UNIVERSIDADE FERNANDO PESSOA

THE ROLE OF DENTISTS IN IDENTIFYING EATING BEHAVIOR DISORDERS - AN INTEGRATIVE REVIEW OF LITERATURE

[O Papel do Dentista na Identificação de Perturbações do Comportamento Alimentar - uma Revisão Integrativa da Literatura]

Projeto de Dissertação de Mestrado em Medicina Dentária - MI

Marie- Charlotte Suzanne Flavie Gas 40896

Orientadora: Professora Doutora Ana Sofia Sousa

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Resumo

Introdução: As perturbações alimentares, incluindo a anorexia nervosa, a bulimia nervosa e a perturbação da compulsão alimentar, são condições mentais e comportamentais complexas que afectam a saúde física e mental. Estas perturbações têm um impacto significativo na saúde oral, com consequências como a erosão dentária, doenças periodontais e disfunção das glândulas salivares. A identificação precoce das perturbações alimentares através de manifestações orais representa uma oportunidade única para os profissionais de medicina dentária intervirem, contribuindo para uma gestão e tratamentomais eficazes destas condições.

Objetivo: Esta revisão integrativa tem como objetivo explorar o papel dos médicos dentistas na deteção precoce de distúrbios alimentares em jovens com idades compreendidas entre os 15 e os 30 anos. Através da análise da literatura recente, a revisão procura determinar de que forma a identificação precoce de sinais orais das perturbações alimentares pode melhorar a eficácia global do tratamento e os resultados dos pacientes.

Métodos: A revisão integrativa da literatura foi realizada de acordo com as diretrizes PRISMA. Foi efectuada uma pesquisa sistemática utilizando as bases de dados PubMed, Scielo e Embase, com foco em artigos publicados entre 2013 e 2024. Os critérios de inclusão incluíram artigos originais e revisões escritos em inglês, francês ou português que discutissem o papel dos profissionais de medicina dentária na identificação das perturbações alimentares.

Conclusão: A identificação precoce das perturbações alimentares através de avaliações da saúde oral pode ser fundamental para melhorar os resultados do tratamento. Os dentistas, como membros- chave de uma equipa multidisciplinar, desempenham um papel fundamental no reconhecimento dos sinais orais das perturbações alimentares, facilitando a intervenção precoce e aumentando a eficácia do tratamento. A incorporação de consultas de medicina dentária na gestão mais alargada das perturbações alimentares é crucial para a prestação de cuidados holísticos e para a prevenção de complicações a longo prazo associadas a estas perturbações.

Palavras-chave: Medicina Dentária; erosão dentária; distúrbios alimentares; identificação precoce; colaboração multidisciplinar.

Abstract

Introduction: Eating disorders including anorexia nervosa, bulimia nervosa, and binge-eating disorder , are complex mental and behavioral conditions that affect both physical and mental health. These disorders significantly impact oral health, with consequences such as dental erosion, periodontal diseases, and salivary gland dysfunction. Early identification of Eating disorders through oral manifestations presents a unique opportunity for dental professionals to intervene, contributing to more effective management and treatment of these conditions.

Purpose : This integrative review aims to explore the role of dentists in the early detection of eating disorders among young individuals aged 15-30. By analyzing recent literature, the review seeks to determine how early identification of oral signs of Eating disorders can improve the overall effectiveness of treatment and patient outcomes.

Methods : The integrative literature review was conducted according to PRISMA guidelines. A sistematic search was performed using the PubMed, Scielo and Embase databases, focusing on artciles published between 2013 and 2024. Inclusion critera were original articles and reviews written in English, French or Portuguese that discussed the role of dental professionals in identifying Eating disorders.

Results : The review identified 19 relevants studies, highlighting the significant role dental professionals play in the early detection of Eating disorders. The findings emphasized the prevalence of oral manifestations like dental erosion and salivary dysfunction in patients with Eating disorders. Studies showed that early detection by dentists often leads to timely referral to multidisciplinary teams, including psychologists, nutritionists, and general pratictioners, which significantly improves treatment outcomes.

Conclusion : Early identification of Eating disorders through oral health assessments can be instrumental in improving treatment outcomes. Dentists, as key members of a multidisciplinary team, play a critical role in recognizing the oral signs of Eating disorders, facilitating early identification, and enhancing the effectiveness of treatment. Incorporating dental consultations into the broader management of Eating disorders is crucial for holistic care and preventing long-term complications associated with these disorders.

Keywords : Dentistry; dental erosion; eating disorders; early identification; multidisciplinary collaboration.

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List of Abbreviations

AN: Anorexia Nervosa

BED: Binge-eating disorder

BN: Bulimia Nervosa

CBT: Cognitive-Behavioral Therapy

DSM-5: Diagnostic and Statistical Manual of Mental Disorders

ED: Eating Disorder

EDs: Eating disorders

GP : General Practitioner

GPs : General Practitioners

SSRIs: Selective Serotonin Reuptake Inhibitors

SWS: stimulated whole saliva

TMJDs: Temporomandibular Disorders

UWS: unstimulated whole saliva

I. Introduction

Oral health is a crucial component of overall well-being, reflecting the condition of body systems and contributing not only to the prevention of dental diseases but also to the maintenance of general health (Hasan & al., 2020). Eating disorders are significant public health challenges (Lourenço & al., 2018). These disorders severely affect both physical and mental health, leading to a diminished quality of life (Kisely, 2016). EDs are complex mental and behavioral conditions that may exist alone or alongside mood disorders like major depressive disorder, bipolar disorder, anxiety disorders, obsessive-compulsive disorder, post-traumatic stress, substance use, self-harm, and suicidality, which complicate their diagnosis and treatment (Rosten & Newton, 2017).

As mental health conditions, EDs profoundly influence individuals's eating habits, self-perception, daily activities, and overall quality of life (Rosten & Newton, 2017). The American Psychiatric Association (2014) highlights that EDs such as AN and BN are psychiatric disorders with complex origins, typically characterized by altered eating behaviors and social functioning, and commonly emerge during late adolescence and young adulthood.

