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Palliative care: Overview of mouth care at the end of life

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INTRODUCTION

Palliative care is an interdisciplinary medical specialty that focuses on preventing and relieving suffering and on supporting the best possible quality of life for patients and their families facing serious illness. Palliative care aims to relieve suffering in all stages of disease and is not limited to end of life care. A major tenet of palliative care is early identification, assessment, and treatment of pain and other sources of physical, psychological, emotional, and spiritual distress. Depending on the specific problem or complication, specialists, including dentists, may function as essential members of the interdisciplinary team. (See ["Benefits, services, and models of subspecialty palliative care"](#).)

Patients at the end of life are susceptible to a range of oral complications, including pain, salivary gland dysfunction, dysphagia, and oromucosal infections [1,2]. Swallowing disorders may lead to aspiration pneumonia, which can directly contribute to mortality. This topic provides an overview of the importance of oral health in patients at the end of life, and the diagnosis and management of common oral complications. A more extensive discussion of swallowing disorders in palliative care patients is provided elsewhere, as is mucositis/stomatitis related to cancer treatment. (See ["Swallowing disorders and aspiration in palliative care: Definition, consequences, pathophysiology, and etiology"](#) and ["Swallowing disorders and aspiration in palliative care: Assessment and](#)

[strategies for management](#)" and ["Oral toxicity associated with chemotherapy"](#) and ["Management and prevention of complications during initial treatment of head and neck cancer"](#), [section on 'Mucositis'](#).)

WHY ORAL HEALTH MATTERS IN END OF LIFE CARE

The oral cavity is often the first site of manifestation of treatment-related side effects in terminally ill patients, or it may be compromised by the direct and indirect effects of progressive, advanced disease [3,4]. Oral health is essential for carrying out activities of daily living such as communication, eating, speaking, and swallowing. The oral complications that can arise in terminally ill patients can impact quality of life (QOL) and contribute to functional decline and failure to thrive [5]. Oral health care is therefore an integral component of palliative care, with the goals of preventing oral complications, maintaining adequate oral function, and optimizing QOL and comfort [6].

Oral health impacts a person's dignity as well as oral function:

- **Dignity and respect** – While easily overlooked, a patient's concerns with facial and oral esthetics may relate to his or her desire to die with dignity and respect. As oral health is often neglected at the end of life [6], usual oral hygiene practices may be forgotten or eliminated, and this can contribute to gingivitis and/or periodontitis, caries development, tooth loss, and halitosis. This can impact self-esteem. Additionally, family and friends may avoid contact with their loved one due to halitosis, worsening the patient's isolation and depression [3,7].
- **Oral function** – Eating and speaking depend on adequate oral function, and the coordinated activity of the muscles of mastication, the salivary glands, and the dentition. Compromised oral health can significantly impact function, contributing to eating difficulty and a diminished capacity to communicate:
 - Decayed, broken, and/or missing teeth can compromise mastication, as well as increase the likelihood of oral soft tissue trauma and subsequent disability.
 - Salivary gland dysfunction (mainly xerostomia but also dysgeusia) can influence appetite, bolus formation, and the ability to swallow, as well as speech and communication.

- Oral pain and/or ill-fitting dentures can compromise oral intake and further diminish a patient's ability to communicate.

The consequences of eating difficulty include reduced food intake, poor nutrition, weight loss, and changes in facial structure. Difficulty with speech and communication can contribute to undue stress and frustration on the part of both patients and their caregivers/families [8].

For all of these reasons, routine oral hygiene should be maintained in palliative care patients if at all possible. (See '[Preventive oral care](#)' below.)

In addition, given the importance of teeth to appearance to others, facial appearance to self, eating in general, enjoyment of eating, chewing/biting, and comfort [9], replacing decayed, broken, and/or missing teeth at the end of life should be addressed if it is important to the patient and consistent with the goals of care. (See '[Restorative work](#)' below.)

ROLE OF THE DENTIST

It is optimal to include a dentist in the interdisciplinary palliative care team, although this is not always feasible. The role of the dentist is to maintain and improve quality of life by assessing oral health and status, and determining the need for any dental interventions. In order to minimize overtreatment and/or even potentially harmful interventions at the end of life, treatment plans must be modified over time, based upon the clinical course and/or the patient's goals of care.

In the absence of a dentist, the palliative care team must be capable of performing an oral health assessment and developing a plan for oral care.

Oral health assessment — A comprehensive oral health assessment is comprised of symptom assessment, clinical examination, cognitive assessment, functional assessment, and identifying goals of care. It is important to determine if the patient is capable of maintaining his or her own oral hygiene and to identify a person to monitor the oral health status of the patient.

The [Oral Health Assessment Tool \(OHAT\)](#), a 2004 modification of the Kayser-Jones Brief Oral Health Status Examination (BOHSE) tool ([table 1](#)) [10] (which was eventually published as a guideline from the Australian Institute of Health and Welfare in 2009 [11]), is a validated instrument

that has been used to screen residents of nursing facilities for oral health status, including those with cognitive impairments [12]. OHAT is a screening tool, not a diagnostic tool, and it is designed for use by nondental professionals. This tool can be used to assess the oral health status of a patient and to identify the need for an examination by a dentist. The tool can also be used as an intervention tool to establish a patient's oral health status at baseline, prior to initiating an individualized oral hygiene care plan, and to monitor progress of the intervention [13].

Pain should be addressed and quantified using validated tools (figure 1 and form 1). Patients at the end of life may only be able to convey nonverbal cues of pain [14,15]. It is important to observe patient behaviors that are considered pain related. The American Geriatrics Society categorizes six types of behavioral pain indicators, which may be helpful in the assessment of oral pain in the nonverbal patient (table 2). As with verbal patients, pain should be assessed, evaluated, documented, and repeatedly reassessed in nonverbal patients using an appropriate pain assessment tool (table 3) [16]. Family members, friends, and caregivers should be engaged to participate in the pain assessment.

