



Review Article

Mechanisms and Clinical Spectrum of Oral and Maxillofacial Pathology in Substance Use Disorders: A Narrative Review

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ABSTRACT

Background: Substance use disorders (SUDs) significantly impact oral health, yet the pathophysiological mechanisms remain under-synthesized. This narrative review evaluates the clinical manifestations, diagnostic challenges, and management strategies for oral pathologies associated with SUDs.

Methods: A literature search of PubMed/MEDLINE, Scopus, and Web of Science (2000–2026) was conducted to identify relevant studies, including systematic reviews, clinical trials, and observational data, focusing on dental caries, periodontal disease, and oral mucosal lesions.

Results: Individuals with SUDs exhibit increased prevalence of dental caries, periodontal disease, and xerostomia. Quantitative evidence suggests a 1.84-fold higher risk for periodontal disease and a 2.13-fold increase in oral lesions among users compared to non-users. Pathophysiological drivers include direct pharmacological effects, such as vasoconstriction and xerostomia, exacerbated by poor nutritional status and hygiene. Emerging evidence highlights bidirectional links between periodontal inflammation and psychiatric comorbidities, alongside risks associated with medication-assisted treatments.

Conclusion: Oral health must be integrated into addiction treatment protocols. Clinical management should prioritize rigorous history-taking, aggressive xerostomia mitigation, and tailored follow-up intervals for high-risk patients. These measures are essential to translate existing research into improved patient outcomes.

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Introduction

Substance use disorders (SUDs) remain a critical global public health problem. In 2021, an estimated 296 million people (5.8% of those aged 15–64) used illicit drugs, a 23% rise since 2011 [1]. In Iran, a Tehran study reported lifetime prevalence of 57.3% for hookah, 54.4% for cigarettes, and 41.9% for alcohol, with public parks identified as high-risk settings [2]. Drug use disorders cause approximately 500,000 deaths yearly through overdose, infection, and organ damage [3].

While systemic effects of SUDs (cardiovascular disease, respiratory depression, hepatic injury, endocarditis, and viral hepatitis) are well documented [4], their impact on oral and maxillofacial health is still under-recognized in clinical practice and policy [5, 6]. Similarly, the skin shares vascular and immunological susceptibilities with the oral mucosa, underscoring that superficially accessible tissue can serve as early indicators of underlying systemic damage induced by SUDs [7]. Chronic SUDs have been shown to dysregulate inflammatory pathways, including purinergic signaling cascades that modulate immune cell function [8]. The oral cavity serves as both a mirror of systemic health and a critical portal through which substance use exerts direct and indirect pathological effects.

Oral disease is among the most common comorbidities of SUDs, yet patients often neglect hygiene and present only for emergency care after advanced destruction. This delayed presentation, combined with direct toxic effects, produces severe oral disease that impairs quality of life, nutrition, psychosocial function, and recovery [5, 6, 9]. Direct pharmacological actions (reduced salivary flow, vasoconstriction, tissue toxicity) converge with behavioral patterns (poor hygiene, inadequate diet, limited dental access, and the psychosocial effects of dependence) [10]. Periodontal inflammation can release systemic pro-inflammatory cytokines that worsen psychiatric symptoms and hinder recovery, creating a bidirectional cycle [11, 12]. Recent work identifies oral microbiome dysbiosis and cytokine cascades as key pathways [13]. Substance use reduces beneficial oral species and expands periodontopathogens, promoting oncogenic and inflammatory signaling [10]. Combined with hyposalivation and impaired immunity, this creates a pro-inflammatory milieu that drives both caries and periodontal destruction [10, 14, 15].

This narrative review is structured to provide a

comprehensive and systematic overview of the topic. We begin by examining the epidemiological evidence regarding the prevalence of oral diseases in populations with SUDs, alongside the socio-behavioral factors that contribute to this disease burden. Subsequently, we delve into the underlying pathophysiological mechanisms, including substance-specific pharmacological effects, the central role of xerostomia, and the emerging evidence on oral microbiome dysbiosis and inflammatory pathways. Following this, the clinical manifestations of substance use on oral and maxillofacial structures are described for each major drug class, and diagnostic considerations are outlined. Finally, we discuss the clinical and research implications of these findings, address the limitations of the current evidence base, and conclude with recommendations for integrated multidisciplinary care and future research directions.

