



Oral Manifestations of Glucagon-Like Peptide-1 Receptor Agonist Therapy: Implications for Dental Practice

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ABSTRACT

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have transformed the management of type 2 diabetes mellitus and obesity, becoming among the most widely prescribed pharmacologic therapies worldwide. Medications such as semaglutide, tirzepatide, liraglutide, dulaglutide, and exenatide have demonstrated substantial benefits in glycemic control, weight reduction, and cardiovascular risk reduction. As the use of these agents continues to expand, healthcare providers are increasingly recognizing adverse effects that extend beyond the gastrointestinal and metabolic systems. Emerging evidence suggests that GLP-1 receptor agonists may influence oral health through alterations in salivary gland function, delayed gastric emptying, reflux-related complications, dehydration, and changes in nutritional status. Reports of xerostomia, halitosis, taste disturbances, enamel erosion, dentinal hypersensitivity, and increased caries susceptibility have generated growing interest within the dental community. Emerging literature has also explored the potential impact of GLP-1 therapy on periodontal health, peri-implant tissues, and oral inflammatory processes.

This narrative review examines the pharmacologic basis of GLP-1 receptor agonists and discusses their potential oral manifestations and implications for dental practice. Particular emphasis is placed on xerostomia, dental erosion, caries risk, oral mucosal changes, periodontal considerations, and the emerging concept of “Ozempic mouth.” The review also highlights clinical recommendations for dental professionals managing patients receiving GLP-1 receptor agonist therapy and identifies areas requiring future investigation. As the use of these medications continues to increase, dental practitioners must recognize potential oral complications and implement preventive strategies to optimize patient outcomes.

Keywords: GLP-1 receptor agonists, semaglutide, tirzepatide, oral manifestations, xerostomia, dental erosion, oral health, obesity, diabetes, dentistry

INTRODUCTION

The global prevalence of obesity and type 2 diabetes mellitus has reached unprecedented levels, creating significant public health challenges and increasing demand for effective long-term treatment strategies.^{22,23} Over the past decade, glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have emerged as a major therapeutic advancement in the management of both conditions.^{7,8} Originally developed for glycemic control in patients with type 2 diabetes, these medications have demonstrated substantial efficacy in promoting weight loss, improving metabolic parameters, and reducing cardiovascular risk.^{7,8} Their success has resulted in widespread adoption across medical specialties and rapidly expanding use among diverse patient populations.

Commonly prescribed GLP-1 receptor agonists include semaglutide, liraglutide, dulaglutide, exenatide, and the dual glucose-dependent insulinotropic polypeptide (GIP)/GLP-1 receptor agonist tirzepatide.^{7,8} Through mechanisms involving delayed gastric emptying, appetite suppression, enhanced insulin secretion, and reduced glucagon release, these medications produce clinically meaningful improvements in body weight and glycemic

control.^{9,10} As a result, millions of individuals worldwide are currently receiving GLP-1-based therapies for diabetes, obesity, and related metabolic disorders.^{22,23}

Although the systemic benefits of GLP-1 receptor agonists are well established, increasing attention has been directed toward their adverse effect profile. Gastrointestinal symptoms, including nausea, vomiting, delayed gastric emptying, and gastroesophageal reflux, are among the most commonly reported treatment-related complications.^{6,11} These effects have important implications for oral health because repeated exposure of the dentition to gastric acid may contribute to enamel demineralization, dentinal hypersensitivity, and erosive tooth wear.^{17,18} Furthermore, growing evidence suggests that GLP-1 receptor agonists may influence salivary gland function and contribute to xerostomia, one of the most frequently reported oral complaints among users of these medications.^{4,5}

The dental profession has increasingly become aware of a phenomenon popularly referred to as “Ozempic mouth” or “Ozempic teeth.” While these terms are not recognized clinical diagnoses, they reflect growing concerns regarding oral complications potentially associated with semaglutide and other GLP-1 receptor agonists.^{3,5} Reports from clinicians and emerging literature have described dry mouth, halitosis, altered taste perception, increased caries susceptibility, and dental erosion among some individuals undergoing treatment.^{3,4} Although many of these observations remain under investigation, they highlight the need for greater awareness within oral healthcare settings.

Interestingly, the relationship between GLP-1 receptor agonists and oral health may not be exclusively detrimental. Some studies have suggested that these medications may exert beneficial anti-inflammatory effects, potentially contributing to improved periodontal outcomes and reduced peri-implant bone loss.^{20,21} Such findings underscore the complex interactions between systemic metabolic therapies and oral tissues and emphasize the importance of evidence-based evaluation rather than reliance on anecdotal reports alone.

As the number of patients receiving GLP-1 receptor agonists continues to rise, dental professionals must understand the mechanisms by which these drugs may affect the oral cavity and recognize potential manifestations during routine clinical examinations. Increased awareness can facilitate earlier identification of complications, implementation of preventive interventions, and effective interdisciplinary collaboration with medical providers.^{3,5} This narrative review explores the pharmacology of GLP-1 receptor agonists, examines emerging evidence regarding their oral manifestations, and discusses practical implications for contemporary dental practice.