An oral exam should be undertaken to identify the oral pathology and the state of oral hygiene. Oral function related to a patient's ability to chew food, insert and remove a dental prosthesis, and speak should also be assessed and reported.

Scope of care — The scope of the oral care provided by dentists at the end of life may be restorative, preventive, or simply symptom-based comfort care, and it may include extraction of infected or loose teeth and restoring carious teeth with interim restorative materials. The complexity of palliative care dentistry lies in the lack of evidence-based care guidelines and the need to individualize and prioritize the components of care in a way that corresponds to the patient's health status and overall goals of care [17]. (See '[Management/treatment of common conditions](#)' below.)

COMMON ORAL DISEASES AT THE END OF LIFE

The most common oral problems among terminally ill patients are xerostomia, oromucosal pain, and problems with eating, as illustrated by the following two reports:

- A study conducted in 20 hospice patients in England demonstrated that the most common oral

symptoms were xerostomia (58 percent of patients), mucosal pain (42 percent), dysphagia (37 percent), and disturbance of taste (26 percent) [1].

- Similarly, a Norwegian study of 126 cancer patients receiving palliative care showed that xerostomia (78 percent), oral pain (67 percent), problems with food intake (56 percent), oral candidiasis (34 percent), and dental plaque accumulation (24 percent) were frequently observed [2].

Several oral complications increase in frequency as the disease progresses. In one study of 105 patients admitted to an inpatient palliative care unit, the frequencies of dry mouth (78 versus 54 percent), tongue inflammation (67 versus 46 percent), and dysphagia (43 versus 20 percent) were all significantly more common in those who lived fewer than 28 days from the time of dental assessment compared with those living 28 days or longer [18].

Salivary gland dysfunction — Salivary gland dysfunction is defined as any qualitative and/or quantitative change in the output of saliva. Salivary gland dysfunction in terminally ill patients can manifest as both reduced (salivary gland hypofunction) as well as excessive salivary flow (sialorrhea) [19]. The normal unstimulated whole salivary flow rate averages 0.3 to 0.4 mL/minute [20,21]. Hyposalivation occurs when the unstimulated whole salivary flow rate is ≤ 0.1 mL/minute [22]. Although xerostomia is a frequent complication of radiation therapy to the head and neck region, the primary cause of reduced flow in terminally ill patients is the use of xerogenic medications and polypharmacy (table 4). In one survey, hospice patients with advanced cancer were on a median number of four drugs that were associated with xerostomia [23]. (See "[Management of late complications of head and neck cancer and its treatment](#)", section on '[Salivary gland damage and xerostomia](#)'.)

Complications of hyposalivation include rampant tooth decay and oral candidiasis. Dry mouth and limited oral intake may also lead to an over-keratinization of the tongue dorsum ("hairy tongue") (picture 1).

Sialorrhea or excess drooling may be caused by neuromuscular dysfunctions in patients with amyotrophic lateral sclerosis (ALS), cerebral palsy, stroke, and Parkinson disease [24]. Saliva pools in the mouth due to a lack of swallowing rather than a true salivary gland hyperfunction. Sialorrhea may also occur in patients affected by Alzheimer disease or myasthenia gravis who

take drugs with reversible cholinesterase inhibitor activity. Sialorrhea can contribute to skin irritation, poor oral health, and dehydration and can increase the risk of aspiration pneumonia. Furthermore, it is embarrassing and socially disabling.

Swallowing disturbances — Dysphagia is a common condition in terminally ill patients, especially those with brain tumors, advanced neurologic disorders, and cancers of the upper aerodigestive tract. Hyposalivation/xerostomia can further contribute to dysphagia. Swallowing dysfunction may lead to communication impairment, dehydration, and poor nutrition. Dysphagia is a severe risk factor for aspiration pneumonia and airway obstruction. Swallowing disturbances in palliative care patients are addressed in detail elsewhere. (See ["Swallowing disorders and aspiration in palliative care: Definition, consequences, pathophysiology, and etiology"](#) and ["Swallowing disorders and aspiration in palliative care: Assessment and strategies for management"](#).)

Orofacial pain conditions — Orofacial pain conditions of noninfectious etiology, such as myofascial pain and neuropathic pain disorders, may be encountered in patients at the end of life. A careful history and physical examination may help to discriminate between odontogenic and other sources of pain.

Parafunctional habits such as clenching and grinding of the teeth may lead to myofascial pain, with or without secondary temporomandibular joint arthralgia. Patients may complain of a dull, aching pain that is exacerbated with wide opening of the jaw and chewing [14]. Myofascial pain may present at the end of life even in patients with no prior history or known risk factors. (See ["Temporomandibular disorders in adults"](#).)

Trigeminal neuralgia is one of the most frequent causes of facial pain; its prevalence increases with age. Trigeminal neuralgia is characterized by intense unilateral electric-shock-like pain in the distribution of one division of the trigeminal nerve. (See ["Trigeminal neuralgia"](#).)

Central neuropathic facial pain may be a complication of multiple sclerosis or a stroke. (See ["Central neuropathic facial pain"](#).)

Persistent idiopathic facial pain is a neuropathic pain condition characterized by constant oral or facial pain in the absence of a known cause; it is often mistakenly attributed to odontogenic infection. (See ["Overview of craniofacial pain", section on 'Persistent idiopathic facial pain'](#).)

Oral dysesthesia is typically characterized by oral burning in the absence of physical causes with other associated symptoms, including tingling, taste changes, and xerostomia. (See ["Overview of craniofacial pain", section on 'Burning mouth syndrome'](#).)

Jaw pain may also be due to osteonecrosis of the jaw, which may be a long-term complication of radiation therapy to the head and neck (osteoradionecrosis) or medication related (most often from the use of antiresorptive therapy [high-dose bisphosphonates and [denosumab](#)] among patients with skeletal metastases). (See ["Management of late complications of head and neck cancer and its treatment", section on 'Osteoradionecrosis and soft tissue necrosis'](#) and ["Medication-related osteonecrosis of the jaw in patients with cancer"](#).)

