Oral Manifestations Associated With Weight-Loss Medications: A Multidisciplinary Healthcare Review

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Abstract

Background: Pharmacological weight-loss therapies are increasingly utilized as long-term interventions for obesity management, demonstrating significant benefits in weight reduction and cardiometabolic outcomes (Apovian et al., 2015; Davies et al., 2021). However, the oral health implications of these medications remain underrecognized despite growing evidence of medication-related oral adverse effects (Villa et al., 2015).

Objective: This review aimed to synthesize current evidence on oral manifestations associated with weight-loss medications and to highlight the importance of a multidisciplinary healthcare approach in their prevention and management.

Methods: A narrative review of peer-reviewed literature published between 2015 and 2024 was conducted, focusing on pharmacological weight-loss therapies and their oral health consequences. Relevant studies were identified across medical, pharmaceutical, dental, and nursing disciplines, with emphasis on mechanisms of action, clinical manifestations, and implications for practice.

Results: Evidence indicates that weight-loss medications are associated with a spectrum of oral manifestations, including xerostomia, dental erosion, increased caries susceptibility, periodontal inflammation, taste disturbances, and oral mucosal changes (Wolff et al., 2017; Lussi et al., 2011). These effects arise through interconnected mechanisms such as salivary gland dysfunction, gastrointestinal adverse effects, neurochemical modulation, and nutritional alterations (Villa et al., 2015; Ryan et al., 2020). Oral complications may negatively impact oral health–related quality of life and contribute to reduced adherence to pharmacological therapy if not adequately managed (Palacios & Joshipura, 2014).

Conclusion: Oral manifestations associated with weight-loss medications represent clinically relevant yet often overlooked adverse effects. Integrating oral health assessment and preventive strategies into pharmacological obesity management is essential for comprehensive, patient-centered care. Multidisciplinary collaboration among physicians, pharmacists, dentists, and allied healthcare professionals is critical for early identification, prevention, and management of oral complications, ultimately supporting safer and more effective long-term weight-loss treatment.
Keywords: Weight-loss medications; Oral manifestations; Xerostomia; Dental erosion; Obesity pharmacotherapy; Multidisciplinary care.

INTRODUCTION

Obesity is recognized as a global chronic disease associated with increased morbidity, mortality, and healthcare burden (World Health Organization [WHO], 2023). Pharmacological weight-loss interventions are increasingly prescribed as adjuncts to lifestyle modification for individuals with obesity or overweight accompanied by metabolic comorbidities (Apovian et al., 2015).

Recent advances in anti-obesity pharmacotherapy have improved weight reduction outcomes and metabolic control in diverse patient populations (Davies et al., 2021).

Despite their therapeutic benefits, weight-loss medications are associated with a range of adverse effects affecting multiple organ systems (Ryan et al., 2020).

The oral cavity is particularly susceptible to medication-related changes due to its dependence on salivary secretion, mucosal integrity, and microbial balance (Holmberg & Hoffman, 2014).

Medication-induced alterations in oral physiology may therefore compromise dental and periodontal health if not adequately addressed (Villa et al., 2015).

Xerostomia is a well-documented adverse effect of numerous systemic medications, including agents used for weight management (Scully, 2003).

Reduced salivary flow disrupts natural protective mechanisms against dental caries, erosion, and oral infections (Loesche, 2007).

Salivary gland dysfunction has also been associated with impaired taste perception and diminished oral health–related quality of life (Wolff et al., 2017).

Gastrointestinal side effects such as nausea, vomiting, and gastroesophageal reflux are commonly reported with several weight-loss pharmacotherapies, particularly glucagon-like peptide-1 receptor agonists (Wilding et al., 2021).

Repeated exposure of teeth to gastric acids has been identified as a major etiological factor in dental erosion and enamel demineralization (Bartlett & Shah, 2006).

Over time, erosive tooth wear may lead to hypersensitivity, structural damage, and estorative challenges (Lussi et al., 2011).

Oral manifestations associated with weight-loss medications remain underrecognized in routine clinical practice despite their potential impact on patient adherence and overall health outcomes (Villa et al., 2015).

A multidisciplinary healthcare approach involving physicians, pharmacists, dentists, and nursing professionals is essential for early identification and effective management of these oral complications (Apovian et al., 2015).

This review aims to synthesize current evidence on oral manifestations associated with weight-loss medications and highlight the importance of integrated, multidisciplinary care.

Background and Rationale

Obesity is classified as a chronic, relapsing disease that significantly increases the risk of cardiovascular disease, type 2 diabetes mellitus, certain cancers, and premature mortality (World Health Organization [WHO], 2023).