Among EDs, AN, BN, and BED are the most prevalent. AN and BN are further categorized into restrictive and purgative types. Restrictive types involve fasting, minimal food intake, and excessive exercise, while purgative types include the use of laxatives, diuretics, appetite suppressants, or self-induced vomiting (Lourenço & al., 2018). Other eating disorders, such as pica, rumination disorder, and avoidant/restrictive food intake disorder, exist but are less common and not the focus of this review (Rangé & al. 2021).

Anorexia nervosa (AN) is characterized by intentional starvation, an obsessive desire for thinness, and an intense fear of gaining weight, often resulting in significant weight loss (Traebert & Moreira, 2001). Bulimia nervosa (BN) involves compulsive overeating followed by compensatory behaviors, such as vomiting or excessive use of laxatives and diuretics, driven by a similar fear of weight gain (Traebert & Moreira, 2001). Binge-eating disorder (BED), in contrast, is defined by the consumption of large amounts of food in a short period, without compensatory behaviors like purging (Gonçalves & al., 2013). BED can cause significant harm to the oral cavity and gastrointestinal system, with individuals often choosing high-calorie foods and potentially engaging in purging, laxative use, or extreme exercise afterward (Paszynska & al., 2023).

Prevalence rates of EDs, as outlined in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), vary widely, particularly in Western countries. For women, AN prevalence is around 0.8%, while for BED, it is approximately 4%, with lower prevalence observed in men (Lourenço & al., 2018). These statistics reflect a gender disparity in ED occurrences, with women being disproportionately affected. Such prevalence data are essential for public health planning and resource allocation (Rangé & al., 2021).

Several risk factors contribute to the development of EDs. Influences from media, societal norms, and family dynamics play prominent roles, particularly regarding the idealization of thinness and its impact on body image. The family environment also significantly influences eating behaviors through the structure and regularity of mealtimes. EDs are linked to health issues like nutritional deficiencies, which affect growth, weight gain, and oral health, leading to conditions like cheilosis, dental erosion, periodontitis, salivary gland enlargement, and social difficulties (Gonçalves & al., 2013). However, the exact causes of EDs remain unclear, with genetic predispositions, cultural expectations, and psychological factors believed to play key roles (Monda & al., 2021).

According to Rangé and al. (2021), those most at risk for developing EDs include young females, individuals with a personal or family history of EDs or obesity, and adolescents with weight concerns, particularly if they have gastrointestinal or psychological issues. A complex interplay of biological, psychological, social, and cultural factors underlies EDs. Societal ideals of body image, gender roles, and personal vulnerabilities, such as genetic predispositions and behavioral traits, contribute to their development. Family dynamics, especially in families with problematic problem-solving methods, perfectionism, or overprotection, also play a significant role (Paszynska & al., 2023). Furthermore, traumatic life events like physical or sexual abuse are often linked to EDs (Paszynska & al., 2023).

Certain professions, particularly those emphasizing weight control, also carry an elevated risk for EDs. These include athletes in weight-sensitive sports like gymnastics, modeling, dance, and professions that prioritize appearance, such as catering and show business. Medical conditions requiring strict dietary control, like type 1 diabetes or inflammatory bowel disease, are additional risk factors (Rangé & al., 2021; Paszynska & al., 2023).

The global focus on beauty and fitness has contributed to the increasing prevalence of EDs, particularly among adolescents and young adults. Though EDs primarily affect

young women, they can impact people of any age or gender. AN, in particular, is complex and often reduces self-esteem and increases vulnerability to addictive behaviors. This highlights the need for a comprehensive treatment approach addressing both psychological and physical aspects (Hasan & al., 2020).

Dental health professionals often encounter the early signs of EDs due to the distinct oral manifestations, such as dental erosion, periodontal disease, and salivary gland disorders. Given the dental implications of EDs, dentists play a critical role in early detection and intervention. Their ability to identify these signs enables timely diagnosis and better management, reinforcing the need for a multidisciplinary care approach (Szupiany-Janeczek & al., 2023).

Historically, the association between EDs and oral health was first identified in the late 1970s, underscoring the importance of dental care in ED management (Kisely, 2016). Dentists are often the first healthcare providers to detect ED-related symptoms through thorough interviews and examinations. Therefore, it is crucial for psychiatrists, psychologists, and nutritionists to understand the oral health consequences of EDs and incorporate dental care into the overall treatment plan (Szupiany-Janeczek & al., 2023).

Early intervention is crucial for managing EDs. Detecting these conditions in their early stages and applying tailored, evidence-based treatments can lead to more effective and cost-efficient outcomes (McGorry & al., 2018; Shah & al., 2020). Most treatment guidelines recommend specialist multidisciplinary teams to manage EDs, with outpatient care as the preferred initial option. However, missed opportunities due to inadequate training or biases can hinder progress (Allen & al., 2023). Many young people, unaware of the severity of ED complications, attend routine medical or dental appointments where their conditions may be diagnosed incidentally. However, poor dietary choices, such as consuming acidic energy drinks, further exacerbate the risk of oral pathologies (Paszynska & al., 2023).

Thus, this integrative review of literature aims to present an updated overview on the current evidence regarding, on the role of dentists in identifying the signs and symptoms of EDs and the impact on oral health.

II. Materials and methods

For this review, we used the PubMed, Scielo, and Embase databases, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a comprehensive and systematic approach. The search terms employed in PubMed included “dental erosion” AND “medical complications” AND “oral manifestations” AND “anorexia nervosa” OR “bulimia nervosa” OR “binge-eating disorder” AND “oral health” AND “dentist.” In Scielo, the terms “dental erosion” AND “anorexia nervosa” were used, while in Embase, the search included “dental erosion” AND “eating disorder” OR “anorexia nervosa” OR “bulimia nervosa” OR “binge-eating disorder” AND “oral health.” This comprehensive search for the integrative review was conducted on February 22, 2024. The results yielded 792 articles from PubMed, three from Scielo, and 26 from Embase. All results were meticulously reviewed, with relevant manuscripts being identified and selected based on pre-established inclusion and exclusion criteria. This rigorous approach ensured that the review was comprehensive, focusing on the intersection of dental health and eating disorders to provide meaningful insights.