Infections

Odontogenic infections — Oral bacterial infections are mainly odontogenic and may originate from an infection of the dental pulp secondary to dental caries, or from the periodontium in patients with advanced or untreated periodontal disease. The different types of odontogenic infections are outlined in the figure and discussed in more detail elsewhere ([figure 2](#)). (See ["Epidemiology, pathogenesis, and clinical manifestations of odontogenic infections"](#).)

Patients at the end of life may be at a greater risk for rampant caries due to hyposalivation and/or decreased oral care [[17](#)]. Dental caries can be diagnosed clinically in most cases, but intraoral dental radiographs may be necessary ([picture 2](#)). Large dental caries may lead to pulpal necrosis and secondary infection (abscess) ([picture 3](#)). If untreated, an odontogenic infection may lead to pain/swelling, trismus, risk of sepsis, and other life-threatening complications. (See ["Complications, diagnosis, and treatment of odontogenic infections"](#).)

Compromised oral hygiene is common in patients at the end of life, and this can contribute to gingivitis and periodontitis ([picture 4](#)). Periodontitis is a disease that affects the tissues surrounding the teeth (the gingiva, periodontal ligament, and alveolar bone). The clinical signs of periodontal disease include the presence of plaque and calculus, bleeding on probing, periodontal pockets, and mobile teeth. If untreated, periodontal disease may lead to abscess formation, tooth mobility, and subsequent tooth loss. (See ["Overview of gingivitis and periodontitis in adults"](#).)

Viral infections — Herpes simplex virus type 1 (HSV-1), also known as herpes labialis, is the etiologic agent of vesicular lesions of the lips, tongue, and oral mucosa, commonly referred to as

“cold sores.” Recrudescence of HSV-1 infection is common in debilitated patients, most frequently presenting as ulceration of the commissures of the lips and, less frequently, intraorally. Intraoral mucosal ulcerations are painful and characterized by shallow irregular margins ([picture 5](#) and [picture 6](#) and [picture 7](#)). Oral ulcers suspicious for HSV-1 should be cultured to rule out infection. (See ["Epidemiology, clinical manifestations, and diagnosis of herpes simplex virus type 1 infection"](#).)

Fungal infections — Oropharyngeal candidiasis is a frequent mucosal infection in palliative care patients. Multiple contributing risk factors include poor oral hygiene, dry mouth, wearing of dentures, diabetes mellitus, anemia, antibiotic use, and long-term immunosuppression [25]. The usual causative agent is *Candida albicans*, but other species, including *Candida glabrata*, *Candida krusei*, and *Candida tropicalis*, have been isolated. (See ["Overview of Candida infections"](#), [section on 'Oropharyngeal candidiasis'](#).)

There are several forms of oropharyngeal candidiasis:

- The pseudomembranous form (“thrush”) is the most common and appears as white to yellowish curd-like papules and plaques on the buccal mucosa, palate, tongue, or oropharynx that can be easily wiped away, leaving a bleeding base ([picture 8](#)).
- The atrophic form, also called denture stomatitis, is the most common form in older adults. It is often found under upper dentures and is characterized by diffuse erythema without plaques ([picture 9](#)) [26].
- Hyperplastic candidiasis is a rare chronic variant that manifests with white plaques that do not rub off, suggestive of leukoplakia.
- Candidal infection may also cause angular cheilitis with painful erythematous fissures at the labial commissures ([picture 10](#)).

Many patients with oropharyngeal candidiasis are asymptomatic. The most common symptoms that do occur are a cottony feeling in the mouth, loss of taste, and in some cases, pain during eating and swallowing. Patients who have denture stomatitis usually experience pain. (See ["Clinical manifestations of oropharyngeal and esophageal candidiasis"](#).)

PREVENTIVE ORAL CARE

Maintaining good oral hygiene can help reduce gingivitis, periodontitis, halitosis, oral infections, and caries risk. Oral hygiene should be performed at minimum twice daily:

- Use a soft-bristled toothbrush with an over-the-counter [fluoride](#) toothpaste or a prescription-strength fluoride toothpaste (1.1% sodium fluoride). Place the brush at the gingival margin and use a circular motion to reach all surfaces of the teeth.
- Rinse thoroughly with water or an alcohol-free mouthwash to decrease bacterial load and improve halitosis.
- Remove dentures, if present, and brush thoroughly with a denture brush and warm water. Dentures may need to soak in a solution if candidiasis is present.
- Apply [lanolin](#) to moisten lips if dry or chapped [\[27\]](#).
- For patients who are unable to rinse or spit or who have swallowing problems, swab the mouth and teeth twice daily with a sponge toothette soaked in alcohol-free 0.12% [chlorhexidine](#) gluconate [\[28\]](#).
- For patients at risk for caries, [fluoride](#) gels (1.1% sodium fluoride gel) can be applied with a brush and used daily, topical fluoride varnish (5% sodium fluoride varnish, 0.4 mL dose) can be applied at three-month intervals, or silver diamine fluoride (38% silver diamine fluoride) can be applied at three-month intervals [\[29-31\]](#).

MANAGEMENT/TREATMENT OF COMMON CONDITIONS

Palliative oral care should aim to maintain patients' quality of life and oral comfort. Regular oral examinations are necessary for patients at the end of life to identify possible oral complications. In some cases, depending on the patient's goals of care, definitive care is indicated, while in other situations, less involved palliative therapies may be sufficient.

Restorative work — As noted above, the presence of teeth has been shown to influence

appearance to others, facial appearance to self, eating in general, enjoyment of eating, chewing/biting, and comfort [9]. Replacing decayed, broken, and/or missing teeth at the end of life should be addressed if it is important to the patient and consistent with the goals of care. (See ['Why oral health matters in end of life care'](#) above.)

