Oral Manifestations Of Diabetes And Antidiabetic Pharmacotherapy, Clinical Implications For Dental And Pharmacy Professionals

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Abstract

Diabetes mellitus is a prevalent chronic metabolic disorder with well-established systemic complications, including significant effects on oral health. Increasing evidence demonstrates that diabetes is associated with a wide range of oral manifestations such as periodontal disease, xerostomia, dental caries, oral infections, delayed wound healing, and sensory disturbances. In parallel, the expanding use of antidiabetic pharmacotherapy has introduced additional oral and dental considerations, as several drug classes may contribute independently to salivary dysfunction, mucosal reactions, taste alterations, and hypoglycemia-related dental emergencies.

This narrative review synthesizes current evidence on the oral manifestations of diabetes mellitus and the oral effects associated with antidiabetic medications, with particular emphasis on their clinical relevance for dental and pharmacy professionals. The review highlights the bidirectional relationship between diabetes and periodontal disease, the influence of glycemic control on oral outcomes, and the role of pharmacotherapy in modifying oral risk profiles. Furthermore, it underscores the importance of medication review, patient counseling, and early recognition of drug-related oral adverse effects within pharmacy practice.

An interprofessional framework integrating dentistry and pharmacy is emphasized as a critical strategy for improving early detection of complications, optimizing treatment planning, and enhancing patient safety. Strengthening collaboration between dental and pharmacy professionals may contribute to more

comprehensive, patient-centered diabetes care and improved oral and systemic health outcomes.
Keywords: Diabetes mellitus; Oral manifestations; Antidiabetic pharmacotherapy; Periodontal disease; Xerostomia; Interprofessional collaboration.

1. INTRODUCTION

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from defects in insulin secretion, insulin action, or both. It represents one of the most prevalent non-communicable diseases worldwide and constitutes a major public health burden due to its systemic complications affecting multiple organs and tissues, including the oral cavity (World Health Organization [WHO], 2023; Saeedi et al., 2019).

A substantial body of evidence has established a bidirectional relationship between diabetes and oral health, particularly periodontal disease. Poor glycemic control has been consistently associated with increased prevalence and severity of periodontitis, while periodontal inflammation itself may exacerbate insulin resistance and impair metabolic control (Preshaw et al., 2012; Lalla & Papapanou, 2011). Beyond periodontal tissues, diabetes is also linked to a wide spectrum of oral manifestations such as xerostomia, dental caries, oral candidiasis, delayed wound healing, taste disturbances, and burning mouth syndrome, all of which may compromise quality of life and complicate dental care (Lamster & Lalla, 2001; Mauri-Obradors et al., 2017).

In parallel with the rising global prevalence of diabetes, the use of antidiabetic pharmacotherapy has expanded considerably. Contemporary diabetes management involves multiple drug classes, including insulin analogues, biguanides, sulfonylureas, dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagon-like peptide-1 (GLP-1) receptor agonists, and sodium–glucose cotransporter-2 (SGLT2) inhibitors (Davies et al., 2018). While these therapies play a central role in glycemic control, growing evidence suggests that several antidiabetic agents may be associated with oral adverse effects, such as xerostomia, taste alterations, oral infections, and medication-related mucosal changes (de Vries et al., 2020; Sánchez-Domínguez et al., 2021).

Despite increasing recognition of these associations, the oral implications of diabetes-related pharmacotherapy remain underreported in routine clinical practice. Dental professionals may encounter oral complications without full awareness of underlying medication-related factors, while pharmacy professionals are often insufficiently engaged in oral health surveillance and patient education. This gap highlights the need for a multidisciplinary approach integrating dentistry and pharmacy to optimize patient outcomes, improve early detection of oral complications, and enhance overall diabetes management (Bissett et al., 2013; WHO, 2010).

Accordingly, this review aims to synthesize current evidence on the oral manifestations of diabetes mellitus and the oral effects associated with antidiabetic pharmacotherapy, with a particular focus on their clinical implications for dental and pharmacy professionals. Emphasizing interprofessional collaboration, this work seeks to support safer, more comprehensive, and patient-centered care for individuals living with diabetes.