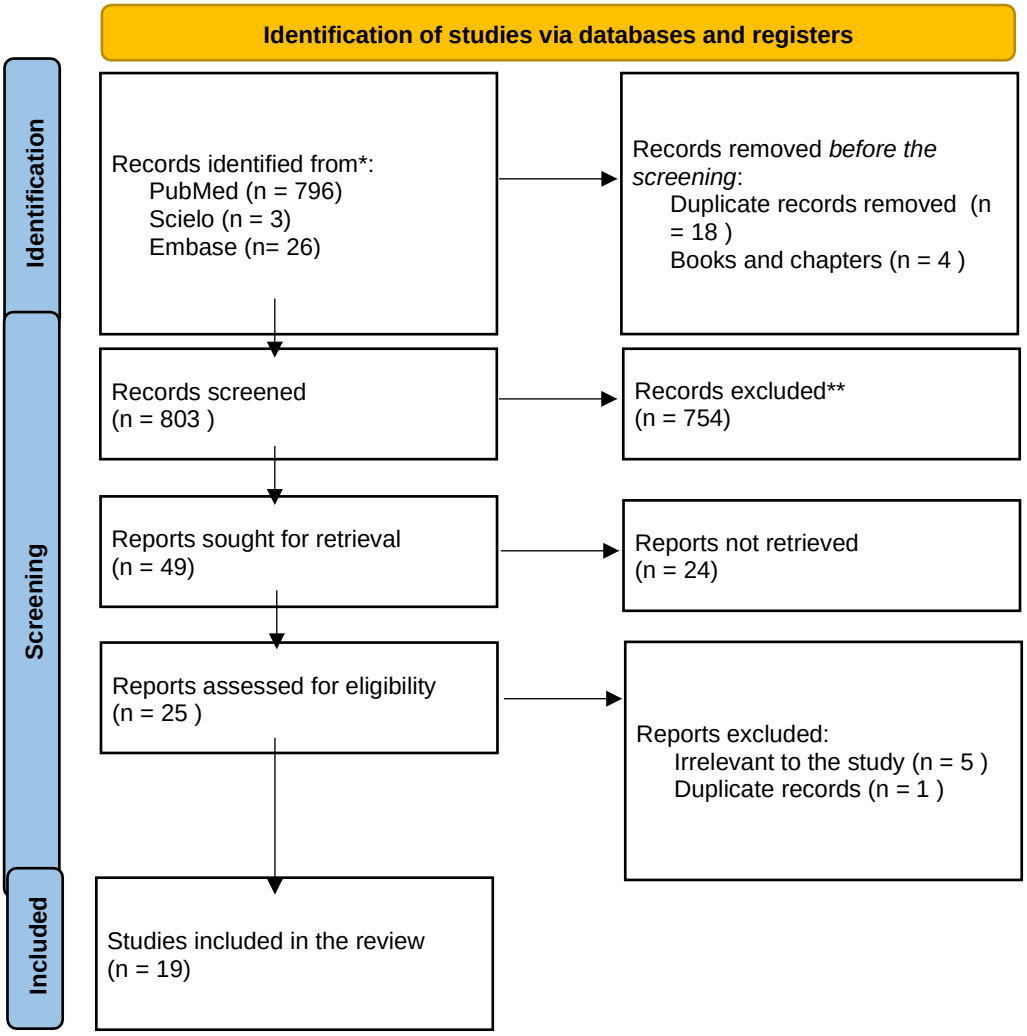
Also, specific inclusion criteria were established. Only reviews or articles published since 2013 were considered to ensure that the information is up-to-date with current research and practices. The studies selected must address the consequences of eating disorders on oral health, highlighting the significant impact these conditions have on dental hygiene and structures. Additionally, it was essential that the studies mention the specific role of dentists in identifying eating disorders, emphasizing their crucial position in early detection and multidisciplinary care. The target population for these studies was young people aged between 15 and 30, as eating disorders frequently develop during adolescence and young adulthood. By adhering to these criteria, the review aims to provide a thorough understanding of the oral health implications of eating disorders, the critical role of dental professionals, and the impact on young individuals.

Specifics exclusion criteria were applied. Studies that do not mention the oral sphere or oral health were excluded, as the primary aim is to explore the impact of eating disorders on dental health. Additionally, studies that do not discuss the role of dentists in identifying eating disorders were omitted, ensuring that the review remains relevant to dental professionals. Research conducted on animal populations was also excluded, as the focus is on human subjects. Non-original publications such as book chapters, editorials, and

letters to the editor were not considered to maintain a basis in primary research. Lastly, studies not published in English, Spanish, French, or Portuguese were excluded to ensure accessibility and comprehension by the review team. These criteria ensure that the review is comprehensive, relevant, and focused on original research within the specified context.

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were used in this integrative literature review, ensuring a systematic and transparent approach to identifying, selecting, and analyzing the included studies.

Figure A. PRISMA flow diagram presenting search strategy.



We identified a total of 19 articles relevant to our integrative literature review, with 15 sourced from PubMed, 3 from Scielo, and 1 from Embase. By applying the PICO method, we determined that the population (P) under consideration was adolescents and young adults, reflecting the typical age of early onset for eating disorders (EDs). The

intervention (I) focused on the early identification of ED signs and symptoms by dentists. The comparison (C) was made against scenarios where such early identification was absent. The outcomes (O) were measured by the reduction in ED symptoms, improvement in quality of life, and restoration of oral health. Using these criteria, we formulated the central research question: "Does early identification of signs and symptoms of EDs by dentists among the young population contribute to the effectiveness of treatment for these diseases? ». This question aims to highlight the potential role of dental professionals in the early detection and intervention of EDs, which could lead to better health outcomes and more effective management of these complex conditions.