Dental caries — The risk of developing dental caries can be reduced with good oral hygiene at bedside, low consumption of carbohydrates, and use of topical [fluoride](#) preparations, including fluoride varnishes and silver diamine fluoride [29-31]. Caries should be monitored unless symptomatic or considered at high risk for fracture and/or abscess formation. Gross decay with pulpal involvement requires dental extraction. Palliative management includes temporary restorations and antibiotics in cases of acute infections.

Periodontal disease — Treatment of periodontal disease in palliative care patients includes improvement of oral hygiene practices (eg, use of interproximal brushes) and antimicrobial therapies with topical [chlorhexidine](#) gluconate and/or systemic antibiotics, if appropriately aligned with the patient's goals of care [32]. Localized scaling to remove obvious calculus deposits may be helpful. Extraction of loose teeth should be considered when there is aspiration risk.

Salivary gland dysfunction — Management of salivary gland dysfunction is directed at lessening symptoms.

Dry mouth — Basic measures include minimizing use of pharmacologic therapies that are associated with salivary hypofunction ([table 4](#)), improved hydration, humidifiers, use of sugar-free chewing gums or candy, and mucosal lubricants/saliva substitutes. Use of prescription sialogogues is generally not indicated in end of life care.

Sialorrhea/excess drooling — For clinically significant sialorrhea, anticholinergic medications may be helpful ([table 5](#)), particularly [glycopyrrolate](#) because of its relatively low central nervous system activity. Intrasalivary gland injection of botulinum toxin A may be beneficial. For refractory cases, radiation therapy to the parotid and submandibular glands could be considered. However, each of these treatment options has significant side effects and may be contraindicated or poorly tolerated in various populations. A portable suction device can assist in temporary evacuation of secretions, although its effect is usually short lived. (See ["Management of nonmotor symptoms in Parkinson disease"](#), [section on 'Sialorrhea'](#) and ["Symptom-based management of amyotrophic](#)

[lateral sclerosis](#)", [section on 'Sialorrhea'](#) and ["Swallowing disorders and aspiration in palliative care: Assessment and strategies for management"](#), [section on 'Sialorrhea'](#).)

Swallowing disturbances — Management of patients who are experiencing swallowing difficulties aims to maintain nutrition and reduce the risk of complications. Compensatory strategies (eg, diet modifications or postural changes) improve swallowing efficacy and safety. Oral hygiene maintenance is important for prevention of aspiration pneumonia [33]. This subject is discussed in detail elsewhere. (See ["Swallowing disorders and aspiration in palliative care: Assessment and strategies for management"](#).)

Infections (non-odontogenic)

Herpes simplex virus — Antiviral therapy with [acyclovir](#) or [valacyclovir](#) should be initiated if this is in keeping with the patient's goals of care. Supportive care includes nutritional support and adequate hydration. Pain must be managed appropriately with topical/systemic analgesics [34].

Oral candidiasis — Treatment includes topical and systemic antifungal medications. [Fluconazole](#) is highly effective and generally easier to dose as it is a single daily tablet. Commonly used topical agents include [nystatin](#) suspension and [clotrimazole](#) troches. It is imperative to also clean dentures regularly. Dentures should be cleaned and soaked in 3% sodium hypochlorite diluted in water (1:10) for no more than 10 minutes, or an antibacterial solution (eg, [chlorhexidine](#) digluconate 0.12 to 2%) or the nystatin suspension (if prescribed for oral use) overnight. Angular cheilitis is effectively managed with topical nystatin/[triamcinolone](#) cream or ointment.

Odontogenic infections — A dentist should assess the patient for the location, severity, and symptoms of the infection. Acute and chronic odontogenic infections should be treated with antibiotics, analgesics, and/or root canal therapy or tooth extraction. In most cases, tooth extraction is recommended due to the difficulty in scheduling multiple visits for root canal therapy and subsequent tooth restoration. Considerations for extraction include gross tooth decay, tooth mobility, or a fractured tooth and root tips. It should be noted that the coordination of care may be challenging and prevent definitive treatment. In this case, relieving symptoms with antibiotic treatment and/or analgesics should be administered with appropriate follow-up to determine if the infection has subsided. The course of action should be appropriately aligned with the patient's goals of care.

Temporomandibular, myofascial, and neuropathic pain — All patients with craniofacial pain syndromes should be evaluated by a dentist, should be instructed to maintain a soft diet, and should perform passive jaw stretching exercises. Management is specific to the condition:

- Management of myofascial pain includes systemic and topical antiinflammatory therapy and, in severe cases, the use of muscle relaxants and anxiolytics. Topical antiinflammatory preparations should be applied multiple times throughout the day to the affected areas. When trigger points are identified, intralesional corticosteroid therapy can be very effective. (See ["Cancer pain management: Interventional therapies", section on 'Soft tissue and joint injections'.](#))
- Treatment for persistent idiopathic facial pain includes low-dose tricyclic antidepressants, [clonazepam](#), [gabapentin](#), or [pregabalin](#). (See ["Overview of craniofacial pain", section on 'Persistent idiopathic facial pain'.](#))
- Most cases of trigeminal neuralgia are effectively managed with [carbamazepine](#). (See ["Trigeminal neuralgia", section on 'Carbamazepine'.](#))
- Oral dysesthesia is generally responsive to topical or systemic [clonazepam](#) therapy [35]. Other options include tricyclic antidepressants, [gabapentin](#), or [pregabalin](#). (See ["Overview of craniofacial pain", section on 'Burning mouth syndrome'.](#))

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See ["Society guideline links: Palliative care"](#).)

SUMMARY AND RECOMMENDATIONS

- Oral health is essential for carrying out activities of daily living such as communication, eating, speaking, and swallowing. Oral complications that can arise in terminally ill patients, such as pain, salivary gland dysfunction, dysphagia, and oromucosal infections, can impact quality of life (QOL) and contribute to functional decline and failure to thrive. Oral health care is an

integral component of palliative care, with the goals of preventing oral complications, maintaining adequate oral function, and optimizing QOL and comfort. (See ['Why oral health matters in end of life care'](#) above.)

