril 2.5 mg daily for hypertension.

Question 1

What is the possible differential diagnosis for Jean's facial pain?

Question 2

What aspects of a pain history are important when diagnosing orofacial pain?

Further information

The pain is episodic and lasts for up to 30 seconds when present. The intensity is 10/10, and Jean describes it as sharp and shooting. The pain is triggered by eating, talking, drinking and teeth brushing. Immediately after the episode, the same stimuli do not seem to cause the pain. Although paracetamol and nonsteroidal anti-inflammatory drugs have done little to alleviate the pain, Jean's sleep is undisturbed. She thinks the pain may be coming from an upper right molar. During the consultation, you observe Jean experiencing a pain attack, and note that she winces and is unable to speak during the episode. Her pain completely resolves after each attack. The pain episodes are becoming more frequent, and Jean is beginning to feel very anxious.

Question 3

What diagnoses would you consider?

Further information

You undertake a comprehensive oral examination using white light. There are no obvious oral mucosal lesions. The right maxillary second molar is the only tooth in that quadrant, and it is unopposed in the mandibular arch. The tooth is heavily restored, and palpation around the buccal sulcus elicits Jean's pain, although there is no redness or swelling. Cranial nerve examination is normal. As Jean is afebrile and there are no signs of systemic infection, you decide antibiotics are not indicated. As you are uncertain whether the tooth is the source of pain, you refer her to her local dentist.

Question 4

What will the dentist do to make a diagnosis?

Further information

Jean returns to see you after three weeks. At her dental visit, it was unclear whether the right maxillary molar was the source of pain. However, Jean, who was extremely distressed, insisted that the tooth was the cause and requested dental extraction. The extraction was performed under local anaesthesia and was uneventful. Jean, however, continues to experience severe episodic pain. On examination, the extraction socket has healed well, with no sign of alveolar osteitis or infection. Jean now reports that cold air on her face and face washing also trigger her pain, and she points to a particular area on her right cheek that she is unable to touch.

Question 5

What is your diagnosis based on this information?

Question 6

What further investigations or assessment should be undertaken?

Further information

Jean undergoes magnetic resonance imaging (MRI) of the trigeminal nerve, skull base and brain. This shows evidence of significant neurovascular impingement by a loop of the right superior cerebellar artery, which is focally indenting and laterally displacing the cisternal segment of the right trigeminal nerve immediately anterior to its root entry point. No other significant intracranial abnormality is shown.

Question 7

How will you manage Jean's pain? What monitoring is required?

Question 8

What is the prognosis for Jean?

Question 9

What are her other management options?

CASE 1 Answers

Answer 1

The orofacial region is the most commonly affected site in patients presenting to the doctor or dentist with pain.[1]

Orofacial pain can have a wide range of causes, including:[2]

- dental, oral or oropharyngeal diseases (eg infection, trauma, neoplastic or other inflammatory conditions)
- temporomandibular disorders
- neurological disorders
- paranasal sinus disease
- neurovascular disorders.

Of these, dental (odontogenic) pain is the most common; other orofacial pains may be mistaken for toothache and vice versa.[1]

Answer 2

Usually, a detailed history and examination will reveal the aetiology of facial pain. The salient features to distinguish dental (odontogenic) pain on history are precipitation or exacerbation

of pain with thermal stimuli or biting. Acute maxillary sinusitis may present with diffuse pain in the malar region, and there may be tenderness over the antrum and maxillary molar teeth, as well as frontal headache.[2] This pain may be exacerbated by a change of position such as bending forward.[3] Primary headache disorders such as migraines and cluster headache presenting solely as facial pain are rare, but patients may have prodromal symptoms or associated autonomic features. In temporomandibular disorders, there will be pain with mandibular movements (often with chewing or clenching), and/or restricted jaw movement, and/or joint sounds.[2] Trigeminal neuralgia is often mistaken for toothache,[4] with pain frequently presenting in a dentoalveolar site or a specific tooth.[3] It is characteristed as brief, abrupt, recurrent unilateral electric shock–like pains that are triggered by innocuous stimuli.[5]

Answer 3

The likely diagnosis is trigeminal neuralgia, although odontogenic pain cannot completely be ruled out. Pain associated with caries that have penetrated the dentine is described as a sharp, deep sensation, usually evoked by an external stimulus, that subsides within a few seconds.[6] A cracked tooth may have similar symptoms, with the addition of sharp pain elicited by biting. When the caries process approaches the dental pulp, pain often outlasts the stimulus and is typically intense and usually poorly localised. Some patients describe dull pain, while others describe it as throbbing or sharp. The pain may seem episodic, being spontaneous in onset and abatement. Careful history-taking and clinical evaluation will assist in differentiating between trigeminal neuralgia and odontogenic pain.

Answer 4

Pulp sensibility (with thermal provocation), percussion testing, periodontal probing and mobility testing of the dentition form the basis of diagnosing dental pain.[7] Radiological examination, typically with a plain X-ray, may be undertaken at the dental surgery. It should be noted that pulp sensibility testing is often unpredictable and may indicate that an otherwise healthy tooth (unrestored and non-diseased) is non-vital. This can add to diagnostic dilemma.[3]

Answer 5

Trigeminal neuralgia is a clinical diagnosis[8] and may be challenging to differentiate from toothache without sufficient consideration of the key features; misdiagnosis by general practitioners (GPs) has been found to be as high as 48%.[9] It can be difficult for a dentist to establish a firm diagnosis as trigeminal neuralgia occurs more commonly in patients aged >50 years,[3,10] who often have a heavily restored dentition, and seemingly arises in a tooth with associated tenderness; in addition, pulp testing is often unpredictable.[3] Hence, a distressed patient and dentist may make irrational treatment decisions.[3]

Internationally, the annual incidence of trigeminal neuralgia has been found to be between three and eight per 100,000 people per year, with a lifetime prevalence of 0.7 per 100,000 people per year.[8,11] It affects women twice as frequently as men.[10] Trigeminal neuralgia is considered to be one of the causes of the most severe pain of neurological origin, and it has been termed the 'suicide disease'.[8] Quality of life can be severely affected, with weight loss, insomnia due to pain, disruption of daily function and higher levels of anxiety and depression reported.[10,12] Trigeminal neuralgia can affect more than one branch of the trigeminal nerve but is most common in the maxillary or mandibular division, with up to 2% of cases involving the ophthalmic division.[10] Table 1 outlines the diagnostic criteria for trigeminal neuralgia.

Table 1. Diagnostic criteria for trigeminal neuralgia[3,5,17]

Subtypes of trigeminal neuralgia

- Classical
- Secondary
- Idiopathic

Criteria for all subtypes of trigeminal neuralgia

- Recurrent paroxysms of unilateral facial pain affecting one or more divisions of the trigeminal nerve, with no radiation beyond
  - either purely paroxysmal or associated with concomitant continuous or near-continuous pain
- Pain has all of the following characteristics:
  - lasting from a fraction of a second to two minutes
  - severe intensity
  - electric shock–like, shooting, stabbing or sharp in quality
- Precipitated by innocuous stimuli within the affected trigeminal distribution; there may be specific trigger areas/zones or trigger 'manoeuvres' that stimulate the pain

Classical trigeminal neuralgia

- Criteria as listed above
- No clinically evident neurological deficit, although allodynia or hyperalgaesia may occur in the distribution of the nerve[10]
- Attributable to neurovascular compression with morphological changes of the trigeminal nerve root

Secondary trigeminal neuralgia

- Criteria for all subtypes of trigeminal neuralgia as listed above
- Sensory changes (common)
- Bilateral presentation possible
- Attributable to an underlying disease such as multiple sclerosis, space-occupying lesion or another cause

Idiopathic trigeminal neuralgia

- Criteria for all subtypes of trigeminal neuralgia as listed above
- No significant abnormalities on investigation (including magnetic resonance imaging and electrophysiological tests)
- Not accounted for by abovementioned conditions

Answer 6

Imaging such as traditional computed tomography (CT) or cone beam CT may be appropriate for the evaluation of common dental pathologies or cracked tooth syndrome, which may be confused with trigeminal neuralgia.[13]

Clinical differentiation of rhinological and odontogenic causes of maxillary sinusitis is usually challenging, and imaging has a key role in diagnosis and subsequent management.[14]

Cranial nerve examination should be undertaken. Neurological deficits may be indicative of intracranial pathology.

Neuroimaging, particularly three-dimensional high-resolution MRI of the brain and skull base (to view the trigeminal nerve and ganglion),[15] is recommended to rule out secondary causes of trigeminal neuralgia[5] such as intracranial space-occupying lesions or multiple sclerosis. It also allows for the assessment of neurovascular compression of the trigeminal nerve and ganglion, and the degree of atrophy or displacement.[5] This is particularly useful for consideration of surgical treatment options.[5,10]

Answer 7

A diagnosis of trigeminal neuralgia has been clinically established, with investigations revealing the classical subtype. Pharmacotherapy is the initial treatment recommendation for trigeminal neuralgia. The best evidence is for carbamazepine, although oxcarbazepine may be better tolerated.[10] In refractory cases, other anticonvulsant medications may be used. Combination therapy may be considered, although there is no good evidence that durable pain control will be achieved once a first-line medication at an adequate dose has failed.[16] Table 2 outlines medications used for the management of trigeminal neuralgia. Because of the potential for medication toxicity, regular monitoring is advised.

Referral to an expert, such as an oral medicine specialist or neurologist, is advised in the following situations:[15]

- There is doubt regarding the diagnosis.
- The patient does not respond to an adequate dose of a medication.
- The patient does not tolerate a medication.
- The medication loses efficacy.

Answer 8

There is no cure for trigeminal neuralgia, and management can be complex. Patients may have pain-free remission periods, at which time they may be medication-free, and approximately 50% of patients have remissions that last for more than six months.[11] It is suggested that patients will experience more severe and more frequent pain attacks over time, with less response to treatment over time.[9,11] Medication therapy may fail either because of lack of pain control, or poor tolerance; this seems to be independent of serum medication levels.[9]

Answer 9

In suitable patients, surgical options for the management of trigeminal neuralgia include microvascular decompression (MVD), percutaneous rhizotomy or stereotactic radiotherapy ('gamma knife' therapy).[15] Referral to a neurosurgeon early in the disease process is recommended to discuss options, particularly if the patient has a demonstrated neurovascular conflict on imaging and is healthy. Of the surgical options, MVD is the only non-ablative procedure and has demonstrated the greatest improvement in quality of life, with 60–70% of patients remaining pain-free at 10–20 years following surgery.[16] However, this is the most invasive treatment option, with mortality rates between 0.2% and 0.5%[8] and permanent ipsilateral hearing loss in up to 5% of cases.[16] Although less invasive, the other surgical procedures commonly result in facial numbness, with lower success rates and a higher rate of pain recurrence (55% at five years)[10] than MVD.[8]

Conclusion

Trigeminal neuralgia is an uncommon orofacial pain disorder that may be mistaken for odontogenic pain, and management may be delayed by misdiagnosis. The role of the GP is to initiate medical therapy for pain management, with prompt referral to the appropriate specialist (eg oral medicine, neurology, neurosurgery) for assistance with diagnosis, refractory cases requiring complex management or surgical treatment options. Given the pain severity and risk of debilitation, mood changes, suicidal ideation and medication toxicities, the GP is an essential part of the team to support patients.