2. Overview of Diabetes Mellitus

2.1 Definition and Classification

Diabetes mellitus (DM) is a heterogeneous group of metabolic disorders characterized by chronic hyperglycemia due to impaired insulin secretion, defective insulin action, or a combination of both. The sustained elevation of blood glucose levels leads to progressive microvascular and macrovascular complications, with well-documented effects on oral and periodontal tissues (American Diabetes Association [ADA], 2024; Saeedi et al., 2019).

According to internationally accepted classifications, diabetes mellitus is categorized into several main types. **Type 1 diabetes mellitus (T1DM)** results from autoimmune destruction of pancreatic β-cells, leading to absolute insulin deficiency. **Type 2 diabetes mellitus (T2DM)**, the most prevalent form, is characterized by insulin resistance combined with relative insulin deficiency and is strongly associated with obesity, sedentary lifestyle, and genetic predisposition (ADA, 2024). **Gestational diabetes mellitus (GDM)** is defined as glucose intolerance first recognized during pregnancy and is associated with both short- and long-term metabolic consequences for the mother and offspring. Other less common forms include monogenic diabetes syndromes and diabetes secondary to pancreatic disease or pharmacological agents (WHO, 2019; ADA, 2024).

2.2 Pathophysiology Relevant to Oral Health

The pathophysiological mechanisms of diabetes have direct and indirect implications for oral tissues. Chronic hyperglycemia promotes the formation of **advanced glycation end products (AGEs)**, which accumulate in periodontal tissues and interact with specific cell surface receptors, triggering inflammatory cascades and oxidative stress. This process contributes to connective tissue breakdown, impaired collagen metabolism, and delayed tissue repair within the oral cavity (Lalla & Papapanou, 2011; Taylor et al., 2013).

Diabetes is also associated with **microvascular dysfunction**, resulting in reduced blood flow, impaired oxygen diffusion, and compromised nutrient delivery to gingival and mucosal tissues. These vascular changes play a critical role in delayed wound healing and increased susceptibility to oral infections, particularly fungal and bacterial infections (Lamster & Lalla, 2001; Preshaw et al., 2012).

Furthermore, immune dysregulation in diabetes leads to altered neutrophil function, impaired chemotaxis, and exaggerated inflammatory responses. Such immune alterations contribute to increased severity of periodontal disease and reduced host resistance to oral pathogens, reinforcing the bidirectional link between diabetes and oral inflammatory conditions (Lalla et al., 2007; Preshaw et al., 2012).

2.3 Glycemic Control and Oral Disease Risk

Glycemic control is a critical determinant of oral health outcomes in individuals with diabetes. Poorly controlled diabetes has been consistently associated with higher prevalence, greater severity, and faster progression of periodontal disease compared to well-controlled diabetes or non-diabetic populations (Tsai et al., 2002; Preshaw et al., 2012).

Conversely, evidence suggests that effective periodontal treatment may lead to modest but clinically relevant improvements in glycemic control, reflected by reductions in glycated hemoglobin (HbA1c) levels. This interrelationship underscores the importance of oral health as an integral component of comprehensive diabetes management (D'Aiuto et al., 2018; Simpson et al., 2020).

Understanding these mechanisms provides a critical foundation for evaluating the oral manifestations of diabetes and the additional effects introduced by antidiabetic pharmacotherapy, which are explored in subsequent sections of this review.

3. Antidiabetic Pharmacotherapy: An Overview

3.1 Major Classes of Antidiabetic Medications

The pharmacological management of diabetes mellitus has evolved substantially over the past two decades, with the introduction of multiple drug classes targeting different pathophysiological mechanisms of hyperglycemia. These therapies aim to improve glycemic control, reduce diabetes-related complications, and enhance quality of life. From an oral health perspective, understanding these drug classes is essential, as several agents may exert direct or indirect effects on oral tissues and salivary function (Davies et al., 2018; ADA, 2024).

Insulin and insulin analogues remain the cornerstone of treatment for type 1 diabetes and are widely used in advanced type 2 diabetes. While insulin itself is not directly associated with oral adverse effects, inadequate dosing or poor coordination with meals may precipitate hypoglycemic episodes, which can present as acute dental emergencies during clinical procedures (ADA, 2024; Little et al., 2018).