- The role of the dentist within the interdisciplinary palliative care team is to maintain and improve QOL by assessing oral health and status, and determining the need for any dental interventions. The scope of the oral care provided by dentists at the end of life can include restorative, preventive, and symptom-based comfort care. The dentist needs to individualize and prioritize care in a way that corresponds to the patient's evolving health status and overall goals of care. (See ['Role of the dentist'](#) above.)
- Routine oral hygiene should be maintained in palliative care patients if at all possible. Maintaining good oral hygiene can help reduce gingivitis, periodontitis, halitosis, oral infections, and caries risk. Oral hygiene should be performed at minimum twice daily. (See ['Preventive oral care'](#) above.)

Replacing decayed, broken, and/or missing teeth at the end of life should be addressed if it is important to the patient and consistent with the goals of care. (See ['Restorative work'](#) above.)

Caries should be monitored unless symptomatic or considered at high risk for fracture and/or abscess formation. Gross decay with pulpal involvement requires dental extraction. Palliative management includes temporary restorations and antibiotics in cases of acute infections. (See ['Dental caries'](#) above.)

Treatment of periodontal disease includes improved oral hygiene practices (eg, use of interproximal brushes, localized scaling if necessary) and antimicrobial therapies if appropriately aligned with the patient's goals of care. Extraction of loose teeth should be considered when there is aspiration risk. (See ['Periodontal disease'](#) above.)

- Salivary gland dysfunction in terminally ill patients can manifest as salivary gland hypofunction, most often related to use of xerogenic medications ([table 4](#)), or excessive salivary flow (sialorrhea). (See ['Salivary gland dysfunction'](#) above.)

Management of salivary gland dysfunction is directed at symptom control:

- Basic measures for salivary hypofunction include minimizing use of xerogenic

pharmacologic therapies ([table 4](#)), improved hydration, humidifiers, use of sugar-free chewing gums or candy, and mucosal lubricants/saliva substitutes. Use of prescription sialogogues is generally not indicated in end of life care. (See ['Dry mouth'](#) above.)

- For clinically significant sialorrhea, anticholinergic medications may be helpful ([table 5](#)), particularly [glycopyrrolate](#). Intrasalivary gland injection of botulinum toxin A or radiation therapy to the parotid and submandibular glands could be considered. However, each of these treatments has significant side effects and may be contraindicated or poorly tolerated in various populations. (See ['Sialorrhea/excess drooling'](#) above.)
- Dysphagia is common in patients at the end of life, especially those with brain tumors, advanced neurologic disorders, and cancers of the upper aerodigestive tract. Swallowing dysfunction may lead to communication impairment, dehydration, and poor nutrition, and it is a risk factor for aspiration pneumonia and airway obstruction. (See ['Swallowing disturbances'](#) above.)

Management of patients with swallowing difficulties aims to maintain nutrition and reduce the risk of complications. Compensatory strategies (eg, diet modifications or postural changes) improve swallowing efficacy and safety. Oral hygiene maintenance is important for prevention of aspiration pneumonia. (See ["Swallowing disorders and aspiration in palliative care: Assessment and strategies for management"](#).)

- For infection with Herpes simplex virus type 1 (HSV-1), antiviral therapy with [acyclovir](#) or [valacyclovir](#) should be initiated if this is in keeping with the patient's goals of care; appropriate analgesia should be addressed. (See ['Herpes simplex virus'](#) above.)
- Treatment for oral candidiasis includes topical and systemic antifungal medications. Angular cheilitis is effectively managed with topical [nystatin/triamcinolone](#) cream or ointment. (See ['Oral candidiasis'](#) above.)
- Odontogenic infections should be treated with antibiotics, analgesics, and/or definitive treatment of the affected tooth (extraction, root canal with restoration) if the patient can tolerate the procedure. If definitive treatment cannot be performed, relieving symptoms with antibiotic treatment and/or analgesics should be administered with appropriate follow-up to determine if the infection has subsided. (See ['Odontogenic infections'](#) above.)

- Orofacial pain conditions of noninfectious etiology, such as myofascial pain, neuropathic pain disorders, and jaw osteonecrosis, may be encountered in patients at the end of life. A careful history and physical examination may help to discriminate between odontogenic and other sources of pain. (See ['Orofacial pain conditions'](#) above.)

All patients with orofacial pain should be evaluated by a dentist, should be instructed to maintain a soft diet, and should perform passive jaw stretching exercises. Management is specific to the condition. (See ['Temporomandibular, myofascial, and neuropathic pain'](#) above.)

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Topic 86293 Version 10.0

GRAPHICS

Kayser-Jones Brief Oral Health Status Examination

Resident's name				Date
Examiner's name				TOTAL SCORE
Category	Measurement	0	1	2
Lymph nodes	Observe and feel nodes	No enlargement	Enlarged, not tender	Enlarged and tender*
Lips	Observe, feel tissue and ask resident, family or staff (eg, primary caregiver)	Smooth, pink, moist	Dry, chapped, or red at corners*	White or red patch, bleeding or ulcer for two weeks*
Tongue	Observe, feel tissue and ask resident, family or staff (eg, primary caregiver)	Normal roughness, pink, and moist	Coated, smooth, patchy, severely fissured or some redness	Red, smooth, white, or red patch; ulcer for two weeks*
Tissue inside cheek, floor and roof of mouth	Observe, feel tissue and ask resident, family or staff (eg, primary caregiver)	Pink and moist	Dry, shiny, rough, red, or swollen*	White or red patch, bleeding, hardness; ulcer for two weeks*
Gums between teeth and/or under artificial teeth	Gently press gums with tip of tongue blade	Pink, small indentations; firm, smooth, and pink under artificial teeth	Redness at border around one to six teeth; one red area or sore spot under artificial teeth*	Swollen or bleeding gums, redness at border around seven or more teeth, loose teeth; generalized redness or sores under artificial teeth*
Saliva (effect on tissue)	Touch tongue blade to center of tongue and floor of mouth	Tissues moist, saliva free flowing and watery	Tissues dry and sticky	Tissues parched and red, no saliva*
Condition of natural teeth	Observe and count number of decayed or broken teeth	No decayed or broken teeth/roots	One to three decayed or broken teeth/roots*	Four or more decayed or broken teeth/roots; fewer than four teeth in either jaw*
Condition of artificial teeth	Observe and ask patient, family or staff (eg, primary caregiver)	Unbroken teeth, worn most of the time	One broken/missing tooth, or worn for eating or cosmetics only	More than one broken or missing tooth, or either denture missing or never worn*
Pairs of teeth in chewing position (natural or artificial)	Observe and count pairs of teeth in chewing position	Twelve or more pairs of teeth in chewing position	Eight to 11 pairs of teeth in chewing position	Zero to seven pairs of teeth in chewing position*
Oral cleanliness	Observe appearance	Clean, no food	Food particles/tartar	Food particles/tartar