Resources for patients

- Trigeminal Neuralgia Association Australia, www.tnaaustralia.org.au

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Table 2. Medication therapy for trigeminal neuralgia[15,18–24]

Medication	Dose	Maximum dose	Toxicities*	Notes†
First-line therapy				
Carbamazepine (modified-release tablet)	100 mg orally, twice daily Titrate every seven days if needed Usually effective with approximately 400 mg twice daily Larger doses should be given as 3–4 divided doses	1200 mg daily	Aplastic anaemia or agranulocytosis Potentially fatal cutaneous medication reaction‡ Medication interaction due to CYP450 3A4 induction Falls risk in elderly due to dizziness, ataxia and somnolence	Baseline and periodic haematological, renal and hepatic testing recommended Withdraw immediately if signs and symptoms are suggestive of a severe skin reaction
Second-line therapy				
Oxcarbazepine	300 mg orally, twice daily Titrate every seven days as needed, up to 600 mg twice daily	2400 mg daily	Less toxicity than carbamazepine Potentially fatal cutaneous medication reaction‡	Withdraw immediately if signs and symptoms are suggestive of a severe skin reaction
Third-line therapy				
Baclofen	5 mg orally, twice daily Titrate every four days, up to 10–20 mg daily	75 mg daily	May be used as combination medication therapy with carbamazepine in refractory cases	Test of baseline and periodic hepatic and glucose levels recommended in patients with liver diseases or diabetes mellitus Monitor respiratory and cardiovascular function in patients with cardiopulmonary disease or respiratory muscle weakness Use with caution with renal insufficiency
Gabapentin	300 mg orally, once daily at night Titrate every 3–7 days, up to 600–1200 mg three times daily	3600 mg daily		
Lamotrigine	25 mg orally once daily on alternative days for 14 days, then 25 mg once daily for 14 days If necessary, increase daily dose by 25 mg every 14 days, up to 100 mg twice daily	200 mg daily	Potentially fatal cutaneous medication reaction‡ Hypersensitivity syndrome (drug reaction with eosinophilia and systemic symptoms [DRESS]) Haemophagocytic lymphohistiocytosis Aseptic meningitis	Withdraw immediately if skin rash Slow dose titration less likely to result in cutaneous medication reactions
Phenytoin	300 mg orally, once daily	600 mg daily	Potentially fatal cutaneous medication reaction‡ Hypersensitivity syndrome (DRESS) Angioedema Hepatic injury Haematopoeitic complications	Baseline and periodic haematological, renal and hepatic testing recommended Withdraw immediately if signs and symptoms are suggestive of a severe skin reaction
Pregabalin	75 mg orally, once daily at night Titrate every 3–7 days up to 150–300 mg twice daily	600 mg daily		

*A complete list of medication toxicities has not been included. Please see appropriate source (eg AusDI) for further and specific medication information.

†Patients should be routinely monitored for suicidal thoughts, depression and behavioural changes.

‡The *HLA B*1502* allele has been associated with predisposition to a severe cutaneous medication reaction (eg Stevens–Johnson syndrome) when taking carbamazepine, oxcarbazepine, lamotrigine and phenytoin.[25] Patients of Asian ethnicity (excluding Japanese) should be tested prior to commencement of therapy, and these medications avoided if possible if the allele is present.[15]

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CASE

2 Naru's mouth is burning

Naru is a woman aged 55 years who presents with a one-year history of oral burning. She reports that it is constant, predominantly affecting the anterior tip of her tongue and hard palate, and she feels that it is gradually getting worse.

Her medical history includes type 2 diabetes, asthma, gastroesophageal reflux, hypertension, depression and anxiety. Her daily medications include metformin 500 mg, escitalopram 10 mg, pantoprazole 20 mg and ramipril 5 mg. She uses a corticosteroid inhaler (budesonide/formoterol 160/9 µg) daily for her asthma.

Naru does not smoke and consumes 1–2 standard alcoholic beverages per week when out socially with friends.

Question 1

What are the possible causes of oral burning?

Question 2

What further information would you like to obtain from Naru in relation to her symptoms?

Further information

Naru is partially edentulous and wears a full upper denture. She rarely removes it at night. Her upper denture is more than 10 years old and poorly fitting. She also does not rinse out her mouth for steroid use. She does not have any recent trauma history, and there have been no recent changes to her medical history.

Clinically, you see creamy, semi-adherent plaques in the maxillary buccal sulcus (Figure 1).

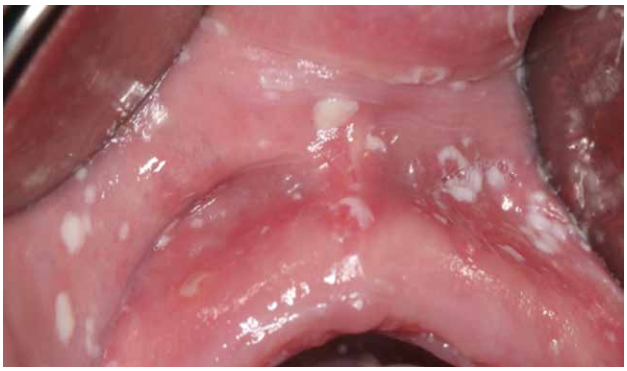

Figure 1. Creamy, semi-adherent plaques in the maxillary buccal sulcus

Question 3

Based on Naru's history and the plaques visible, what would be the most likely diagnosis?

Question 4

What are some signs and symptoms of oral candidosis?

Question 5

How is oral candidosis best diagnosed and managed?

Further information

You prescribe Naru miconazole 2% oral gel to be used four times daily for 14 days. She also receives a new, well-fitting maxillary complete denture, and her denture hygiene improves. However, after four weeks she comes to see you and tells you that her oral burning persists.

Question 6

What further tools or investigations would be helpful to establish the cause of Naru's oral burning?

Further information

Based on Naru's history, you order a full blood examination, iron studies and tests for vitamin B12, serum folate and glycated haemoglobin. All serological tests are within normal limits.

Question 7

Assuming there are no signs of oral pathology or mucosal lesions, what could Naru's diagnosis be?

Question 8

How is burning mouth syndrome (BMS) treated?

CASE 2 Answers

Answer 1

Possible causes of oral burning include:

- medication related (most common)
- traumatic, including iatrogenic causes (eg radiotherapy to the oral cavity), or physical, thermal or chemical trauma
- autoimmune/immune mediated (eg Sjogren's syndrome or oral lichen planus)
- neoplastic (eg central nervous system pathology)
- idiopathic (eg oral dysaesthesia or BMS)
- infective (eg oral candidosis)
- degenerative (eg Alzheimer's disease)
- systemic conditions (eg nutritional deficiencies)
- metabolic conditions (eg diabetes).

Answer 2

Relevant information to seek on history-taking includes the following.

History of presenting complaint

It is important to seek a history of the oral burning, including:

- date of onset
- precipitating event
- previous treatments trialled
- other investigations undertaken
- quality of the pain
- intensity of the symptoms
- exacerbating or relieving factors.

Medical history

Extensive attention needs to be paid to the medical history, as burning symptoms in the oral cavity can be caused by a range of systemic and local factors.

Some considerations include:

- Naru's diabetic control
- nutritional deficiencies
- autoimmune conditions
- endocrinopathies
- central nervous system disorders including multiple sclerosis or Parkinson's disease
- traumatic causes, such as damage to tongue papillae; this may be due to mucosal disease or damage secondary to salivary gland hypofunction (eg radiotherapy, saliva problems, eating disorders, gastroesophageal reflux, dehydration or previous oral cavity surgeries)
- medication-related adverse effects (eg angiotensin-converting enzyme inhibitors, antibiotics, neurological medications, cardiac medications, endocrine medications and psychotropic medications).[1]

Psychosocial history

Psychological and psychiatric comorbidities are prevalent in a significant number of patients who experience oral burning.[2] Some patients with oral burning have a high incidence of anxiety, depression and personality disorders.[3]

Associated symptoms

Associated symptoms may include xerostomia (salivary gland hypofunction) and dysgeusia.[4]

A history of trauma

Chemical, mechanical or thermal trauma may cause oral burning. One possible cause of trauma is an ill-fitting prosthesis such as a denture.

Parafunctional habits

A habit such as tongue thrusting may cause damage to the tongue papilla.

Mucosal lesions

Naru's oral burning may be related to an underlying condition. Oral mucosal diseases such as oral infections (eg oral candidosis), mucocutaneous lesions (eg oral lichen planus) and other mucosal reactions such as hypersensitivity, contact allergy and lichenoid reactions can be associated with oral burning.[5]

Answer 3

From your clinical examination and patient history, the most likely diagnosis is oral candidosis.

Answer 4

Candida spp. are the most common fungal pathogens isolated from the oral cavity.[6] As they are commensal organisms, their presence is not indicative of pathology. Of the *Candida* spp., the dimorphic yeast *Candida albicans* is the most common and is generally regarded as the most virulent. Oral carriage of *Candida* spp. is generally asymptomatic, occurring in between 35% and 80% of healthy individuals.[7] *Candida* spp. opportunistically instigate oral infection when there is an underlying predisposing condition in the host, and this transition from harmless commensal microorganisms to pathogenic microorganisms is the result of upset of the delicate and fine balance between host immune defences and fungal virulence factors.

There are a variety of clinical presentations. Primary oral candidosis classification includes pseudomembranous, erythematous and chronic hyperplastic candidosis. Naru's presentation is consistent with pseudomembranous candidosis. Candida-associated lesions include angular cheilitis, median rhomboid glossitis, denture-associated erythematous stomatitis and linear gingival erythema. Secondary oral candidosis includes chronic mucocutaneous candidosis.

The pseudomembranes of pseudomembranous candidosis present as white patches and are typically semi-adherent, leaving a red erythematous base when removed. Lesions are usually asymptomatic, although patients may sometimes complain of burning and dysphagia. Chronic hyperplastic candidosis presents as white plaques, and may be homogenous or speckled. Chronic hyperplastic candidosis lesions are usually asymptomatic and may be associated with a higher degree of dysplasia and malignancy. A biopsy is usually mandatory. Erythematous candidosis, presenting as small or large red areas, is usually painful, especially in the acute form.

Answer 5

As *Candida* spp. are commensal organisms, the use of swabs for culture and microscopy is not necessarily able to discriminate between candidal carriage and invasiveness in the oral cavity. The correct methods of sampling and detection will therefore depend on the nature of the lesion being investigated. The diagnosis of oral candidosis is generally based on clinical signs and symptoms in conjunction with a thorough medical history.

Risk factors for the development of oral candidosis are numerous. Examples of local predisposing factors include a prosthesis such as a denture, endogenous epithelial changes, change in the commensal flora, and qualitative and quantitative salivary changes. Systemic risk factor examples include primary and secondary immunodeficiencies, nutritional deficiency, endocrine deficiency and malignancies.[8] Risk factors should be addressed as part of management.

Polyene or azole antifungal agents are commonly used in the pharmacological management of candidosis. Fungicidal polyene medications, such as amphotericin B, act by binding

to sterols in the plasma membrane, disrupting membrane function. Fungistatic azoles, such as fluconazole and ketoconazole, act by inhibiting the target enzyme lanosterol demethylase in the ergosterol biosynthetic pathway.[9] Treatment using lozenges should comprise a 10 mg lozenge sucked (then swallowed) four times per day after food, for 7–14 days, until 2–3 days after symptoms resolve.[9] Amphotericin B lozenges should be avoided in patients with salivary gland hypofunction as they are difficult to dissolve, and the sucking action may further irritate the oral mucosa.

Nystatin oral suspension (100 000 units/mL) is frequently prescribed for patients. The Therapeutic Guidelines recommend a dose of 1 mL topically (then swallowed), four times per day after food, for 7–14 days, continued for 2–3 days after symptoms resolve.[10] Care should also be exercised when prescribing this to patients at high risk of caries or those who are not regular dental attendees, as this medication contains large amounts of sucrose. The patient must not eat or drink directly after application, as successful treatment requires an adequate contact time between the medication and oral mucosa, and this is often overlooked. To apply the aforementioned medications, patients must remove any prosthesis such as dentures. Miconazole 2% oral gel may be applied directly to the fitting surface of dentures, aiding ease of use in these patients. The recommended treatment regimen using miconazole is 2.5 mL topically (then swallowed), four times daily after food, for 7–14 days, continued for at least seven days after resolution of symptoms.[10] Denture hygiene, such as removing nightly and appropriate cleaning, must also be reinforced.

Answer 6

Investigations to consider may include blood tests and saliva testing.

Patients presenting with subjective xerostomia and objective salivary gland hypofunction will likely present with oral burning. Saliva testing may sometimes be undertaken to demonstrate this. Underlying autoimmune conditions to consider and exclude include Sjogren's syndrome and systemic lupus erythematosus.[5] While out of the scope of this case, clinicians should be aware of systemic signs, such as sicca symptoms, that would precipitate further investigation.

Systemic conditions associated with oral burning include nutritional abnormalities (eg vitamin B12, folic acid or iron deficiencies), diabetes, adverse medication reactions, hormonal deficiencies (eg hypothyroidism and steroid sex hormones) and emotional stress.[5] Naru's blood glucose control should also be reviewed.

Measurements of iron, folate, ferritin and vitamin B12 levels have been recommended as a screening test in patients with oral burning.[11] Other serological tests to consider include vitamins B1, B2 and B6 and zinc, although a strong association has not been shown. A thyroid function test should be considered if the patient has other symptoms that are indicative of hypothyroidism.

Answer 7

BMS is also known as oral dysaesthesia or complex oral sensitivity disorder. Older terminology includes 'stomatodynia', 'glossopyrosis' or 'glossodynia'. It is a diagnosis of exclusion, and therefore other factors that may be associated with oral burning should be excluded before reaching a diagnosis of BMS.