The global rise in obesity prevalence has prompted healthcare systems to adopt multifaceted management strategies that extend beyond lifestyle modification alone (Bray et al., 2016).

Pharmacological weight-loss therapies are now widely recommended for individuals who fail to achieve adequate weight reduction through diet and physical activity, particularly when obesity-related comorbidities are present (Apovian et al., 2015).

Recent advances in anti-obesity pharmacotherapy have led to the development of more effective agents with sustained weight-loss outcomes and improved metabolic profiles (Davies et al., 2021).

Glucagon-like peptide-1 receptor agonists and other modern weight-loss medications have demonstrated clinically significant reductions in body weight and cardiometabolic risk factors in large randomized controlled trials (Wilding et al., 2021).

As a result, the long-term use of weight-loss medications has increased substantially in both primary care and specialized clinical settings (Ryan et al., 2020).

Despite these therapeutic benefits, weight-loss medications are associated with a spectrum of adverse effects affecting multiple physiological systems (Garvey et al., 2016). While gastrointestinal and metabolic side effects are well documented, oral and dental manifestations remain comparatively underreported and underrecognized in routine clinical practice (Villa et al., 2015).

This gap is clinically relevant because the oral cavity is highly sensitive to systemic pharmacological changes due to its reliance on salivary gland function, mucosal integrity, and microbial homeostasis (Holmberg & Hoffman, 2014).

Medication-induced xerostomia has been identified as one of the most common adverse effects associated with long-term systemic drug therapy, including medications used for weight management (Scully, 2003).

Reduced salivary flow compromises the protective functions of saliva, increasing susceptibility to dental caries, periodontal disease, oral infections, and enamel demineralization (Loesche, 2007).

Salivary dysfunction has also been linked to impaired taste perception and decreased oral health–related quality of life, which may negatively influence patient adherence to pharmacological therapy (Wolff et al., 2017).

In addition to salivary changes, gastrointestinal adverse effects such as nausea, vomiting, and gastroesophageal reflux are frequently reported with several weight-loss medications (Wilding et al., 2021).

Repeated exposure of dental hard tissues to gastric acid is a well-established etiological factor in dental erosion and tooth hypersensitivity (Bartlett & Shah, 2006).

Over time, erosive tooth wear can result in irreversible enamel loss, functional impairment, and increased need for restorative dental interventions (Lussi et al., 2011).

Oral health complications associated with weight-loss pharmacotherapy may have broader clinical implications by affecting nutrition, communication, self-esteem, and overall quality of life (Palacios & Joshipura, 2014).

nmanaged oral adverse effects may also contribute to reduced medication adherence and premature discontinuation of otherwise effective weight-loss treatments (Ryan et al., 2020).

These considerations highlight the need to systematically evaluate oral manifestations within the context of pharmacological obesity management (Villa et al., 2015).

A multidisciplinary healthcare approach is essential to address the complex interaction between weight-loss medications and oral health outcomes (Apovian et al., 2015).

Collaboration among physicians, pharmacists, dentists, and nursing professionals enables early identification, prevention, and management of medication-related oral complications (Garvey et al., 2016).

Therefore, integrating oral health considerations into obesity treatment frameworks represents an important step toward comprehensive, patient-centered care.

Table 1. Key Studies (2015–2024) Examining Oral Effects of Weight-Loss and Related Systemic Medications

Key Conclusions	Main Oral Findings	Population	Medication / Drug Class	Study Design	Author (Year)
Medication-induced salivary hypofunction is common and clinically significant	Xerostomia, salivary gland dysfunction	Adults (mixed)	Multiple systemic drugs	Systematic review	Villa et al. (2015)
Polypharmacy increases xerostomia risk	Dry mouth, taste alteration	Adults	Xerogenic medications	Narrative review	Wolff et al. (2017)
Nutritional imbalance affects oral tissues	Mucosal changes, periodontal risk	Adults	Nutrition-related drugs	Review	Palacios & Joshipura (2014/2015 *)
Long-term GLP-1 use associated with nausea and reflux	Indirect oral risk via GI effects	Overweight & obese adults	Semaglutide (GLP-1 RA)	RCT / CV outcomes	Ryan et al. (2020)
GI adverse effects relevant to oral health	Enamel erosion risk (indirect)	Adults with obesity	Semaglutide 2.4 mg	RCT	Davies et al. (2021)
Acid exposure may predispose to dental erosion	Vomiting, reflux	Adults with obesity	GLP-1 RA	RCT	Wilding et al. (2021)
Gastric acid is a major etiological factor	Enamel erosion	Dental patients	Acid exposure	Clinical review	Lussi et al. (2011/2018 *)
Systemic inflammation links obesity and periodontitis	Periodontal inflammation	Diabetic & obese adults	Metabolic drugs	Consensus report	Chapple et al. (2017)
Systemic risk factors accelerate	Periodontal progression	Adults	Systemic conditions	Classification review	Tonetti et al. (2017)

periodontal disease					
Multidisciplinary monitoring recommended	Oral effects underreported	Adults	Anti-obesity drugs	Clinical guideline	Garvey et al. (2016)

*Included because heavily cited and foundational.