	of teeth or dentures	particles/tartar in the mouth or on artificial teeth	in one or two places in the mouth or on artificial teeth	in most places in the mouth or on artificial teeth
Upper dentures labeled: Yes _____ No _____ None _____				
Lower dentures labeled: Yes _____ No _____ None _____				
Is your mouth comfortable? Yes _____ No _____ If no, please explain:				
Additional comments:				

* Refer to dentist immediately.

Originally published in: Kayser-Jones J, Bird WF, Paul SM, et al. An instrument to assess the oral health status of nursing home residents. Gerontologist 1995; 35:814. Reproduced with permission from Jeanie Kayser-Jones, RN, PhD, FAAN. Copyright © 1995.

Graphic 102732 Version 1.0

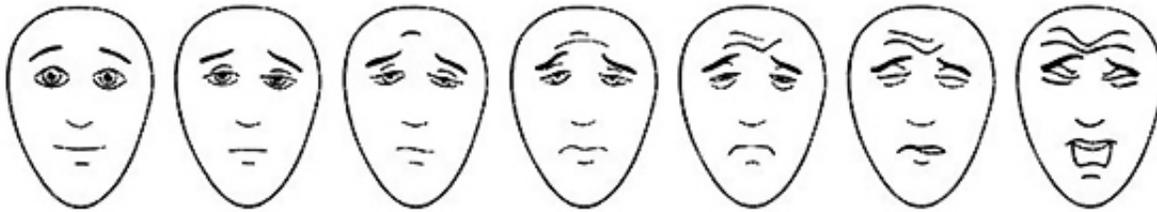
Numeric pain scale

Please mark in the circle of the number that most appropriately rates your pain level:

	0 = No pain					10 = Worst possible pain					
	0	1	2	3	4	5	6	7	8	9	10
Right <i>now</i>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
At its <i>worst</i> in the past month	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
At its <i>least</i> in the past month	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
At its <i>average</i> in the past month	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					

Graphic 61221 Version 1.0

Faces pain scale



Schematic representation of the faces pain scale, rated from 0 to 6 left to right.

Bieri, D, Reeve, RA, Champion, GD, et al. Pain 1990; 41:139. Copyright © 1990 with permission from Elsevier Science.

Graphic 67351 Version 4.0

Six types of behavior pain indicators from the American Geriatric Society

Behavior pain indicator	Description
Facial expressions	Grimacing, closed or tightened eyes, rapid blinking
Verbalizations/vocalizations	Noisy breathing, moaning, calling out
Body movement	Guarding, restricted movement, mobility changes
Changes in interpersonal interactions	Withdrawn, resisting care, aggressive
Changes in activity patterns or routines	Refusing food, changes in rest pattern, increased wandering
Mental status changes	Increased confusion, distress, crying, or tears

Source: Herr K, Coyne PJ, Key T, et al. Pain assessment in the nonverbal patient: Position statement with clinical practice recommendations. *Pain Manag Nurs* 2006; 7:44.

Graphic 102314 Version 1.0

Behavioral pain scale

Item	Description	Score*
Facial expression	Relaxed	1
	Partially tightened (eg, brow lowering)	2
	Fully tightened (eg, eyelid closing)	3
	Grimacing	4
Upper limb movements	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Compliance with mechanical ventilation	Tolerating movement	1
	Coughing but tolerating ventilation for most of the time	2
	Fighting ventilator	3
	Unable to control ventilation	4

* Score ranges from 3 (no pain) to 12 (maximum pain).

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Graphic 103690 Version 2.0

Classes of drugs associated with salivary hypofunction

Alpha and beta-adrenoreceptor blocking agents
Antidepressant drugs
Antihistamines
Antipsychotic drugs
Benzodiazepines
Glucocorticoids
Diuretics
Histamine H2-receptor antagonists
Nonsteroidal anti-inflammatory drugs
Opioid analgesics
Proton pump inhibitors

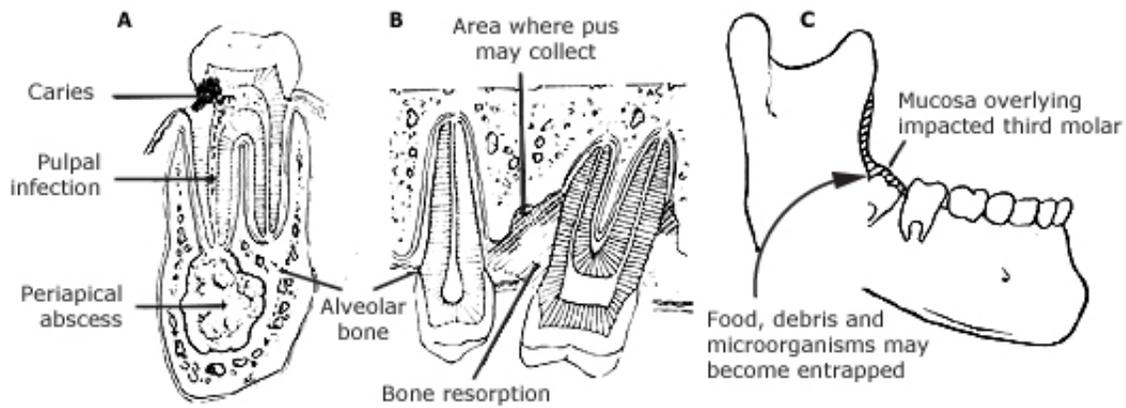
Graphic 108327 Version 1.0

Black hairy tongue



Graphic 102280 Version 1.0

Odontogenic infections



Panel A: Dental caries, pulp infection, and periapical abscess.