III. Results

A. Impact of Early Diagnosis on Eating Disorders

AN is recognized as the psychiatric disorder with the highest mortality rate. Adolescents are particularly vulnerable to developing EDs due to the significant developmental changes they undergo, which can greatly influence their body image and self-esteem (Chew, K. K., & Temples, H. S., 2022, p.619). The early diagnosis of eating disorders is crucial as it allows for timely intervention, which can significantly improve the prognosis and reduce the risk of severe health complications.

The presence of psychiatric comorbidities, a history of suicidal thoughts or self-harm, and other mental illnesses heighten the risk of death among patients with eating disorders. Socialization issues and difficulties in being assertive are additional factors that can maintain and exacerbate these disorders. Effective treatment and support are vital to address these challenges.

Patients who possess temperament traits such as harm avoidance and high reward dependence are often more successful in recovering from eating disorders. These protective traits can foster resilience and aid in the recovery process, emphasizing the importance of personalized treatment approaches (Westmoreland, P., & al., 2016, p.32). Early recognition and intervention, combined with tailored support, are essential in improving outcomes for those affected by eating disorders.

B. Challenges in the Diagnosis and Management of Eating Disorders

Extended periods of inadequate nutrition and stress can hinder brain development, affecting both its structure and function (King & al., 2018; Walton & al., in press). Neuroimaging and neurocognitive studies have demonstrated that EDs over time are linked to alterations in brain structure and function, which can diminish the prospects of recovery (Allen, K. L., & al., 2023).

Delays in receiving care for EDs arise from factors at the patient, clinician, service, and system levels. For patients, lack of awareness about their condition and low motivation to seek help or change behavior contribute to these delays. Clinicians may fail to detect EDs or adopt a ‘watch and wait’ approach, further postponing intervention. On the service and system level, accessibility and the reach of ED treatment pose significant barriers.

Long waiting times are particularly problematic, as they can exacerbate symptoms and lead to poorer treatment outcomes once care is finally provided (e.g., Carter & al., 2012; Reichert & Jacobs, 2018).

There is also a documented association between the length of AN and its impact on emotional and social functioning. Longer durations are associated with fewer positive facial expressions, more severe social functioning issues, and greater strain on family and friends, ultimately leading to a diminished social support network. Social withdrawal is also observed in BN and BED, driven by feelings of shame related to overeating and purging behaviors, as well as negative perceptions of obesity (Kalindjian, N., & al., 2022, p.22).

Thus, we find different EDs depending on the behavior and eating habits used, but the same populations are always at risk: teenagers and young women. In a changing world, with evolving technologies, the way we see and relate to our bodies is also changing, and young people faced with a new relationship to thinness are increasingly prone to such psychological illnesses. What impact do these illnesses have on the body, and more specifically, here in the oral cavity?

C. Oral and Systemic Symptoms of Eating Disorders

The oral cavity frequently serves as one of the initial indicators of systemic diseases and nutritional deficiencies due to the rapid turnover of epithelial cells in the mucous membranes, which occurs every 3–7 days, unlike the skin, where cell turnover can take up to 28 days (Monda, M., and al., 2021, p.156). EDs present a broad spectrum of symptoms affecting both the body and the oral cavity. One of the primary issues caused by EDs is dental erosion. Additionally, there are numerous other oral health problems, such as periodontal diseases, lesions on the mucous membranes, disorders of the salivary glands, and xerostomia (dry mouth).

1. Dental Erosion

Dental erosion is defined by the gradual and irreversible depletion of the mineralized tooth structure caused by a non-bacterial chemical process. Initial indicators include smooth, glossy dental surfaces. As the condition advances, it often results in flat or shallow depressions above the enamel-cementum junction. In more severe cases, the tooth's original shape alters, showing signs like cupping or grooves on the occlusal and incisal surfaces (Lourenço, M., & al., 2018, p.1919).

Research shows that individuals with eating disorders are five times more likely to experience dental erosion than healthy individuals, with the risk even higher among those who self-induce vomiting (Monda, M., & al., 2021, p.156). The term « perymolysis », introduced by Holst and Lange in 1939, describes the enamel loss primarily seen on the palatal surfaces of the upper teeth in these patients. This condition is often a result of vomiting, gastric reflux, regurgitation, and insufficient saliva protection. Besides vomiting, other factors like the frequent consumption of acidic energy drinks during sports or caffeinated and carbonated beverages to stave off hunger also contribute to dental erosion, particularly on the occlusal and vestibular surfaces (Monda, M., & al., 2021, p.156).

Even individuals who have managed to control their eating disorders may still be at risk for dental erosion due to persistent gastroesophageal reflux issues (Monda, M., & al., 2021, p.156). The study conducted by Szupiany-Janeczek, T., and al. highlights a significant disparity in the prevalence of erosive dental defects between those with eating disorders and healthy individuals. The findings reveal that 28.81% of the study group exhibited erosive defects, in stark contrast to just 3.33% in the control group, indicating a statistically significant difference. Additionally, the study underscores a pronounced gender difference, with 35.56% of women experiencing dental erosion compared to only 7.15% of men. These results emphasize the urgent need for targeted dental care and monitoring, particularly for women and individuals with eating disorders, to address and mitigate the high risk of dental erosion in these populations.

Rytomaa and al. found that individuals with bulimia were more likely to consume herbal tea, soft drinks, and apple vinegar than healthy individuals. In several studies, these beverages have been shown to cause dental erosion. Additionally, carbonated drinks were frequently consumed to suppress hunger. In a study comparing 20 bulimics to 20 healthy controls, 13 bulimics drank fizzy drinks more than four times a week, compared to only four controls (Rosten, A., & Newton, T., 2017, p. 534).

Gastric acid, with an average pH of 2.9, significantly damages tooth surfaces as it is well below the critical pH of 5.5 needed to dissolve dental enamel (Rosten, A., & Newton, T., 2017, p. 534). Patients suffering from dental erosion are also more susceptible to dentinal sensitivity. This hypersensitivity is characterized by a sharp, brief, and localized pain in the dentin triggered by thermal or chemical stimuli. It typically occurs in the cervical

region where the enamel layer is thinnest, exposing the dentin and dentinal tubules (Hasan, S., & al., 2020, p.3891).