Biguanides, particularly metformin, are the first-line pharmacological therapy for type 2 diabetes. Metformin is generally well tolerated; however, studies have reported associations with taste disturbances, xerostomia, and, in rare cases, oral mucosal discomfort. These effects may influence patient adherence and oral comfort, particularly in long-term therapy (de Vries et al., 2020; Sánchez-Domínguez et al., 2021).

Sulfonylureas act by stimulating pancreatic insulin secretion and are associated with a higher risk of hypoglycemia compared to newer agents. Hypoglycemia-related manifestations such as sweating, tremors, and confusion may complicate dental treatment and necessitate careful appointment planning and glucose monitoring (Little et al., 2018).

Dipeptidyl peptidase-4 (DPP-4) inhibitors enhance endogenous incretin activity and are widely prescribed due to their favorable safety profile. Nevertheless, emerging evidence has linked DPP-4 inhibitors to oral mucosal conditions, including bullous pemphigoid-like lesions and lichenoid reactions, underscoring the importance of vigilance by dental professionals (Patel et al., 2016; García-Pola et al., 2020).

Glucagon-like peptide-1 (GLP-1) receptor agonists improve glycemic control by enhancing insulin secretion and delaying gastric emptying. Although primarily associated with gastrointestinal side effects, recent reports suggest potential associations with xerostomia and taste alterations, which may indirectly affect oral hygiene and dietary patterns (Scully, 2016; de Vries et al., 2020).

Sodium–glucose cotransporter-2 (SGLT2) inhibitors lower blood glucose by promoting renal glucose excretion. While their oral effects are less clearly defined, concerns have been raised regarding dehydration and reduced salivary flow, potentially predisposing patients to xerostomia and opportunistic oral infections (Zinman et al., 2015; Sánchez-Domínguez et al., 2021).

3.2 Mechanisms of Drug-Related Oral Effects

Antidiabetic medications may influence oral health through several mechanisms. Alterations in salivary flow and composition, changes in immune response, and modifications in oral microbial ecology have all been proposed as contributing factors. Xerostomia, whether drug-induced or secondary to poor glycemic control, plays a central role in increasing susceptibility to dental caries, periodontal disease, and oral infections (Sreebny & Schwartz, 1997; Mauri-Obradors et al., 2017).

Additionally, pharmacologically induced hypoglycemia can pose significant risks during dental procedures, emphasizing the need for close coordination between

dental and pharmacy professionals to optimize treatment timing and patient safety (Little et al., 2018).

A comprehensive understanding of antidiabetic pharmacotherapy and its potential oral implications is therefore essential for delivering safe, effective, and integrated care to patients with diabetes.

4. Oral Manifestations Associated with Diabetes Mellitus

Diabetes mellitus is associated with a broad spectrum of oral manifestations that arise from chronic hyperglycemia, immune dysregulation, microvascular changes, and alterations in salivary gland function. These manifestations are not merely localized findings but reflect the systemic nature of the disease and its metabolic control, making their recognition clinically important for both dental and pharmacy professionals (Lamster & Lalla, 2001; Mauri-Obradors et al., 2017).

4.1 Periodontal Diseases

Periodontal disease is the most extensively documented oral complication of diabetes mellitus. Individuals with diabetes exhibit a higher prevalence, severity, and progression rate of gingivitis and periodontitis compared with non-diabetic populations. Poor glycemic control is a key determinant, with elevated HbA1c levels strongly correlated with increased periodontal inflammation, attachment loss, and alveolar bone resorption (Preshaw et al., 2012; Lalla & Papapanou, 2011).

From a pathophysiological standpoint, hyperglycemia enhances the accumulation of advanced glycation end products (AGEs) within periodontal tissues, amplifying inflammatory responses and impairing collagen turnover. This creates a destructive cycle in which periodontal inflammation further worsens insulin resistance, reinforcing the bidirectional relationship between diabetes and periodontal disease (Taylor et al., 2013; Preshaw et al., 2012).

4.2 Dental Caries and Tooth Loss

Although the association between diabetes and dental caries is less consistent than that observed for periodontal disease, multiple studies suggest an increased caries risk in patients with poorly controlled diabetes. Reduced salivary flow, elevated salivary glucose concentrations, and changes in oral microbial composition may collectively contribute to enamel demineralization and caries development (Mauri-Obradors et al., 2017; López-Pintor et al., 2016).

