

# Oral medicine considerations for the older patient

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## Key points

Older patients are more likely to have established or undiagnosed medical comorbidities which should be considered as a potential cause for their clinical presentation.

It is the clinician’s duty to be conscientious when prescribing for older patients in terms of the side effects, interactions and oral manifestations associated with each medication.

If oral lesions do not resolve following first line management, referral to specialist hospital services should be considered.

## Abstract

With the proportion of the world population aged over 60 years expected to nearly double to 22% by 2050, health care professionals are faced with the challenge of ensuring they are ready to address this demographic shift. As people age, they are more likely to develop comorbidities which have implications for their oral health. The effects of polypharmacy used to address these underlying health problems can also influence the oral health of older-aged patients. From a clinician’s perspective, an awareness of the variety of conditions associated with old age, such as oral-mucosal disease, swellings and manifestations of underlying health conditions, are required to ensure appropriate referral, investigation and management, both in primary and secondary care settings. This article aims to provide the practitioner with an overview of orofacial and oral mucosal conditions commonly encountered with the older patient.

## Introduction

The World Health Organisation (WHO) states that the pace of population ageing is much faster than previous, with the expectation that the number of people worldwide aged 60 or older will nearly double to 2.1 billion by 2050.<sup>1</sup> This increase in life expectancy has focused attention on the impact of chronic diseases and use of long-term medication. Over recent decades, the prevalence of polypharmacy and use of medication has dramatically increased and ageing patients with various comorbidities are more susceptible to oral diseases.<sup>2</sup> A variety of oral manifestations also arise in this demographic, in part due to a lifetime of cumulative environmental factors, including smoking, alcohol and UV exposure, as well as local factors, such as tooth wear and use of dental prostheses due to tooth loss. This

makes them more susceptible to a spectrum of lesions ranging from ulceration, infections, swellings, neoplasms and manifestations of systemic disease.<sup>3</sup>

## Xerostomia (dry mouth)

Xerostomia is the subjective perception of oral dryness, often caused by salivary gland hypofunction, resulting in decreased salivary output; however, subjective xerostomia does not always correspond to objective measures of salivary flow rate.<sup>4</sup> Studies have shown up to 40% of patients over the age of 65 have reported symptoms of xerostomia.<sup>4</sup> The Challacombe scale provides a useful guide to the clinical presentation of dry mouth.<sup>5</sup> In older patients, the cause is normally related to polypharmacy and onset of various medical conditions over time, which can impact on salivary gland function, such as diabetes and Sjögren’s syndrome (SS). Xerostomia can also exacerbate caries and mucosal disease.

## Medication

The most common cause of oral dryness is drug therapy. In the UK, almost four million people aged over 65 are taking at least five prescribed medications;<sup>6</sup> therefore, older patients receiving polypharmacy are

particularly prone.<sup>7</sup> Salivary glands are among the most sensitive target organs of medications with anticholinergic properties, interrupting the neural stimulation of saliva secretion and reducing saliva flow.<sup>8</sup> Sympathomimetic drugs mimic the sympathetic nervous system and can act either centrally or peripherally to cause hyposalivation.<sup>9</sup> Diuretics affect the concentration of electrolytes by depletion of body fluids which can lead to xerostomia by reducing salivation rate, similar to the effects of dehydration from insufficient fluid intake.<sup>10</sup> Cytotoxic drugs cause xerostomia by direct cellular damage of salivary gland tissue. Examples of medication-related xerostomia are listed in Table 1.