2. Periodontal diseases

Individuals with EDs are more prone to gingival recession compared to the general population, but not necessarily to periodontitis (Rangé, H., & al., 2021, p.20). This gingival recession often results from aggressive tooth brushing techniques, particularly following episodes of vomiting, which cause abrasion. Despite this, studies examining periodontal pockets greater than 3 mm found no significant difference in the prevalence of periodontal disease between individuals with eating disorders and the general population. The primary periodontal impact of eating disorders stems from gingival abrasion due to compulsive, intense, and frequent tooth brushing, leading to multiple areas of gingival recession (Rangé, H., & al., 2021, p.19).

Furthermore, while there may be no significant difference in the depth of periodontal pockets, EDs can lead to vitamin deficiencies, notably vitamin C. Szupiany- Janeczek, T., and al. (2023) highlight that vitamin C deficiencies due to malnutrition can alter the marginal periodontium and promote gingivitis. Additionally, dry mouth from impaired salivary gland function can adversely affect the periodontium and oral mucosa. Deficiencies in vitamins C and D, common in individuals with EDs, can interfere with collagen synthesis essential for periodontal turnover and exhibit immunomodulatory effects that influence the onset and progression of periodontitis (Lourenço, M., & al., 2018, p.1920).

Patients with EDs are also more likely to experience mouth irritation, often diagnosed as Burning Mouth Syndrome. This condition is identified by dentists based on the patient's reported symptoms, as it typically lacks objective signs in the oral mucosa (Paszynska, E., & al., 2023, p.6).

Regarding the overall periodontal status, Rangé, H., and al. (2021) noted that individuals with EDs show a higher prevalence of various oral conditions such as dry lips, labial erythema, exfoliative cheilitis, palatal tissue discoloration (orange-yellow palate), hemorrhagic lesions, lip and cheek biting, burning tongue, and periodontal diseases compared to healthy individuals.

3. Salivary Glands Disorders

Saliva is crucial for maintaining oral health, and a reduction in salivary flow can lead to significant oral imbalances. Bulimia often results in a decreased salivary flow rate, as noted by Rosten and Newton (2017). A study by Dynesen and al. revealed that bulimics have a significantly lower unstimulated whole saliva (UWS) flow rate compared to healthy controls, although stimulated whole saliva (SWS) flow rates were similar between the groups. Medication use was a major factor in this difference, but non-medicated bulimics still showed lower UWS flow rates, likely due to dehydration from self-induced vomiting.

Frequent vomiting, along with the misuse of laxatives, diuretics, appetite suppressants, and excessive physical activity, can lead to persistent dehydration and reduced saliva production. This problem can be exacerbated by the use of antidepressants, which often cause dry mouth (xerostomia). Reduced salivary flow, coupled with decreased buffering capacity, lowers salivary pH, increasing the risk of tooth demineralization and decay (Lourenço & al., 2018).

Pharmacotherapy plays a key role in treating bulimia. According to NICE guidelines, selective serotonin reuptake inhibitors (SSRIs), especially fluoxetine, are preferred for treating bulimia due to their effectiveness and tolerability. However, SSRIs can cause xerostomia, making it essential for dentists to review patients' medication histories to identify potential causes of dental issues like caries and erosion (Rosten & Newton, 2017).

Xerostomia is a common side effect of various psychotropic, neuroleptic, and antidepressant medications used to treat eating disorders. This condition involves a subjective feeling of dry mouth and is characterized by reduced saliva production and buffering capacity. Anorexic patients often experience hyposalivation due to prolonged starvation, whereas bulimics may suffer from it due to binge eating patterns (Hasan & al., 2020).

Swelling of the parotid salivary glands, known as sialadenosis, is a clinical sign associated with vomiting-related eating disorders. This non-inflammatory, non-neoplastic enlargement typically occurs bilaterally and is minimally tender. Sialadenosis develops a few days after the cessation of chronic vomiting and can be distressing for patients focused on their body image. The condition is characterized by enlarged acini with

prominent zymogen granules and elevated salivary isoamylase levels (Westmoreland & al., 2016).

Sialadenosis, frequently reported in 10-50% of patients with self-induced vomiting, results from peripheral autonomic neuropathy, which increases acinar protein production and disrupts granular release, leading to parotid hypertrophy and impaired salivary secretion (Hasan & al., 2020). Early in EDs, swelling may come and go, but it often becomes persistent, eventually affecting the submandibular and minor salivary glands as well (Monda & al., 2021). Parotid gland enlargement in bulimics has been documented in multiple studies, underscoring the need for awareness and management of this condition in affected patients (Rosten & Newton, 2017).

4. Dental Caries

Dental caries tends to be less common than dental erosion in individuals with eating disorders, partly because those with anorexia often exhibit obsessional personality traits, leading them to be more diligent about their oral hygiene (Kisely S., 2016, p.279).

Increased incidence of dental caries among patients with eating disorders is a notable clinical problem, as discussed by Szupiany-Janeczek, T., and al. (2023). Their research indicates no direct correlation between the frequency of vomiting and caries severity. However, they note that patients with eating disorders frequently experience more caries-related defects. This prevalence is linked to diets rich in simple carbohydrates, decreased saliva production, and a tendency to avoid dental visits out of fear that their eating disorder might be detected (p.3).

Paszynska, E., and al. (2023) add that a low intake of essential nutrients like proteins and vitamins A, C, and D, along with minerals, heightens susceptibility to demineralization, which can lead to caries. Moreover, eating disorder behaviors such as slow eating, binge eating high-calorie and high-carbohydrate foods, and self-induced vomiting contribute to food debris retention, plaque formation, lower oral pH, and increased demineralization, thus promoting dental caries. Despite the lack of a direct relationship consistently demonstrated between eating disorders and caries, these disorders increase risk factors, including poor dietary habits and avoidance of dental check-ups.

The Australian National Dietary Survey of Adults found that individuals with bulimia consume 21% more carbohydrates than the national average. Carbohydrates are essential for the development of dental caries because they provide a food source for cariogenic

bacteria, which thrive on sugars and produce acids that demineralize tooth enamel. Consequently, frequent bingeing on high-sugar diets supplies these bacteria with ample nourishment, accelerating the carious process (Rosten, A., & Newton, T., 2017, p.535).