Tooth loss in individuals with diabetes is often a cumulative outcome of advanced periodontal disease and caries. Epidemiological studies indicate that adults with long-standing diabetes are more likely to experience partial or complete edentulism, which may adversely affect nutrition, glycemic control, and overall quality of life (Tsai et al., 2002; D'Aiuto et al., 2018).

4.3 Salivary Gland Dysfunction and Xerostomia

Salivary gland dysfunction is a common yet underrecognized manifestation of diabetes. Xerostomia may result from autonomic neuropathy, dehydration due to osmotic diuresis, or concomitant medication use. Reduced salivary flow compromises the protective functions of saliva, including buffering capacity, antimicrobial activity, and mechanical cleansing, thereby increasing susceptibility to caries, mucosal lesions, and oral infections (Sreebny & Schwartz, 1997; Scully, 2016).

Patients frequently report subjective dry mouth even when objective salivary flow rates appear normal, highlighting the need for careful clinical assessment and patient-reported outcome measures (López-Pintor et al., 2016).

4.4 Oral Mucosal Lesions and Infections

Diabetes mellitus predisposes individuals to a variety of oral mucosal alterations. Oral candidiasis is particularly prevalent, reflecting impaired immune responses and elevated salivary glucose levels that favor fungal proliferation. Clinically, candidiasis may present as pseudomembranous, erythematous, or angular cheilitis forms, often accompanied by burning sensations and dysgeusia (Mauri-Obradors et al., 2017; Lamster & Lalla, 2001).

Other reported mucosal conditions include oral lichen planus–like lesions, recurrent aphthous ulcers, and delayed wound healing following dental extractions or periodontal therapy. These manifestations complicate routine dental care and may necessitate modifications in treatment planning (Lalla & Papapanou, 2011).

4.5 Taste Disturbances and Burning Mouth Syndrome

Taste alterations (dysgeusia) and burning mouth syndrome have been reported with increased frequency among patients with diabetes, particularly in those with long disease duration or neuropathic complications. These symptoms may negatively influence dietary choices, medication adherence, and oral hygiene practices, further impacting glycemic control and oral health outcomes (Scully, 2016; López-Pintor et al., 2016).Collectively, these oral manifestations underscore the importance of early identification and ongoing monitoring of oral health in individuals with diabetes. For dental professionals, awareness of these conditions supports timely diagnosis and appropriate intervention. For pharmacy professionals, recognizing oral complaints as potential indicators of poor glycemic control or systemic complications can enhance patient counseling and interdisciplinary referral pathways.

5. Oral Effects of Antidiabetic Pharmacotherapy

In addition to the direct oral manifestations attributable to diabetes mellitus itself, increasing evidence indicates that antidiabetic pharmacotherapy may independently contribute to a range of oral and dental effects. These effects may arise from drug-specific mechanisms, systemic metabolic changes, or interactions with existing oral conditions, highlighting the importance of medication awareness among dental and pharmacy professionals (de Vries et al., 2020; Sánchez-Domínguez et al., 2021).

5.1 Drug-Induced Xerostomia and Salivary Alterations

Xerostomia is among the most frequently reported oral complaints in patients receiving antidiabetic medications. While reduced salivary flow is often multifactorial, pharmacotherapy-related effects have been documented across several drug classes, including biguanides, GLP-1 receptor agonists, and SGLT2 inhibitors. Dehydration, altered autonomic regulation, and changes in fluid balance may contribute to subjective dry mouth even in the absence of measurable hyposalivation (Scully, 2016; de Vries et al., 2020).

Salivary dysfunction compromises oral homeostasis by reducing buffering capacity and antimicrobial activity, thereby increasing the risk of dental caries, periodontal disease, and mucosal irritation. Persistent xerostomia may also impair speech, mastication, and denture retention, with direct implications for oral function and quality of life (Sreebny & Schwartz, 1997).

5.2 Taste Disturbances and Oral Sensory Changes

Taste alterations, including dysgeusia and hypogeusia, have been reported particularly in association with metformin and, to a lesser extent, GLP-1 receptor agonists. These sensory changes may influence dietary preferences, potentially leading to increased consumption of cariogenic foods or reduced nutritional intake,

which can indirectly affect glycemic control and oral health (Scully, 2016; Sánchez-Domínguez et al., 2021).