While not actually a syndrome, BMS is defined as 'a chronic intraoral burning sensation that has no identifiable cause – either local or systemic condition or disease'[12] or 'an intraoral burning or dysaesthetic sensation, recurring daily for more than two hours per day for more than three months, without evident causative lesions on clinical examination and investigation'.[13]

BMS is associated with normal clinical signs and laboratory findings. It is estimated to affect between 0.1% and 3.9% of the general population and is most typically seen in post-menopausal women.[13] The cause of BMS is poorly understood, but hypotheses include peripheral neuropathy or neuropathic pain, with central sensitisation.[14]

The most frequently affected area for people with BMS is the tongue, but it can affect any area of the oral mucosa. Symptoms are typically bilateral and symmetrical, and the pain tends to follow a temporal pattern, most commonly worsening during the day.[15,16]

Answer 8

BMS is a chronic, distressing condition, and it has a negative impact on patients' quality of life.[13] Management may be difficult, and there should be consideration of any perpetuating psychosocial factors.[16] These should be addressed as part of a comprehensive management plan.

Many pharmacological treatments have been trialled, including topical or systemic clonazepam, gabapentinoids, tricyclic antidepressants and antispasmodics.[12] Success rates vary considerably.[12]

The best evidence exists for efficacy of topical and systemic clonazepam.[17] Topical clonazepam (using 0.5–1 mg three times daily for two weeks) can effectively reduce pain intensity in some patients with BMS, with some carryover effects observed at six months.[17]

Other management strategies include the use of vitamin B12 or zinc supplementation, alpha-lipoic acid, palmitoylethanolamide, low-level laser therapy and capsaicin mouthwashes.[5] Patient education and anxiety management to improve patients' quality of life should also be considered. To date, few effective treatments are available, and management of BMS can be challenging.

Conclusion

There are numerous differential diagnoses for intra-oral burning. BMS is a diagnosis of exclusion, and therefore other factors that may be associated with oral burning should be excluded before reaching a BMS diagnosis. Treatment can be challenging, and there should be consideration of any

perpetuating psychosocial factors. Referral to an oral medicine specialist should be considered.

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CASE

3 Ingrid has a sore mouth

Ingrid, aged 66 years, presents with a five-year history of periodic mouth soreness and ulcers, which stop her from eating comfortably. She has noted an increase in the frequency of her mouth ulcers, with episodes occurring monthly and lasting 2–3 weeks. She finds eating spicy foods very uncomfortable and notes that her gums are sensitive when she brushes her teeth.

Her medical history is otherwise significant for osteoporosis, which is managed with 35 mg risedronic acid, weekly. She is an ex-smoker with a 30 pack-year history and consumes three standard drinks of alcohol per day. You conduct a comprehensive head and neck examination, followed by an oral examination under white light. You note the lesions as shown in Figure 1.

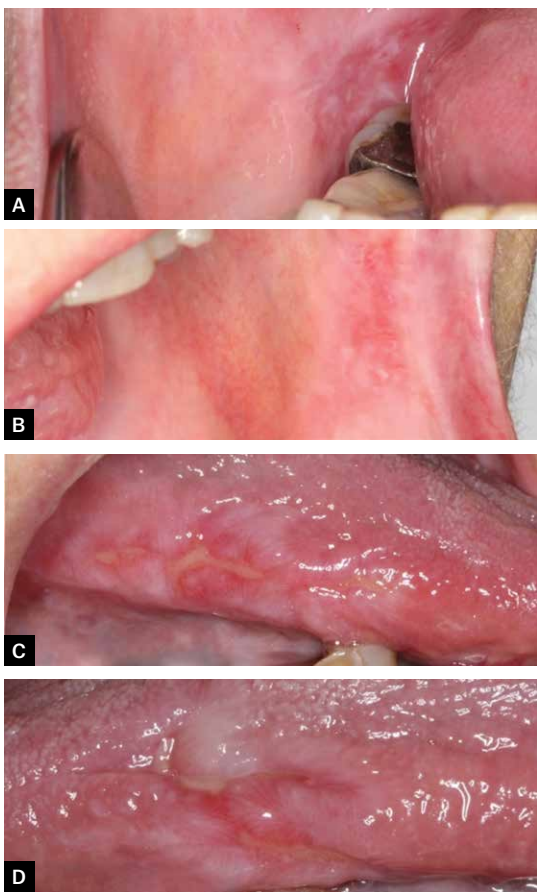

Figure 1. Clinical images of Ingrid's mouth

A. White reticular striae with background erythema on the posterior right buccal mucosa; **B.** Erythema with subtle white striations noted on left anterior buccal mucosa; **C.** Ulceration with background erythema and white striae; **D.** Ulceration with associated erythema and white reticular striae

Question 1

What is the possible differential diagnosis for Ingrid's mouth soreness?

Further information

On further questioning, Ingrid tells you she has not experienced any cutaneous lesions or genital irritation. She also does not report any oral blisters. She has, however, noted increased linear ridging along her nails.

Question 2

What is the most likely diagnosis for Ingrid's oral condition?

Question 3

How would you confirm this diagnosis?

Further information

Ingrid undergoes an oral soft-tissue biopsy from the right buccal mucosa, and her tissue specimen is sent for histopathological assessment and direct immunofluorescence. Both test results confirm oral lichen planus (OLP) .

Question 4

What management options could help alleviate Ingrid's oral symptoms?

Question 5

What is Ingrid's prognosis? What advice would you give her?

Further information

You refer Ingrid to an oral medicine specialist but she misses her routine follow-up appointment regarding her OLP. She presents to you two months later, complaining of an ulcer on her right lateral tongue that is not responding to topical corticosteroids. She mentions that she has been applying 0.05% betamethasone dipropionate ointment twice per day for the past month to the ulcer, with no clinical improvement. In fact, she believes the ulcer has increased in size during this time. You conduct a comprehensive head and neck examination, followed by an oral examination under white light. No regional lymphadenopathy is palpable. Intra-orally, you note an indurated, tender, ulcerated lesion with surrounding patchy erythematous and white mucosal changes on the right anterior lateral tongue (Figure 2).

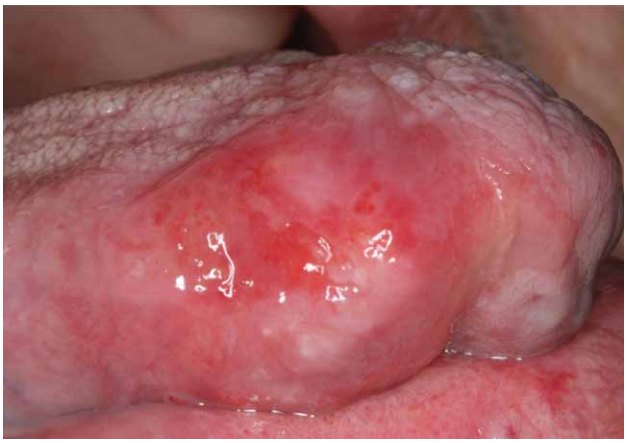

Figure 2. Clinical image showing an ulcerated lesion with mixed erythematous and white mucosal changes on the right anterior lateral tongue

Question 6

What is your differential diagnosis?

Question 7

How would you finalise the diagnosis? What investigations should you consider?

Further information

You refer Ingrid to an oral medicine specialist, who performs an incisional biopsy. Ingrid's histopathology results confirm an oral squamous cell carcinoma. She is informed by her oral medicine specialist of this diagnosis but re-presents to you feeling scared and wanting more information about what future management entails.

Question 8

How would you counsel Ingrid about her upcoming cancer management?

Further information

Ingrid was informed that her oral cancer diagnosis was given a stage II clinical classification. She is worried about her prognosis and would like to know what the current prognosis is for oral cancer in Australia.

Question 9

How would you answer Ingrid?

CASE 3 Answers

Answer 1

Oral ulcerative conditions have a wide range of clinical presentations. They can occur as a result of local oral disease or indicate an underlying systemic condition, including viral, bacterial, parasitic and fungal infections; immune-mediated diseases; neoplasms; haematological disorders; trauma; and medication reactions.[1,2] The differential diagnosis for oral ulcerative conditions can be narrowed by taking a thorough history and a careful clinical examination. Specifically, history and clinical examination should assess for number of lesions (solitary ulcer versus multiple), duration of ulcers (acute versus chronic), specific localisation (keratinised versus non-keratinised mucosa), presence of a blister preceding the ulcer, presence of other mucosal changes and presence of other systemic manifestations including cutaneous rashes or genital irritation.[3,4] Ingrid's history and clinical findings indicate the presence of multiple chronic, recurrent oral ulcerations in association with other mucosal changes. Based on this, the differential diagnosis for Ingrid would include the following immune-mediated conditions of the oral cavity.

Oral lichen planus

OLP presents with a bilateral, symmetrical pattern, with the presence of a lacelike network of slightly raised grey-white lines (reticular lesions). The buccal mucosa (bilaterally) is the most common site of involvement, but OLP can affect any mucosal site.

While reticular lesions are the most recognised form of OLP, other clinical subtypes – including erosive, atrophic, bullous and plaque-like lesions – can coexist within the same patient, making clinical diagnosis challenging. The presence of reticular lesions in the oral mucosa is, however, required for a clinical diagnosis of OLP.

Systemic manifestations can also include cutaneous lesions affecting the skin, nails and scalp. Genital involvement is common in women with lichen planus, with resultant burning, pain and vaginal discharge. Oesophageal, conjunctival and laryngeal involvement have also been documented.

Oral lichenoid reactions

Oral lichenoid reactions are hypersensitivity reactions (eg to medications or dental restorations) that resemble OLP clinically.

Cases of oral lichenoid reactions related to restorative material typically present in direct topographic relationship with the restorative material.

Lichenoid medication reactions typically arise with a direct temporal association when taking certain medications (eg nonsteroidal anti-inflammatory drugs, antihypertensive medications, oral hypoglycaemic medication).[5]

Mucous membrane pemphigoid

Mucous membrane pemphigoid commences with recurring vesicles or bullae affecting either mucous membranes or skin. There is primary oral involvement of gingiva, buccal mucosa, hard and soft palate, and tongue.

Fluid-filled blisters develop and then break, leaving raw, painful ulcers that heal slowly over several days to weeks.

The most common oral manifestation is patchy, or generalised gingival sloughing with superficial ulcers and erosion.[6]

Bullous pemphigoid

Bullous pemphigoid primarily affects the skin, with occasionally mild mucosal blistering and ulceration.[7]

Graft versus host disease

Graft versus host disease resembles OLP clinically. It may also present with salivary gland involvement, presenting similarly to Sjogren's syndrome or with sclerodermatous changes to the skin.

The patient will have a history of allogenic haematopoietic stem cell transplant.

Lupus erythematosus

Oral manifestations of lupus erythematosus cause pain and sensitivity, and present as aphthous-like ulcers or poorly demarcated red and white reticulated lesions of the buccal, lip and palatal mucosa.[8]

Pemphigus vulgaris

In pemphigus vulgaris, the oral mucosa displays erosions more often than intact blistering. The palatal mucosa, buccal mucosa, labial mucosa and tongue are most commonly affected. Oral mucosal involvement can present with or without skin lesions.

Linear immunoglobulin A disease

Oral involvement consists of painful erosions and ulceration, with generalised erythema on gingiva. Bullae or urticarial plaques in a ring-shaped distribution can be noted on the trunk and extremities.[7]

Answer 2

Ingrid's oral mucosal lesions are clinically consistent with OLP. Lichen planus is a chronic inflammatory disease affecting the skin, scalp, nails and mucosa.[1,9] In the oral cavity, OLP is commonly chronic and non-remissive, and it can be a source of morbidity.[9] OLP is the most common mucocutaneous condition of the mouth, affecting approximately 1–2% of the population.[9] While the most recognised clinical manifestations of OLP include reticular lesions, other patients may display an array of signs and symptoms that further subtype this condition into reticular, plaque-like, atrophic, erosive, papular and bullous.[1,9] Symptomology regarding OLP varies among individuals, with some patients remaining asymptomatic, while other patients report roughness of the lining of the mouth, sensitivity of the oral mucosa to hot or spicy foods, experience of oral ulcerations, or red-white patches.[1,9]

Answer 3

While some patients show a classic reticular pattern on oral mucosal surfaces, it can be challenging to clinically diagnose non-reticular types or oral lichenoid reactions. Therefore, to achieve a final diagnosis, clinical as well as histopathological criteria should be included. These criteria are outlined in the modified World Health Organization (WHO) diagnostic criteria for OLP and oral lichenoid lesions (OLL).[10] The clinical criteria include the presence of symmetrical, bilateral lesions and a lacelike pattern of raised grey-white lines. If there are reticular lesions elsewhere in the oral mucosa, then erosive, atrophic, bullous and plaque-like lesions are also considered a subtype. If the lesion resembles OLP but does not completely align with the clinical criteria, it is considered 'clinically compatible with' OLP. The histopathological criteria include evidence of 'liquefaction degeneration' in the basal cell layer as well as a well-defined, band-like zone of cellular infiltration (predominantly lymphocytes) located on the superficial part of the connective tissue. There is no epithelial dysplasia. If these criteria are not clearly met, the presentation is considered 'histopathologically compatible with' OLP. The term OLP is used if all criteria are fulfilled. OLL is used if the presentation is clinically and histopathologically 'compatible with' OLP, or in cases where the clinical and histopathological features are typical but the associated histopathological and clinical features (respectively) are only 'compatible with' OLP.