Additionally, vomiting indirectly increases the risk of dental caries by reducing salivary flow, which is critical for neutralizing acids and washing away food particles. Directly, it increases the presence of S. mutans, a bacteria associated with tooth decay. However, some studies have not shown a significant difference in DMFT scores between bulimic patients and control groups, suggesting that more research is needed. This research should focus on bulimic patients to better isolate the effects of vomiting. It would also be beneficial to examine oral hygiene practices between bulimic patients and healthy controls to determine if these behaviors contribute to differences in DMFT scores (Rosten, A., & Newton, T., 2017, p.535).

Overall, while there is no unequivocal evidence linking EDs directly to increased dental caries, the associated behaviors and dietary habits undoubtedly elevate the risk. This underscores the importance of comprehensive dental care and regular check- ups for individuals with eating disorders to mitigate these risks and promote better oral health outcomes.

Individuals with EDs are less likely to develop dental caries compared to dental erosion, partly due to meticulous oral hygiene often seen in anorexia patients. However, increased dental caries is still a significant issue among those with eating disorders linked to high-carbohydrate diets, reduced saliva production, and avoidance of dental visits. Nutrient deficiencies and eating behaviors such as binge eating and self- induced vomiting contribute to this risk by promoting demineralization and plaque formation. Studies show no direct correlation between vomiting and caries severity but highlight the importance of understanding these risks and the need for further research to better isolate the effects of eating disorders on dental health.

5. Oral Mucosal lesions

In individuals with eating disorders, candidiasis frequently appears in the bacterial microflora. This prevalence can be attributed to the acidic environment that promotes the growth of fungal species, as well as the high intake of carbohydrates and sucrose, particularly among bulimic individuals (Monda, M., & al., 2021, p.156).

Additionally, bulimics often exhibit erythematous palates and trauma-induced ulcerations on the soft palate and pharynx. These conditions result from chronic exposure to stomach acid and repeated injury from inducing vomiting (Hasan, S., & al., 2020, p.3894).

6. Temporomandibular Joint Disorders (TMJDs)

When the chewing surfaces of the teeth wear down, it results in the loss of stability of interarch contacts and a reduction in vertical dimension, which can contribute to TMJDs (Rangé, H., & al., 2021, p. 19).

The association between EDs and TMJDs is particularly evident in cases of BN, where one condition increases the likelihood of the other. BN involves recurrent binge eating episodes followed by behaviors to prevent weight gain, such as self-induced vomiting, severe dietary restrictions, and the misuse of laxatives, diuretics, or other medications. Repeated vomiting leads to abrupt and excessive mouth opening, which strains the temporomandibular joints, as well as the masticatory muscles and tendons. This repeated stress can cause micro-trauma to the stomatognathic system, further contributing to TMJDs (Tseng, H. J., & al., 2020, p. 1204).

7. Muscle Sensitivity and Facial Pain

Case-control studies indicate that individuals with EDs, particularly those engaging in vomiting or binge-eating, exhibit greater sensitivity to muscle palpation, more frequent gum chewing, and elevated levels of craniofacial pain compared to healthy individuals (Rangé, H., & al., 2021, p. 19). Chronic facial pain is a significant concern in the treatment of EDs patients and should be consistently evaluated and addressed as part of their overall care plan (Rangé, H., & al., 2021, p. 19).

8. Systemic Manifestations of Eating Disorders

Eating disorders significantly impact physical health, particularly affecting the cardiovascular, gastrointestinal, metabolic, bone, and reproductive systems (Rangé, H., & al., 2021, p. 17). During the initial stages of refeeding, dysphagia can hinder calorie intake due to weakened and uncoordinated pharyngeal muscles (Westmoreland, & al., 2016, p. 31). Self-induced vomiting leads to both localized adverse effects and systemic electrolyte-acid base imbalances. Excessive vomiting can result in chronic gastric acid reflux, causing difficulties in swallowing (dysphagia) and indigestion (dyspepsia) (Westmoreland, & al., 2016, p. 34).

9. Cardiac Complications

Sudden cardiac death, along with other medical issues and suicide, accounts for roughly 60% of fatalities in individuals with anorexia nervosa. The precise cause of sudden death in these patients remains unclear, as autopsies do not show signs of obstructive coronary artery disease (Westmoreland, & al., 2016, p.32). Severe cases of AN can also alter cardiac structure, with many patients developing left ventricular atrophy and mitral valve prolapse due to changes in the heart's annulus. Additionally, some patients may experience pericardial effusions, which typically resolve once weight is restored. A notable cardiovascular abnormality in these patients is a significant decrease in left ventricular myocardial mass, though left ventricular systolic function is usually maintained. This condition is generally reversible with adequate refeeding (Westmoreland, & al., 2016, p.32).

Cardiac complications commonly associated with AN include electrocardiograph abnormalities such as sinus bradycardia and prolonged corrected QT (QTc) intervals, as well as cardiac dysrhythmias (Chew, K. K., & Temples,H. S., 2022, p. 620).

10. Hematologic Abnormalities

As AN progresses, it leads to trilinear hypoplasia, resulting in the development of anemia, leukopenia, and thrombocytopenia. Anemia is present in 40% of affected individuals, leukopenia is seen in 30%, and thrombocytopenia occurs in around 10% of cases. This condition is a rare but serious complication of AN that can cause lasting damage even after recovery (Westmoreland, & al., 2016, p.32).

11. Dermatologic Manifestations

AN leads to various skin changes, including dry skin (xerosis), fine hair growth on the back and sides of the face (lanugo), hair thinning, bluish discoloration of the extremities (acrocyanosis), and cold-induced skin lesions (perniosis). Additionally, patients may experience increased acne and a yellowish tint to the skin (carotenoderma). These changes are not indicative of virilization but are instead related to the loss of subcutaneous fat and the body's efforts to retain heat. Fortunately, these skin conditions typically improve with weight restoration (Westmoreland, and al., 2016, p.33).