For dental professionals, awareness of medication-related taste disturbances is essential when evaluating unexplained oral discomfort or changes in eating behavior. Pharmacists play a critical role in identifying these adverse effects and counseling patients regarding their transient or dose-related nature.

5.3 Oral Mucosal Reactions and Infections

Certain antidiabetic agents have been associated with oral mucosal reactions, including lichenoid lesions and bullous pemphigoid–like manifestations, particularly with DPP-4 inhibitors. Although relatively uncommon, these reactions may present initially within the oral cavity and be misattributed to idiopathic mucosal disease if medication history is not carefully reviewed (Patel et al., 2016; García-Pola et al., 2020).

Moreover, alterations in immune response and salivary composition associated with pharmacotherapy may predispose patients to opportunistic infections such as oral candidiasis. These infections may be recurrent or refractory if underlying medication-related factors are not addressed (Mauri-Obradors et al., 2017).

5.4 Hypoglycemia and Dental Care Implications

Hypoglycemia represents a clinically significant risk associated with insulin therapy and insulin secretagogues such as sulfonylureas. Acute hypoglycemic episodes may occur during or following dental procedures, particularly when appointments coincide with peak drug activity or missed meals. Oral manifestations of hypoglycemia include pallor, sweating, tremors, confusion, and, in severe cases, loss of consciousness, constituting a dental emergency (Little et al., 2018).

Preventive strategies include appropriate appointment scheduling, confirmation of recent food intake, and interprofessional communication regarding medication timing. Dental teams must be prepared to recognize and manage hypoglycemia promptly, while pharmacy professionals can reinforce patient education on safe medication use around dental visits.

5.5 Clinical Implications of Medication-Related Oral Effects

Medication-related oral effects may compromise treatment outcomes, patient comfort, and adherence to both dental and medical therapies. Failure to recognize these effects can lead to misdiagnosis, unnecessary interventions, or discontinuation of essential antidiabetic medications. A collaborative approach involving dentists and pharmacists is therefore essential to differentiate disease-related manifestations from drug-induced effects and to optimize patient-centered care (Bissett et al., 2013; WHO, 2010).

6. Clinical Implications for Dental Professionals

Dental professionals play a pivotal role in the early detection, prevention, and management of oral complications associated with diabetes mellitus and antidiabetic pharmacotherapy. Given the high prevalence of oral manifestations in this population, comprehensive dental assessment and individualized treatment planning are essential components of safe and effective care (Lamster & Lalla, 2001; Preshaw et al., 2012).

6.1 Dental Assessment and Risk Stratification

A thorough medical and medication history is fundamental when managing patients with diabetes. Assessment should include diabetes type, duration, glycemic control indicators (e.g., HbA1c), presence of complications, and current pharmacotherapy. Poorly controlled diabetes has been consistently associated with increased

periodontal breakdown, delayed healing, and higher risk of oral infections, necessitating closer monitoring and more frequent recall visits (Tsai et al., 2002; D'Aiuto et al., 2018).

6.2 Treatment Planning and Procedural Considerations

Dental treatment planning must be adapted to the patient's metabolic status. Elective invasive procedures should ideally be scheduled when glycemic control is optimized, and morning appointments are generally preferred to reduce hypoglycemia risk. Awareness of medication timing, particularly insulin and sulfonylureas, is essential to prevent acute glycemic events during dental care (Little et al., 2018).

Periodontal therapy deserves particular emphasis, as evidence indicates that effective periodontal treatment may contribute to modest improvements in glycemic control. This underscores the dentist's role not only in oral health maintenance but also in broader metabolic management (Simpson et al., 2020).

