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Common Systemic Medical Conditions and Their Effects on Oral Health: A Review and Practical Guide for Medical and Dental Practitioners

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ABSTRACT

Background: Oral health is an integral component of general health, and the relationship between the two is bidirectional. Many conditions encountered daily in medical and dental practice, including diabetes mellitus, cardiovascular disease, respiratory disease, chronic kidney disease, HIV infection and mental illness, influence the oral cavity directly through disease processes and indirectly through the medications used to treat them.

Objective: To review the effects of common systemic medical conditions on oral health and to provide a practical, evidence-informed guide for doctors and dentists.

Methods: A narrative review was undertaken of literature published between 2000 and 2025 in PubMed/MEDLINE, Scopus and the Cochrane Library, prioritising systematic reviews, meta-analyses, consensus reports and clinical guidelines.

Results: The evidence is strongest for the bidirectional relationship between diabetes and periodontitis, the association of periodontitis with hypertension and cardiovascular disease, the oral manifestations of HIV infection, the role of reflux and eating disorders in erosive tooth wear, and the high burden of oral disease in people with severe mental illness. Medication-induced xerostomia, gingival overgrowth and medication-related osteonecrosis of the jaw are important and often preventable iatrogenic oral complications.

Conclusion: Systemic conditions and their treatment shape oral health risk, and oral disease can in turn complicate systemic disease control. Routine medical history review, risk-based preventive care, and timely interprofessional communication can reduce preventable harm. Oral examination should be regarded as part of comprehensive chronic disease care.

Keywords: oral health; systemic disease; periodontitis; xerostomia; medication-related adverse effects; interprofessional care

Introduction

Oral diseases are among the most common noncommunicable conditions worldwide, with the World Health Organization estimating that nearly 3.5 billion people are affected [1]. Untreated caries of permanent teeth and severe periodontitis rank among the most prevalent conditions globally [2,3]. Oral disease is not a purely local problem: it causes pain, impairs chewing, nutrition and speech, reduces quality of life, and shares social and behavioural determinants with the major noncommunicable diseases [3,4].

The relationship between oral and general health is bidirectional. Periodontitis is a chronic inflammatory disease driven by a dysbiotic biofilm and an exaggerated host response, and it has the potential to contribute to systemic inflammatory burden [5]. Conversely, systemic disease may alter immune responses, salivary function, wound healing and patient behaviour, while the drugs used to treat chronic conditions frequently have oral adverse effects [6,7]. The 2017 World Workshop classification of periodontal and peri-implant diseases formally recognised periodontal manifestations of systemic diseases as a distinct category [8,9].

These interactions matter in everyday practice because chronic conditions are common. For example, diabetes mellitus was estimated to affect 537 million adults worldwide in 2021 [10]. Patients with such conditions are seen by both physicians and dentists, yet communication between the professions is often limited. Physicians may have little training in oral examination, and dentists may be unaware of how a patient's condition or medication changes the risks of oral disease and dental treatment.

The objective of this review is to summarise current evidence on the effects of common systemic medical conditions on oral health, and to translate that evidence into a practical guide for doctors and dentists. For each condition the review considers the mechanisms of interaction, the principal oral manifestations, and the implications for clinical management and interprofessional care.

Materials and Methods

Study design

This work is a narrative review with a structured approach to literature identification and synthesis. A narrative design was chosen because the topic spans many conditions and study types, which precludes a single pooled quantitative analysis. Reporting was guided by the principles of the Scale for the Assessment of Narrative Review Articles (SANRA) [11].

Literature sources and search strategy

PubMed/MEDLINE, Scopus and the Cochrane Library were searched for English-language publications from January 2000 to December 2025. Search terms combined oral health concepts (for example "oral health", "periodontitis", "dental caries", "xerostomia", "gingival overgrowth", "oral manifestations") with condition-specific terms (for example "diabetes mellitus", "hypertension", "cardiovascular disease", "asthma", "chronic kidney disease", "HIV", "mental illness", "pregnancy", "osteoporosis", "bisphosphonate"). Reference lists of key articles, together with guidelines and consensus statements from professional bodies, were also screened.