REVIEW METHODOLOGY

This narrative review was developed through a comprehensive appraisal of published literature addressing glucagon-like peptide-1 receptor agonists (GLP-1 RAs), their mechanisms of action, adverse effects, and potential implications for oral health. Peer-reviewed articles, clinical studies, review papers, and professional reports related to diabetes management, obesity treatment, salivary gland physiology, oral medicine, and dental practice were examined. Relevant topics included GLP-1 receptor pharmacology, xerostomia, salivary dysfunction, gastroesophageal reflux, dental erosion, oral mucosal manifestations, periodontal health, and emerging reports associated with semaglutide and related therapies. The available evidence was synthesized narratively to provide a dental perspective on the potential oral manifestations of GLP-1 receptor agonist use. Because this manuscript is a narrative review, a formal systematic review protocol and meta-analysis were not performed.

Overview of GLP-1 Receptor Agonists

Glucagon-like peptide-1 receptor agonists represent a rapidly expanding class of medications developed for the treatment of type 2 diabetes mellitus and obesity. The endogenous hormone glucagon-like peptide-1 (GLP-1) is secreted by intestinal L-cells following food intake and functions as an incretin hormone, enhancing glucose-dependent insulin secretion while suppressing glucagon release. It also slows gastric emptying and promotes satiety, thereby contributing to improved glycemic control and regulation of energy balance.^{9,10}

Pharmaceutical development of GLP-1 receptor agonists was initially aimed at improving diabetes management by replicating the beneficial metabolic effects of endogenous GLP-1 while overcoming its short biologic half-life.⁹ Over time, these agents demonstrated substantial effectiveness in promoting weight reduction, leading to expanded indications for obesity treatment.^{7,8} As a result, GLP-1 receptor agonists have become some of the most widely prescribed medications in contemporary medicine.^{22,23}

Currently available GLP-1 receptor agonists include semaglutide, liraglutide, dulaglutide, exenatide, and lixisenatide. More recently, tirzepatide, a dual glucose-dependent insulinotropic polypeptide (GIP) and GLP-1 receptor agonist, has emerged as an important therapeutic option demonstrating remarkable efficacy in both glycemic control and weight reduction.^{7,8} The increasing popularity of these medications has expanded their use well beyond endocrinology and obesity medicine, resulting in growing exposure among patients routinely seeking dental care.

The widespread adoption of GLP-1 receptor agonists underscores the importance of understanding not only their systemic benefits but also their potential effects on oral tissues and oral healthcare outcomes. As dentists increasingly encounter patients receiving these medications, awareness of both therapeutic implications and adverse effects becomes essential for comprehensive patient management.^{3,5}

GLP-1 Receptors in Oral Tissues and Salivary Glands

Although glucagon-like peptide-1 receptor agonists are primarily recognized for their metabolic effects, emerging evidence suggests that GLP-1 receptors are distributed beyond traditional endocrine organs and may be present within tissues relevant to oral health. This expanding understanding has generated interest in the potential impact of GLP-1 signaling on salivary gland function and oral physiology.⁴

Saliva plays a critical role in maintaining oral health through lubrication, buffering of acids, antimicrobial activity, facilitation of mastication and swallowing, and promotion of enamel remineralization. Any disruption in salivary gland function can significantly affect the oral environment, increasing susceptibility to dental caries, periodontal disease, mucosal disorders, and oral discomfort. Consequently, alterations in salivary secretion associated with pharmacologic therapies warrant careful consideration by dental professionals.^{12,13,14,15}

Recent investigations have proposed that GLP-1 receptors may influence secretory activity within salivary tissues. While the precise mechanisms remain incompletely understood, researchers have suggested that GLP-1 signaling may participate in regulatory pathways governing salivary gland function, cellular protection, and fluid secretion. These observations have raised questions regarding whether prolonged stimulation of GLP-1 receptors through pharmacologic agents such as semaglutide could alter normal salivary physiology in susceptible individuals.⁴

In addition to direct receptor-mediated effects, several indirect mechanisms may contribute to oral manifestations observed among GLP-1 receptor agonist users. Appetite suppression, reduced fluid intake, gastrointestinal symptoms, and weight-loss-associated metabolic changes may collectively influence hydration status, salivary flow, and oral microbial balance. Furthermore, delayed gastric emptying and reflux-related complications may expose oral tissues to additional physiologic stress.^{6,11}

Understanding the relationship between GLP-1 receptor signaling and oral tissues provides an important foundation for examining the oral manifestations associated with these medications. Although definitive mechanistic evidence remains limited, increasing recognition of salivary dysfunction and oral complaints among users of GLP-1 receptor agonists highlights the need for greater attention to oral health considerations in this rapidly growing patient population.^{4,5} The potential pathways through which GLP-1 receptor agonists may contribute to oral manifestations are summarized in Figure 1.