## Systemic disease

Xerostomia is a widespread complication of endocrine disorders, such as diabetes, whereby endothelial dysfunction and deterioration of microcirculation due to neuropathy may result in impairment of the secretion and composition of saliva.<sup>11</sup>

SS is a chronic autoimmune disorder of unknown aetiology, characterised by immune-mediated damage of salivary and lacrimal glands, manifesting as oral and ocular dryness.<sup>12</sup> SS is diagnosed on average between the fifth and sixth decade<sup>13</sup> and mainly affects

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Table 1 Medications associated with xerostomia	
Drug Activity	Examples of medication
Anticholinergic	Alpha receptor antagonists, for example, doxazosin, tamsulosin Antihistamines, for example, loratidine, cetirizine Antipsychotics, for example, phenothiazines Benzodiazepines, for example, diazepam Muscarinic receptor antagonists, for example, atropine, hyoscine Opioids, for example, morphine Proton pump inhibitors, for example, omeprazole Tricyclic antidepressants, for example, amitriptyline
Sympathomimetic	Anti-hypertensive agents, for example, beta-blockers, calcium channel blockers Decongestants for example, pseudoephedrine Selective serotonin reuptake inhibitors (SSRIs), for example, fluoxetine Serotonin-norepinephrine reuptake inhibitors (SNRIs), for example, duloxetine
Fluid depletion	Diuretics, for example, furosemide, spironolactone
Direct damage to salivary glands	Cytotoxic drugs, for example, mercaptopurine



Fig. 1 Dry, lobulated fissured tongue in a patient with Sjögren's syndrome

women (female-to-male ratio: 9:1). Patients may also experience dysphagia (difficulty swallowing), dysgeusia (altered taste) and burning sensation in the oral cavity.<sup>13</sup> Clinical examination may reveal dry, erythematous oral mucosa, a lobulated or depapillated tongue (Fig. 1), candida, angular cheilitis, dental caries, or bacterial sialadenitis. Extra-orally, fatigue and arthralgia are reported in 75–80% of SS patients.<sup>13</sup> There is a small risk of malignancy associated with SS, most commonly seen with mucosa-associated lymphoid tissue lymphoma.<sup>7</sup> The EULAR 2016 criteria for classification of SS can be used to guide investigation, diagnosis and referral.<sup>14</sup>

### Irradiation of salivary glands

Approximately 25–40% of head and neck cancer cases diagnosed worldwide are patients over 70 years old,<sup>15</sup> with a considerable proportion of these receiving curative or palliative radiotherapy. Xerostomia is the most common side effect of head and neck radiotherapy owing to irradiation of salivary glands. However, more recent studies have shown that intensity-modulated radiotherapy reduces the incidence of this.<sup>16</sup>

### Management

Initial investigative measures include identification of underlying causes, such as review of existing medication and blood investigations to exclude undiagnosed diabetes and autoimmune conditions.<sup>17</sup> In terms of treatment of dry mouth, saliva substitutes in the form of sprays or gels may help symptomatically. Salivary stimulants, including sugar-free gum or stimulating tablets, may be useful but should have a neutral pH, particularly with dentate patients.<sup>18</sup> Regular dental review, use of fluoride varnish and high-strength fluoride toothpaste is recommended given the concomitant increased caries risk. Pilocarpine, a direct acting cholinergic parasympathomimetic agent, may be considered in a hospital setting if initial management is unsuccessful; however, given its side effects, such as excessive sweating, it should be prescribed with caution.<sup>19</sup> Patients with SS are often under the care of a multidisciplinary team, including a rheumatologist, for overall coordination and management of this multisystem disease.<sup>20</sup> In addition to symptomatic therapy for SS, disease-controlling therapies such as hydroxychloroquine may be used.<sup>20</sup>

### Sialorrhoea

Sialorrhoea (hypersalivation or drooling) is the involuntary loss of saliva beyond the lip margins. It is caused either by hypersecretion of saliva (idiopathic or drug-induced), poor retention of saliva by dysfunction of the oropharyngeal musculature, or reduction in salivary clearance such as in cases of dysphagia.<sup>21</sup> Sialorrhoea is a common complaint in patients with chronic neurological conditions such as Parkinson's, a disease for which incidence estimates increase with age over 65 years.<sup>22</sup> Management can be conservative or more invasive. Conservative measures include behavioural interventions and oral-motor exercises as well as identifying potential causative reversible factors, such as medication and acidic foods which stimulate salivation. Medical therapies include use of anticholinergic agents such as hyoscine hydrobromide transdermal patches, as well as botulinum toxin injections.<sup>23</sup>

### Oral ulceration

Oral mucosal ulceration in the older patient can be attributed to multiple factors, including medication, trauma and malignancy. Oral ulceration in older patients is also seen in mucocutaneous disorders, such as oral lichen planus and immunobullous conditions, such as pemphigus and mucous membrane pemphigoid, which are covered in further detail in other articles within this series.