12. Musculoskeletal Effects

Osteoporosis frequently develops in individuals with AN and tends to manifest early in the course of the illness. This condition, characterized by weakened bones and an increased risk of fractures, is a significant and early complication of the disorder (Westmoreland, & al., 2016, p.33).

13. Obesity and BED

The primary health issue linked to BED is obesity. Teenagers suffering from BED face a significantly higher risk of developing obesity-related medical conditions, including high blood pressure, type 2 diabetes, and metabolic syndrome (Mitchell, 2016).

14. Russell's sign

A common indicator of self-induced vomiting is known as "Russell's sign," which is characterized by calluses on the back of the hand and fingers. These calluses result from repeated trauma with the upper front teeth during attempts to induce vomiting (Monda, M., & al., 2021, p.156).

15. Pseudo-Barett's syndrome

The most frequent electrolyte disturbances in individuals who engage in vomiting include metabolic alkalosis and hypokalemia. These occur because vomiting leads to the loss of stomach acid and potassium, and the resulting dehydration prompts increased aldosterone secretion to maintain blood pressure. This sequence of compensatory mechanisms is known as pseudo-Barrett's syndrome. It makes patients prone to edema formation when they stop purging or if intravenous saline is administered too rapidly (Westmoreland, & al., 2016, p.34).

Therefore, AN has severe implications for various bodily systems. Cardiac complications, such as sudden cardiac death, structural changes, and ECG abnormalities, contribute significantly to mortality. Hematologically, it leads to trilinear hypoplasia, resulting in anemia, leukopenia, and thrombocytopenia. Dermatologic changes include xerosis, lanugo, hair thinning, acrocyanosis, and increased acne, all reversible with weight gain. Osteoporosis is a common and early musculoskeletal complication BED primarily leads to obesity and its associated risks like hypertension and type 2 diabetes. Notable signs of eating disorders include Russell's sign from self-induced

vomiting and pseudo-Barrett's syndrome due to metabolic imbalances from purging behaviors. These multifaceted health issues underscore the critical need for comprehensive management and treatment of eating disorders.

D. Role of Dentists in Detection, Prevention, and Support of Eating Disorder Patients

1. Importance of Early Identification

The longer an ED persists, the higher the risk of mortality and suicide attempts, exacerbated by worsening social isolation over time (Kalindjian, N., & al., 2022, p.22). Specialized centers for treating eating disorders have noted that patients often receive appropriate care many months or even years after the first symptoms appear. Treatment for AN is less effective the longer the illness remains untreated. Specifically, if AN treatment begins more than three years after symptom onset, its effectiveness diminishes significantly. Early detection is crucial: Patients diagnosed at age 19 or younger are four times more likely to recover from AN and eight times more likely to recover from BN compared to those diagnosed after age 20, likely due to the shorter duration of the illness (Kalindjian, N., & al., 2022, p.21).

Dentists, especially pediatric dentists, may be the first healthcare professionals to identify the clinical signs of eating disorders by taking a comprehensive history and conducting detailed oral examinations (Monda, M., & al., 2021, p.156). Early identification of oral complications related to eating disorders is critical for prompt referral and treatment, addressing both psychological and somatic issues as well as oral health manifestations (Lourenço, M., & al., 2018, p.1916). Dentists should build trust with patients by discussing eating habits and gastrointestinal problems rather than directly asking about AN and BN (Traebert, J., & Moreira, E. A. M., 2001, p.361).

Early identification and treatment can significantly improve outcomes, with a recovery rate of approximately 70% for adolescents with EDs (Chew, K. K., & Temples, H. S., 2022, p.625). Research suggests that the first signs of EDs often appear in the oral cavity within the first six months of abnormal behavior (Hasan, S., & al., 2020, p.3890). Therefore, the dentist's role in recognizing these early symptoms is crucial, as they may be the first to identify an ongoing systemic disease through a thorough interview and detailed examination (Szupiany-Janeczek, T., & al., 2023, p.1).

Evaluating outpatients can help identify early clinical signs, allowing for timely referral, assessment, and intervention (Lourenço, M., & al., 2018, p.1918).

2. Strategies to Mitigate Disease Impact

Dentists are uniquely positioned to counsel bulimic patients on reducing their intake of acidic foods and drinks and on maintaining optimal oral hygiene post-vomiting. They can advise patients to rinse their mouths with water, chew gum, and avoid brushing their teeth immediately after vomiting to mitigate the oral damage caused by bulimia (Rosten, A., & Newton, T., 2017, p.539).

Brushing teeth too soon after vomiting can remove the tooth's outer protective layer, exposing the decalcified layer that needs time to remineralize. To prevent further dental erosion, it is crucial to rinse the mouth with water or other neutralizing liquids immediately after vomiting (Nijakowski, K., & al., 2023, p.11). Bulimic patients can also protect their teeth by neutralizing stomach acid with water and antacids after vomiting, which is feasible since they often plan their binge eating and vomiting episodes (Nijakowski, K., & al., 2023, p.12).

Wearing 'bite-guards' during vomiting, with the inside surface coated with Sodium Bicarbonate suspension or Milk of Magnesia, can help neutralize gastric acid and protect the teeth (Paszynska, E., & al., 2023, p.11).

Initial dental treatment for individuals with eating disorders focuses on discouraging destructive obsessive-compulsive toothbrushing behaviors and enhancing oral hygiene skills. Patients with anorexia nervosa and bulimia nervosa often brush their teeth intensely and frequently to hide their embarrassment after vomiting or to induce vomiting. Dentists should advise them to limit toothbrushing to three times daily and to rinse their mouths with an acid-neutralizing solution or still water instead of brushing immediately after vomiting. Gastric acids, with a pH of 1.5, severely impact teeth, so patients should delay brushing for at least an hour after vomiting to prevent compulsive behaviors. Using additional fluoride sources, such as fluoride toothpaste or rinses combined with stannous ions, is recommended. Dedicated oral hygiene appointments with comprehensive oral and written recommendations are essential to prevent dental erosion, caries, gingivitis, and gingival recession. An electric toothbrush with an overpressure monitoring system is preferred for effective plaque control (Rangé, H., & al., 2021, p.26).