Figure 1. Proposed Mechanisms Linking GLP-1 Receptor Agonist Therapy to Oral Manifestations

GLP-1 RECEPTOR AGONIST THERAPY



Physiologic Effects



- Reduced fluid intake
- Delayed gastric emptying
- Reflux and vomiting
- Appetite suppression
- Nutritional changes



Changes in the Oral Environment



- Reduced salivary flow
- Xerostomia
- Increased gastric acid exposure
- Altered oral microbial balance
- Oral mucosal dryness



Potential Oral Manifestations



- Dental caries
- Dental erosion
- Dentinal hypersensitivity
- Halitosis
- Taste disturbances
- Oral mucosal irritation
- Periodontal and peri-implant changes



Clinical Dental Implications



- Increased preventive care needs
- Caries risk management
- Xerostomia management
- Erosion monitoring
- Interdisciplinary collaboration

Figure Legend: Proposed mechanisms through which glucagon-like peptide-1 receptor agonist therapy may contribute to xerostomia, dental erosion, increased caries susceptibility, oral mucosal changes, halitosis, taste disturbances, and other oral manifestations. These effects may result from a combination of reduced salivary flow, dehydration, gastrointestinal adverse effects, and treatment-associated nutritional changes.^{4,5}

Xerostomia and Salivary Dysfunction: The Most Common Oral Manifestation

Among the oral complications associated with GLP-1 receptor agonist therapy, xerostomia has emerged as the most frequently recognized and clinically relevant manifestation.^{4,5} While many patients tolerate these medications without significant oral symptoms, increasing numbers of individuals report persistent dry mouth following initiation of therapy.^{4,6} The symptom may range from mild oral dryness to substantial discomfort that interferes with speaking, swallowing, eating, and oral hygiene practices.

The etiology of xerostomia in patients receiving GLP-1 receptor agonists is likely multifactorial. Proposed mechanisms include direct effects on salivary gland function, reduced fluid intake secondary to appetite suppression, dehydration associated with gastrointestinal adverse effects, and altered physiologic signaling within salivary secretory pathways.^{4,6} In many cases, patients experience diminished thirst perception while simultaneously consuming fewer calories and fluids, creating conditions that may reduce oral hydration and salivary output.⁴

Saliva performs numerous protective functions within the oral cavity. Adequate salivary flow facilitates lubrication of oral tissues, buffering of dietary and bacterial acids, antimicrobial defense, remineralization of

enamel, and maintenance of mucosal integrity.^{12, 13, 14, 15} Consequently, any reduction in salivary secretion may significantly alter the oral environment and increase susceptibility to disease.

Clinically, patients may complain of persistent oral dryness, difficulty swallowing dry foods, increased need for fluids during meals, burning sensations of the tongue or oral mucosa, and discomfort when speaking for prolonged periods. Some individuals may also report difficulty wearing removable prostheses due to reduced lubrication of oral tissues. On clinical examination, findings may include dry and sticky mucosa, reduced salivary pooling, stringy saliva, fissured tongue surfaces, and increased plaque accumulation.^{12, 16}

Because xerostomia often develops gradually, patients may not initially associate symptoms with their medication use. Dental professionals should therefore routinely review medication histories and specifically inquire about GLP-1 receptor agonist therapy when evaluating patients presenting with dry mouth complaints. Early recognition allows implementation of preventive interventions that may reduce the risk of secondary complications and preserve oral health.¹⁶

Differential Diagnosis of Xerostomia in Patients Receiving GLP-1 Receptor Agonists

Although xerostomia is increasingly reported among patients receiving GLP-1 receptor agonist therapy, clinicians should recognize that oral dryness is frequently multifactorial in origin. Many individuals prescribed these medications have underlying medical conditions that may independently contribute to salivary dysfunction. Type 2 diabetes mellitus itself has long been associated with xerostomia, often as a consequence of altered salivary gland function, chronic dehydration, and metabolic dysregulation.^{12, 16} In addition, obesity-related comorbidities frequently necessitate medications such as antihypertensives, antidepressants, anxiolytics, antihistamines, and diuretics, all of which are recognized causes of medication-induced dry mouth.¹²

Systemic disorders should also be considered in the differential diagnosis of xerostomia. Autoimmune diseases such as Sjögren syndrome, prior head and neck radiation therapy, neurologic disorders, endocrine abnormalities, and age-related changes in salivary gland function may contribute to reduced salivary flow.^{12, 16} Consequently, clinicians should avoid attributing xerostomia solely to GLP-1 receptor agonist therapy without performing a comprehensive evaluation of the patient's medical history, medication profile, and associated risk factors. Careful assessment can facilitate accurate diagnosis, guide appropriate management strategies, and help distinguish medication-associated symptoms from underlying systemic conditions.¹⁶

Dental Caries Risk and Changes in the Oral Environment

Alterations in salivary flow associated with GLP-1 receptor agonist use may have important implications for dental caries risk. Saliva serves as one of the oral cavity's primary defense mechanisms against cariogenic challenges by buffering acids, facilitating clearance of food debris, and supporting remineralization processes.^{13, 14} Consequently, reductions in salivary flow can significantly increase susceptibility to dental decay.^{12, 16}