Table 2. Weight-Loss Drug Classes and Reported Oral Manifestations

Drug Class	Examples	Reported Oral Manifestations	Mechanism	Supporting Evidence
GLP-1 receptor agonists	Semaglutide, Liraglutide	Dental erosion, hypersensitivity	Vomiting, delayed gastric emptying	Davies et al. (2021); Wilding et al. (2021)
Centrally acting appetite suppressants	Phentermine	Xerostomia, taste changes	Sympathomimetic effects	Wolff et al. (2017); Villa et al. (2015)
Lipase inhibitors	Orlistat	Gingival inflammation (indirect)	Fat-soluble vitamin deficiency	Palacios & Joshipura (2014)
Combination therapies	Phentermine/Topiramate	Dry mouth, mucosal discomfort	CNS + metabolic effects	Garvey et al. (2016)
Polypharmacy	Mixed	Severe xerostomia	Cumulative anticholinergic burden	Scully (2003); Wolff et al. (2017)

2. Overview of Weight-Loss Pharmacotherapy

Pharmacological therapy for weight management is recommended as an adjunct to lifestyle modification in adults with obesity or overweight accompanied by obesity-related comorbidities when non-pharmacological interventions alone are insufficient (Apovian et al., 2015).

International and regional clinical guidelines emphasize that anti-obesity medications should be prescribed within a structured medical framework that includes long-term monitoring of efficacy and safety (Garvey et al., 2016).

The growing availability of effective pharmacological agents has expanded the use of weight-loss medications across diverse healthcare settings (Ryan et al., 2020).

Current weight-loss pharmacotherapy encompasses several drug classes that differ in mechanisms of action, clinical effectiveness, and adverse effect profiles (Bray et al., 2016). These agents exert their effects through central appetite regulation, gastrointestinal nutrient absorption inhibition, or modulation of metabolic and hormonal pathways involved in energy balance (Davies et al., 2021).

Understanding these mechanisms is critical for anticipating systemic and oral adverse effects associated with prolonged drug exposure (Villa et al., 2015).

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) represent one of the most widely prescribed classes of modern anti-obesity medications (Wilding et al., 2021).

These agents promote weight loss by enhancing satiety, reducing appetite, and delaying gastric emptying through both central and peripheral mechanisms (Davies et al., 2021). Large randomized controlled trials have demonstrated sustained weight reduction and improvement in cardiometabolic risk factors among patients treated with GLP-1 RAs (Ryan et al., 2020).

Despite their clinical efficacy, GLP-1 receptor agonists are frequently associated with gastrointestinal adverse effects, particularly nausea, vomiting, and gastroesophageal reflux, especially during treatment initiation and dose escalation (Wilding et al., 2021). These gastrointestinal manifestations are clinically relevant to oral health due to repeated exposure of dental tissues to gastric acid (Bartlett & Shah, 2006).

Prolonged acid exposure has been identified as a major etiological factor in dental erosion and enamel demineralization (Lussi et al., 2011).

Centrally acting appetite suppressants exert their effects by modulating hypothalamic neurotransmitter pathways involved in hunger and satiety regulation (Bray et al., 2016). These medications often possess sympathomimetic or anticholinergic properties that have been associated with reduced salivary gland secretion (Scully, 2003).

Medication-induced salivary hypofunction increases susceptibility to dental caries, periodontal disease, and oral mucosal discomfort (Loesche, 2007).

Gastrointestinal lipase inhibitors, such as orlistat, reduce dietary fat absorption by inhibiting pancreatic lipase activity within the intestinal lumen (Heck et al., 2000). Although these agents exhibit minimal systemic absorption, long-term use has been associated with deficiencies in fat-soluble vitamins essential for oral mucosal integrity and periodontal health (Palacios & Joshipura, 2014).

Nutritional deficiencies may compromise wound healing and immune responses in oral tissues, indirectly increasing oral disease risk (Chapple et al., 2017).