For patients requiring an oral soft-tissue biopsy, referral to an oral medicine specialist, oral and maxillofacial surgeon or head and neck surgeon is advised.

In some cases, histopathology may not be conclusive, or clinical features may resemble other immune-mediated mucocutaneous conditions. In these circumstances, additional direct immunofluorescence (DIF) is essential for appropriate diagnosis. The reported DIF findings for OLP include shaggy deposition of fibrinogen at the basement membrane zone, positive anti–immunoglobulin M staining of colloid bodies and weak anti-C3 staining within the basement membrane zone.[11]

Answer 4

Management of OLP should be based on the degree of clinical involvement as well as the patient's symptoms and age. Topical steroids remain the first-line treatment for OLP.[9,12] Systemic steroids are reserved for acute exacerbations, multiple or widespread lesions or patients unresponsive to topical steroids.[9,12] Topical and systemic immunosuppressants have also shown efficacy in the management of atrophic and erosive OLP. Referral to an oral medicine specialist should be considered when treatment is required for atrophic and ulcerative lesions.

Table 1 outlines the available pharmacotherapeutic agents that have shown efficacy in the management of symptomatic OLP. Further advice should also be given regarding the use of sodium lauryl sulphate–free toothpaste to reduce the sensitivity experienced when brushing teeth, in addition to avoiding known triggers of symptoms. An optimal oral hygiene program, with regular dental attendance, should be instituted in patients with gingival disease and to ensure sharp teeth or broken restorations do not exacerbate the patient's symptoms.[1]

Answer 5

OLP is considered a potentially malignant disorder, although the rate of malignant transformation has sparked heated debates for almost a century.[13] Recent studies have shown a

Table 1. Empirical treatments for oral lichen planus[9,12]

Medication group with examples	Route of administration
Corticosteroids	
Clobetasol	Topical as cream, gel, ointment within optimised vehicle delivery or in a paste or mouthwash Intralesional injection Systemic *Note: The use of topical antifungals as prophylactic agents can be considered in conjunction with topical steroid use to prevent secondary oral candidosis*
Fluocinolone	
Triamcinolone acetonide	
Betamethasone	
Dexamethasone	
Prednisolone	
Immunosuppressants	
Cyclosporine	Topical as ointment, cream or mouthwash
Tacrolimus	
Pimecrolimus	
Azathioprine	Starting dose at 150 mg per day; also available as mouthwash
Thalidomide	50–150 mg per day orally Gel for topical use
Disease-modifying antirheumatic medications	
Mycophenolate	2–3 g per day for adults
Methotrexate	7.5–12.5 mg per kg per week in two divided doses
Hydroxychloroquine	100–400 mg daily in two divided doses
Antibiotics	
Dapsone	50–100 mg per day orally
Retinoids	
Isotretinoin	Topical as cream, ointment or paste Systemic
Tretinoin	
Tazarotene	

malignant transformation rate of 0.44%, with risks of malignant transformation significantly higher among patients with OLP who have smoked (odds ratio [OR] = 4.62), consumed alcohol (OR = 3.22), were seropositive for hepatitis C infection (OR = 3.77) and/or displayed a non-reticular subtype (OR = 0.37).[13] Counselling should be undertaken to educate the patient regarding associated malignant transformation risks. Furthermore, modifiable risk factors should be assessed, including advice on smoking cessation, moderation of alcohol intake and cessation of alcohol-containing mouthwashes. Finally, Ingrid should be reviewed at regular intervals (ranging from every two months to annually), with the interval determined by disease activity and symptomology.[1]

Answer 6

Given the history of a non-healing ulcer with associated induration, with the background of OLP, a differential diagnosis of oral squamous cell carcinoma needs to be considered. Oral squamous cell carcinomas have variable clinical presentations, appearing as a flat/slightly raised white, red or mixed white-red lesion; an exophytic lesion; or a chronically ulcerated and indurated mass.[14] Therefore, oral cavity lesions that fail to resolve within two weeks should raise the suspicion of the treating clinician.

Answer 7

Ingrid should be referred to an oral medicine specialist, an oral and maxillofacial surgeon or a head and neck surgeon for an incisional biopsy with histopathological analysis.[15] Histopathological assessment is required to diagnose oral squamous cell carcinoma and should be undertaken by a specialist oral and maxillofacial pathologist or anatomical pathologist with an interest in oral pathology. Computed tomography (CT) scanning with contrast or magnetic resonance imaging (MRI) of the head and neck should also be undertaken to evaluate the extent and infiltration of the lesion and associated lymphadenopathy.[15]

Answer 8

Management for oral squamous cell carcinoma is dependent on anatomical site, tumour staging and patient factors, with an individualised treatment plan generally formalised by a multidisciplinary team comprising surgeons, oncologists, pathologists, oral medicine specialists and health support staff.[14,15] Further imaging with positron emission tomography–CT is undertaken by the multidisciplinary team to detect metastasis or secondary primary tumours, and to finalise tumour staging.[15]

Treatment for early-stage oral cancers (stage I and II) is primarily surgical, including resection of the primary tumour with possible neck dissection or sentinel lymph node biopsy.[14,16] Surgical treatment is directed at both the primary tumour and neck for oral cancers with advanced tumour staging including neck dissection (stage III or IV), with adjuvant radiotherapy or chemotherapy possibly used post-operatively. Follow-up care every three months in the first year post-treatment, every 2–6 months in the second year, every 4–8 months in years 3–5 and annually after the fifth year is advised. This allows for early detection of disease recurrence, detection and management of treatment complications and provision of psychosocial care.[16]

Answer 9

It is important to reassure Ingrid that her tumour staging (stage II) is considered an early staging, with an Australian study suggesting a three-year survival prognosis of 75%.[17] Detecting and diagnosing oral cancers early is key to favourable outcomes for the patient.[17] Studies have shown a

significant disparity in prognosis between early-stage cancers and advanced-stage cancers, with reported five-year survival ranges from 25% to 85%.[18] Finally, the diagnosis and treatment of oral cancers can be confronting and can lead to psychosocial issues including depression and anxiety.[16] Excellent guidelines on psychosocial care of patients with cancer are available for general practitioners from Cancer Council Australia.[19]

Conclusion

OLP is the most common mucocutaneous condition affecting the oral cavity. It has a wide range of signs and symptoms, but most often presents with a symmetrical, bilateral lacelike network of slightly raised grey-white lines. Clinical and histopathological criteria are needed to fulfill a diagnosis of OLP. This can be further supplemented by direct immunofluorescence, especially when other immune-mediated conditions must be excluded. Topical corticosteroids remain the first-line treatment for symptomatic management. Counselling should be provided to patients regarding the risk of malignant transformation. Modification of risk factors, including smoking and alcohol cessation, need to be reinforced. Regular follow-up should be scheduled for patients with OLP to ensure their symptoms are well managed, with surveillance for mucosal changes indicative of malignancy.

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CASE

4 Rodger's face is swollen

Rodger, aged 53 years, presents with fever and lethargy. He says that the left side of his face is swollen and painful. He feels like the area near his ear has become rapidly swollen. Rodger mentions that when he eats, he experiences an unusual taste and worsening of his pain. His medical history is unremarkable.

Question 1

What do you think is the nature of Rodger's swelling?

Further information

Examination reveals pain and swelling that is localised to the left parotid region. You note that the parotid gland on this side feels larger and warmer than the contralateral side, with erythematous changes to the overlying skin. There are no cuts or abrasions on Rodger's skin, and he says he has no discomfort in or around his teeth.

Question 2

What is the most likely diagnosis for Rodger's presentation?

Question 3

What are some other causes of salivary gland swelling?

Question 4

How would you manage Rodger's presentation?

Further information

Rodger re-presents two days later. He did not take the antibiotics and now reports that in addition to the previous symptoms, he has decreased oral intake due to difficulty and pain when swallowing.

Question 5

Does this new presentation change your management?

Further information

Rodger is successfully managed at the hospital and presents a week later for follow-up. During the appointment, he says that he has been experiencing a dry mouth for several months.

Question 6

Is this information relevant to Rodger's infection?

Question 7

How would you assess this presentation?

Further information

During the appointment, Rodger reveals he believes his mouth is dry when he eats and usually requires liquids to assist with eating. Extra-oral examination is normal; no mass, swelling or residual tenderness is found. Intra-oral examination reveals oral dryness with a labial mucosa rehydration time greater than 30 seconds. You diagnose Rodger with a dry mouth (hyposalivation).

Rodger would like some advice on why he has a dry mouth.

Question 8

What would you tell Rodger?

Further information

Rodger mentions that he has noticed a reduction in his ability to taste as well as some discolouration to his teeth. He would like to know if the dryness is a contributing factor.

Question 9

How would you answer Rodger?

Further information

Rodger tells you his dry mouth significantly bothers him. He wonders if something can be done.

Question 10

How would you counsel Rodger?

CASE 4 Answers

Answer 1

Rodger's swelling appears infective in nature because of the rapid onset and constitutional symptoms of fever, chills and malaise. Orofacial swellings that occur as the result of an infection have a wide range of causes and are often categorised into odontogenic and non-odontogenic.[1]

Odontogenic infections primarily involve the teeth and include periapical disease, periodontal disease and pericoronitis.[2] Non-odontogenic infections presenting with orofacial swelling are varied and may arise from the oral or oropharyngeal region, salivary glands, developmental cysts and skin.[3]

Answer 2

Rodger has acute suppurative sialadenitis (parotitis). Acute suppurative sialadenitis is usually caused by *Staphylococcus aureus*, though occasionally streptococci, coliforms and polymicrobial infections can be the cause.[4] As in Rodger's case, the affected salivary gland will feel larger and warmer than the contralateral side. To touch, the affected salivary gland may feel tense or fluctuant. Patients tend to feel systemically unwell and, as the infection progresses, may complain of difficulty swallowing. When the parotid gland is massaged, suppuration can often be seen coming out of the parotid duct[5] on the buccal mucosa (inner cheek).

Answer 3

While salivary gland swelling may be due to infection, the majority of causes are from non-infective origins.[5] Table 1 outlines potential causes of salivary gland swelling.

Table 1. Potential causes of salivary gland swelling[5,6,25]

Neoplasms	**Benign**	Pleomorphic adenoma, Warthin's tumour, basal cell adenoma, monomorphic adenoma
	Malignant	Mucoepidermoid carcinoma, adenoid cystic carcinoma, acinic cell carcinoma, adenocarcinoma, lymphoma
Infection	**Viral**	Mumps, Coxsackievirus, Epstein–Barr
	Bacterial	*Staphylococcus aureus*, *Streptococcus* spp., mixed
Metabolic		Alcoholic liver disease, malnutrition, bulimia, obesity, coeliac disease
Endocrine		Diabetes, hypothyroidism, Cushing's syndrome
Medication or food hypersensitivity		Anticholinergic, heavy metals, psychotropic
Obstructive		Stones (sialolith), mucous retention (ranula)
Autoimmune disease		Sjogren's syndrome, immunoglobulin G4–related diseases

Answer 4

Initial management involves culture and susceptibility testing of the exudate from the parotid duct. As the patient is systemically unwell, it would be appropriate to commence empirical antibiotics with *S. aureus* cover, such as:[6]

- dicloxacillin 500 mg orally, six-hourly for 10 days
- flucloxacillin 500 mg orally, six-hourly for 10 days
- clindamycin 450 mg orally, six-hourly for 10 days (for patients allergic to penicillin).