The relationship between GLP-1 receptor agonist therapy and caries development is likely indirect rather than drug-mediated. Xerostomia creates an environment in which acidogenic bacteria may proliferate, pH buffering capacity decreases, and enamel becomes increasingly vulnerable to demineralization.^{12, 13} Furthermore, diminished salivary clearance may prolong the retention of fermentable carbohydrates within the oral cavity, further enhancing cariogenic potential.¹³

Several additional factors may contribute to alterations in caries risk among patients receiving GLP-1 receptor agonists. Dietary changes associated with weight-loss efforts can vary substantially between individuals. Some patients adopt healthier nutritional habits with reduced sugar intake, potentially lowering risk, whereas others may consume smaller but more frequent meals or rely on certain beverages and supplements that influence oral health.^{3, 5} As a result, individual caries risk should be evaluated comprehensively rather than assuming universal effects from medication use alone.

Dental practitioners should maintain heightened awareness of caries risk factors in patients reporting xerostomia during GLP-1 therapy. Regular caries risk assessment, fluoride supplementation, remineralization therapies, dietary counseling, and close clinical monitoring may play important roles in preventive management.^{16,13} Early intervention may help mitigate adverse outcomes and preserve long-term oral health in this rapidly expanding patient population.

Gastroesophageal Reflux, Vomiting, and Dental Erosion

Gastrointestinal adverse effects represent some of the most commonly reported complications of GLP-1 receptor agonist therapy and are particularly relevant from a dental perspective. Nausea, vomiting, delayed gastric emptying, and gastroesophageal reflux may occur during treatment initiation, dose escalation, or long-term therapy.^{6,11} Although these symptoms vary considerably among individuals, repeated exposure of oral tissues to gastric contents has significant potential consequences for dental hard tissues.

Dental erosion is characterized by the irreversible loss of tooth structure resulting from chemical dissolution of enamel and dentin in the absence of bacterial involvement.^{17,18} Gastric acid possesses an extremely low pH and is capable of rapidly demineralizing enamel surfaces following repeated exposure.¹⁷ Patients who experience recurrent vomiting or reflux episodes may therefore be at increased risk of erosive tooth wear.^{5,11}

Clinical manifestations of erosion often begin with subtle smoothing of enamel surfaces and loss of normal surface texture. As the condition progresses, patients may develop enamel thinning, dentinal exposure, increased translucency of incisal edges, cupping of occlusal surfaces, and generalized tooth sensitivity.^{17,18} Advanced cases may present with substantial structural loss that compromises both esthetics and function.

Recognition of erosion patterns is particularly important in patients receiving GLP-1 receptor agonists. A thorough medical history should include inquiries regarding nausea, vomiting, reflux symptoms, and recent initiation of weight-loss medications.^{5,6} Preventive recommendations may include avoiding toothbrushing immediately after vomiting episodes, rinsing with water or bicarbonate solutions, use of remineralizing agents, application of topical fluoride, and referral for medical evaluation when significant gastrointestinal symptoms persist.¹⁷

The increasing popularity of GLP-1 receptor agonists creates a unique opportunity for interdisciplinary collaboration between dental and medical professionals. Identification of erosion-related findings may assist in uncovering previously unrecognized medication-related adverse effects and facilitate more comprehensive patient care.⁵

Halitosis and Taste Disturbances

Changes in breath odor and taste perception have also been reported among some individuals receiving GLP-1 receptor agonist therapy. Although these manifestations have received less scientific attention than xerostomia or gastrointestinal symptoms, they may significantly affect quality of life and contribute to patient concerns regarding treatment.^{4,5}

Halitosis may arise through several potential mechanisms. Reduced salivary flow diminishes the oral cavity's natural cleansing capacity, promoting retention of debris and accumulation of volatile sulfur compounds associated with malodor.^{13,16} Additionally, rapid weight loss and alterations in metabolic pathways may contribute to transient ketone production, which can generate distinctive breath odors perceived by patients as unpleasant or unusual.^{3,5}

Taste disturbances may present as diminished taste sensitivity, altered taste perception, metallic tastes, or persistent abnormal flavors. These symptoms may be related to xerostomia, medication effects, nutritional changes, or alterations in oral sensory function.^{4,5} Although often temporary, taste alterations can influence dietary habits and may contribute to reduced enjoyment of food.

Because both halitosis and taste disturbances can arise from diverse causes, clinicians should avoid attributing these symptoms solely to GLP-1 therapy without considering alternative diagnoses. Oral infections, periodontal disease, medication interactions, nutritional deficiencies, and systemic conditions may also contribute.¹⁶ Comprehensive evaluation remains essential in determining appropriate management strategies.