Methods of Literature Search

Study Design

This study is a narrative review that synthesizes current evidence on the pathophysiological mechanisms, clinical manifestations, diagnostic considerations, and management strategies of oral and maxillofacial pathologies associated with SUDs.

Search Strategy

A comprehensive literature search was conducted across the following electronic databases: PubMed/MEDLINE, Scopus, Web of Science, and Google Scholar (for grey literature and supplementary reports)

Search Timeframe

The search was systematically performed for publications from January 1, 2000, to July 31, 2026. This timeframe was selected to encompass both foundational early evidence and the most recent updates, including FDA warnings and emerging data on medication-assisted treatments (MAT).

Search Terms

The following combination of keywords and MeSH terms was used, employing Boolean operators (AND, OR): Substance use disorders OR drug abuse OR opioid OR methamphetamine OR cocaine OR cannabis OR alcohol AND Oral health OR dental caries OR periodontal disease OR xerostomia OR oral mucosa OR temporomandibular disorders OR meth mouth AND Pathophysiology OR mechanisms OR microbiome OR inflammation OR immunosuppression

In addition to database searches, hand-searching of reference lists of relevant systematic reviews and meta-analyses was performed to identify additional eligible studies.

Inclusion Criteria

Studies were considered eligible for inclusion if they met the following criteria: Study Types: Systematic reviews, narrative reviews, meta-analyses, clinical trials, cohort studies, cross-sectional studies, and case reports with adequate sample size (≥ 10 participants in the case group). Population: Individuals diagnosed with SUDs (stimulants, opioids, alcohol, cannabis, or polydrug use). Outcomes: At least one oral or maxillofacial outcome, including but not limited to dental caries, periodontal disease, xerostomia, oral mucosal lesions, temporomandibular disorders, or bruxism. Language: English or Persian. Full-text availability

Exclusion Criteria

Studies were excluded based on the following criteria: Lack of direct relevance to the effects of substances on oral health; studies focusing exclusively on psychiatric, social, or epidemiological aspects of addiction without clinical oral outcomes; very small sample sizes (fewer than 10 participants in the case group); letters to the editor, opinion pieces, or articles without original or synthesized clinical data; duplicate publications across databases.

Study Selection and Data Extraction

The study selection process was conducted in multiple stages: Initial Screening: Titles and abstracts were independently screened by two reviewers to identify potentially relevant studies; Full-Text Review: Full texts of potentially eligible articles were assessed against the inclusion and exclusion criteria; Data Extraction: The following data were extracted from each included study: Type of substance(s) investigated, reported oral and maxillofacial outcomes, Pathophysiological mechanisms discussed, Behavioral and sociodemographic contributing factors. For narrative reviews, quality was assessed based on comprehensiveness, consistency with current evidence, and clarity of reporting.

Data Synthesis

Given the narrative nature of this review, data were synthesized descriptively and thematically. The search strategy yielded a comprehensive body of literature, including systematic reviews, meta-analyses, cohort studies, cross-sectional studies, clinical trials, and case reports with adequate sample size (≥ 10 participants in

the case group). Rather than applying formal quantitative meta-analytic techniques or PRISMA-based enumeration, we thematically organized the extracted evidence into the following main categories: (1) Common pathophysiological mechanisms (e.g., xerostomia, vasoconstriction, and immunosuppression), (2) Substance-specific oral manifestations, (3) Oral microbiome dysbiosis and inflammatory pathways, (4) MAT-related oral health risks, and (5) Socio-behavioral and healthcare access factors. This descriptive thematic synthesis is consistent with established methodologies for narrative reviews in the biomedical literature.

Results

Prevalence of Oral Disease in SUDs

Systematic reviews and meta-analyses consistently show poorer oral health among people with SUDs than age-matched controls [5, 6, 16]. Baghaie et al. [5] (28 studies; 4,086 SUD patients and 28,031 controls) found significantly higher DMFT scores, more untreated decay, greater tooth loss, and more severe periodontal disease. Severity varies by substance: methamphetamine, heroin, and cocaine users exhibit the most pronounced pathology [17]. Intravenous users face elevated risks of rapid periodontitis, osteomyelitis, osteonecrosis, and oral malignancy [18, 19].