In the majority of cases, the patient will respond quickly to oral antibiotics. It is recommended to counsel patients on supportive therapy such as salivary gland massage, warm compresses and sialagogues to increase flow of saliva and rehydration. If patients do not respond to treatment within 48 hours, imaging is indicated to assess for an obstructive process or abscess.[7,8]

Answer 5

Rodger's condition has worsened and he should now be referred urgently to a tertiary hospital (with ear, nose and throat/maxillofacial services) for surgical review. While rare, airway obstruction caused by oedema and spread of infection to the parapharyngeal spaces has been reported.[9,10] Rodger will require urgent assessment. This assessment will involve a clinical examination, further culture and susceptibility testing of any suppuration as well as imaging. Ultrasonography with or without computed tomography scanning of the head and neck will be performed followed by the administration of intravenous antibiotics in conjunction with local intervention such as drainage.[11] Oral antibiotic therapy will be initiated once Rodger can swallow.

Answer 6

Rodger has xerostomia – a subjective sensation of oral dryness. This may or may not be associated with salivary gland hypofunction (SGH) – the objective reduction of salivary production.[12] While xerostomia alone is not associated with an increased risk of acute suppurative sialadenitis, SGH is.[13]

Answer 7

SGH is diagnosed when the unstimulated salivary flow rate is <0.1 mL/min or the stimulated salivary flow rate is <0.7 mL/min.[14,15]

Rodger should be asked the following questions:

- Does the amount of saliva in your mouth seem to be too little?
- Does your mouth feel dry when eating a meal?
- Do you sip liquids to aid in swallowing dry food?

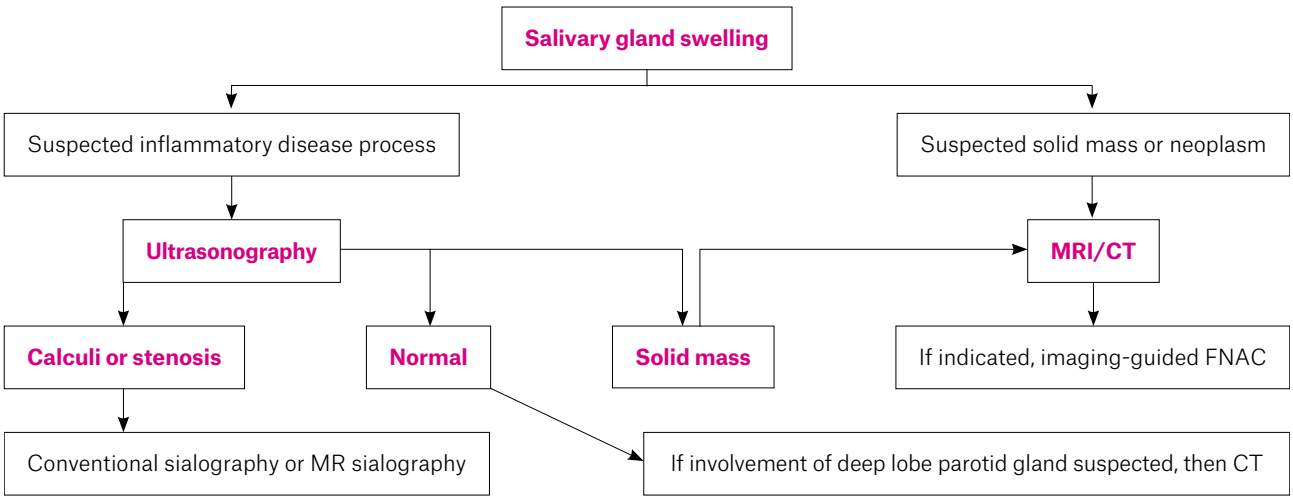

Figure 1. Radiographic assessment of salivary gland swelling

Reproduced with permission from Diagnostic Imaging Pathways, Diagnostic imaging pathways – Salivary gland swelling, Perth, WA: Diagnostic Imaging Pathways, 2012, available at www.imagingpathways.health.wa.gov.au/index.php/imaging-pathways/ear-nose-throat/salivary-gland-swelling#pathway [Accessed 22 November 2020].

CT, computed tomography; FNAC, fine-needle aspiration cytology; MR, magnetic resonance; MRI, magnetic resonance imaging

- Do you have difficulty swallowing?

A positive response to any of these questions is an indication of SGH.[16] Rodger should have his major salivary glands assessed for any masses, swelling or residual tenderness. If abnormalities are found, imaging will be required (Figure 1).

The oral cavity should also be assessed for generalised dryness. A simple technique is to visually assess saliva production from the minor salivary glands in the labial mucosa (inner lower lip).[17] The lower lip should be everted and then dried, and the time taken for this area to rehydrate is then recorded. Times of <30 seconds indicate a normal flow rate.[18]

If SGH is difficult to assess, Rodger should be referred to an oral medicine specialist who can undertake quantitative and qualitative salivary assessment.

Answer 8

SGH has many potential causes. Systemic medical conditions (Table 2), medications as well as the side effects of medical treatment can all be contributing factors.[6,16]

Medications frequently associated with SGH include:[6]

- anticholinergic medications
- antihistamines
- antihypertensives
- antimuscarinic medications
- psychotrophic medications (antidepressants, antipsychotics, psychostimulants, illicit drugs)
- opioids
- alcohol
- cigarettes
- caffeine.

SGH is often worse when people are taking more than one medication.

Medical interventions associated with SGH include radiotherapy to, or through, the major salivary glands, as well as allogeneic stem cell transplant and subsequent graft versus host disease.[19]

Table 2. Medical conditions frequently associated with salivary gland hypofunction[16,19]

Autoimmune and chronic inflammatory conditions	• Sjogren's syndrome • Primary biliary cirrhosis • Immunoglobulin G4–related disease • Sarcoidosis • Rheumatoid arthritis
Degenerative disease	• Amyloidosis
Metabolic disease	• Type 2 diabetes
Infective	• Human immunodeficiency virus/acquired immunodeficiency syndrome • Hepatitis C virus
Developmental	• Salivary gland aplasia or agenesis
Psychological	• Anxiety
Physiological	• Dehydration • Advancing age • Mouth breathing

It is recommended to assess Rodger's medical and social history, as well as medications, to identify if he has any contributing factors to his dry mouth. In addition, haematological testing may be warranted. Tests for antinuclear antibody, extranuclear antibody (including SS-A and SS-B) and rheumatoid factor may be useful. Referral to an oral medicine specialist for minor salivary gland biopsy might be considered if the oral dryness is thought to be due to Sjogren's syndrome, sarcoidosis or amyloidosis.

Answer 9

There are many oral and dental effects of a dry mouth; both alterations in taste and changes to the dentition can occur (Table 3).[19] These effects can be compounded as people who lack taste are often drawn to sweet and more cariogenic (decay-forming) foods.

Table 3. Oral and dental complications of a dry mouth[16,20]

Dentition	• Dental caries • Enamel demineralisation (chalky white spots on teeth) • Plaque accumulation
Periodontium	• Periodontal disease • Gingivitis
Oral mucosa	• Mucosal desquamation • Atrophic mucosa • Traumatic ulceration • Oral candidosis • Painful or burning mouth
Lips	• Peeling • Angular chelitis
Salivary glands	• Swelling and enlargement • Sialadentitis
Oral cavity	• Dysphagia • Dysgeusia • Dysphonia • Halitosis

Answer 10

Rodger's medical history and medications should be assessed to identify any causative or contributing factors. For some patients, oral dryness can be significantly improved by addressing these factors. Medications, including recreational drugs, should be evaluated to see if there are alternatives or if cessation is possible.

Management of oral dryness must also include the prevention and management of the oral and dental complications of the dryness.[20] Rodger should be advised to practice excellent oral hygiene, limit sugar intake and sugary snacks as well as avoid acidic foods and beverages. It is recommended that Rodger has a regular dental examination with his general dental practitioner.[21]

Patients often benefit from additional strategies such as oral lubrication, salivary substitution and salivary flow stimulation. Stimulation is only possible for patients who have adequate salivary gland tissue remaining.

One of the simplest forms of oral lubrication is the regular use of food-grade oil either smeared or sprayed on the mucosa of the oral cavity. Edentulous patients may be counselled on the use of 3% citric acid, which has been shown to be effective.[22] Dentate patients should not use this or any other acidic product as it will lead to rapid erosive changes in the remaining dentition.[23] Many over-the-counter oral lubricants and salivary substitutes exist and are available in different formulations that can be tailored to patients' needs (Table 4).

Table 4. Over-the-counter salivary substitutes[14,19]

Form	Preparations	Main active ingredient
Rinse	Biotene Colgate Dry Mouth Relief	Carboxymethylcellulose
	Oral 7	Carboxymethylcellulose, lactoferrin, lysozyme and lactoperoxidase
Gel	Biotene GC Dry Mouth Gel	Carboxymethylcellulose
	Oral 7	Carboxymethylcellulose, lactoferrin, lysozyme and lactoperoxidase
Toothpaste	Biotene	Carboxymethylcellulose
Tablet	Xylimelts	Carboxymethylcellulose, xylitol

The regular use of sugar-free, non-acidic gum is a simple yet effective tool to stimulate saliva. For patients with functioning salivary glands, parasympathomimetic agents with potent muscarinic-stimulating properties, such as pilocarpine, may be considered.[24] Although these increase salivation significantly, they have many adverse effects that may prevent regular use. Newer management methods, such as electrostimulation, may also be beneficial for these patients.[10] Referral to an oral medicine specialist or dentist for the fabrication of a custom-fitting neuroelectrostimulation device may be considered if non-customised electrostimulation devices fail or become cumbersome to use.[10]

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CASE

5 Lisa has pain when chewing

Lisa, aged 31 years, has had a long history of left-sided temporomandibular joint (TMJ) clicking when she opens and closes her mouth. Her medical history is significant for anxiety and depression. Five days ago, she awoke with severe left-sided jaw pain and limited mouth opening. Attempts to chew food resulted in aggravation of her left-sided jaw pain.

Question 1

What questions should you ask to screen Lisa for temporomandibular disorders (TMDs), as opposed to other orofacial pains?

Further information

Lisa has had a history of intermittent left preauricular area and masseter muscle area pain in the mornings. The pain is aggravated by yawning and eating her breakfast every morning, and it gradually improves as the day progresses. In the past, she has been aware of intermittent periods of left TMJ clicking and catching; however, her clicking has now ceased and her jaw is locked (limited mouth opening).

Question 2

Given Lisa's positive response to the screening questions, how will you conduct your comprehensive history to establish her diagnoses? What additional information may be pertinent?

Further information

Lisa rates her pain as 7/10 on a numerical rating scale. The pain is constant, aching in quality and occasionally sharp with jaw functions. The pain is at its worst in the morning and also with chewing and yawning. Over-the-counter ibuprofen reduces the pain to manageable levels. Lisa is aware of clenching her teeth during the day, especially throughout periods of stress, and sometimes chews her nails. Her partner reports that he can hear her grinding her teeth while asleep. Lisa purchased an over-the-counter mouthguard for her sleep bruxism; however, it was too uncomfortable to wear at night.

Question 3

Why is taking a psychosocial history important?

Further information

Lisa has poor sleep and finds it difficult to fall asleep and stay asleep. She reports that her mind races in the evening. She is happily married with two young children. Her younger son has learning difficulties. Lisa has a casual job at the local supermarket and does not get along with her supervisor. Her history of depression and anxiety began during her childhood and is related to her relationship with her physically abusive father.

Question 4

What are the steps for examination of the masticatory system?

Further information

Lisa's maximum mouth opening is limited to 25 mm with a hard end feel. Her right excursive function is 3 mm and left excursive function is 10 mm. Her jaw deflects to the left on opening. There is pain on palpation of her left preauricular area and masseter muscle without referral to a distant site. There are no TMJ sounds noted. Moderate wear facets of her dentition are noted.

Question 5

Given Lisa's history and examination, what diagnostic imaging is necessary to confirm the diagnosis?