Patient education can play an important role in symptom management. Reinforcement of oral hygiene practices, optimization of salivary flow, maintenance of adequate hydration, and regular professional care may help reduce symptom severity and improve overall oral comfort.^{13, 16}

Oral Mucosal Manifestations

The oral mucosa depends heavily on saliva to maintain hydration, lubrication, and protection from environmental and microbial challenges. Consequently, prolonged reductions in salivary flow may have secondary effects on mucosal health among patients receiving GLP-1 receptor agonist therapy.^{12, 13}

Many reported mucosal manifestations appear to be indirectly mediated through xerostomia rather than direct pharmacologic toxicity. Affected patients may experience mucosal dryness, irritation, burning sensations, increased tissue sensitivity, and discomfort during eating or speaking.^{4, 16} Symptoms may be particularly noticeable in individuals with preexisting salivary dysfunction or other contributing medical conditions.

In some cases, chronic oral dryness may increase vulnerability to opportunistic infections and inflammatory conditions. Reduced salivary antimicrobial activity may alter the oral microbial ecosystem and facilitate development of oral candidiasis, particularly among medically compromised individuals.^{12, 13} Angular cheilitis, fissuring of the lips, and generalized mucosal irritation may also occur when normal tissue lubrication is compromised.¹⁶

Nutritional changes associated with substantial weight loss may provide an additional mechanism through which oral mucosal health is affected. Reduced intake of certain vitamins, minerals, or proteins may influence mucosal integrity and healing capacity.^{3, 5} While such effects are unlikely to occur in all patients, they should be considered when evaluating oral complaints in individuals experiencing significant dietary changes during GLP-1 therapy.

Careful oral examination and comprehensive medical history review can help clinicians distinguish medication-associated manifestations from unrelated oral pathologies. Management should focus on symptom relief, maintenance of salivary function, prevention of secondary infections, and coordination of care with the patient's medical team when necessary.¹⁶

Periodontal and Peri-Implant Considerations

The relationship between GLP-1 receptor agonist therapy and periodontal health represents an emerging area of interest within both medical and dental research. Unlike many of the oral manifestations discussed previously, which are generally viewed as potential adverse effects, periodontal outcomes associated with GLP-1 receptor agonists may be both beneficial and complex. As obesity, diabetes mellitus, and periodontal disease share common inflammatory pathways, therapies that improve metabolic control may also influence oral inflammatory conditions.^{20, 21}

Chronic hyperglycemia is a well-established risk factor for periodontal disease, contributing to impaired immune function, increased inflammatory mediator production, delayed wound healing, and destruction of periodontal supporting tissues.^{20, 21} By improving glycemic control and reducing systemic inflammation, GLP-1 receptor agonists may potentially exert favorable effects on periodontal health. Improvements in metabolic status may enhance host response, reduce inflammatory burden, and support more effective periodontal disease management.²⁰

Several investigators have proposed that GLP-1 receptor agonists may possess anti-inflammatory properties that extend beyond glycemic regulation. Reduction in circulating inflammatory markers and improvement in

insulin sensitivity may indirectly contribute to improved periodontal outcomes.^{20,21} Patients with diabetes who achieve better metabolic control often demonstrate reduced periodontal inflammation and improved response to periodontal therapy, suggesting a possible pathway through which GLP-1-based treatments may benefit oral health.²⁰

Emerging evidence has also explored potential effects on peri-implant tissues. Metabolic disorders such as poorly controlled diabetes are associated with increased risk of peri-implant disease and impaired osseointegration.^{19,20} Some preliminary observations have suggested that individuals receiving GLP-1 receptor agonist therapy may experience favorable peri-implant outcomes, potentially related to reduced inflammation and improved systemic metabolic health.¹⁹ However, current evidence remains limited, and further studies are necessary before definitive conclusions can be established.

Despite these potentially beneficial effects, clinicians must remain mindful of competing risk factors. Xerostomia, altered oral hygiene practices, dietary changes, and reduced salivary protection may negatively influence plaque accumulation and oral microbial balance.^{12,16} Consequently, the overall impact of GLP-1 receptor agonist therapy on periodontal and peri-implant health may vary among individuals depending on systemic health status, oral hygiene practices, and coexisting risk factors.

Further research is needed to clarify the relationship between GLP-1 receptor agonists and periodontal disease progression, treatment response, implant survival, and peri-implant tissue stability. As use of these medications continues to expand, understanding their influence on oral inflammatory diseases may provide valuable insights into the interplay between systemic metabolic health and oral health outcomes.^{19,21}

“Ozempic Mouth”: Social Media, Patient Perceptions, and Emerging Clinical Observations

In recent years, social media platforms, online health forums, and popular media outlets have increasingly used the terms “Ozempic mouth” and “Ozempic teeth” to describe a collection of perceived oral changes associated with semaglutide and other GLP-1 receptor agonists. Although these terms are not recognized medical diagnoses, their widespread use reflects growing public awareness and concern regarding potential oral complications associated with these medications.^{3,5}

Descriptions of “Ozempic mouth” commonly include dry mouth, bad breath, altered taste perception, increased dental sensitivity, enamel erosion, caries development, and changes in facial appearance attributed to rapid weight loss.^{3,5} Patients frequently encounter such information through social media before discussing concerns with healthcare providers, highlighting the importance of evidence-based communication within dental practice.