Socio-Behavioral Contributing Factors

Elevated disease burden is not solely due to pharmacology. Irregular brushing and self-neglect are common [5, 20]. High sugar intake, especially among opioid users, and irregular nutrition create a cariogenic environment. Low socioeconomic status, limited education, unemployment, and housing instability restrict both health literacy and access to care [18]. Patients with SUDs visit dentists less often and show lower treatment adherence because of cost, stigma, competing priorities, and scarce dental services within addiction programs [6]. Psychiatric comorbidity and social isolation further reinforce neglect [21, 22]. The concept of “severe and multiple disadvantage” (homelessness, substance dependence, and criminal-justice involvement) identifies the highest-risk subgroup [18].

Pathophysiological Mechanisms

Methamphetamine

Methamphetamine produces the most destructive oral pattern, known as “meth mouth”: extensive cervical caries, severe periodontitis, and marked attrition [23, 24]. Its acidic nature erodes enamel; sympathomimetic effects cause profound xerostomia

via adrenergic stimulation of the salivary glands [25]; and vasoconstriction reduces gingival perfusion, impairing tissue integrity and immune surveillance [26]. The distinctive cervical and smooth-surface caries pattern can itself suggest methamphetamine use [27].

Cocaine

Cocaine's potent vasoconstriction and local-anesthetic properties produce mucosal ulceration, palatal perforation, and gingival necrosis through prolonged norepinephrine reuptake inhibition and tissue ischemia [28, 29]. Additional findings include periodontal disease, TMJ disorders, bruxism, soft-tissue damage, caries, dry mouth, and taste loss [30]. The anesthetic effect may mask pain and infection until advanced necrosis has occurred [6, 10].

Heroin and Other Opioids

Chronic opioid use causes extensive cervical and interproximal caries. The primary mechanism is xerostomia, which results from down-regulation of salivary aquaporins and sympathetic over-activity [16, 31]. Additionally, μ -opioid receptor agonism on immune cells impairs neutrophil chemotaxis and fibroblast function. This raises susceptibility to candidiasis and herpetic reactivation, and delays post-extraction healing [32, 33]. Prolonged methadone maintenance has been linked to medication-related osteonecrosis of the jaws. This risk is especially elevated when methadone is combined with benzodiazepines and poor hygiene [34]. Opioid users also show elevated gingival-crevicular IL-6 and TNF- α , which accelerates alveolar bone loss [35, 36].

Cannabis

THC binds to CB1/CB2 receptors in salivary glands. This down-regulates aquaporin-5 and reduces salivary flow. The resulting hyposalivation predisposes users to caries, aggressive periodontitis, and candidiasis [37, 38]. Chronic inhalation introduces polycyclic aromatic hydrocarbons. These compounds form DNA adducts and epigenetically silence tumor-suppressor genes in oral epithelium, independent of tobacco [39]. Population data show a dose-dependent increase in the risk of oral and oropharyngeal squamous cell carcinoma among heavy users [40]. Cannabis-associated vasculopathy also delays osteotomy healing and increases dry-socket rates after extraction [41]. Structured substance-use history and surveillance are therefore warranted [42].

Alcohol

Heavy alcohol use is a major independent risk factor

for leukoplakia, erythroplakia, and oral squamous-cell carcinoma. Acetaldehyde, generated both systemically and by oral microbiota, forms DNA adducts, induces oxidative stress, impairs nucleotide excision repair, and suppresses natural killer cell activity. Synergy with tobacco multiplies cancer risk [43–46]. Nutritional deficiencies (folate, vitamin A, zinc), cirrhosis-related coagulopathy, and poor hygiene further worsen surgical outcomes and raise rates of osteonecrosis and wound infection [43, 47, 48]. Pre-operative AUDIT-C screening and 4–6 weeks of abstinence before major head-and-neck surgery reduce morbidity [49, 50].

Xerostomia

Nearly all major psychoactive classes induce clinically significant hyposalivation through central or peripheral anticholinergic/adrenergic effects [51, 52]. Loss of saliva abolishes buffering, remineralization, carbohydrate clearance, and antimicrobial defense, creating a highly cariogenic and infection-prone environment. Severity depends on substance, dose, duration, route, and host factors.