Eligibility and selection

Systematic reviews, meta-analyses, consensus reports, clinical practice guidelines and major observational or interventional studies were prioritised. Case reports, conference abstracts and studies without a clear link between a systemic condition (or its treatment) and an oral outcome were excluded. Where high-level evidence was unavailable, narrative reviews were used to support descriptive statements and are identified as such in the text.

Synthesis and appraisal

Findings were synthesised thematically by condition. For each condition, mechanisms, oral manifestations and clinical implications were extracted and compared across sources. Formal risk-of-bias scoring of individual studies was not performed, and the certainty of evidence was judged qualitatively, with greater weight given to systematic reviews and consensus reports.

Ethical considerations

This review used published literature only and involved no human participants, patient data or animals. Ethical approval and informed consent were therefore not required.

Results and Discussion

Mechanisms linking systemic conditions and oral health

Across the literature, six broad pathways explain how systemic conditions influence oral health:

- **Shared inflammatory pathways.** Chronic periodontal inflammation and conditions such as diabetes, atherosclerosis and rheumatoid arthritis share cytokine-mediated mechanisms [5,12].
- **Shared risk factors.** Tobacco use, poor diet and socioeconomic disadvantage raise the risk of both oral and systemic disease, which is the rationale for the common risk factor approach [4].
- **Medication effects.** Hundreds of drugs reduce salivary flow, and some cause gingival overgrowth, mucosal reactions or jaw osteonecrosis [6,7].
- **Disease-related physiological change.** Altered salivary function, impaired immune response, abnormal haemostasis and delayed healing change oral disease risk and the safety of dental treatment.
- **Behavioural and access barriers.** Fatigue, cognitive impairment, depression, cost and mobility limitations reduce effective oral hygiene and dental attendance.
- **Procedure-related risks.** Dental procedures may cause transient bacteraemia, bleeding or haemodynamic stress that is relevant in some systemic conditions.

Medication-related oral effects

Polypharmacy is a major driver of oral disease in older and chronically ill patients. The most frequent effect is xerostomia with salivary gland hypofunction. A systematic review for the World Workshop on Oral Medicine VI identified antidepressants, antipsychotics, antihistamines, anticholinergics, opioids, diuretics and several other classes as being associated with salivary dysfunction, and found that the risk rises with the number of drugs taken [6]. Saliva buffers acids, remineralises enamel, clears food debris and supports mucosal defence, so persistent dryness predisposes to rampant caries, erosive wear, oral candidiasis, mucosal soreness and difficulty with dentures [13,14].

Drug-induced gingival overgrowth is associated mainly with phenytoin, ciclosporin and dihydropyridine calcium channel blockers such as nifedipine, and is influenced by plaque levels and individual susceptibility [15]. Antiresorptive and antiangiogenic therapies are associated with medication-related osteonecrosis of the jaw (MRONJ), which is uncommon at the doses used for osteoporosis but more frequent at the higher doses used in oncology [16,17]. Table 1 summarises commonly encountered drug classes and suggested actions.

Table 1. Common drug classes and their oral effects, with suggested clinical actions.