The emergence of these popular terms underscores a broader challenge faced by clinicians in the digital age. While social media can increase awareness of potential health concerns, it may also amplify anecdotal experiences that lack scientific validation. Many oral manifestations discussed online may be multifactorial in origin and not necessarily attributable solely to GLP-1 receptor agonist therapy. Factors such as preexisting oral disease, dehydration, dietary modifications, oral hygiene practices, comorbid medical conditions, and concurrent medication use may all contribute to reported symptoms.^{12,16}

Nevertheless, patient concerns should not be dismissed. Reports of dry mouth, reflux-related erosion, and oral discomfort are sufficiently common to warrant clinical attention.^{4,5} The increasing prevalence of these concerns presents an opportunity for dental professionals to educate patients regarding both established evidence and areas of ongoing investigation. By providing balanced information, clinicians can help patients distinguish between scientifically supported findings and unsupported claims.

Open communication is particularly important because patients may discontinue beneficial medications due to fears generated by social media content. Dentists should encourage patients to discuss concerns with both medical and dental providers before making decisions regarding medication use. Collaborative management may allow preservation of therapeutic benefits while simultaneously addressing oral health complications through preventive and supportive care strategies.³



The phenomenon of “Ozempic mouth” highlights the growing intersection between systemic pharmacotherapy, patient perceptions, public discourse, and oral health. As additional research emerges, a more comprehensive understanding of these associations will likely develop and help guide evidence-based recommendations for both healthcare professionals and patients.^{3, 5}

Figure 2. Suggested Clinical Workflow for Dental Management of Patients Receiving GLP-1 Receptor Agonist Therapy

PATIENT RECEIVING GLP-1 RECEPTOR AGONIST THERAPY

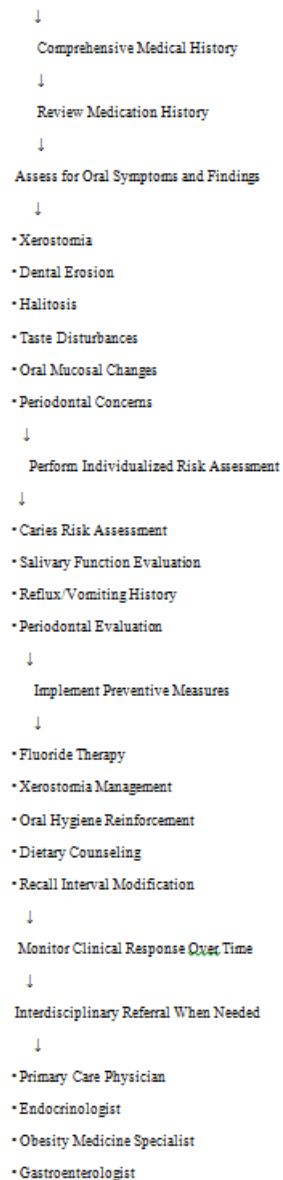


Figure Legend

Figure 2. Suggested clinical workflow for evaluation and management of patients receiving glucagon-like peptide-1 receptor agonist therapy in dental practice. Dental assessment should include identification of oral manifestations, individualized risk assessment, implementation of preventive strategies, and collaboration with medical providers when appropriate.^{3, 5, 12, 17}

Clinical Considerations and Recommendations for Dental Professionals

As the use of GLP-1 receptor agonists continues to expand, dental professionals are increasingly likely to encounter patients receiving these medications. Recognition of potential oral manifestations and implementation of appropriate preventive strategies are essential components of contemporary patient-centered care.^{3, 5}

Comprehensive medical history updates should include specific inquiry regarding medications used for diabetes management and weight loss. Patients may recognize brand names such as Ozempic, Wegovy, Mounjaro, Zepbound, Trulicity, or Victoza more readily than the corresponding generic drug names. Identifying medication use during routine dental visits allows clinicians to consider potential associations between oral symptoms and pharmacologic therapy.^{7,8}

When patients report xerostomia, clinicians should evaluate symptom severity and assess for associated complications. Recommendations may include increasing water intake, using salivary substitutes, chewing sugar-free gum to stimulate salivary flow, and avoiding products that further contribute to oral dryness. Caries prevention strategies should be individualized based on risk assessment and may include fluoride therapy, remineralization products, and more frequent recall intervals.^{16,12}

Particular attention should be directed toward signs of dental erosion among patients who report nausea, vomiting, or gastroesophageal reflux. Detailed examination of enamel surfaces, dentinal exposure, incisal wear, and hypersensitivity can facilitate early diagnosis. Preventive counseling should emphasize appropriate post-vomiting oral care, including rinsing with water rather than immediate toothbrushing and use of fluoride-containing products to strengthen enamel surfaces.^{17,18} Dental professionals should also evaluate patients for halitosis, mucosal irritation, candidiasis, altered taste perception, and periodontal changes when clinically indicated. Because many oral manifestations may be secondary rather than directly medication-induced, management should focus on alleviating symptoms, minimizing risk factors, and maintaining overall oral health.^{12,16}