Oral Microbiome Dysbiosis and Inflammation

Substance use disrupts the oral microbiome (~700 species) via direct antimicrobial selection, reduced salivary clearance favoring acidogenic species (*Streptococcus mutans*, *Lactobacillus*), high-sugar diets, and immunosuppression [53–60]. The resulting dysbiosis elevates pro-inflammatory cytokines (IL-6, TNF- α , IL-1 β) in gingival crevicular fluid, driving attachment loss and bone resorption. Systemic cytokine spillover may contribute to neuroinflammation and perpetuate psychiatric symptoms, establishing a bidirectional oral mental health loop [55, 59].

Medication-Assisted Treatment (MAT) Considerations

A 2022 FDA warning and subsequent studies have highlighted oral risks of transmucosal buprenorphine. The combination of buprenorphine, Suboxone, and methadone has been termed a “perfect storm for dental disease” [61, 62]. Propensity-weighted analyses show higher oral-disease risk with transmucosal formulations; animal data demonstrate prolonged salivary-gland accumulation [63]. Contributing factors include prolonged mucosal contact, acidic pH of some formulations, and additive xerostomia from co-prescribed psychotropics [63–65]. Simple preventive steps, rinsing after dissolution, delaying brushing for 60 minutes, and using fluoridated products mitigate risk without discouraging MAT. The complex interplay between substance-specific pharmacological effects, behavioral factors, and oral microbiome dysbiosis is

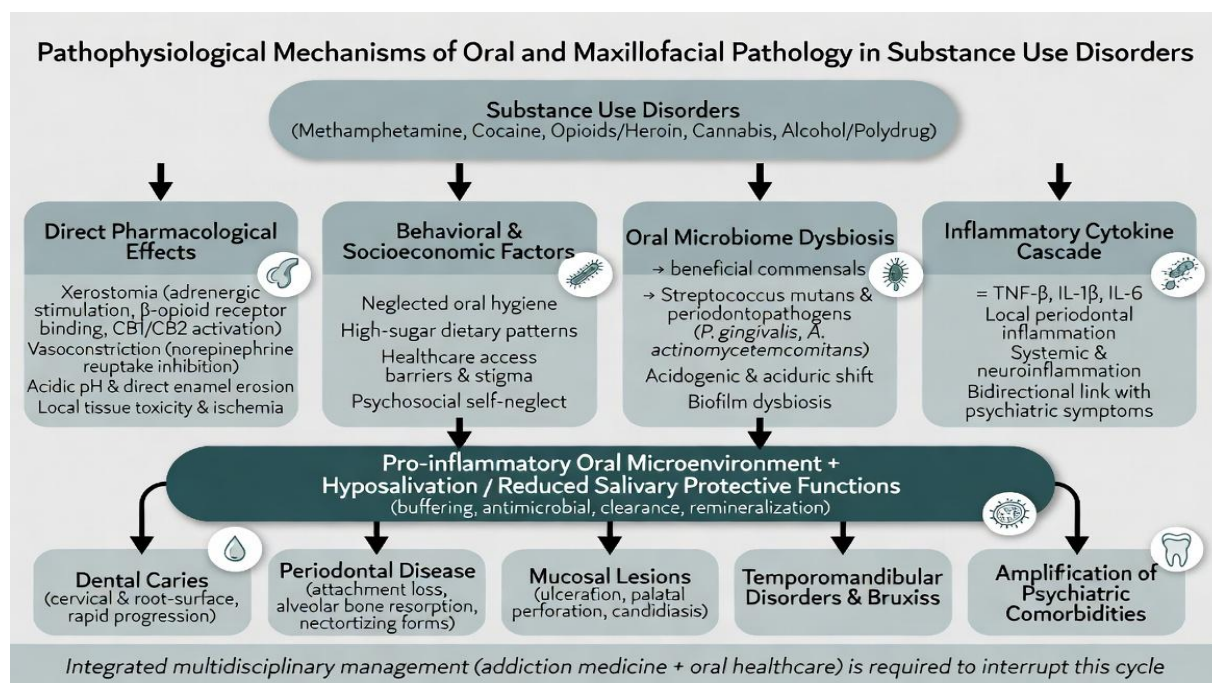
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Figure 1. Conceptual framework of pathophysiological and behavioral mechanisms linking SUDs to oral and maxillofacial pathology.

summarized in the conceptual framework presented in Figure 1.