### Oral cancer

Age is an established risk factor for oral cancer, traditionally occurring during the fifth through to the seventh decade of life.<sup>24</sup> Evidence suggests the risk profile in this demographic arises from different exposures and prognostic factors, in part due to medical comorbidities, but also from a lifetime of cumulative carcinogenic insults, including smoking, alcohol consumption and UV light exposure.<sup>25</sup> Oral cancer can present clinically in various ways, including as a solitary non-healing ulcer in cases of squamous cell carcinoma (Fig. 2). Features of ulceration which may indicate a likelihood of malignancy include raised, rolled or irregular margins, as well as induration, speckling or point bleeding, particularly in high-risk sites such as the floor of mouth and posterolateral tongue. The National Institute for Health and Clinical Excellence<sup>26</sup> have published guidelines for detection and referral of head and neck cancers. Cases of unexplained ulceration in the oral cavity lasting more than



**Fig. 2 Squamous cell carcinoma of left lateral tongue**



**Fig. 3 Nicorandil-induced oral ulceration of dorsal tongue**



**Fig. 4 Traumatic ulceration of the right lateral tongue**



**Fig. 5 Denture-induced ulceration of upper labial sulcus from denture flange**

three weeks, a persistent and unexplained lump in the neck, a lump on the lip or in the oral cavity consistent with oral cancer, or a red or speckled patch in the oral cavity should be considered as a suspected cancer referral.<sup>27</sup> It is expected, in the UK, that such patients should be seen within 14 days of referral at an oral and maxillofacial unit in their local district general hospital, or with an oral medicine or oral surgery unit in a dental school.<sup>18</sup>

### Medication

Numerous systemic medications used for co-morbidities can induce oral ulceration. Drug-induced oral ulceration is typically classified either as widespread mucositis and ulceration (mainly due to cytotoxic drugs) or caused by fixed drug eruptions due to medications such as nicorandil (Fig. 3), methotrexate and some non-steroidal anti-inflammatory drugs.<sup>28</sup> These ulcers

typically have well-defined margins but are without induration. They often resemble the appearance of traumatic ulcers without any obvious irritant factors in their vicinity.<sup>28</sup>

### Radiotherapy

In addition to dry mouth, radiation therapy to the head and neck can result in oral mucositis, encompassing ulceration, erythema and oedema of the mucosal tissues. Radiation-induced ulcers are usually confined to non-keratinised mucosa, such as the lateral-ventral tongue, buccal mucosa and soft palate. Furthermore, mucositis results in a breakdown of the protective mucosal barrier which can increase the patient's susceptibility to infections.<sup>29</sup>

### Trauma

In an ageing population, tooth wear and tooth loss are likely to increase.<sup>30</sup> Tooth wear may increase susceptibility to traumatic ulceration of the adjacent oral mucosal tissues (Fig. 4). Denture-wearing patients may experience traumatic ulceration beneath the fitting surface or flange extensions (Fig. 5). Traumatic ulceration usually presents acutely as a single, painful irregular ulcer in the oral mucosa.<sup>18</sup>

### Chronic sclerosing sialadenitis

Chronic sclerosing sialadenitis is a benign, inflammatory condition of the major salivary glands. It typically presents as a unilateral painless swelling; however, it can present as oral ulceration (Fig. 6), often making it difficult to differentiate from a neoplasm, meaning biopsy is required for definitive diagnosis.<sup>31</sup>