Table 1. Oral manifestations of diabetes mellitus and clinical relevance for dental practice

Oral manifestation	Clinical significance in dental care	Key evidence
Periodontitis	Increased severity, attachment loss, impaired healing	Preshaw et al., 2012; Lalla & Papapanou, 2011
Xerostomia / hyposalivation	Higher caries risk, mucosal irritation, denture intolerance	López-Pintor et al., 2016; Scully, 2016
Dental caries	Altered salivary glucose, microbial imbalance	Mauri-Obradors et al., 2017
Oral candidiasis	Opportunistic infection, delayed resolution	Lamster & Lalla, 2001
Delayed wound healing	Post-extraction complications	Lalla & Papapanou, 2011
Taste disturbances / burning mouth	Reduced oral comfort, dietary impact	López-Pintor et al., 2016
Tooth loss	Functional and nutritional consequences	Tsai et al., 2002

6.4 Preventive and Educational Strategies

Preventive care is central to reducing oral complications in patients with diabetes. Dentists should emphasize meticulous oral hygiene, regular periodontal maintenance, and early management of xerostomia and mucosal changes. Patient education regarding the bidirectional relationship between diabetes and oral health can improve adherence to both dental and medical treatment plans (D'Aiuto et al., 2018).

Close communication with pharmacy professionals enhances medication review, identification of drug-related oral adverse effects, and reinforcement of patient counseling, supporting a coordinated and patient-centered approach.

7. Clinical Implications for Pharmacy Professionals

Pharmacy professionals are strategically positioned to detect, prevent, and mitigate oral complications in patients with diabetes because they routinely review

medication regimens, assess adherence barriers, and manage adverse drug reactions (ADRs). In diabetes care, oral complaints (e.g., xerostomia, dysgeusia, mucosal irritation) may reflect (1) suboptimal glycemic control, (2) polypharmacy and xerogenic medication burden, or (3) drug-specific immune or mucocutaneous reactions. Systematically screening for these symptoms and communicating findings to dental and medical teams supports safer, more coordinated care (World Health Organization [WHO], 2010; ADA, 2024).

7.1 Medication Review Focused on Oral Risk

A structured medication review should extend beyond glycemic efficacy to include (a) hypoglycemia risk (insulin, sulfonylureas), (b) xerogenic co-medications (antihypertensives, antidepressants, antihistamines), and (c) potential immune-mediated mucocutaneous ADRs. Drug-induced dry mouth is a well-recognized phenomenon across many therapeutic classes and can meaningfully increase caries risk, mucosal discomfort, and susceptibility to oral infections—issues that may be incorrectly attributed solely to diabetes unless medication effects are considered (Sreebny & Schwartz, 1997; Scully, 2016).

7.2 Counseling and Practical Interventions

Pharmacists can implement brief, high-yield counseling points:

- **Xerostomia support:** hydration guidance, sugar-free gum/lozenges, saliva substitutes, avoidance of alcohol-based mouthrinses, and referral if persistent (Scully, 2016).
- **Hypoglycemia prevention around dental care:** emphasize meal timing, carry fast-acting carbohydrate, and coordinate appointment timing—particularly for insulin/sulfonylureas (ADA, 2024).
- **Oral infection vigilance:** encourage prompt evaluation of soreness, removable plaques, angular cheilitis, or burning sensations suggestive of candidiasis, especially when glycemic control is poor (Lamster & Lalla, 2001; Mauri-Obradors et al., 2017).
- **Referral pathways:** when symptoms suggest immune-mediated lesions (e.g., persistent erosions, bullae, lichenoid patterns), pharmacists should facilitate escalation to dental/oral medicine and the prescribing clinician for ADR evaluation (Patel et al., 2016).

7.3 Evidence-Synthesis Table for Pharmacy Practice (Medication Class × Oral Signals × What to Do)

Table 2. Antidiabetic drug classes: oral/dental signals, supporting evidence, and pharmacy actions

Drug class (examples)	Oral/dental signals to watch	Evidence signal (type)	Practical pharmacy action
Insulin / analogues	Hypoglycemia presenting during dental visits; delayed healing risk mainly via glycemic instability	Guideline consensus on hypoglycemia risk and management	Reinforce meal–dose timing; advise morning dental visits; ensure patient carries glucose; communicate risk to dental team (ADA, 2024; Little et al., 2018)
Sulfonylureas (e.g., glimepiride)	Higher hypoglycemia risk	Guideline consensus	Same as insulin; counsel on