Drug class	Examples	Principal oral effects	Suggested action
Antidepressants, antipsychotics, antihistamines, anticholinergics	Amitriptyline, olanzapine, cetirizine, oxybutynin	Xerostomia and hyposalivation; increased caries, candidiasis and mucosal discomfort [6]	Review necessity and dose with the prescriber; saliva substitutes, high-fluoride toothpaste, frequent recall [13]
Calcium channel blockers	Nifedipine, amlodipine	Gingival overgrowth, most marked with poor plaque control [15]	Meticulous plaque control; periodontal therapy; discuss alternatives with the physician if severe
Antiepileptics and immunosuppressants	Phenytoin, ciclosporin	Gingival overgrowth [7,15]	Preventive periodontal care; surgical correction where indicated
Diuretics and other antihypertensives	Furosemide, hydrochlorothiazide	Xerostomia [6]	Hydration advice, sugar-free saliva stimulants, caries prevention
Antiresorptive and antiangiogenic agents	Alendronate, zoledronic acid, denosumab	Risk of MRONJ after invasive dental procedures [16,17]	Dental assessment and treatment of active disease before therapy; minimise invasive procedures during therapy; liaise with prescriber
Inhaled corticosteroids	Beclometasone, fluticasone	Oral candidiasis, dysphonia; possible increased caries in asthma [18]	Spacer device, rinse mouth after use, review oral hygiene
Anticoagulants	Warfarin, direct oral anticoagulants	Gingival bleeding; post-extraction bleeding risk [19]	Check INR where relevant; local haemostatic measures; follow local protocols and prescriber advice

Diabetes mellitus

Diabetes and periodontitis have a well-established two-way relationship. Diabetes, particularly with poor glycaemic control, increases the risk, extent and severity of periodontitis, and periodontitis is associated with worse glycaemic control and a higher risk of diabetic complications [12,20,21]. A Cochrane review found that periodontal treatment in people with diabetes was associated with a modest reduction in HbA1c, of the order of 0.3 percentage points at three to four months, although the certainty of evidence was limited and longer-term effects remain uncertain [22].

Other oral manifestations include xerostomia, increased caries risk, oral candidiasis, burning mouth symptoms and delayed wound healing [23]. From a practical standpoint, a dental history should establish the type of diabetes, recent glycaemic control, hypoglycaemic episodes and medications. Appointments are generally best arranged after meals and at times that fit the patient's medication routine, and patients should be advised to take their usual medication and meals. The dental team should be prepared to recognise and manage hypoglycaemia. Physicians should be encouraged to ask about gum disease, loose teeth and dental attendance as part of routine diabetes review, and to refer patients for periodontal assessment.

Hypertension and cardiovascular disease

Periodontitis is associated with an increased likelihood of hypertension, and meta-analysis shows higher blood pressure in people with periodontitis, although causality has not been established [24]. Consensus reports conclude that periodontitis is independently associated with atherosclerotic cardiovascular disease, but that evidence that periodontal therapy prevents cardiovascular events is insufficient [25,26]. Intensive periodontal treatment produces short-term systemic inflammation and endothelial dysfunction, followed by improvement in endothelial function after several months [27]. Dental care should therefore be considered part of overall risk management in cardiovascular patients, but not a substitute for established cardiovascular prevention.

Cardiovascular medications also affect oral health. Calcium channel blockers cause gingival overgrowth [15], and diuretics contribute to xerostomia [6]. Anticoagulated patients frequently need dental extractions; a systematic review and meta-analysis found that, with local haemostatic measures, extractions can generally be performed without interrupting warfarin when the INR is within the therapeutic range, though patients should be managed according to local protocols and in consultation with the prescriber [19]. Patients on antiplatelet or direct oral anticoagulant therapy should likewise be managed with careful local haemostasis and individual risk assessment.

Infective endocarditis prevention remains an area where interprofessional clarity is essential. Bacteraemia occurs after routine activities such as toothbrushing as well as after dental extraction [28]. For this reason, guidelines from the American Heart Association have restricted antibiotic prophylaxis before invasive dental procedures to patients at highest risk of adverse outcomes from endocarditis, such as those with prosthetic cardiac valves or previous infective endocarditis [29,30]. The 2023 European guidelines likewise recommend prophylaxis only for high-risk patients undergoing procedures that involve manipulation of gingival tissue or the periapical region of teeth, and emphasise good oral hygiene and regular dental review [31]. The United Kingdom's NICE guideline recommends against routine prophylaxis [32]. Dentists should be aware of the guideline adopted in their jurisdiction and should consult the patient's cardiologist when in doubt.