### Management

Oral ulceration which is suspected to have arisen from traumatic aetiology should be managed by eliminating the causative agent in the first instance. Any solitary ulcer which fails to resolve within three weeks should be referred to hospital services on a two-week referral basis for further investigation.<sup>32</sup> Delayed healing of benign chronic ulceration should prompt the possibility of nutritional deficiencies in older patients or consider the systemic effects of comorbidities. Drug dose reduction or cessation is often required in cases of drug-induced ulceration; however, any suspected cases should also be referred for a specialist opinion.<sup>18</sup> In cases of painful ulceration or mucositis, analgesic mouth rinses such as benzydamine hydrochloride may be useful.



## Infections

There is a high prevalence of oral infections in the older adult population, mainly caused by candida infection<sup>33</sup> followed by herpes viral infections.

### Fungal

Oral candidiasis is prevalent among older people due to predisposing factors, such as drug therapy (for example, broad spectrum antibiotics, corticosteroids) and chronic disease, such as diabetes, malnutrition, immunosuppression and neoplasia. Additional local factors such as denture-wearing and inhalation of steroid inhalers also increase risk of candida infection.<sup>34</sup> Pseudomembranous candidiasis is the most common clinical presentation and is characterised by painless, adherent, white plaques affecting the labial and buccal mucosa, hard and soft palate and oropharynx which can be wiped off to reveal an erythematous base (Fig. 7).<sup>35</sup> Erythematous candidiasis presents as well-demarcated red areas seen on the dorsum of the tongue, palate, or buccal mucosa (Fig. 8). When found on the palate, it is frequently a mirror lesion of that encountered on the dorsal tongue.<sup>18</sup> Chronic hyperplastic candidiasis is a subtype of oral candidiasis, typically presenting either as an isolated, adherent, plaque-like lesion (homogenous form) or a speckled form with white nodules on an erythematous background. It typically presents on the bilateral buccal commissures (Fig. 9) and its malignant potential is still a point of contention with limited evidence.<sup>36</sup>

Diagnosis of oral candidiasis involves a concise history and systematic clinical examination. Antifungal therapy should be prescribed in older patients with consideration for interactions with common medications such as statins and warfarin.<sup>37</sup> There are other candida-associated conditions typically found in denture-wearing patients, such as denture stomatitis and angular cheilitis. Denture stomatitis is a common disorder affecting denture wearers, characterised by inflammation and erythema of the oral mucosal surfaces covered by the denture (Fig. 10). In addition to predisposing systemic factors, the most significant risk factors are poor dental hygiene and continuous denture wearing.<sup>38</sup> Angular cheilitis (Fig. 11) is a mixed infection at the commissures of the lips caused by candida albicans and streptococcus aureus, frequently seen in those who are edentulous, as well as a lack of denture stability and reduced



Fig. 6 Chronic sclerosing sialadenitis presenting as palatal ulceration



Fig. 7 Pseudomembranous candidiasis



Fig. 8 Erythematous candidiasis of the palate

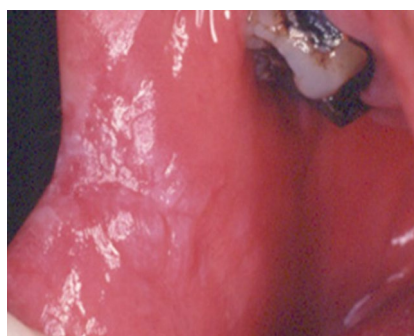


Fig. 9 Chronic hyperplastic candidiasis of the buccal commissure

occlusal vertical dimension.<sup>39</sup> Swabs for mycology studies and blood investigations are undertaken if candida infection is persistent or recurrent, and if resistant to first line antifungal treatment, such as nystatin or fluconazole, they should be referred to an oral medicine specialist for further investigation.<sup>18</sup>

### Viral

Older patients, and particularly those at risk of immunodeficiency, are at increased risk of developing opportunistic infections such as herpes simplex-related infections (HSV).<sup>40</sup> HSV is one of the most widespread infections of the orofacial region. Infection with herpes zoster is