Further information

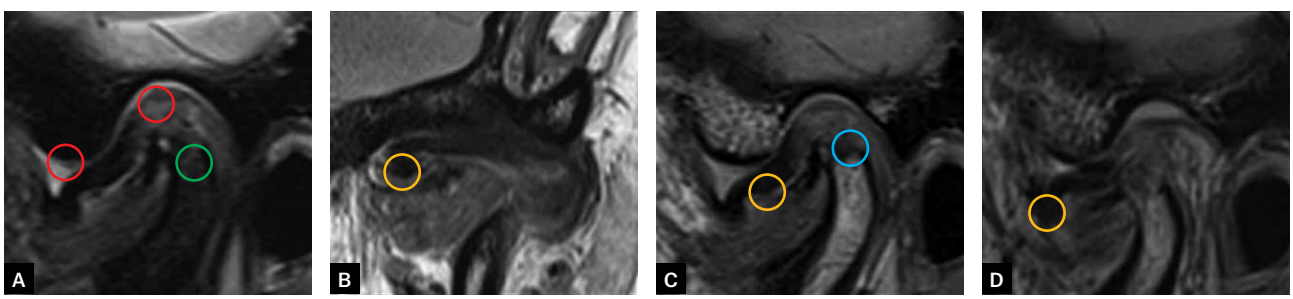
Magnetic resonance imaging (MRI) of the TMJs (Figure 1) is obtained and reveals left TMJ disc displacement without reduction, as noted in the closed (Figures 1A, 1B, 1C) and open (Figure 1D) positions. There is also evidence of synovitis, effusion and marrow oedema, which explains the pain. In addition, there are moderate degenerative changes of the condyle.

Question 6

Based on the history, examination and imaging, what is Lisa's diagnosis, and what are the possible contributing factors?

Question 7

What treatment would you prescribe for Lisa?



Effusion and synovitis Slight increased signal related to mild marrow oedema Moderate degenerative change of the condylar head Non-reducing severe anteromedial articular disc displacement

Figure 1. Magnetic resonance imaging of the temporomandibular joint

Non-reducing severe anteromedial articular disc displacement with effusion and synovitis. There is moderate degenerative change with mild condylar marrow oedema. **A**. Corrected sagittal closed T2-weighted image; **B**. Corrected coronal closed proton density (PD)–weighted image; **C**. Corrected sagittal closed PD-weighted image; **D**. Corrected sagittal open PD-weighted image
Images courtesy of Drs Bernard Koong and Tom Huang, Envision Medical Imaging

Further information

In spite of the treatment recommendations, Lisa continues to struggle with limited mouth opening and 7/10 pain based on a numerical rating scale. The pain is localised to the left ear area and masseter muscle. She is becoming more anxious and distressed because of the pain and its effects on her quality of life.

Question 8

What other treatment options are available to Lisa?

CASE 5 Answers

Answer 1

TMDs encompass a group of musculoskeletal and neuromuscular conditions that involve the TMJs, masticatory muscles and associated tissues. Symptoms typically involve pain localised to the preauricular area and masticatory muscles that may be aggravated by jaw function such as chewing and yawning. Mandibular movements may be limited and associated with TMJ sounds such as clicking, popping, grating and crepitus.[1]

Screening questions include:

- Do you have pain in your temple, face, jaw or jaw joint once a week or more?
- Do you have pain once a week or more when you open your mouth or chew?
- Does your jaw lock or become stuck once a week or more?

This questionnaire has a sensitivity and specificity of 98% and 97%, respectively, in accurately identifying painful TMDs and excluding other orofacial pain complaints. It has a positive predictive value of >98.[2]

Answer 2

The comprehensive history starts with the chief complaint, which in this case is severe left-sided jaw pain and limited mouth opening. Other relevant information includes:

- Date and event of onset – determination of the initiating factor(s) or aetiology of the complaint is important to consider when planning treatment.
- Location – the site of pain may not always be the source of the pain, and it is important to direct treatment towards the source of pain.
- Quality – the pain quality enables classification of the pain category. For example, TMDs present as dull pain, aching, pressure, tightness, stiffness and occasionally sharp pain.
- Intensity – the intensity of pain is mostly subjective and influenced by underlying psychosocial factors. It assists in establishing the patient's interpretation and treatment priorities.
- Frequency/duration – these factors identify if the pain is constant or intermittent (brief, or persistent for minutes/hours) and hence enable classification of the pain.
- Modulating factors (precipitating, aggravating or alleviating) – TMDs are similar to pain and dysfunction of the musculoskeletal system and may be precipitated by jaw function and bruxism, and in turn alleviated by analgesics and rest.
- Previous treatment results – provides insight into nature of the pain. For example, anti-inflammatories will likely alleviate painful TMDs.

Answer 3

The psychosocial history typically involves assessment of social, behavioural and psychological issues. Occupational, recreational and familial status are also assessed. In addition, litigation, disability or secondary gain issues are noted. Psychosocial factors often play a part in amplifying orofacial pains and, in some cases, may be the primary aetiological factor. General distress is common in chronic TMDs.[3] Somatic symptoms are a strong predictor of TMD onset. Other contributors to TMD onset include psychological stress, anxiety, obsessive-compulsive feeling and poor pain coping strategies. Overall, patients with TMD exhibit psychological impairment such as anxiety, depression and sleep disturbances because of the presence of persistent pain.[4] The presence of underlying psychosocial stressors may affect prognosis, in spite of typically effective treatment.

Answer 4

Recommended steps for examination of the masticatory system include:

- measure the range of movement
  - normal mouth opening is between 40 mm and 55 mm
  - normal excursive movement (right and left) is at least 7 mm
- note the jaw opening pattern – straight, deviation and deflection (uncorrected deviation) and related to underlying TMJ disk displacement
- note any pain or tenderness with jaw movements as well as end feel (hard – TMJ internal derangement, or soft – muscular in origin)
- palpate the preauricular area and intrameatal area for pain or tenderness

- palpate the main muscles of mastication (temporalis and masseter muscles) for pain or tenderness
- note any trigger points and pain referral patterns
- auscultate and/or palpate for TMJ sounds such as clicking or crepitation.

Intra-oral inspection involves assessment of teeth wear, buccal mucosa ridging and tongue scalloping for underlying bruxism; any oral pathology should be noted.[1]

Answer 5

Imaging should only be undertaken if signs and symptoms are atypical or if the diagnosis remains elusive. Also, imaging may be necessary if typical non-surgical treatments for TMD fail to resolve the pain and dysfunction. The choice of imaging should be based on the history and examination and subsequently the working diagnosis. A screening panaromic radiograph is useful for excluding odontogenic and bony pathology. In cases where bony TMJ pathoses such as degenerative/arthritic changes, fractures, bony cysts, infections and tumours are suspected, computed tomography (CT) is the imaging modality of choice. If soft tissue pathoses are suspected, MRI is the imaging of choice and is considered the gold standard for diagnostic TMJ imaging.[5] It enables open and closed mouth views to determine the TMJ articular disc position and morphology, intra-articular effusion and condylar bone marrow oedema, and hence is ideal for TMJ internal derangements.[6]

Answer 6

Lisa most likely presents with left TMJ disc displacement without reduction with limited mouth opening (closed lock), left TMJ arthralgia, left TMJ degenerative joint disease and local myalgia.[7] The left TMJ disc displacement without reduction with limited mouth opening (closed lock) was diagnosed by pain localised to the left preauricular area, deflection of the jaw to the left on opening, history of TMJ clicking (now ceased/not recaptured) and the limited mouth opening. The left TMJ arthralgia was diagnosed on the basis of pain on function and palpation localised to the left preauricular area. This was further supported by the MRI findings of synovitis, effusion and marrow oedema. The left TMJ degenerative joint disease was diagnosed incidentally by the MRI findings. For patients with TMJ degenerative joint disease, TMJ crepitation on function is typically noted; however, this is not always the case. Last, the local myalgia was diagnosed by pain localised to the left masseter muscle on function and palpation.

It is likely Lisa has developed left TMJ disc displacement because of underlying TMJ degenerative joint disease. With TMJ degenerative joint disease, her left TMJ disc ultimately displaced without recapture (closed lock).[8] It is apparent that her ongoing psychosocial stressors continue to aggravate and perpetuate her jaw pain and dysfunction.

Answer 7

Treatment goals for TMD are similar to other musculoskeletal conditions with a focus on conservative, non-surgical therapies. The aims are to decrease pain, improve function and resume activities of daily living. Education and reassurance regarding the diagnoses is critical. Lisa should be informed that with time and appropriate treatment, her jaw pain and limited mouth opening will gradually improve. In the first instance, resting the masticatory system through soft diet, parafunctional habit awareness and habit reversal such as avoiding clenching during the day and limiting jaw function to within pain-free ranges is paramount. A home physiotherapy program that includes the use of heat and/or ice applied to painful areas, massage of affected muscles and gentle range-of-motion exercises can significantly improve the range of jaw movements and decrease pain.[9]

Given Lisa has significant pain and jaw dysfunction, pharmacological agents may be necessary in the short term. Analgesics, namely aspirin and paracetamol, may be used for pain management. Nonsteroidal anti-inflammatory drugs (NSAIDs) also have been reported to be effective for mild-to-moderate inflammatory conditions.[10] With the above treatment protocol and the natural history of TMD, Lisa's prognosis is good.

Answer 8

Given her persistent pain and limited mouth opening, a different type of NSAID may be considered. Also, intra-articular corticosteroid injection (celestone) under CT guidance may be considered. Physiotherapy under the care of a physiotherapist to reduce pain and improve function is a treatment option.[11] Oral splint therapy (Figure 2) under the care of an oral medicine specialist has been found to be effective.[12] In cases of persistent masticatory myalgia, botulinum toxin injections are often effective in reducing pain and improving function. Referral to a clinical psychologist with expertise in pain to manage Lisa's anxiety and depression may be considered. Surgical options may be explored, and this typically involves either arthrocentesis or arthroscopy of the affected TMJ in cases of TMJ synovitis. Open joint surgery is rarely necessary although may be reserved for cases of TMJ degenerative joint disease unresponsive to non-surgical treatments.

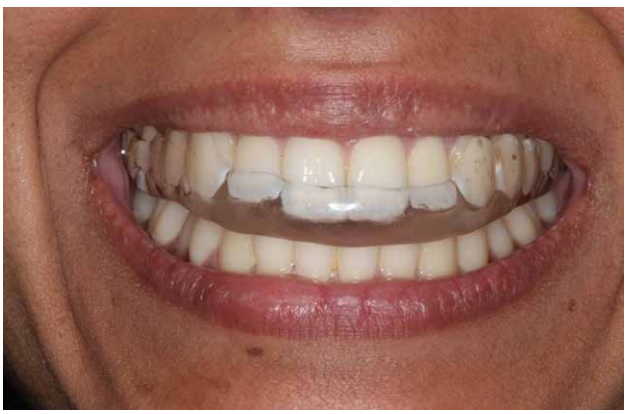


Figure 2. Oral splint therapy

Conclusion

Lisa elects to undergo oral splint therapy to reduce loading from sleep bruxism and also commences jaw physiotherapy and clinical psychology sessions. The combination of these treatments results in a gradual and significant improvement in signs and symptoms. After six weeks, Lisa is able to open her mouth to 41 mm without pain. She is also able to chew normally again without issues.

Summary

TMDs are often remitting, self-limiting or fluctuate over time. Progression to a chronic disabling condition is relatively uncommon. Most patients with TMD improve with conservative and reversible treatment over time and rarely require surgical interventions. There is evidence that psychosocial stressors can aggravate and perpetuate symptoms, and these factors need to be considered in every patient.

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CASE

6 Anthony's lip is swollen

Anthony, aged 49 years, presents with a swollen lower lip. He reports that he has not previously experienced lip swelling and that his current onset was gradual. This has now become cosmetically concerning to him.

Question 1

What is the differential diagnosis for persistent lip swelling?

Question 2

What are the oral manifestations of inflammatory bowel disease (IBD)?

Further information

Anthony does not report skin or gastrointestinal symptoms. In addition to the swollen lower lip, when undertaking a clinical examination you note some crusting of the angles of his mouth, intra-oral ulceration in the lower left buccal sulcus as well as other subtle smaller ulcers elsewhere in the oral cavity, hyperplastic soft lumps on the buccal mucosa and swollen gums, particularly involving the upper anterior teeth. On palpation, there is no lymphadenopathy or other extra-oral mass noted. Collectively, the oral features are suggestive of IBD.

Question 3

What systemic features are suggestive of IBD?

Question 4

What initial investigations should be undertaken?

Further information

You refer Anthony to an oral medicine specialist, and a biopsy of the left buccal mucosa is undertaken. On histopathology, the oral submucosa shows a dense chronic inflammatory infiltrate composed predominantly of lymphocytes, plasma cells and histiocytes. Focal non-caseating epithelioid histiocyte granulomas and scattered multinucleate giant cells of the Langhans and Touton type are seen (Figure 1). Inflammation is most prominent within the subepithelial stroma; however, the deep submucosa and intramuscular connective tissue is involved. Deep within the muscle there are also Langhans-type giant cells. The squamous epithelium shows lymphocyte exocytosis, spongiosis and reactive changes. Anti-*Saccharomyces cerevisiae* antibody (ASCA) immunoglobulin (Ig) G and IgA are elevated, and perinuclear anti-neutrophil cytoplasmic antibody (p-ANCA) is negative. Coeliac serology (deaminated gliadin IgG and endomysial IgA) are negative.