	→ dental chair emergencies		recognizing early symptoms; consider therapy review if recurrent episodes (ADA, 2024; Little et al., 2018)
Biguanide (metformin)	Patient-reported dysgeusia; possible oral discomfort in some individuals	Reported ADRs in clinical practice; drug–saliva effect reviews (general)	Screen for taste change; assess adherence impact; rule out oral infection/xerostomia; if persistent, coordinate with prescriber for evaluation (Scully, 2016)
DPP-4 inhibitors (e.g., sitagliptin)	Mucocutaneous immune reactions (bullous pemphigoid), may involve oral mucosa in some cases	Documented association in literature (case series/observational pharmacovigilance)	Treat as potential serious ADR; urgent referral (dermatology/oral medicine); coordinate discontinuation decision with prescriber (Patel et al., 2016)
GLP-1 receptor agonists (e.g., liraglutide, semaglutide)	Indirect oral risk via GI effects → reduced intake/dehydration; patient may report dry mouth	Reviews on salivary gland/drug effects (general)	Ask about hydration and dry mouth; counsel on oral hygiene during appetite changes; refer if persistent xerostomia/candidiasis symptoms (Scully, 2016; Mauri-Obradors et al., 2017)
SGLT2 inhibitors (e.g., empagliflozin)	Indirect xerostomia risk via osmotic diuresis/dehydration; oral discomfort may worsen with poor hydration	Mechanism-based inference + general xerostomia drug literature	Hydration counseling; monitor for persistent dry mouth/caries risk; encourage dental checkups and saliva-protective strategies (Scully, 2016; Sreebny & Schwartz, 1997)

Thiazolidinediones (e.g., pioglitazone)	No consistent direct oral ADR signal; oral status mainly influenced by glycemic control & comorbid meds	Guideline-based positioning	Focus on overall medication burden and glycemic control; manage xerogenic co-meds (ADA, 2024; Sreebny & Schwartz, 1997)

7.4 Interprofessional Communication Triggers

Effective interprofessional communication is a cornerstone of safe and comprehensive diabetes care, particularly when oral complications intersect with pharmacological management. Pharmacy professionals, due to their continuous contact with patients and detailed oversight of medication regimens, are uniquely positioned to identify early warning signs that necessitate timely communication with dental and medical teams (World Health Organization [WHO], 2010).

Communication should be actively initiated when patients report recurrent or unexplained oral symptoms that may indicate poor glycemic control, adverse drug reactions, or emerging oral pathology. Repeated episodes of hypoglycemia, especially in patients treated with insulin or sulfonylureas, warrant prompt notification of both dental professionals and prescribers to allow adjustment of appointment timing, medication dosing, or dietary recommendations. Failure to address these risks may result in dental chair emergencies and compromised patient safety (American Diabetes Association [ADA], 2024; Little et al., 2018).

Persistent xerostomia or salivary dysfunction that interferes with speech, mastication, swallowing, or denture retention should also trigger interprofessional referral. Such symptoms may reflect dehydration related to SGLT2 inhibitors, cumulative xerogenic effects of polypharmacy, or inadequate glycemic control. Early communication enables dental teams to implement preventive strategies while pharmacists reassess medication-related contributors (Scully, 2016; Sreebny & Schwartz, 1997).

Of particular clinical importance are non-healing oral lesions, erosive or bullous mucosal changes, and lichenoid reactions. These findings may represent immune-mediated adverse drug reactions, notably those associated with DPP-4 inhibitors, and should prompt urgent interdisciplinary evaluation involving pharmacy, dentistry, and the prescribing physician. Delayed recognition can result in prolonged morbidity and inappropriate symptomatic treatment without addressing the underlying cause (Patel et al., 2016; García-Pola et al., 2020).

Recurrent oral infections, such as candidiasis that persist despite standard local therapy, constitute another critical communication trigger. Such presentations may indicate uncontrolled diabetes, altered salivary composition, or medication-related immunomodulatory effects. Coordinated management facilitates optimization of glycemic control, targeted antifungal therapy, and reinforcement of oral hygiene and medication adherence (Lamster & Lalla, 2001; Mauri-Obradors et al., 2017).

By establishing clear communication triggers and referral pathways, pharmacy professionals contribute significantly to early detection of complications, reduction of preventable adverse outcomes, and delivery of integrated, patient-centered diabetes care. This collaborative framework aligns with international recommendations for interprofessional practice and supports improved clinical and quality-of-life outcomes for individuals living with diabetes (WHO, 2010).

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