**Fig. 10 Denture stomatitis**



**Fig. 11 Angular cheilitis**



**Fig. 12 Herpes zoster affecting the left palate**



**Fig. 13 Papilloma – floor of mouth**

caused by reactivation of varicella-zoster virus (VZV) which has remained latent in the sensory nerve ganglia following VZV infection (chicken pox). The incidence of herpes zoster rises with ageing, doubling in each decade past the age of

50 years.<sup>18</sup> Branches of the trigeminal nerve are usually involved, with prodromal symptoms including pain, tenderness and tingling followed by unilateral vesicular eruptions within the affected dermatome (Fig. 12). Complications

include ocular involvement and post-herpetic neuralgia, which may be avoided by early intervention with antiviral treatment such as high dose aciclovir. Facial nerve involvement leads to Ramsay Hunt syndrome, which is characterised by facial paralysis and vesicles around the ear and oral mucosa, as well as loss of taste sensation affecting the anterior two-thirds of the tongue.<sup>41</sup> Human papillomaviruses (HPV) are part of the papillomaviridae family, with over 200 different genotypes identified. HPV-16 is the most potent and is linked with malignancy in the oral cavity. Low-risk strains of HPV produce warts in the oral mucosa (Fig. 13), while high-risk strains can lead to intraepithelial squamous lesions evolving into oral carcinoma.<sup>42</sup>

### Oral pigmentation

Oral pigmentation is due to the accumulation of one or more pigments in tissues, causing changes in the colour of the oral mucosa.<sup>43</sup> Pigmentation of the oral mucosa can be focal or diffuse. Focal pigmentation includes melanotic macules (Fig. 14) and naevi, as well as amalgam tattoos (Fig. 15). It can also present rarely as malignant melanoma or Kaposi's sarcoma. Various medications can induce melanosis, including anti-malarials such as hydroxychloroquine (Fig. 16), chemotherapeutic agents such as cyclophosphamide and antibiotics such as minocycline.<sup>44</sup> Other presentations of diffuse pigmentation include smoker's melanosis (Fig. 17) and melanosis related to systemic diseases, such as adrenal insufficiency, Addison's disease and Cushing's syndrome. Due to multifactorial causes of pigmentation in the oral cavity, diagnosis can be challenging.<sup>43</sup> In cases of localised pigmentation, radiographs may be helpful to exclude the possibility of a foreign body. Otherwise, a biopsy may be indicated particularly in cases of solitary raised lesions, with a rapid increase in size, change in colour, ulceration, pain or regional lymph node enlargement.<sup>45</sup>

### Swellings

Lumps and swellings in the mouth are common with a range of aetiologies from benign to malignant. Some are specific to the older patient. Examples are listed below.

#### Angioedema

Angioedema is swelling of the mucosal and submucosal tissues which can affect the face, eyes, tongue and lips (Fig. 18) and in the older



Fig. 14 Melanotic macule – lower lip



Fig. 15 Amalgam tattoo – upper left alveolar ridge



Fig. 16 Hydroxychloroquine-induced melanosis

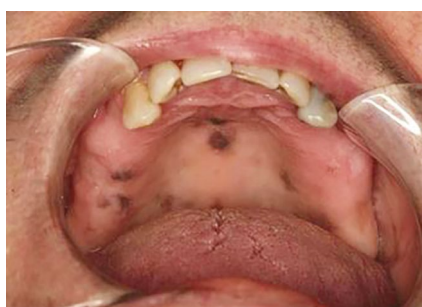


Fig. 17 Smokers melanosis

patient is commonly drug-induced, with angiotensin-converting enzyme inhibitors frequently implicated. Unlike allergic angioedema, this is mostly medicated by bradykinin and develops gradually overtime. When treated with antihistamines and corticosteroids, symptoms may improve within 2–5 days, but discontinuation of the offending drug is necessary for complete resolution.<sup>46</sup>