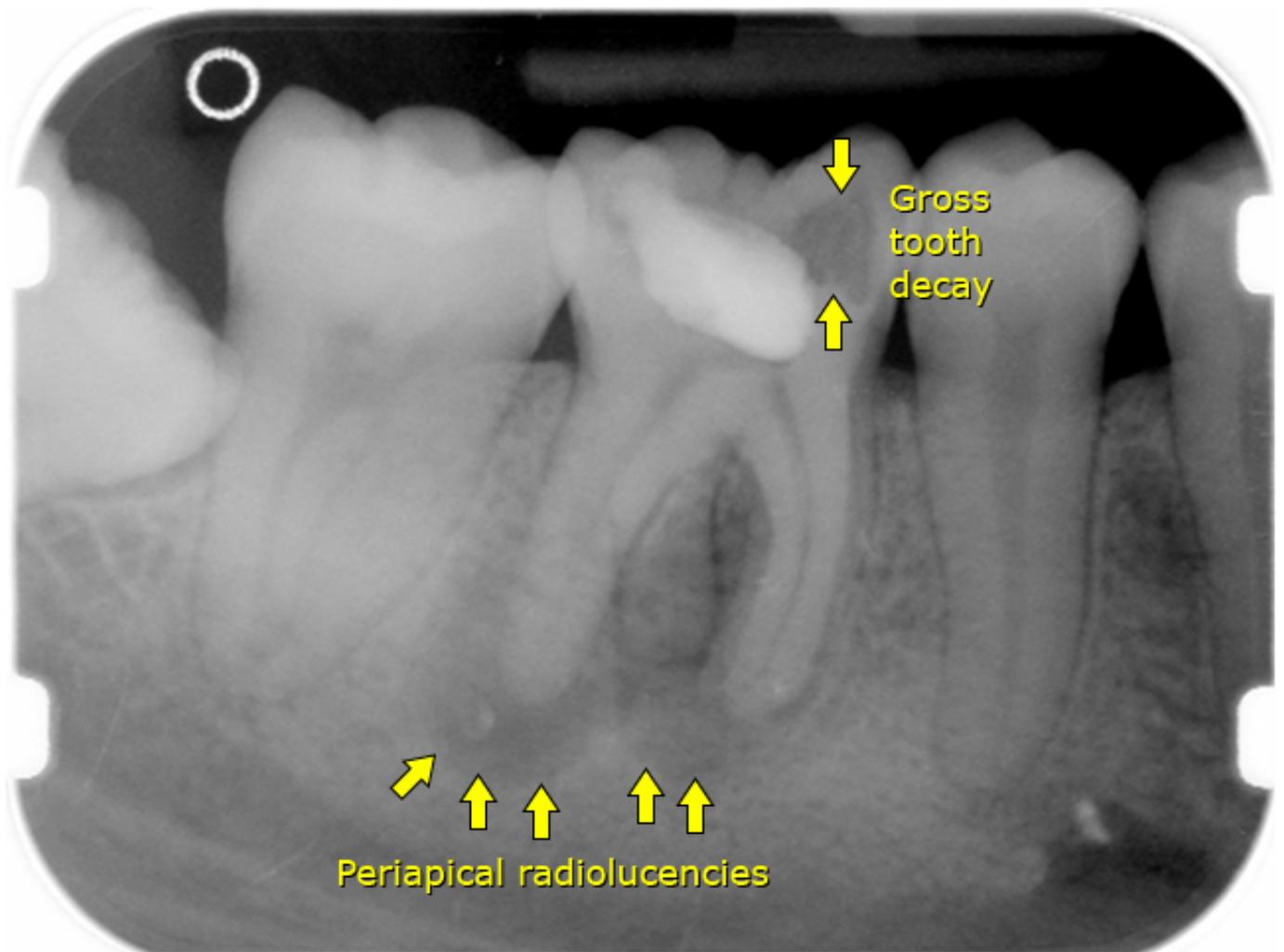
Panel B: Periodontal infection with destruction of supporting structures.

Panel C: Pericoronal infection.

Reproduced with permission from Chow AW, Roser SM, Brady FA, Ann Intern Med 1978; 88:392.