Interdisciplinary collaboration represents another important aspect of patient care. Communication with physicians, endocrinologists, obesity medicine specialists, and primary care providers may be beneficial when significant oral complications arise. Shared management can help ensure that systemic therapeutic benefits are maintained while oral adverse effects are appropriately addressed.^{3,5} Ultimately, awareness and preventive care remain the most effective tools available to dental professionals. Through early recognition, patient education, and evidence-based management, dentists can play an important role in minimizing oral complications and supporting the long-term success of GLP-1 receptor agonist therapy.^{3,5}

Table 1. Reported Oral Manifestations of GLP-1 Receptor Agonist Therapy and Clinical Implications

Oral Manifestation	Proposed Mechanism	Potential Clinical Consequences
Xerostomia	Reduced salivary flow, dehydration, reduced fluid intake	Caries, mucosal irritation, candidiasis
Dental Caries	Reduced salivary buffering and clearance	Increased enamel demineralization
Dental Erosion	Reflux, nausea, vomiting	Enamel loss, dentinal hypersensitivity
Halitosis	Xerostomia and altered metabolism	Oral malodor and reduced quality of life
Taste Disturbances	Salivary changes and medication-related effects	Altered food intake and oral discomfort
Oral Mucosal Changes	Dryness, altered nutrition, reduced saliva	Mucosal irritation and tissue sensitivity
Periodontal Changes	Systemic metabolic and inflammatory modulation	Potential improvement or alteration in periodontal status
Peri-Implant Considerations	Modified inflammatory responses and metabolic control	Potential effects on peri-implant tissue health



Table Legend: Oral manifestations that have been reported or proposed among patients receiving glucagon-like peptide-1 receptor agonist therapy, along with potential mechanisms and clinical implications to dental practice.^{3, 5}

Table 2. Selected Studies Evaluating Oral Health Effects and Clinical Implications of GLP-1 Receptor Agonist Therapy

Study	Study Type	Key Findings	Relevance to Dentistry
Barać & Roganović (2025)	Narrative Review	Proposed mechanisms linking semaglutide to salivary gland dysfunction and xerostomia	Supports biologic basis for oral adverse effects
GLP-1 Receptor Agonists and Oral Health (BDJ 2026)	Review	Discussed xerostomia, erosion, reflux-related complications, and clinical implications	Provides emerging dental evidence
Adverse Events of Oral Semaglutide (2024)	Pharmacovigilance Study	Identified adverse-event patterns associated with semaglutide use	Highlights medication-related complications relevant to oral healthcare
Wilding et al. (2021)	Randomized Clinical Trial	Demonstrated substantial weight reduction with semaglutide	Supports widespread adoption and increased dental exposure
Jastreboff et al. (2022)	Randomized Clinical Trial	Demonstrated significant weight loss with tirzepatide	Establishes expanding use of incretin-based therapies
Villa et al. (2015)	Systematic Review	Examined medication-induced salivary dysfunction and xerostomia	Provides framework for assessing dry mouth in GLP-1 users
Dawes et al. (2015)	Review	Described protective functions of saliva in oral health	Explains consequences of reduced salivary flow
Preshaw et al. (2012)	Review	Demonstrated bidirectional relationship between diabetes and periodontal disease	Supports discussion of periodontal implications
Sanz et al. (2018)	Evidence Review	Examined relationship between diabetes and periodontal outcomes	Relevant to potential periodontal benefits of GLP-1 therapy

Table Legend: Summary of selected studies relevant to oral manifestations, salivary dysfunction, metabolic effects, and periodontal considerations associated with LP-1 receptor agonist therapy.^{3,4,5}

Future Directions and Research Priorities

Although awareness of the oral implications of GLP-1 receptor agonist therapy has increased substantially in recent years, the available evidence remains limited and several important knowledge gaps persist. Much of the current literature consists of case reports, observational studies, pharmacovigilance data, mechanistic hypotheses, and narrative reviews.^{4,6} Consequently, definitive conclusions regarding causation, prevalence, and long-term oral outcomes remain difficult to establish.

Future research should prioritize prospective longitudinal studies evaluating the incidence and progression of oral manifestations among patients receiving GLP-1 receptor agonists. Such studies would help clarify whether

xerostomia, dental erosion, taste disturbances, and other reported complications represent direct pharmacologic effects, indirect consequences of associated metabolic changes, or multifactorial processes influenced by patient-specific characteristics.^{4, 6}

Additional investigations examining salivary gland physiology and GLP-1 receptor signaling within oral tissues may provide valuable insights into the biological mechanisms underlying reported symptoms. Improved understanding of salivary gland responses to GLP-1 receptor activation may help explain variations in symptom severity among patients and facilitate development of targeted preventive strategies.^{4, 12}

The influence of GLP-1 receptor agonists on the oral microbiome also warrants further exploration. Alterations in salivary flow, dietary habits, and metabolic status may affect microbial composition and potentially influence susceptibility to caries, periodontal disease, and oral mucosal conditions.^{12, 13} Future studies incorporating microbiome analyses could provide important information regarding these interactions.