Obesity

A systematic review and meta-analysis found a positive association between obesity and periodontitis [33]. Mechanisms may include adipokine-mediated inflammation and shared dietary and behavioural risk factors. High intake of free sugars is also a principal driver of dental caries [34], and the World Health Organization recommends limiting free sugars to less than 10% of total energy intake [35]. Weight management counselling and dietary advice are therefore relevant to both professions.

Respiratory disease

Asthma has been associated with increased caries, dental erosion, oral candidiasis and gingival inflammation, attributed to a combination of medication effects (including reduced salivary flow and the local effects of inhaled corticosteroids), mouth breathing and dietary habits [18]. Patients should be advised to use a spacer, rinse the mouth after inhaled corticosteroid use and bring their reliever inhaler to dental appointments.

A systematic review found good evidence for an association between poor oral hygiene and pneumonia, particularly in institutionalised and hospitalised older adults, and fair evidence for an association with chronic obstructive pulmonary disease [36]. Improving oral hygiene in these settings is a low-cost intervention that may reduce respiratory infection risk [37]. Physicians, nurses and carers in hospitals and long-term care facilities should therefore include daily oral care in routine care plans.

Gastro-oesophageal reflux disease and eating disorders

Gastro-oesophageal reflux disease (GORD) is associated with erosive tooth wear, characteristically affecting the palatal surfaces of maxillary teeth and the occlusal surfaces of posterior teeth [38]. Erosive tooth wear is multifactorial, with intrinsic acid from reflux or vomiting combining with extrinsic dietary acid and mechanical wear [39]. Frequent self-induced vomiting in bulimia nervosa is another cause, and dental erosion is often among the first visible signs of an eating disorder [40].

Dentists are well placed to detect these patterns. The Basic Erosive Wear Examination provides a simple scoring system for monitoring severity [41]. Management includes dietary analysis, avoidance of brushing immediately after acid exposure, topical fluoride, restorative care where needed and referral for medical evaluation of reflux. Where an eating disorder is suspected, the conversation should be approached sensitively and non-judgementally and the patient referred to the appropriate medical or mental health service.

Chronic kidney disease

Patients with chronic kidney disease frequently experience xerostomia, altered taste, halitosis, uraemic stomatitis, periodontitis and a high prevalence of oral infection, and poor oral health may contribute to systemic inflammation in this population [42]. Practical considerations include altered drug metabolism and the need to adjust doses of some antibiotics and analgesics, avoidance of nephrotoxic drugs such as non-steroidal anti-inflammatory drugs, and an increased bleeding tendency related to platelet dysfunction and heparin use during haemodialysis. Dental treatment is usually best scheduled

on the day after dialysis, and the nephrologist should be consulted before invasive procedures. Dental assessment and treatment of active infection are advisable before transplantation or the start of immunosuppression.

HIV infection

Oral lesions are common in HIV infection and may be the first sign of disease or of immune decline. They include oral candidiasis, oral hairy leukoplakia, Kaposi sarcoma, necrotising periodontal diseases, recurrent aphthous ulceration and salivary gland disease [43]. The prevalence of several of these lesions has fallen with the widespread use of combination antiretroviral therapy [43]. This is particularly relevant in southern Africa, where HIV remains highly prevalent and the oral cavity offers a simple, non-invasive window on immune status. Dentists should apply standard infection control precautions to all patients, avoid assumptions based on perceived HIV status, and ensure confidentiality. Physicians should include oral examination in clinical review and refer patients with persistent or atypical lesions.

Mental illness

A systematic review and meta-analysis found that people with severe mental illness have substantially worse oral health than the general population, with higher levels of caries, tooth loss and periodontal disease [44]. People with depression and anxiety disorders likewise have higher levels of caries and tooth loss [45]. Contributing factors include reduced self-care, diet, smoking, limited access to dental care and psychotropic medication-induced xerostomia [6]. Dental teams should therefore adopt a supportive, non-judgemental approach, offer simplified preventive routines and short appointments, and coordinate medication review with prescribers where xerostomia is severe. Mental health services should regard oral health as part of physical health monitoring.