Combination pharmacotherapies are increasingly used to enhance weight-loss efficacy by targeting multiple physiological pathways simultaneously (Garvey et al., 2016). While combination regimens may improve clinical outcomes, they also increase the likelihood of cumulative adverse effects, including xerostomia and taste disturbances (Wolff et al., 2017).

Polypharmacy has been consistently identified as a significant risk factor for medication-induced oral complications, particularly in long-term treatment contexts (Villa et al., 2015).

The duration of pharmacological weight-loss therapy is another important consideration, as many patients require extended or lifelong treatment to maintain weight reduction (Ryan et al., 2020).

Long-term exposure to anti-obesity medications increases the clinical relevance of cumulative oral adverse effects that may otherwise be overlooked in short-term trials (Villa et al., 2015).

Therefore, a comprehensive understanding of weight-loss pharmacotherapy is essential for evaluating its potential impact on oral health outcomes (Garvey et al., 2016).

3. Pathophysiological Links Between Weight-Loss Medications and Oral Health

Weight-loss medications influence oral health through multiple interconnected pathophysiological mechanisms involving salivary gland function, gastrointestinal physiology, neurochemical pathways, and nutritional status (Villa et al., 2015). These mechanisms often act synergistically, increasing the risk of oral manifestations during prolonged pharmacological therapy (Wolff et al., 2017).

Understanding these links is essential for identifying patients at higher risk of medication-related oral complications (Garvey et al., 2016).

Table 5. Pathophysiological Mechanisms Linking Weight-Loss Medications to Oral Manifestations

Pathophysiological Pathway	Drug Classes Involved	Biological Mechanism	Resulting Oral Effects	Key References
Salivary gland dysfunction	Centrally acting agents, combination therapy	Sympathomimetic & anticholinergic effects reduce salivary secretion	Xerostomia, caries, mucosal irritation	Villa et al. (2015); Wolff et al. (2017)
Gastric acid exposure	GLP-1 receptor agonists	Nausea, vomiting, delayed gastric emptying	Dental erosion, hypersensitivity	Bartlett & Shah (2006); Lussi et al. (2011)
Neurochemical modulation	Appetite suppressants	Altered neurotransmitters affect taste pathways	Dysgeusia, appetite changes	Scully (2003); Wolff et al. (2017)
Nutritional imbalance	Lipase inhibitors, reduced intake	Fat-soluble vitamin deficiency	Gingival inflammation, delayed healing	Palacios & Joshipura (2014); Chapple et al. (2017)
Systemic inflammation	Obesity + medications	Inflammatory mediators affect periodontal tissues	Periodontal disease progression	Preshaw et al. (2012); Tonetti et al. (2017)

Table 5 summarizes the primary biological pathways through which weight-loss medications influence oral health outcomes.

Salivary gland dysfunction emerges as a central mechanism, particularly in patients receiving centrally acting or combination pharmacotherapies, where reduced salivary flow compromises enamel protection and microbial balance (Villa et al., 2015). Xerostomia has been consistently identified as a dose-dependent adverse effect that increases caries risk and oral discomfort over time (Wolff et al., 2017).

Gastrointestinal side effects represent another critical pathway linking weight-loss medications to oral disease.

GLP-1 receptor agonists are strongly associated with nausea and vomiting, leading to repeated acid exposure of dental tissues (Wilding et al., 2021).

This exposure disrupts enamel mineral integrity and significantly increases susceptibility to erosive tooth wear (Lussi et al., 2011).

Neurochemical modulation of appetite-regulating pathways may also alter gustatory function.

Taste disturbances have been reported in patients using centrally acting weight-loss medications, which may influence dietary preferences and indirectly affect oral disease risk (Scully, 2003).

Such changes may promote increased intake of cariogenic or acidic foods, compounding the effects of reduced salivary protection (Moynihan & Kelly, 2014).

Table 6. Salivary and Gastrointestinal Factors Affecting Oral Health During Weight-Loss Pharmacotherapy

Factor	Medication Association	Oral Consequences	Clinical Relevance	Supporting Evidence
Reduced salivary flow	CNS-active agents	Increased caries and infections	High	Villa et al. (2015)
Lower buffering capacity	Xerogenic drugs	Enamel demineralization	Moderate–High	Featherstone (2004)
Recurrent vomiting	GLP-1 RAs	Dental erosion	High	Bartlett & Shah (2006)
Gastroesophageal reflux	GLP-1 RAs	Hypersensitivity, erosion	Moderate	Lussi et al. (2011)
Altered oral microbiome	Xerostomia + diet	Periodontal inflammation	Emerging	Loesche (2007)

Table 6 highlights the central role of salivary and gastrointestinal factors in mediating oral complications during weight-loss pharmacotherapy.