### Fibroepithelial polyp

Fibroepithelial polyp is the most common benign epithelial tumour of the oral cavity originating from fibrous connective tissue.<sup>47</sup> They typically present as a consequence of exuberant healing after minor oral trauma in sites of close proximity to occlusion, such as the lower lip, lateral or anterior aspect of tongue, as well as the buccal mucosa (Fig. 19). Where it

occurs along the margins or the fitting surface of the denture, the term ‘denture hyperplasia’ or ‘denture fibroma’ are used (Fig. 20). Cowden syndrome (CS) is a rare autosomal dominant condition which may present clinically with oral manifestations including multiple polyp-like swellings. Patients with CS are also at increased risk for malignancies of various organs.<sup>48</sup>

### Lipoma

Lipomas are benign neoplasm of fat cells which are rare in the oral mucosa (1–4%) and present as mobile, painless, soft submucosal nodules, with a yellowish colour but can also present as a fluctuant nodule.<sup>49</sup> They are occasionally fluctuant and may be misdiagnosed as a cyst, especially when located in the deeper submucosal tissues (Fig. 21). The most common sites are the buccal mucosa, tongue, and lips. Lipomas can vary in size and occur most frequently in patients between the sixth and seventh decades of life.<sup>50</sup> Histopathology remains the gold standard in diagnosis and recurrence is rare.

### Neurofibroma

Neurofibroma is a benign peripheral nerve sheath tumour which is composed of Schwann cells, perineural cells and fibroblasts.<sup>51</sup> While a rare presentation in the oral cavity, they may occur as solitary lesions or manifest as multiple lesions in cases of neurofibromatosis. Neurofibromas normally present as painless, firm, submucosal masses and are normally seen on the buccal mucosa, palate, tongue and gingivae (Fig. 22). When solitary, it can be removed by surgical excision with histological confirmation.

### Fordyce spots

Fordyce spots are a common developmental anomaly, associated with ageing, characterised by collections of asymptomatic sebaceous glands. In the oral mucosa, they occur most frequently in the mucosal of the upper lip, commissures and the buccal mucosa in a symmetrical bilateral pattern. Clinically, there are many small, slightly raised, whitish-yellow spots that are well-circumscribed, occasionally coalescing to form plaques, hyperplastic or cystic areas (Fig. 23). They rarely require surgical removal.

### Angina bullosa haemorrhagica

Angina bullosa haemorrhagica is Latin terminology for a painful blood blister and was first described by Badham in 1967.<sup>52</sup> This is an uncommon condition which appears to be more prevalent in women.<sup>53</sup> While the aetiology is unknown, many patients are aware

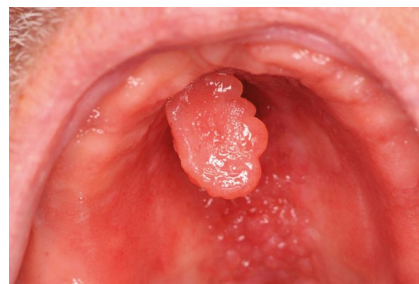




**Fig. 18** Angioedema – lower lip



**Fig. 19** Fibroepithelial polyp – right buccal mucosa



**Fig. 20** Denture fibroma on background of denture-induced stomatitis



**Fig. 21** Lipoma – left palatopharyngeal fold

of a triggering event such as eating. Blister formation may be preceded with a sensation of tightness or burning and appears suddenly. The junction of the hard and soft palate is the most common site of occurrence. Other sites include the buccal mucosa, the lateral and ventral border of the tongue and the buccal mucosa. The intact blister is dark red to purple, has an ecchymotic halo and can be painful (Fig. 24). Often a bleeding, ragged ulcer is left

following rupture which typically heals within 1–2 weeks. Haematological investigations, biopsy and immunofluorescence studies should be undertaken to exclude a coagulopathy or blistering condition and management is symptomatic.<sup>54</sup>

#### Varicosity (phlebectasia)

A varicosity is an asymptomatic local dilatation of a small vein thought to be due

to a local weakness of the vascular wall and therefore a common phenomenon in the middle-aged and older person (Fig. 25). It usually presents as a solitary bluish swelling of variable size affecting the buccal mucosa, lateral and ventral aspects of the tongue and labial mucosa. Diascopy can be used to confirm its vascular origin. There is rarely a need to intervene unless there is recurrent bleeding from the area or it is an aesthetic concern for the patient, in which case cryotherapy may be used as a treatment option.