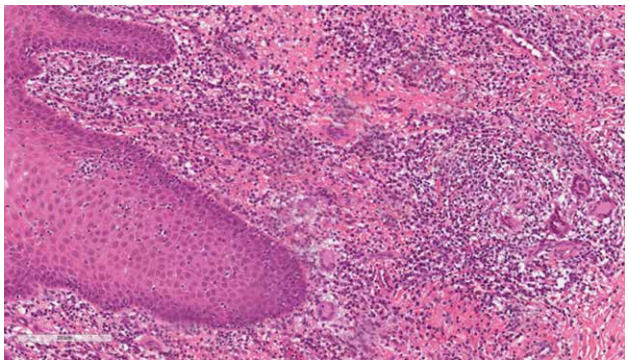

Figure 1. Oral submucosa histopathology demonstrating non-caseating histiocyte granuloma with multinucleate giant cells

Question 5

What additional investigations would help clarify the diagnosis?

Further information

Gastroscopy shows aphthous ulceration of the oesophagus at 20 cm and 39 cm from the incisors. These ulcerations are clean based, superficial and discrete. Biopsies of the ulcerations do not reveal granulomatous disease. Colonoscopy shows moderate-sized internal haemorrhoids but otherwise normal mucosal appearance of the colon and ileum.

Question 6

How should Anthony's condition ultimately be managed?

Question 7

What management of Anthony's oral manifestations would you undertake?

Further information

Intralesional triamcinolone injections (10 mg/mL) are administered by the oral medicine specialist to manage the linear deep ulceration in the buccal sulcus. This is deposited in two divided doses (0.5 mL each). Three fortnightly repeat injections resolve the intra-oral ulceration. Kenacomb ointment three times daily resolves the angular cheilitis. Anthony is worried about his long-term oral and dental health and asks you for advice.

Question 8

What should you advise Anthony regarding his oral health? Are there any considerations before he has dental treatment undertaken?

CASE 6 Answers

Answer 1

Persistent lip swelling can be associated with a range of conditions including sarcoidosis, Crohn's disease (CD),

orofacial granulomatosis, Melkersson–Rosenthal Syndrome (MRS) or angio-oedema.[1] Distinction between recurrent oedema-like swelling and truly persistent swelling is important to narrow the diagnosis. Angio-oedema is more likely to present as a recurrent swelling of the lip. Assessment of C1 esterase inhibitor is useful. Sarcoidosis typically presents with respiratory or other systemic symptoms, fever, lymphadenopathy, hilar lymphadenopathy on chest radiography and raised angiotensin-converting enzyme. CD typically presents with bowel symptoms including diarrhoea, constipation or bleeding. MRS is associated with a current or past history of facial palsy and fissured tongue. Orofacial granulomatosis is a diagnosis of exclusion (sarcoidosis, CD and MRS) and can present with lip swelling commonly related to localised allergy to common food additives.

Answer 2

IBD consists of two well-established but not entirely separate disease entities: CD and ulcerative colitis (UC).[2] Oral lesions seen in patients with IBD can be broadly classified as 'specific' and 'nonspecific'.

Specific oral manifestations

Specific lesions are commonly seen in CD. The specific lesions of CD contain granulomatous changes observed on histological examination. They are less common than non-specific lesions and can occur either concomitantly with intestinal symptoms or several years before gut presentation. The most affected sites within the mouth are the buccal mucosa, gingiva, lips, vestibules and retromolar pads.

Specific oral manifestations of IBD include:[2]

- lip swelling (Figure 2) with vertical fissures; midline lip fissuring may occur in CD
- deep linear ulcerations usually in the buccal sulci with hyperplastic folds (Figure 3)
- cobblestoning (Figure 4) of the buccal mucosa (generally located posteriorly), hyperplastic appearance with fissured swelling and corrugation
- mucosal tags, usually noted in the labial and buccal vestibules and retromolar region
- mucogingivitis, where the gingiva appear oedematous, granular and hyperplastic, with or without ulceration. This typically extends beyond the gingival margin (Figure 5).

Non-specific oral manifestations

Non-specific oral manifestations of IBD include:[2]

- aphthous-like ulcers (Figure 6), which occur in 20–30% of patients with CD and 10% of those with UC
- pyostomatitis vegetans, which present as white or yellow pustules; they are more frequent in UC but may occur in CD
- angular cheilitis (Figure 7)
- persistent submandibular lymphadenopathy.

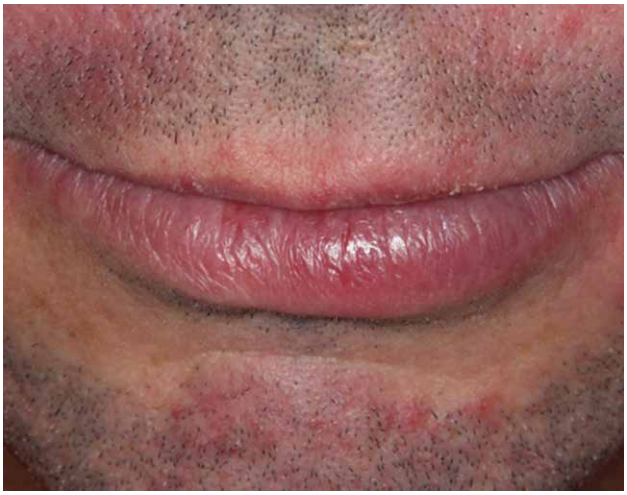

Figure 2. Lip swelling with vertical fissures

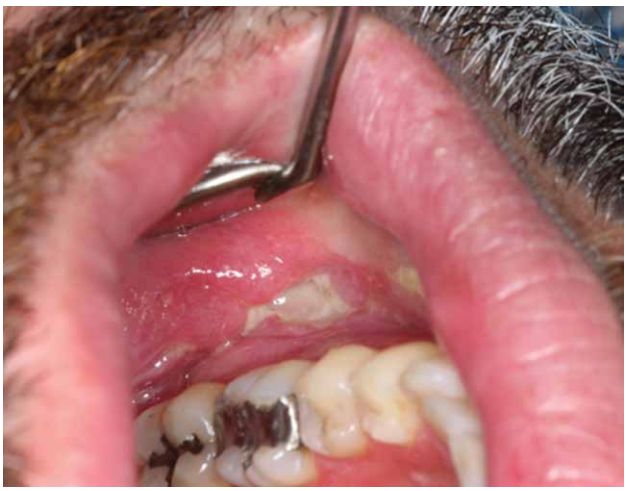

Figure 3. Deep linear ulcerations usually in the buccal sulci with hyperplastic folds

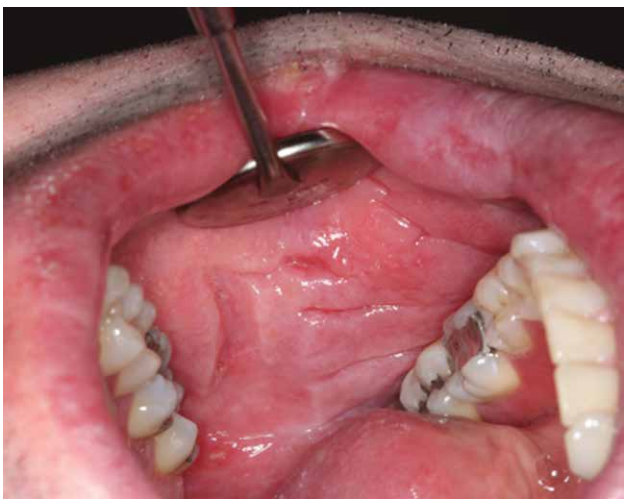

Figure 4. Cobblestoning of the buccal mucosa

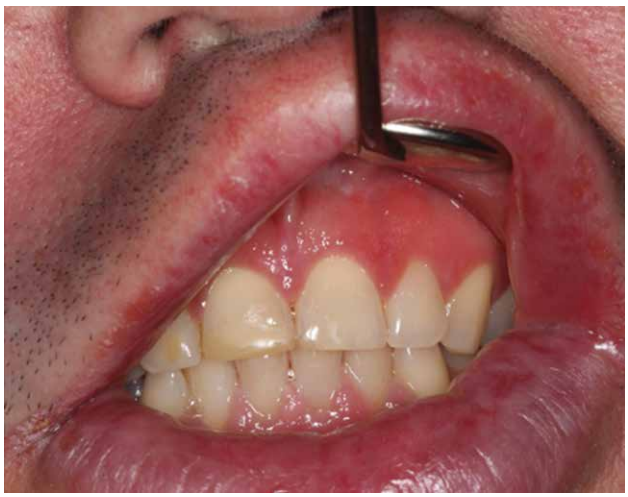

Figure 5. Mucogingivitis

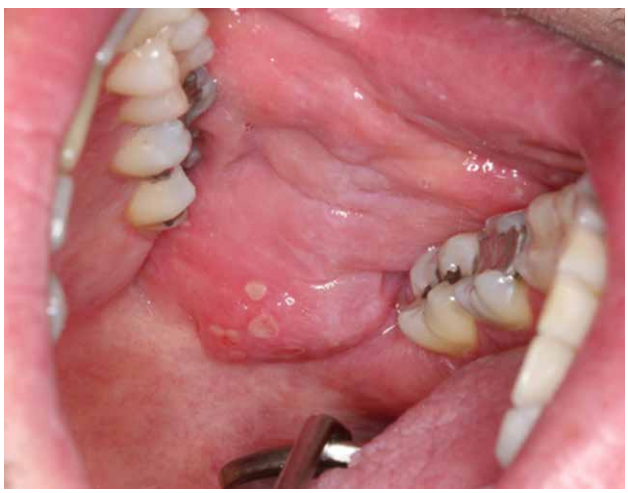

Figure 6. Aphthous-like ulcers

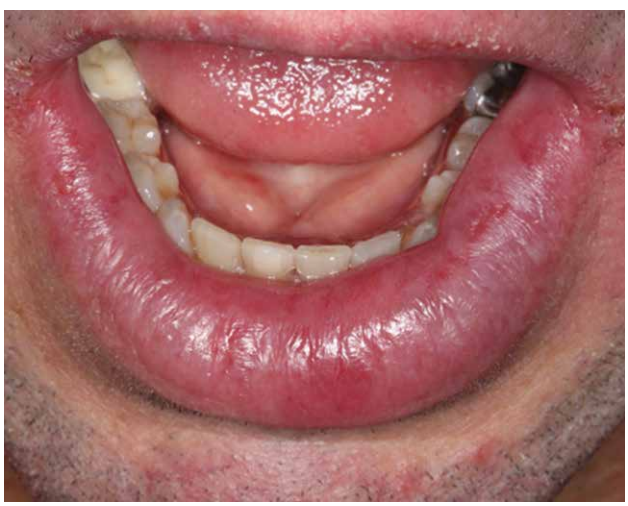

Figure 7. Angular cheilitis

Answer 3

Common clinical features of IBD include recurrent abdominal pain, cramping, irregular bowel habits, diarrhoea and passage of mucus without blood. Systemic symptoms are common and include weight loss, fever, sweats, malaise and arthralgias. Fatigue is often related to the pain, inflammation and anaemia that accompany disease activity. Children may present with growth retardation and delayed or failed sexual maturation. Some patients also present with extra-intestinal manifestations, including arthritis, uveitis or liver disease. Grossly, loosely formed bloody stools, occasionally with tenesmus, although typical of UC, are less common in CD. Fifty per cent of patients with CD may present with perianal disease such as fistulas and abscesses. Weight loss is noted more commonly in CD than in UC, secondary to malabsorption associated with small bowel disease. In many instances, oral manifestations may precede gastrointestinal or other extra-intestinal symptoms, or may be the first cause for presentation to a healthcare practitioner. Noting the oral presentations of IBD is important for early and appropriate diagnosis.

Answer 4

There is no single test that confirms the diagnosis of IBD. The diagnosis of IBD is made from the summation of findings of a physical examination, patient history and various tests, including blood tests, stool tests (especially faecal calprotectin), endoscopy, biopsy and diagnostic imaging.[2]

Blood tests are not specific for IBD but may be performed to evaluate the severity of inflammation, anaemia and vitamin or mineral deficiencies associated with IBD. ASCA and atypical p-ANCA serology can help discriminate CD from UC.