Reduced salivary flow and buffering capacity are particularly detrimental because saliva plays a key role in enamel remineralization and antimicrobial defense (Featherstone, 2004). When these protective functions are compromised, even minor dietary or acidic challenges can result in clinically significant dental pathology (Loesche, 2007).
Gastroesophageal reflux and vomiting further exacerbate these risks by introducing intrinsic acids into the oral environment.
Repeated exposure to gastric acid has been shown to accelerate enamel loss and increase dentin hypersensitivity, particularly in patients receiving long-term GLP-1 receptor agonist therapy (Wilding et al., 2021).
These findings emphasize the need for early preventive strategies targeting both salivary dysfunction and acid exposure.

Table 7. Nutritional and Metabolic Changes Associated With Oral Tissue Vulnerability

Nutritional Factor	Drug-Related Cause	Oral Tissue Impact	Evidence
Vitamin D deficiency	Fat malabsorption	Periodontal inflammation	Palacios & Joshipura (2014)
Vitamin A deficiency	Reduced dietary intake	Mucosal atrophy	Chapple et al. (2017)
Reduced calcium intake	Appetite suppression	Enamel demineralization	Featherstone (2004)
Weight-loss–related inflammation	Obesity pharmacotherapy	Periodontal breakdown	Preshaw et al. (2012)

Nutritional and metabolic alterations represent an indirect yet clinically important pathway linking weight-loss medications to oral disease.
Deficiencies in fat-soluble vitamins and minerals may impair epithelial integrity, immune defense, and periodontal stability (Palacios & Joshipura, 2014).

These effects are particularly relevant in patients undergoing rapid or sustained weight loss, where dietary intake may be significantly altered (Chapple et al., 2017).
Moreover, obesity-related systemic inflammation may persist despite weight reduction and continue to influence periodontal disease progression (Preshaw et al., 2012).
The combined impact of nutritional deficiencies and inflammatory burden underscores the importance of integrating nutritional assessment into oral health risk evaluation for patients on weight-loss medications (Tonetti et al., 2017).

4. Medical and Pharmacy Perspectives on Oral Adverse Effects

From a medical and pharmacy perspective, oral adverse effects associated with weight-loss medications are often secondary to systemic pharmacodynamic and pharmacokinetic mechanisms rather than direct drug toxicity to oral tissues (Apovian et al., 2015). Physicians and pharmacists play a critical role in identifying patients at increased risk of medication-related oral complications through careful drug selection, dose titration, and long-term monitoring (Garvey et al., 2016).
Failure to recognize these effects early may result in progressive oral disease and reduced adherence to pharmacological weight-loss therapy (Villa et al., 2015).

Table 8. Drug-Specific Oral Adverse Effects From a Medical and Pharmacy Perspective (2015–2024)

Drug Class	Common Medications	Systemic Adverse Effects	Oral Adverse Effects	Strength of Evidence	Key References
GLP-1 receptor agonists	Semaglutide, Liraglutide	Nausea, vomiting, reflux	Dental erosion, hypersensitivity	High	Davies et al. (2021); Wilding et al. (2021)
Centrally acting agents	Phentermine	Sympathomimetic effects	Xerostomia, dysgeusia	Moderate–High	Wolff et al. (2017); Scully (2003)
Lipase inhibitors	Orlistat	Fat malabsorption	Gingival inflammation (indirect)	Moderate	Palacios & Joshipura (2014)
Combination therapies	Phentermine/Topiramate	CNS + metabolic effects	Severe xerostomia, mucosal discomfort	Moderate	Garvey et al. (2016)
Polypharmacy	Multiple agents	Cumulative adverse effects	Persistent dry mouth, caries	High	Villa et al. (2015)

Table 8 demonstrates that oral adverse effects vary considerably by pharmacological class and are strongly influenced by systemic side-effect profiles.
GLP-1 receptor agonists exhibit the strongest association with acid-mediated dental erosion due to their well-documented gastrointestinal effects (Wilding et al., 2021). From a medical standpoint, dose escalation strategies and symptom monitoring are essential to mitigate these oral risks (Davies et al., 2021).

Centrally acting appetite suppressants and combination therapies show a higher propensity for salivary gland dysfunction due to sympathomimetic and anticholinergic activity (Scully, 2003).

Pharmacy-based medication review is therefore crucial in patients receiving multiple xerogenic drugs, as cumulative exposure significantly increases oral disease risk (Villa et al., 2015).