Clinical Manifestations

Dental Caries

Caries is the most prevalent oral finding. Methamphetamine users display rapid cervical and smooth-surface lesions that can serve as a diagnostic clue [5, 6]. Meta-analyses confirm higher DMFT scores, especially with stimulants and opioids [5, 16]. Root-surface caries is also common once gingival recession exposes cementum in a xerostomic mouth [10]. Many patients present only after pulpal involvement or abscess formation [6, 18].

Periodontal Disease

Individuals with SUDs exhibit deeper periodontal pockets, greater attachment loss, and higher tooth loss rates [5]. Long-term cannabis use remains a moderate risk factor after adjustment for smoking [66]; cocaine and crack increase odds of periodontitis and mucosal lesions; methamphetamine is linked to near-universal severe periodontitis. Mechanisms include xerostomia, immune impairment, dysbiosis, chemical trauma, and behavioral neglect. The relationship is bidirectional: periodontal inflammation may sustain psychiatric symptoms via systemic cytokines, while untreated periodontitis further impairs quality of life and recovery [55, 67].

Oral Mucosal Lesions

Cocaine produces ischemic ulceration and mid-palatal perforation [6, 30]. Immunosuppression predisposes to candidiasis and bacterial abscesses. Intravenous users risk osteomyelitis, osteonecrosis, and oral cancer [18, 19]. Leukoplakia requires biopsy given elevated squamous-cell carcinoma risk [10]. Other findings include traumatic cheek-biting ulcers (stimulants), talc granulomas (IV adulterants), and medication-induced gingival hyperplasia [6, 19, 30].

Temporomandibular Disorders and Bruxism

MDMA, LSD, and synthetic cathinones are strongly associated with bruxism and jaw clenching [30, 68]. Persistent grinding produces enamel attrition, fractures, and TMD pain. Dopaminergic and serotonergic hyperactivity underlies the muscle hyperactivity; trismus and chronic orofacial pain may further complicate dental care.

Orofacial Pain

Pain arises from caries, periodontitis, mucosal ulceration, and TMD [6, 69]. Cocaine's anesthetic effect can mask symptoms until pathology is advanced [30]. Management is complicated by altered pain perception, drug-drug interactions with MAT, and the risk of relapse if opioids are prescribed [70]. The distinct oral manifestations associated with different

Table 1. Oral and Maxillofacial Manifestations by Substance Type.

Substance	Xerostomia	Caries Pattern	Periodontal	Bruxism/TMD	Specific Lesions	Key Mechanism
Methamphetamine	Severe	Extensive cervical & smooth-surface ("meth mouth")	Aggressive attachment loss	Severe	Attrition, osteonecrosis	Sympathomimetic + acidic pH + xerostomia
Cocaine	Moderate	Cervical/root caries	Necrotizing forms, gingival necrosis	Common (clenching)	Palatal perforation, ischemic ulcers	Potent vasoconstriction + local anesthesia
Cannabis	Moderate	Increased acid-resistant species	Attachment loss, deeper pockets	Moderate	Leukoedema, leukoplakia, candidiasis	CB1/CB2 hyposalivation + smoke carcinogens
Opioids	Severe	Cervical & proximal caries	Increased periodontitis severity	Moderate	Candidiasis, osteomyelitis (IV)	μ -receptor hyposalivation + immunosuppression
Alcohol / Polydrug	Common	Erosive & carious lesions	Severe bone loss	Common (TMD pain)	Leukoplakia, OSCC risk, dental erosion	Acetaldehyde toxicity + nutrition + hygiene

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substances are summarized in Table 1, which highlights the severity patterns and primary mechanisms underlying each substance's pathology.

Diagnostic Considerations

Characteristic findings such as extensive caries, unexplained mucosal ulcers, rapidly progressive periodontitis, or severe bruxism should prompt non-judgmental inquiry about substance type, frequency, duration, and route [71, 72]. Black root caries or freely bleeding bright-red gingiva warrant further history [73]. Overlap with autoimmune disease, medication side effects, and systemic illness requires a full differential. Stigma (both patient and provider) remains a major barrier to disclosure and care; stigma-reduction training for dental professionals is essential [6, 55].