Another important area for investigation involves periodontal and peri-implant outcomes. Preliminary research suggests that GLP-1 receptor agonists may exert beneficial anti-inflammatory effects, yet evidence remains insufficient to determine their long-term influence on periodontal treatment outcomes, peri-implant health, implant survival, and bone remodeling.^{19, 20, 21} Well-designed clinical trials are needed to evaluate these relationships and identify potential therapeutic implications for dental practice.

Research should also address patient-reported outcomes and quality-of-life measures. Xerostomia, halitosis, taste alterations, and oral discomfort can significantly affect daily function and psychosocial well-being.¹⁶ Understanding the patient experience may help inform clinical guidelines and improve interdisciplinary management strategies.

Finally, standardized reporting of oral adverse events associated with GLP-1 receptor agonists would facilitate meaningful comparison across studies and contribute to the development of evidence-based recommendations.⁶ As the use of these medications continues to expand globally, greater collaboration between medical and dental researchers will be essential for advancing understanding of their oral health implications.^{22, 23}

Limitations

Several limitations should be considered when interpreting the findings presented in this review. First, the body of literature specifically examining oral manifestations associated with GLP-1 receptor agonist therapy remains relatively limited compared with the extensive literature addressing the metabolic and cardiovascular effects of these medications.^{7, 8} As a result, certain conclusions are derived from emerging evidence and should be interpreted with appropriate caution.^{4, 5}

Second, many reported oral manifestations have been described in observational studies, case reports, and anecdotal clinical observations. Such evidence is valuable for identifying potential associations but may not establish direct causal relationships between GLP-1 receptor agonist use and specific oral conditions.^{4, 6} Multiple confounding variables, including underlying systemic disease, dietary patterns, oral hygiene practices, hydration status, and concurrent medication use, may influence reported outcomes.

Third, most available studies focus on semaglutide because of its widespread use and media attention.^{4, 6} Consequently, less information is available regarding oral effects associated with other GLP-1 receptor agonists such as liraglutide, dulaglutide, exenatide, and newer dual incretin therapies. Differences in pharmacologic properties between agents may influence oral manifestations and warrant further investigation.^{7, 8}

Fourth, obesity and type 2 diabetes mellitus themselves are associated with numerous oral health conditions, including xerostomia, periodontal disease, dental caries, and impaired wound healing.^{12, 20} Distinguishing medication-related effects from manifestations of underlying systemic disease presents a significant challenge and may complicate interpretation of existing evidence.

Finally, this manuscript represents a narrative review and therefore does not include formal systematic review methodology, risk-of-bias assessment, or meta-analytic synthesis. While every effort was made to provide a balanced and comprehensive overview of the available literature, the findings should be viewed as a narrative synthesis of current evidence rather than a quantitative assessment of treatment effects.

CONCLUSION

Glucagon-like peptide-1 receptor agonists have transformed the management of obesity and type 2 diabetes mellitus, providing substantial benefits in weight reduction, glycemic control, and overall metabolic health.^{7,8,23} As the use of these medications continues to increase, dental professionals are increasingly likely to encounter patients receiving semaglutide, tirzepatide, liraglutide, and related therapies during routine clinical practice.

Emerging evidence suggests that GLP-1 receptor agonists may influence oral health through both direct and indirect mechanisms. Xerostomia appears to be the most commonly reported oral manifestation, with potential downstream consequences including increased caries risk, halitosis, mucosal discomfort, and impaired oral quality of life.^{4,5,16} Gastrointestinal adverse effects such as reflux and vomiting may contribute to dental erosion and dentinal hypersensitivity, while dietary and metabolic changes associated with treatment may further influence the oral environment.^{6,17,18}

At the same time, GLP-1 receptor agonists may offer potential benefits through improved metabolic control and reduced systemic inflammation, with emerging evidence suggesting favorable effects on periodontal and peri-implant health.^{20,21} These observations highlight the complex relationship between systemic pharmacotherapy and oral health and underscore the need for continued scientific investigation.

Dental professionals play a critical role in recognizing medication-related oral manifestations, educating patients, implementing preventive strategies, and collaborating with medical providers to optimize care. Routine assessment of medication history, evaluation of xerostomia and erosion risk, reinforcement of preventive oral health practices, and individualized management approaches can help mitigate complications while supporting the therapeutic benefits of GLP-1 receptor agonist therapy.^{16,17}

As the understanding of these medications continues to evolve, greater integration between medicine and dentistry will be essential for addressing the oral health needs of patients receiving GLP-1-based therapies. Continued research will further clarify the mechanisms, prevalence, and clinical significance of oral manifestations associated with these increasingly important medications.^{4,5,23}

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Informed Consent Statement

This study did not involve human participants, and therefore, informed consent was not required.

Clinical Trial Registration

This research does not involve any clinical trials.

Conflict of Interest

The authors declare no conflict of interest.

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