Table 9. Role of Physicians and Pharmacists in Preventing Oral Complications

Healthcare Professional	Preventive Actions	Oral Health Impact	Evidence
Physician	Drug selection and dose titration	Reduced GI-induced erosion	Apovian et al. (2015)
Physician	Identification of high-risk patients	Early prevention	Garvey et al. (2016)
Pharmacist	Medication reconciliation	Reduced xerostomia risk	Wolff et al. (2017)
Pharmacist	Patient counseling	Improved oral hygiene behaviors	Villa et al. (2015)
Pharmacist	Supplement recommendations	Improved mucosal health	Palacios & Joshipura (2014)

Table 9 highlights the complementary roles of physicians and pharmacists in mitigating oral adverse effects during weight-loss pharmacotherapy.

Physicians are primarily responsible for selecting appropriate medications and adjusting doses to minimize systemic adverse effects that contribute to oral pathology (Apovian et al., 2015).

Early identification of patients with pre-existing oral disease or gastroesophageal reflux is particularly important for preventing dental erosion (Garvey et al., 2016).

Pharmacists contribute significantly through medication reconciliation and patient education, which have been shown to reduce the incidence of drug-induced xerostomia and improve symptom reporting (Wolff et al., 2017).

Counseling on hydration, oral care products, and nutritional supplementation further supports oral tissue integrity during long-term therapy (Palacios & Joshipura, 2014).

Table 10. Pharmacy-Based Interventions to Reduce Oral Adverse Effects

Intervention	Target Oral Issue	Expected Outcome	Supporting Evidence
Saliva substitutes	Xerostomia	Improved comfort	Villa et al. (2015)
Fluoride toothpaste	Enamel demineralization	Reduced caries risk	Featherstone (2004)
Medication timing advice	Nausea-related erosion	Reduced acid exposure	Bartlett & Shah (2006)
Vitamin supplementation	Mucosal integrity	Improved healing	Palacios & Joshipura (2014)

Pharmacy-based interventions represent a practical and accessible strategy for reducing oral complications associated with weight-loss medications.

Evidence supports the use of saliva substitutes and topical fluoride products to counteract the effects of salivary hypofunction and enamel demineralization (Featherstone, 2004). Additionally, counseling patients on medication timing and management of gastrointestinal

symptoms can significantly reduce acid-related dental damage (Bartlett & Shah, 2006).

5. Spectrum of Oral and Dental Manifestations

Oral and dental manifestations associated with weight-loss medications present as a broad clinical spectrum ranging from mild, reversible symptoms to progressive conditions with long-term consequences (Villa et al., 2015).

The severity and presentation of these manifestations are influenced by drug class, duration of therapy, patient susceptibility, and the presence of systemic comorbidities such as diabetes mellitus and gastroesophageal reflux disease (Garvey et al., 2016).

Early recognition of these manifestations is critical for preventing irreversible oral tissue damage and preserving oral health–related quality of life (Wolff et al., 2017).

Table 11. Common Oral and Dental Manifestations Associated With Weight-Loss Medications (2015–2024)

Oral Manifestation	Clinical Features	Associated Drug Classes	Predisposing Factors	Key References
Xerostomia	Dry mouth, burning sensation	Centrally acting agents, combinations	Polypharmacy, dehydration	Villa et al. (2015); Wolff et al. (2017)
Dental caries	Cervical and root caries	Xerogenic drugs	Reduced saliva, high sugar intake	Loesche (2007)
Dental erosion	Smooth enamel loss, sensitivity	GLP-1 receptor agonists	Vomiting, reflux	Bartlett & Shah (2006); Lussi et al. (2011)
Periodontal inflammation	Gingival bleeding, pocketing	All classes (indirect)	Obesity, inflammation	Chapple et al. (2017)
Dysgeusia	Altered taste perception	CNS-active agents	Neurochemical changes	Scully (2003)
Oral candidiasis	White plaques, soreness	Xerogenic drugs	Immunosuppression, dry mouth	Villa et al. (2015)

Table 11 outlines the most frequently reported oral manifestations associated with pharmacological weight-loss therapy.

Xerostomia is consistently identified as the most prevalent symptom and often serves as the initiating factor for secondary complications such as dental caries and mucosal infections (Villa et al., 2015).

The clinical significance of xerostomia is amplified in patients receiving long-term therapy or multiple xerogenic medications (Wolff et al., 2017).

Dental erosion represents a distinct pathological process driven primarily by acid exposure rather than bacterial activity.

Patients receiving GLP-1 receptor agonists are particularly vulnerable due to recurrent gastrointestinal symptoms that increase intrinsic acid challenges to enamel (Wilding et al., 2021).

Without early intervention, erosive tooth wear may progress to dentin exposure and chronic hypersensitivity (Lussi et al., 2011).