Discussion

The findings of this narrative review demonstrate a robust and consistent association between SUDs and adverse oral health outcomes. The meta-analysis by Baghaie et al. [5] found that individuals with SUDs had, on average, 5.15 more decayed, missing, or filled teeth than the general population. This statistically and clinically significant difference underscores the substantial disease burden borne by this population. Furthermore, the meta-analysis demonstrated that Drug type (methamphetamines, heroin; opiates; crack, cocaine, and cannabis as dependent variables) was associated with periodontal disease, and pooled estimates showed that the type of drug used increased the odds of the number of decayed, missing, and filled teeth (DMFT) [16]. These findings are consistent with

earlier systematic reviews, including that of Shekarchizadeh et al. [6], which identified dental caries, periodontal disease, and xerostomia as the most prevalent oral manifestations among substance users. From a pathophysiological perspective, xerostomia emerged as the most important unifying mechanism across different substances. Various drugs, through distinct pathways including sympathetic stimulation (stimulants), muscarinic receptor binding (opioids), and cannabinoid receptor activation (cannabis), all culminate in reduced salivary secretion. Diminished salivary flow leads to decreased oral clearance, reduced buffering capacity, impaired antimicrobial activity, and compromised mucosal lubrication, collectively creating an environment highly susceptible to caries and infection. Additionally, oral microbiome dysbiosis has been identified as a novel mechanistic pathway by which substance use reduces beneficial species and increases periodontopathogenic strains, thereby triggering inflammatory cytokine cascades [10, 74]. Of particular significance are the findings regarding the bidirectional relationship between periodontal disease and psychiatric disorders [55]. According to this model, chronic periodontal inflammation generates systemic inflammatory cytokines, including TNF- α , IL-1 β , and IL-6, that may enter the systemic circulation and contribute to neuroinflammation, potentially exacerbating psychiatric symptoms. This finding underscores the imperative for integrating dental, psychiatric, and addiction care within comprehensive treatment models. Another study demonstrated that SUD patients receiving comprehensive dental care achieved higher treatment completion rates and greater improvements in substance abstinence, providing supportive evidence for this integrative approach [75].

Substance-specific interpretation of findings reveals distinct patterns: methamphetamine produces the most severe oral pathology ("meth mouth"), characterized by extensive cervical caries [5, 6]. Cocaine, through its vasoconstrictive properties, leads to palatal perforation and gingival necrosis [30]. Opioids exert their effects primarily through xerostomia and immunosuppression, with a demonstrated dose-response relationship with periodontitis severity [5]. Cannabis, through reduced salivary flow and microbiome alteration, increases periodontitis risk [76]. Equally important is the identification of previously underappreciated oral health risks associated with MAT, particularly with transmucosal buprenorphine, which, through prolonged oral drug exposure and accumulation in the salivary glands, elevates caries risk [15, 77]. Importantly, these risks are manageable through simple preventive strategies and should not deter clinicians from prescribing MAT.

Finally, socio-behavioral factors including poor oral hygiene, inadequate nutrition, healthcare access barriers, and social stigma play a substantial role in exacerbating the disease burden [18]. The concept of "severe and multiple disadvantage" (SMD), encompassing homelessness, substance use, and offending behavior, identifies populations at highest risk. Moreover, recent evidence underscores the significant psychosocial ramifications of perceived dental aesthetics on oral health-related quality of life in affected populations, highlighting that the impact of substance-related oral pathology extends beyond clinical disease to include psychological and social dimensions that further complicate recovery [78]. Collectively, the findings of this review underscore the critical need for integrated, multidisciplinary approaches that address both addiction and oral health to improve outcomes in this vulnerable population.