#### Amyloidosis

Amyloidosis is a rare heterogenous condition resulting from extracellular deposition of abnormal protein aggregates throughout the tissues and vital organs of the body.<sup>55</sup> The disease may be localised or systemic; typically, oral amyloidosis is secondary to systemic amyloidosis. Systemic amyloidosis is divided into primary and secondary cases whereby primary amyloidosis is unexplained and not related directly to any diseases, and secondary amyloidosis (45% of cases) is secondary to a variety of primary diseases, from rheumatoid arthritis to malignancies such as lymphoma and multiple myeloma.<sup>56</sup> Oral amyloidosis may present clinically as a slowly enlarging tongue with hard texture and poor mobility making it difficult to swallow and talk. Oral deposits may also present as widespread bulla-like masses, papules and yellow nodules typically along the lateral borders of the tongue (Fig. 26), buccal mucosa, gingivae and palate. Oral biopsy is diagnostic and subsequent evaluation is required to assess for further organ involvement in systemic cases.<sup>57</sup>

#### Exostosis

Exostoses are submucosal bony protuberances covered by normal epithelium that occur on the buccal aspect of the maxillary or mandibular gingiva and are seen exclusively in older people (Fig. 27). They are typically asymptomatic unless the overlying mucosa is traumatised. Surgical management is not indicated unless the exostosis interferes with the placement of a removable dental prosthesis or is growing or the overlying mucosa is recurrently ulcerated.<sup>58</sup>

#### Non-Hodgkin's lymphoma

Lymphoma is a malignant disease characterised by neoplastic proliferation of lymphocytes or their precursor cells<sup>59</sup> and can be subdivided into Hodgkin's and non-Hodgkin's lymphoma. Oral involvement may be the sole manifestation

or as part of disseminated disease. It presents as a diffuse painless swelling (Fig. 28) which in advanced cases may ulcerate. The tonsillar area, palate, base of the tongue, posterior gingiva and the floor of the mouth are the most frequent sites involved.

**Sialosis**

Sialosis (sialadenosis) is a bilateral, benign, non-inflammatory swelling of the major salivary glands, which primarily affects the parotid glands. Occasionally the submandibular glands and rarely the minor salivary glands are involved. This can be painless or in some instances tender.<sup>60</sup> It may be idiopathic or related to underlying conditions such as diabetes. Diagnosis is clinical and confirmed through ultrasound imaging.

**Orofacial pain conditions**

Studies<sup>61</sup> have shown referrals for non-odontogenic facial pain account for just over 11% of referrals in older patients, with women affected more commonly than men. The most common conditions encountered in older age are burning mouth syndrome, trigeminal neuralgia and persistent idiopathic facial pain, which are covered in further detail in other articles of this issue. Giant cell arteritis (GCA) is the most common form of vasculitis in older adults, with an average onset of 74 years of age.<sup>62</sup> Symptoms of GCA include headache and jaw claudication and therefore clinicians should remain suspicious of this as a differential diagnosis in new cases of temporomandibular joint dysfunction-like symptoms in older patients.<sup>62</sup> Tricyclic antidepressants such as amitriptyline are commonly used in non-odontogenic facial pain disorders; however, they have known cardio-toxic effects, such as reduced heart rate variability and prolonged QT interval,<sup>63</sup> which increases risk of myocardial infarction or stroke in older patients with a significant cardiac background. The WHO states that around 14% of adults aged over 60 live with a mental health condition, with that figure considered to be widely underreported.<sup>64</sup> In the older population, anxiety and depression are the most common mental health conditions.<sup>64</sup> The experience of oro-facial pain may be associated with both anxiety and depression which can be debilitating in nature and markedly influence patients' emotional wellbeing.<sup>65</sup> Non-pharmacological management such as cognitive behavioural therapy can be useful for these patients suffering from depression or anxiety.