Faecal calprotectin is the most widely used neutrophil-derived protein biomarker and is a highly sensitive, non-invasive marker of intestinal inflammation. It can help in differentiating between patients with or without current inflammation in the lower gut requiring further evaluation, and for monitoring patients undergoing therapy to determine current disease activity, risk of relapse and/or response to type and dose of treatment.

Deep incisional biopsies are useful for confirming the oral manifestations of CD and distinguishing this from UC. More than one deep biopsy is often required, as giant cells may not be noted on individual samples. Intra-oral biopsies are best undertaken by oral medicine specialists given the subtlety of oral manifestations reported and the technical requirements of the procedure.

Answer 5

Endoscopy/colonoscopy with histology and radiology are used to establish the diagnosis of IBD and assess its severity and extent.[2] Capsule endoscopy is a useful modality to assess for the presence, extent and severity of small bowel involvement in CD.

UC primarily affects the mucosa of the large bowel, while CD is a transmural disease that can affect the entire

gastrointestinal tract. Histologically, features of UC include severe crypt architectural distortion and widespread decreased crypt density, as well as frankly villous surface. In addition, there is heavy, diffuse transmucosal lamina propria cell increase with diffuse basal plasmacytosis. There is an increased intensity of the alterations towards the distal colon, with severe mucin depletion. There may also be Paneth cell metaplasia distal to the hepatic flexure.

Features of CD include the presence of granulomas, composed of macrophages/histiocytes and other inflammatory cells with or without giant cells. The macrophages appear as large cells with an abundant pale eosinophilic cytoplasm and large oval nucleus. They are arranged in clusters and are called epithelioid granulomas because they resemble epithelial cells. The cells may be closely packed together and have a sarcoid-like appearance, but a loose expanded form of granuloma is more common in CD. Associated cells include CD4+ T cell lymphocytes showing expression of CD28, the ligand for B7-related cell surface proteins CD80 (B7-1) and CD86 (B7-2).

Plain abdominal radiography may establish whether colitis is present and its extent in cases of UC. It may also give an indication of a mass in the right iliac fossa or evidence of small bowel dilatation or obstruction in CD. Computed tomography (CT), ultrasonography and magnetic resonance imaging (MRI) may be helpful to determine disease extent and severity and assess for perforating complications. Such imaging is best arranged by a gastroenterologist or oral medicine specialist as required.

Answer 6

Patients with IBD require lifelong care. The overall goals of treatment are to:

- treat acute disease by reducing or controlling intestinal inflammation and, if possible, encourage mucosal healing
- minimise side effects and long-term adverse effects of the condition and eliminate symptoms
- optimise quality of life
- correct nutritional deficiencies
- maintain steroid-free remissions
- prevent complications, hospitalisation and surgery.[2]

Initial therapy to control inflammation and allow the gastrointestinal tract to heal includes the use of aminosalicylates, corticosteroids, immunomodulators (eg azathioprine, 6-mercaptopurine and methotrexate) and biologic agents (infliximab, adalimumab, vedolizumab and ustekinumab).[2–4] In paediatric patients, exclusive enteral nutrition may be used for induction of remission in CD. Surgery is indicated when medical therapy is unable to control symptoms to manage mechanical complications such as stricture, obstruction, perforation, abscess or refractory bleeding.

In patients without active gastrointestinal disease, such as in Anthony's case, a conservative 'wait and watch' approach is satisfactory and can avoid the complications associated with commencement of systemic therapies. Commencement of systemic therapy does not delay the onset of gastrointestinal disease. Oral conditions should be managed as conservatively or locally as possible, even if this requires systemic agents.

It is important to be alert to systemic and oral manifestations of IBD and aware of appropriate referral pathways to gastroenterology and oral medicine, while understanding the role of local and systemic therapies in managing the condition.

Answer 7

Management of oral CD is challenging. Most patients with oral manifestations of CD are asymptomatic. In this cohort, no formal treatment is required for the oral disease, and the condition should resolve once the gastrointestinal disease is suppressed. If gastrointestinal disease is not present, and the condition is limited to the oral tissues, then managing each manifestation conservatively is often adequate.

While the oral lesions may pre-date gastrointestinal CD, where investigations have ruled out CD, a search for an allergic aetiology, particularly to cinnamaldehyde and benzoates, is recommended. In severe cases with local oral symptoms, topical and/or systemic corticosteroids and immunosuppressants may be indicated.[2]

Topical and systemic immunosuppressants including intralesional injections of triamcinolone have been used successfully, but many patients require systemic interventions to achieve partial or complete remission of signs and symptoms. Topical corticosteroids and tacrolimus have been reported to be beneficial, and systemic therapies include systemic corticosteroids, azathioprine and methotrexate. In recalcitrant cases, monoclonal antibodies against TNF-alpha, such as infliximab and adamilumab, have been used. Liaison with the patient's gastroenterologist is always required.[3,4]

Answer 8

Dental management of patients with IBD should include:[2]

- frequent preventive and routine dental care
- evaluation of hypothalamic/pituitary/adrenal cortical function to determine the patient's ability to undergo extensive dental procedures
- avoidance of nonsteroidal anti-inflammatory drugs, as they can trigger a flare-up; the use of paracetamol is recommended, although it can also adversely affect patients
- early diagnosis and treatment of oral infections
- diagnosis (referral and biopsy if necessary) and treatment of oral lesions associated with the gastrointestinal disease.

Conclusion

Following discussion with Anthony, and based on adopting a conservative 'wait and watch' approach, no active treatment is instigated for the lip swelling. Anthony is scheduled for annual review by a gastroenterologist and four-monthly review by an

oral medicine specialist.

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ACTIVITY ID **233712**

Oral medicine

This unit of *check* is approved for six CPD Activity points in the RACGP CPD Program. The expected time to complete this activity is three hours and consists of:

- reading and completing the questions for each case study
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  - you must score ≥80% before you can mark the activity as 'Complete'
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You can only qualify for CPD points by completing the MCQs online; we cannot process hard copy answers.

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Case 1 – Gordon

Gordon, aged 57 years, presents with a one-month history of facial pain. He describes it as a constant, burning pain over the left mandible, interspersed with severe (10/10) 'lightning-like' pain for 30 seconds in the same area whenever he shaves or washes the left side of his face. Gordon has stopped shaving and has to pat his face firmly to dry it, as gently moving the towel around the left border of the mandible triggers his pain. You consider your knowledge of trigeminal neuralgia.

Question 1

Which one of the following best describes the signs and symptoms considered diagnostic for trigeminal neuralgia?

A. Facial flushing in conjunction with the pain

B. Continuous aching pain in the distribution of the trigeminal nerve

C. Unilateral, abrupt, severe, electric-shock like pain in the distribution of the trigeminal nerve lasting approximately 30–60 seconds

D. Cold sensitivity of the teeth in the affected region

Further information

You rule out odontogenic causes for the pain, and cranial nerve examination is normal. Magnetic resonance imaging (MRI) of the trigeminal nerve, skull base and brain are normal. Your diagnosis is idiopathic trigeminal neuralgia with concomitant continuous pain.

Question 2

Which one of the following is the first-line treatment for idiopathic trigeminal neuralgia?

A. Referral for a neurosurgical consultation for microvascular decompression

B. Carbamazepine 100 mg twice daily

C. Pregabalin 75 mg once daily, at night

D. Baclofen 5 mg twice daily

Case 2 – Ernesto

Ernesto, aged 59 years, presents to you for an opinion regarding white patches inside his left and right cheeks. He also reports experiencing intermittent oral ulcers and notes generalised sensitivity inside his mouth. Ernesto mentions a recurrent, raised, itchy, red rash on his legs and an itchy scalp.

You conduct a comprehensive head and neck examination and note that there is no regional lymphadenopathy. You do not note any cutaneous rash today but notice a localised area of hair loss on the back of Ernesto's head. During the oral examination under white light, you notice bilateral, symmetrical, white reticular lesions with mild background erythema on the buccal mucosa and lateral tongue. You do not note any other soft tissue lesions.

Ernesto is otherwise medically fit and healthy. He is not taking any regular medications. He is a current smoker with a 25 pack-year history. He consumes, on average, two standard drinks of alcohol per day.

Question 3

Which one of the following is the most likely differential diagnosis of Ernesto's oral condition?

A. Oral leukoplakia

B. Oral lichen planus

C. Oral candidosis

D. Oral squamous cell carcinoma

Question 4

Which one of the following is the most appropriate management for Ernesto?

A. Refer Ernesto to an oral medicine specialist or oral maxillofacial surgeon for incisional biopsy and histopathological assessment to confirm the clinical diagnosis of oral lesions and to a dermatologist for cutaneous lesions.

B. Use nystatin oral drops (four/day for two weeks) and apply 0.05% diprosone ointment on the skin when rashes occur.

C. Prescribe 500 mg amoxicillin tablets, three times per day, for seven days.

D. Reassure Ernesto that the condition in his mouth is due to chronic irritation.

Case 3 – Jakob

Jakob, aged 17 years, presents with a three-month history of jaw pain. He describes it as an intermittent, aching pain over the left masseter muscle, with occasional (7/10) sharp pain over the left preauricular area with yawning and chewing. The left temporomandibular joint (TMJ) was previously clicking, but this stopped three months ago. His mouth opening is now limited. There is no dental pathology noted both clinically and radiographically. The pain does not keep Jakob awake at night.

Question 5

Based on the history, into which one of the following diagnostic categories does Jakob's presentation fit?

A. Temporomandibular disorder (TMD)

B. Dental pain

C. Neuropathic pain

D. Headache related to rhinosinusitis

Question 6

Which one of the following screening questions for painful TMD is typically **not** included?

A. Do you have pain in your temple, face, jaw or jaw joint once a week or more?

B. Do you have pain once a week or more when you open your mouth or chew?

C. Do you have missing teeth or an uneven bite when you clench your teeth?

D. Does your jaw lock or become stuck once a week or more?

Case 4 – Jain

Jain, aged 71 years, presents during a heatwave with acute-onset pain, swelling and warmth over her left submandibular region. Constitutional symptoms include fever, chills and malaise. She has hypertension controlled by medication (beta-blockers) and has recently been told by her optometrist that she has glaucoma. She is waiting for her ophthalmology review. After a thorough history and clinical examination, you diagnose her with acute bacterial suppurative sialadenitis.

Question 7

Which one of the following is the most likely causative organism and the best immediate treatment option?

A. *Staphylococcus aureus* and flucloxacillin 500 mg orally, six hourly for a total of 10 days

B. Streptococci and flucloxacillin 500 mg orally, six hourly for a total of 10 days

C. *Staphylococcus aureus* and clindamycin 450 mg orally, six hourly for a total of 10 days

D. Coliforms and metronidazole 400 mg orally, six hourly for a total of six days

Further information

Jain would like a recommendation regarding how to better lubricate her mouth. Jain is dentate and would prefer to use non-commercial products.

Question 8

Which one of the following would be a suitable recommendation for Jain?

A. 3% citric acid

B. Grapeseed oil

C. Pilocarpine

D. Dry mouth relief mouthwash

Case 5 – Alex

Alex, aged 35 years, presents with persistent swollen gums that are not responding to regular oral hygiene measures. She has seen her dentist, who suggested she consult with her general medical practitioner. Alex has also noticed light yellow patches on her gums extending into the labial sulci. History-taking suggests that Alex also presents with oral ulceration and perianal fistulae. Your provisional diagnosis is Crohn's disease.

Question 9

Which one of the following steps would you take to secure a definitive diagnosis for Alex?

A. A biopsy of the gums to demonstrate the presence of granulomas

B. Referral to an oral medicine specialist or gastroenterologist

C. Anti-*Saccaromyces cerevisiae* antibodies (ASCA) and anti-neutrophil cytoplasmic antibodies (ANCA) serology

D. Computed tomography (CT) of the small bowel

Case 6 – Sophia

Sophia, aged 54 years, presents complaining of oral burning, a dry mouth and sores in her mouth, of approximately three weeks' duration. On clinical examination, you notice creamy, semi-adherent plaques in the maxillary buccal sulcus, which

you are able to wipe away with gauze. After wiping the plaques away, you note that the underlying oral mucosa is erythematous and tender to touch. There are areas of erythema and ulceration involving her bilateral labial commissures.

Question 10

Which one of the following is the most likely diagnosis for Sophia?

A. Chronic hyperplastic candidosis and angular chelitis

B. Oral lichen planus

C. Acute pseudomembranous candidosis and angular chelitis

D. Burning mouth syndrome

check

Independent learning program for GPs