Table 12. Clinical Indicators and Diagnostic Considerations in Dental Practice

Manifestation	Key Diagnostic Indicators	Clinical Assessment Tools	Diagnostic Challenges	Supporting Evidence
Xerostomia	Reduced salivary pooling	Salivary flow tests	Subjective variability	Wolff et al. (2017)
Dental erosion	Smooth, cupped lesions	BEWE index	Overlap with abrasion	Lussi et al. (2011)
Caries risk	Root surface lesions	Caries risk assessment	Confounding diet factors	Loesche (2007)
Periodontal disease	Bleeding on probing	Periodontal charting	Systemic inflammation	Chapple et al. (2017)
Oral infections	Erythema, plaques	Clinical examination	Mimics other lesions	Villa et al. (2015)

Accurate diagnosis of medication-related oral manifestations requires careful clinical assessment and awareness of pharmacological history.

Salivary hypofunction may be underestimated if assessment relies solely on patient-reported dryness, highlighting the importance of objective salivary flow measurements (Wolff et al., 2017).

Similarly, dental erosion may be misdiagnosed as abrasion or attrition if acid exposure history is not adequately explored (Lussi et al., 2011).

Periodontal manifestations are often multifactorial and may reflect the combined influence of obesity-related inflammation and medication-induced oral changes.

Clinicians should therefore interpret periodontal findings within the broader context of systemic health and pharmacotherapy (Chapple et al., 2017).

Table 13. Impact of Oral Manifestations on Patient Outcomes

Outcome Domain	Observed Impact	Clinical Implications	Evidence
Oral function	Chewing discomfort	Nutritional compromise	Palacios & Joshipura (2014)
Quality of life	Pain, dryness	Reduced adherence	Wolff et al. (2017)
Treatment adherence	Therapy discontinuation	Weight regain risk	Ryan et al. (2020)
Dental care needs	Increased restorations	Healthcare burden	Lussi et al. (2011)

Oral manifestations associated with weight-loss medications extend beyond localized dental findings and may significantly influence overall patient outcomes. Oral discomfort and impaired mastication can interfere with dietary intake, undermining nutritional adequacy during weight-loss therapy (Palacios & Joshipura, 2014).Furthermore, persistent oral symptoms have been linked to reduced adherence and premature discontinuation of pharmacological treatment, potentially compromising long-term weight management success (Ryan et al., 2020).

Clinical Practice Implications

The recognition of oral manifestations associated with weight-loss medications has important implications for everyday clinical practice across medical, pharmaceutical, and dental settings (Apovian et al., 2015).

Given the increasing reliance on long-term pharmacological therapy for obesity management, oral adverse effects should be considered a clinically relevant component of overall treatment safety rather than minor or incidental findings (Ryan et al., 2020).
Baseline oral health assessment prior to initiating weight-loss medications represents a critical preventive strategy.

Patients with pre-existing conditions such as xerostomia, gastroesophageal reflux disease, high caries risk, or periodontal disease may be more vulnerable to medication-related oral complications (Villa et al., 2015).
Early identification of these risk factors allows clinicians to implement preventive measures and tailor pharmacological choices accordingly (Garvey et al., 2016).
During active pharmacological treatment, regular monitoring of oral symptoms is essential.
Clinical follow-up should include targeted questioning about dry mouth, tooth sensitivity, altered taste, gingival discomfort, and oral pain, as these symptoms are often underreported unless specifically addressed (Wolff et al., 2017).
Incorporating oral symptom screening into routine obesity follow-up visits may improve early detection of adverse effects and reduce progression to advanced oral disease (Tonetti et al., 2017).
Management of gastrointestinal side effects has direct relevance to oral health preservation.
For patients experiencing nausea, vomiting, or reflux associated with GLP-1 receptor agonists, strategies to minimize acid exposure to dental tissues should be emphasized (Wilding et al., 2021).
Simple measures such as rinsing the mouth with water or bicarbonate solutions and delaying tooth brushing after vomiting can significantly reduce enamel erosion risk (Bartlett & Shah, 2006).
Medication-induced xerostomia requires proactive management to prevent secondary complications.
Clinical evidence supports the use of saliva substitutes, topical fluoride products, and hydration strategies to mitigate the effects of reduced salivary flow (Featherstone, 2004).
Failure to address xerostomia may result in increased caries incidence, oral infections, and reduced oral health–related quality of life (Loesche, 2007).
Clinical practice should also acknowledge the bidirectional relationship between oral health and treatment adherence.
Persistent oral discomfort, taste disturbances, or dental sensitivity may negatively influence patient willingness to continue pharmacological weight-loss therapy (Ryan et al., 2020).
Addressing oral adverse effects promptly can therefore contribute not only to oral health preservation but also to sustained weight management success (Villa et al., 2015).
Finally, integrating oral health considerations into pharmacological obesity management aligns with contemporary patient-centered care models.
Such integration supports holistic assessment, improves interprofessional collaboration, and enhances long-term outcomes for patients receiving weight-loss medications (Apovian et al., 5).
Clinical practice guidelines may benefit from explicitly incorporating oral health monitoring as part of routine obesity pharmacotherapy follow-up (Garvey et al., 2016).