Pregnancy

Hormonal changes in pregnancy amplify the gingival inflammatory response to plaque, producing pregnancy gingivitis and, in some women, localised pyogenic granulomas ('pregnancy epulis') [46]. Pregnancy is a good opportunity for oral health education and routine preventive care. A Cochrane review found that periodontal treatment in pregnancy improves periodontal outcomes and appears safe, but evidence that it reduces preterm birth or low birth weight was of low certainty and inconclusive [47]. Necessary dental treatment can be undertaken during pregnancy, ideally with care to avoid prolonged supine positioning in late pregnancy, and decisions on medications and radiographs should follow the principle of clinical need and minimum exposure. Women who experience frequent vomiting should be advised about erosion prevention.

Osteoporosis, rheumatoid arthritis and cancer therapy

Patients prescribed bisphosphonates or denosumab should ideally undergo dental assessment and treatment of active disease before starting therapy where clinically feasible, and maintain regular dental review and good oral hygiene during treatment [16,17]. Because MRONJ risk is related to dose, duration and invasive procedures, close communication between the prescriber and the dentist is essential.

Rheumatoid arthritis and periodontitis share inflammatory mechanisms, and evidence suggests a bidirectional association, although the direction and strength of causality remain under investigation [48]. Hand dysfunction can impair toothbrushing, so adapted aids such as powered or large-handled brushes are useful.

Patients receiving chemotherapy or head and neck radiotherapy are at risk of oral mucositis, xerostomia, infection and radiation caries. International guidelines recommend oral care protocols as part of supportive care, and a dental assessment before treatment begins allows elimination of infection sources and preventive planning [49].

Tobacco, alcohol and diet

Smoking is a major modifiable risk factor for periodontitis. A systematic review and meta-regression showed a dose-related increase in periodontitis risk in smokers, and smoking also impairs treatment response [50,51]. Tobacco, alcohol and areca nut are leading causes of oral and oropharyngeal cancer, which is why oral mucosal examination and tobacco and alcohol cessation advice are important in both medical and dental consultations [52,53]. Frequent consumption of free sugars drives dental caries [34]. Brief advice delivered by any clinician is an efficient way to address these shared risks, in line with the common risk factor approach [4].

Summary of clinical implications

Table 2 consolidates the main oral effects and practical points for the dental team and physicians across the conditions discussed above.

Table 2. Summary of oral effects and clinical considerations for common systemic conditions.

Condition	Principal oral effects	Considerations for the dental team	Considerations for physicians
Diabetes mellitus	Periodontitis, xerostomia, caries, candidiasis, delayed healing [20,23]	Check recent glycaemic control; schedule around meals and medication; be ready to manage hypoglycaemia	Ask about gum health; refer for periodontal assessment [12]
Hypertension and cardiovascular disease	Periodontitis association; gingival overgrowth; xerostomia [15,24]	Monitor blood pressure; manage anticoagulants with local haemostasis; follow current endocarditis guidance [30,31]	Communicate INR and cardiac risk status; advise regular dental review
Asthma and chronic respiratory disease	Caries, erosion, candidiasis; oral hygiene linked to pneumonia [18,36]	Patient brings inhaler; advise spacer and mouth rinsing	Include oral care in care plans for hospitalised and frail patients
GORD and eating disorders	Erosive tooth wear [38,40]	Monitor with BEWE; fluoride; dietary advice; sensitive referral [41]	Consider dental erosion as a sign; coordinate care
Chronic kidney disease	Xerostomia, uraemic stomatitis, periodontitis, bleeding [42]	Treat after dialysis day; adjust drugs; avoid NSAIDs	Advise on dental clearance before transplantation
HIV infection	Candidiasis, hairy leukoplakia, Kaposi sarcoma, necrotising periodontal disease [43]	Standard precautions; confidentiality; examine mucosa carefully	Refer persistent or atypical oral lesions
Mental illness	Caries, tooth loss, periodontal disease, xerostomia [44,45]	Supportive approach; simplified preventive routines	Include oral health in physical health monitoring
Pregnancy	Gingivitis, epulis, erosion with vomiting [46]	Preventive care and safe timing of treatment; periodontal care [47]	Reinforce oral health advice in antenatal care
Osteoporosis and cancer therapy	MRONJ; mucositis, xerostomia, radiation caries [16,49]	Pre-treatment dental review; minimise invasive procedures on antiresorptives	Arrange dental assessment before therapy; liaise on invasive dental work