Graphic 65240 Version 3.0

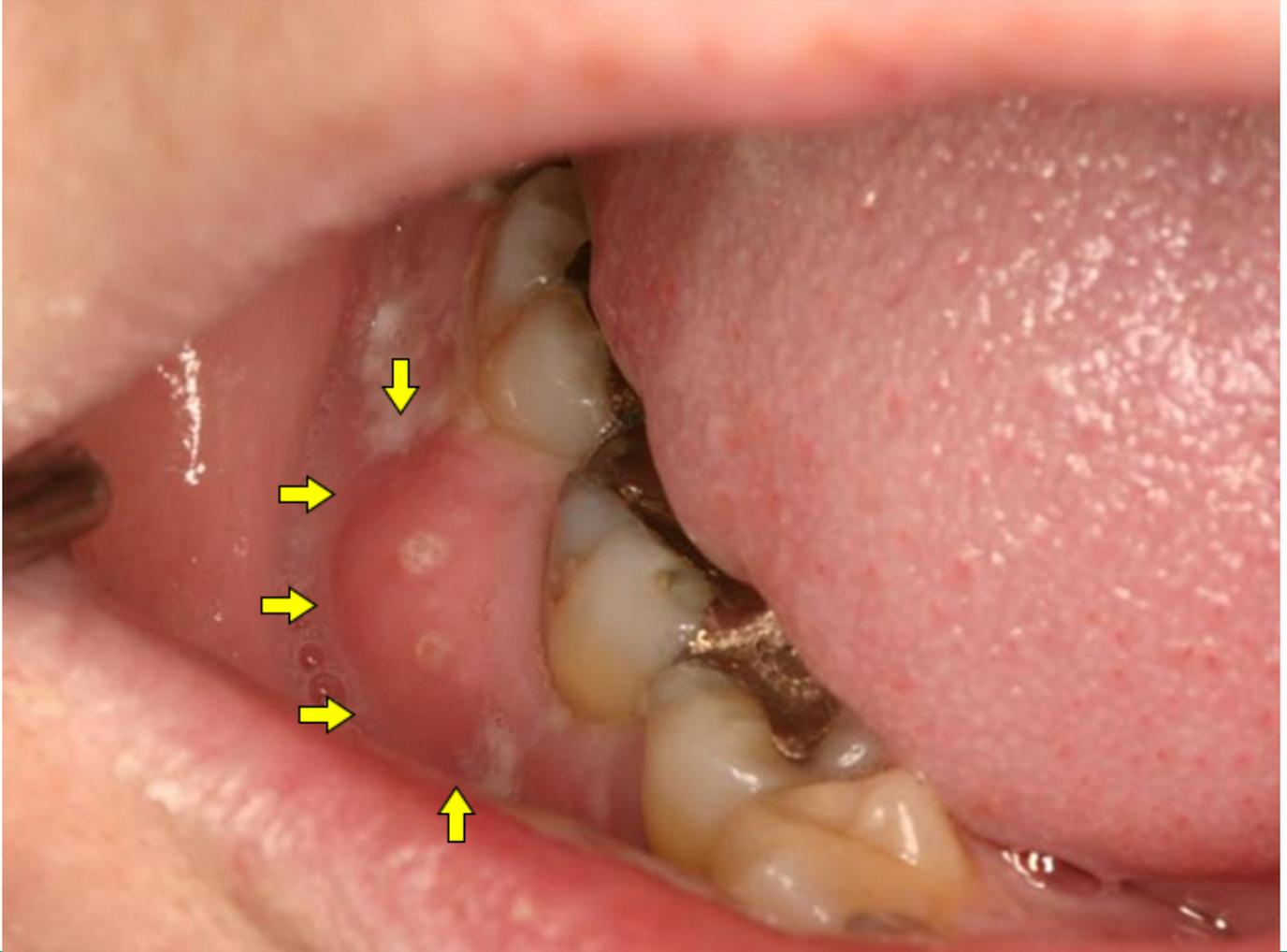
Gross decay of tooth



Gross decay of tooth number 30 with an associated periapical radiolucency.

Graphic 102273 Version 1.0

Odontogenic abscess



Odontogenic abscess in relation to tooth number 30.

Graphic 102272 Version 1.0

Gingivitis with focal marginal erythema and edema



Graphic 102274 Version 1.0

Recurrent herpes simplex type I (HSV-1) infection of the lower lip, herpes labialis



Graphic 102275 Version 1.0

Primary infection with herpes simplex virus type I (HSV-1), with multiple ulcerations on the undersurface of the tongue and labial mucosa



Graphic 102276 Version 1.0

Recrudescence infection with herpes simplex virus type 1 (HSV-1) presenting on the tongue dorsum



Graphic 102277 Version 1.0

Pseudomembranous candidiasis left ventrolateral tongue



Graphic 102278 Version 1.0

Candida denture stomatitis



In patients with dentures, candidal stomatitis frequently causes erythematous lesions on the hard palate without pseudomembranes.

Courtesy of Kenneth Shay, DDS.

Graphic 79519 Version 4.0

Angular cheilitis erythematous fissures



Angular cheilitis with erythematous fissures at the commissures.

Graphic 102279 Version 1.0

Anticholinergic therapy for drying secretions* at the end of life

Agents	Adult dose
Glycopyrrolate (glycopyrronium)	0.2 mg SC every four to six hours ^[1] OR 0.2 mg SC once; followed after 30 minutes by SC or IV continuous infusion of 0.6 to 1.2 mg/day ^[1] OR 0.1 mg SL every six hours as needed (use commercially available or compounded oral liquid) ^[2]
Scopolamine (hyoscine ¶) base transdermal	Apply one patch every 72 hours (1.5 mg patch releases ≈1 mg scopolamine base over 72 hours)
Scopolamine (hyoscine ¶) BUTYLbromide (not available in United States) SEE NOTE	20 mg SC every four to six hours OR 20 mg SC once; followed after 30 minutes by SC or IV continuous infusion of 20 to 60 mg per day ^{Δ[3]}
Scopolamine (hyoscine ¶) HYDRObromide ◊ SEE NOTE	0.3 mg PO or SL every four to six hours (PO/SL not available in United States) OR 0.4 to 0.6 mg SC every four to eight hours OR 0.4 mg SC once; followed after 30 minutes by a SC or IV infusion of 1.2 to 2 mg per day ^[1,3]

IMPORTANT NOTE: Doses of scopolamine (hyoscine) BUTYLbromide are NOT equivalent to scopolamine (hyoscine) HYDRObromide on a mg basis and may not be interchanged. Preparations not available in the United States are widely available in other countries.

SC: subcutaneous; IV: intravenous; SL: sublingual; PO: oral.

* Also known as "death rattle."

¶ Hyoscine is an international generic name. Scopolamine is the United States generic name.

Δ Larger subcutaneous continuous infusion doses of scopolamine (hyoscine) BUTYLbromide up to 120 mg per day may be needed.^[2] Adjust dose depending upon response. Repeat SC dose if needed.^[3]

◊ Scopolamine (hyoscine) HYDRObromide penetrates central nervous system; it is sedating and can cause or worsen delirium.^[2]

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Graphic 81557 Version 13.0

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