Research Gaps and Future Directions

Despite the growing body of evidence supporting the efficacy of pharmacological weight-loss therapies, the oral health consequences of these medications remain insufficiently explored in the current literature (Villa et al., 2015).

Most clinical trials evaluating anti-obesity medications prioritize weight reduction and metabolic outcomes, while oral manifestations are rarely included as primary or secondary endpoints (Ryan et al., 2020).
This gap limits the ability to accurately estimate the prevalence, severity, and clinical progression of medication-related oral adverse effects.
Longitudinal data examining the long-term oral health impact of sustained weight-loss pharmacotherapy are particularly limited (Garvey et al., 2016).
Given that obesity is increasingly managed as a chronic condition requiring prolonged or lifelong treatment, short-term studies may underestimate cumulative oral risks such as dental erosion, caries progression, and periodontal breakdown (Lussi et al., 2011). Future research should therefore incorporate extended follow-up periods to capture delayed or progressive oral manifestations.
Another major limitation in the existing literature is the lack of standardized oral health assessment tools in obesity-related pharmacological trials (Wolff et al., 2017). Heterogeneity in outcome measures and reliance on patient-reported symptoms reduce comparability across studies and may contribute to underreporting of clinically relevant findings (Villa et al., 2015).
The inclusion of validated indices for salivary function, dental erosion, and periodontal status would improve the quality and consistency of future research.
Interdisciplinary research integrating dentistry, medicine, pharmacy, and nutrition remains scarce (Tonetti et al., 2017).
Most available evidence originates from single-discipline perspectives, which may not fully capture the complex interactions between systemic pharmacotherapy and oral health (Apovian et al., 2015).
Future studies adopting multidisciplinary designs could provide more comprehensive insights and support the development of integrated clinical guidelines.
Additionally, limited attention has been given to patient-centered outcomes related to oral health–related quality of life during pharmacological weight-loss therapy (Palacios & Joshipura, 2014).
Oral discomfort, taste disturbances, and functional limitations may influence dietary behaviors and medication adherence, yet these outcomes are rarely evaluated systematically (Ryan et al., 2020).
Incorporating quality-of-life measures into future trials would enhance understanding of the broader clinical implications of oral adverse effects.
Addressing these research gaps is essential for informing evidence-based clinical practice and optimizing patient safety.
Future investigations should prioritize longitudinal, interdisciplinary, and patient-centered approaches to better characterize the oral health implications of weight-loss medications (Garvey et al., 2016).

10. CONCLUSION

Pharmacological weight-loss medications represent an increasingly important component of obesity management, offering substantial benefits in weight reduction and metabolic control (Davies et al., 2021).
However, accumulating evidence indicates that these therapies may be associated with a range of oral manifestations that can adversely affect dental health, oral function, and quality of life if left unrecognized (Villa et al., 2015).
Oral complications such as xerostomia, dental erosion, caries susceptibility, periodontal inflammation, and taste disturbances arise through multiple interconnected mechanisms,

including salivary gland dysfunction, gastrointestinal adverse effects, neurochemical modulation, and nutritional alterations (Wolff et al., 2017).
The multifactorial nature of these manifestations underscores the need for comprehensive clinical assessment beyond traditional metabolic endpoints (Lussi et al., 2011).
Integrating oral health considerations into pharmacological obesity management is essential for achieving holistic, patient-centered care.
Early identification and proactive management of oral adverse effects can prevent irreversible damage, support treatment adherence, and improve long-term outcomes for patients receiving weight-loss medications (Ryan et al., 2020).
A multidisciplinary approach that fosters collaboration among physicians, pharmacists, dentists, and allied healthcare professionals is critical to addressing these challenges effectively (Apovian et al., 2015).Incorporating oral health monitoring into clinical guidelines and future obesity pharmacotherapy trials may strengthen preventive strategies and enhance overall patient safety.
By recognizing the oral cavity as an integral component of systemic health, healthcare systems can better align obesity management practices with comprehensive care principles and improved quality of life outcomes (Tonetti et al., 2017).

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