A practical framework for clinicians

The following framework is proposed to translate the evidence above into everyday practice. It is a synthesis by the author based on the cited literature and should be adapted to local guidelines and individual patient circumstances.

Table 3. Practical checklist for dentists and physicians.

For dentists	For physicians
1. Take a systematic medical history. Record conditions, all medications (including over-the-counter and inhaled drugs), allergies, anticoagulant and bisphosphonate use, pregnancy and tobacco and alcohol use.	1. Include the mouth in clinical review. Look for dry mouth, candidiasis, gingival bleeding, tooth wear and mucosal lesions.
2. Identify medication-related risk. Screen for xerostomia and gingival overgrowth; plan preventive measures accordingly [6,13].	2. Ask about dental attendance. Encourage regular dental review, especially in diabetes, cardiovascular disease, pregnancy, before transplantation and before starting antiresorptive or radiation therapy.

For dentists	For physicians
3. Offer risk-based prevention. High-fluoride toothpaste, dietary counselling, salivary support and tailored recall intervals for high-risk patients.	3. Review medications. Consider the oral effects of prescribed drugs, and where possible choose alternatives with fewer oral effects.
4. Adapt the treatment plan. Consider bleeding risk, infection risk, appointment timing, haemodynamic stability and medication interactions before invasive procedures.	4. Share information. Provide dentists with clear information on current diagnoses, medications, INR and cardiac risk when requested.
5. Communicate. Contact the patient's physician when the risk is unclear, for example before extractions in anticoagulated patients or when prophylaxis is under consideration.	5. Deliver brief advice. Tobacco cessation, reduced alcohol and sugar intake and oral hygiene advice are shared priorities [4].
6. Screen and refer. Examine the oral mucosa at every visit and refer suspicious lesions; flag oral signs of undiagnosed systemic disease.	6. Support institutional oral care. Ensure daily oral hygiene in hospital and long-term care settings [36].

The staged approach to periodontal therapy, from behaviour change and supragingival and subgingival instrumentation to surgical care where needed, is described in the European Federation of Periodontology guideline and applies equally to patients with systemic conditions [54].

Strengths and limitations

The strengths of this review include its breadth, its prioritisation of systematic reviews, meta-analyses and consensus reports, and its translation of evidence into a framework for both professions. Limitations include its narrative design, the absence of formal risk-of-bias assessment, the restriction to English-language sources and the possibility of selection bias. Many of the associations discussed derive from observational studies and cannot establish causation. Recommendations on dental management are based partly on expert consensus and may differ between jurisdictions, and readers should consult current local guidelines. Future research should evaluate whether integrated medical-dental care pathways improve clinical outcomes and cost-effectiveness, particularly in low- and middle-income settings.

Conclusion

Common systemic conditions affect the oral cavity through shared inflammatory pathways, shared risk factors, physiological change and medication effects, and oral disease in turn may complicate the control of systemic disease. The relationship is best supported for diabetes and periodontitis, the oral manifestations of HIV, erosive tooth wear associated with reflux and eating disorders, and the elevated oral disease burden in severe mental illness, while evidence for causal links with cardiovascular and other conditions remains incomplete. Medication review, risk-based prevention and clear communication between doctors and dentists are practical, low-cost measures that can reduce preventable harm. Incorporating oral examination and oral health advice into routine chronic disease care should be regarded as good clinical practice.

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Conflict of Interest

The author declares that there are no financial, professional, institutional or personal conflicts of interest that could have influenced this work.

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