**Fig. 22 Neurofibroma – upper left buccal gingiva**



**Fig. 23 Fordyce spots – lower left buccal mucosa**



**Fig. 24 Angina bullosa haemorrhagica of the soft palate**



**Fig. 25 Varicosity – right buccal mucosa**



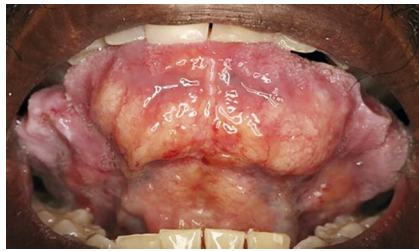


Fig. 26 Amyloidosis affecting tongue



Fig. 27 Bony exostosis – upper left quadrant

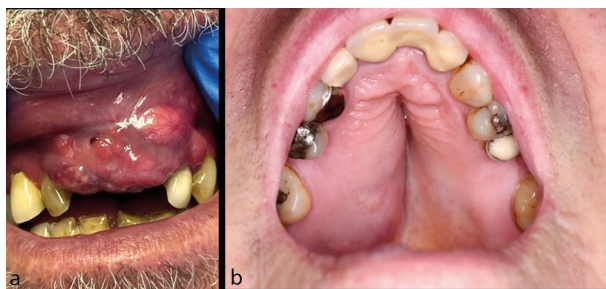


Fig. 28 Non-Hodgkin's lymphoma affecting (a) anterior gingiva and (b) right hard palate

### Prescribing in the older person

As patients become older there is an increased likelihood they will develop morbidities, many of which are managed with prescription medication. Prescribing peaks in the 74–84-year-old group, with it being reported that 34–68% of those with a mean age of 81 years are managed with six or more medications.<sup>66</sup> This can be a particularly challenging problem in oral medicine if medication is needed to manage conditions affecting the oral mucosa or pain conditions affecting the head and neck region. While interactions between drugs can have desired effects and are sometimes exploited in oral medicine, often they lead to serious untoward effects, including a reduction in the therapeutic effects of some drugs. Therefore, it is important for the clinician to be aware of this. Examples of common drug-drug interactions and how they may present are summarised in Table 2.

### Conclusion

The older population is more likely to have a high burden of comorbidities and therefore a higher incidence of oral mucosal disease. Dental practitioners should be aware of such conditions that commonly affect the older patient and be able to diagnose, manage and refer where appropriate for further investigation.

#### Ethics declaration

The authors have no conflict of interest to declare.

#### Author contributions

Conor O’Gorman and Amanda Willis both contributed equally to this article and accept

Table 2 Common drug-drug interactions		
Drugs prescribed	Interacting drug	Potential interaction
Adrenaline containing local anaesthesia	• Beta-blockers	• Hypertensive episode
Non-steroidal anti-inflammatory drugs (NSAIDs)	• Methotrexate	• Methotrexate toxicity
Azole antifungals	• Warfarin • Clopidogrel • Statins	• Increased risk of bleeding • May reduce antiplatelet effect • Risk of myopathy
Carbamazepine	• Levothyroxine • Direct oral anticoagulants, for example, apixaban, rivaroxaban, dabigatran, edoxaban • Warfarin	• May increase thyroid hormone metabolism • Plasma concentrations may be reduced • Increased risk of bleeding
Colchicine	• Statins	• Acute myopathy
Corticosteroids	• Warfarin • Anticonvulsants	• Increased bleeding • Less effective through increased clearance
Mycophenolate mofetil	• Antivirals	• Mycophenolate mofetil toxicity

responsibility for the entire content of the manuscript. Both authors approve its submission.

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