Clinical and Practical Implications

To bridge the gap between epidemiological evidence and clinical practice, dental practitioners should adopt a risk-stratified approach when managing patients with SUDs. Based on the synthesized evidence, we propose the following practical algorithm: First, all patients presenting with characteristic oral findings, including extensive cervical caries, unexplained mucosal ulcerations, severe periodontitis with rapid progression, or severe bruxism, should undergo a non-judgmental substance use history using validated brief screening tools. Second, xerostomia management should be escalated beyond simple palliative measures. For patients with confirmed hyposalivation, clinicians should prescribe: (a) fluoride toothpaste, (b) calcium phosphate-based

remineralization adjuncts, and (c) sugar-free lozenges or chewing gum to stimulate residual salivary function. In severe cases, pharmacologic sialagogues may be considered in consultation with the patient's addiction medicine provider. Third, for patients on MAT, particularly sublingual buprenorphine-naloxone formulations, specific evidence-based recommendations must be communicated: (a) rinse the oral cavity thoroughly with water immediately after the tablet has completely dissolved to dilute acidic excipients and reduce drug retention on tooth surfaces, (b) refrain from toothbrushing for at least 60 minutes post-administration to avoid abrasive enamel wear in an acidic oral environment, and (c) use neutral sodium bicarbonate mouthwashes before brushing to neutralize acidic pH. Fourth, recall intervals should be individualized. Patients with active caries or periodontitis require 3-month recall for preventive care and monitoring, while those with stable oral health but ongoing substance use should be seen at 6-month intervals with reinforced preventive education. Given their elevated risk for osteomyelitis and endocarditis, intravenous drug users require particular vigilance for signs of acute infection. Finally, interdisciplinary collaboration is paramount. Dentists should establish communication channels with addiction medicine specialists to coordinate care timing, particularly during detoxification phases when dental treatment tolerance may be reduced, and to address potential drug-drug interactions between dental medications and MAT regimens. This integrated approach ensures that oral health becomes an enabling component of recovery rather than a neglected comorbidity.

Limitations

The reviewed evidence base is subject to several methodological constraints that affect the interpretation of findings. Heterogeneity in substance use definitions, assessment methods, study designs, and populations complicates synthesis and contributes to variability in effect sizes. Heavy reliance on self-reported use introduces recall and social desirability biases, highlighting the need for standardized measures and biological verification. Most studies are cross-sectional, precluding causal inference; longitudinal research is required to establish temporality and assess the impact of cessation or treatment. Samples from treatment or correctional settings may overrepresent severe cases, potentially inflating effect estimates and underscoring the need for community-based surveys. Incomplete control for confounders such as socioeconomic status, diet, tobacco use, and polysubstance use raises residual confounding concerns. Evidence gaps persist for adolescents and older adults. The mediating role of the oral microbiome remains underexplored, and studies are predominantly

conducted in high-income countries, limiting generalizability to low- and middle-income settings. Finally, despite promising effects of probiotic supplementation on metabolic profiles in neurological disorders [79], no comparable studies have been conducted in substance-using populations, representing a critical gap given the high prevalence of oral microbiome disruption in this group. Moreover, most evidence in this field comes from human observational studies, and controlled experimental models investigating the molecular and structural mechanisms underlying substance-induced oral damage remain scarce. Animal studies have been instrumental in elucidating drug-induced tissue injury in other organ systems [80], and similar approaches could help clarify the pathophysiological pathways linking SUDs to oral and maxillofacial pathology.

Conclusion

SUDs impose a significant yet underrecognized burden on oral and maxillofacial health through xerostomia, microbiome dysbiosis, immunosuppression, and substance-specific toxic effects. These mechanisms collectively drive the elevated prevalence of dental caries, periodontitis, mucosal lesions, and temporomandibular disorders in this population. For policy and clinical practice, we recommend: (1) Integrating routine oral health services into addiction treatment programs; (2) Developing clinical guidelines for early recognition of substance-related oral pathologies; (3) Implementing preventive protocols for patients on MAT (e.g., buprenorphine); and (4) Fostering interdisciplinary training for dental and addiction care providers. For future research, priorities include: longitudinal studies to establish causality, investigations into oral microbiome modulation as a therapeutic target, and cost-effectiveness analyses of integrated care models. Addressing oral health in SUD populations is an essential component of comprehensive addiction care and requires deliberate policy action, research investment, and clinical system reform to reduce preventable suffering and improve recovery outcomes.

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Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript. All authors contributed to the manuscript and approved the final version.

Ethical Considerations

Not applicable.

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