Given the increased risk of plaque-related gingivitis and gingival recession, prevention and early treatment require heightened motivation for plaque control and proper oral hygiene education. Electric toothbrushes are beneficial for patients with EDs as they enhance plaque removal while controlling brushing time and pressure on the gums due to their integrated timer and sensor (Paszynska, E., & al., 2023, p.10).

3. Adopting a Multidisciplinary Approach

To achieve effective dental treatment outcomes and facilitate referrals to multidisciplinary services, it is crucial to first build trust with patients. This approach ensures they receive comprehensive care from a team that includes psychotherapists, doctors, nutritionists, and dental surgeons (Traebert & Moreira, 2001).

Given the intertwined nature of physical and psychiatric health issues, adopting an integrated assessment, planning, and management approach for patients with eating disorders is essential. Involving oral healthcare professionals as part of a multidisciplinary team can enhance the management of both psychological and physical complications associated with eating disorders.

The European Federation of Conservative Dentistry emphasizes that the primary goals in preventing dental caries and erosion are to halt or slow down these conditions through screening and regular dental check-ups. Key areas of focus should include maintaining oral hygiene, remineralization treatments, and providing dietary advice (Paszynska & al., 2022).

An integrated care strategy that involves oral healthcare professionals in a multidisciplinary team can significantly improve outcomes for patients with eating disorders, addressing both their psychological and physical health needs (Lourenço & al., 2018).

The treatment plan for eating disorders must be multidisciplinary, addressing psychological, nutritional, somatic, social, and familial aspects (Rangé & al., 2021). However, it is important for oral health professionals to recognize that managing patients with EDs is psychologically challenging and time-consuming (Rangé & al., 2021).

Oral health treatment should be part of a comprehensive, personalized care plan coordinated by general practitioners and psychiatrists. This plan typically favors non-

invasive treatments, such as prescribing desensitizing agents in toothpaste or mouthwash. However, in cases where severe hard and soft tissue damage has occurred, restorative treatments or periodontal plastic surgery may be necessary as part of the overall management strategy (Paszynska & al., 2022).

4. Enhancing Dentist Training and Awareness

According to Kalindjian, N., and al. (2022), early detection of EDs can be significantly improved through targeted training for school staff and implementing secondary prevention programs directly in schools. Training school staff enables them to better recognize signs of EDs. For instance, one study presented a one-hour training program for school staff that covered definitions, signs, symptoms, causes, effects, and treatments of EDs. Following the training, staff members were tasked with identifying students at risk for EDs. The trained staff identified significantly more students with potential EDs than those in a control group without training (Kalindjian, N., & al., 2022, p.24).

Dental health professionals are often among the first to suspect eating disorders due to the distinct oral manifestations these disorders present. Despite this, a study revealed that many dentists obtain their knowledge about EDs from general media sources, such as television and the Internet, rather than formal education. The study found that 76% of dentists felt a need for more extensive undergraduate and continuing education on managing eating disorders (Rangé, H., & al., 2021, p.25).

Pediatric dentistry plays a crucial role in managing patients with EDs, often identifying these disorders earlier than other health professionals. Early detection and intervention are crucial for a better prognosis, helping to prevent the chronic progression and worsening of the disease (Monda, M., & al., 2021, p.156).

Improving the level of knowledge among healthcare professionals about EDs is essential, both through initial training and continuing education. Some experts suggest incorporating specific training modules on early identification of EDs into the health professional curriculum. This inclusion, however, presents a challenge due to already packed schedules. E-training interventions offer a solution by providing a resource to supplement existing curricula for health professionals, such as dentists, who require both theoretical and practical training. E-learning programs about EDs are cost-effective and

can reach a broad audience, promoting mental health literacy and enhancing the diagnosis and treatment of EDs within the healthcare system (Kalindjian, N., & al., 2022, p.63).

Rangé, H., and al. (2021) emphasize the urgent need to integrate conceptual, procedural, and skills-based objectives for managing EDs into dental and dental hygiene education (p.28). Innovative training programs, such as the "EAT" framework based on motivational interviewing principles, have been developed and evaluated with positive outcomes. These programs have shown significant improvements in dental students' self-efficacy, knowledge of oral manifestations, treatment options, and attitudes toward secondary prevention of EDs (Rangé, H., & al., 2021, p.26).

Additionally, female dentists have shown a greater understanding of the oral and physical signs associated with EDs compared to their male colleagues. This enhanced knowledge equips them to more accurately identify and manage these conditions, leading to more effective oral care advice and appropriate referrals. Their ability to recognize the subtle signs of EDs allows them to intervene early, which is crucial for improving patient outcomes.

Early identification and timely treatment of EDs are essential, particularly for adolescents. When these disorders are detected and managed promptly, the recovery rates can be as high as 70%. This emphasizes the importance of thorough training and awareness among dental professionals to ensure they can play a pivotal role in the early detection and intervention of eating disorders, ultimately contributing to better health outcomes for their patients.

Overall, enhancing education and training for school staff and healthcare professionals, particularly dentists, is vital for the early detection and effective management of eating disorders. These efforts can lead to better health outcomes and higher recovery rates for individuals affected by these conditions.

IV.Discussion

This integrative review of the literature aims to present an updated overview of the current evidence regarding the impact that EDs have on the oral cavity and early detection of oral signs. Timely diagnosis and treatment, especially with a multidisciplinary team involving dentists, psychotherapists, doctors, and nutritionists, are crucial in managing these complex disorders effectively.

EDs are psychiatric diseases mainly observed in adolescents and young women at an increasing and alarming rate. AN and BN are the most common, but we found a lot more diseases, such as BED or Pica (Rangé & al. 2021). In this review we only focused on AN, BN and BED which are proportionally the most common. Whereas AN is characterized by food restriction and fear of gaining weight, BN and BED are characterized by episodes of overeating, and BN follows them using compensatory methods (Nijakowski & al., 2023).

The emergence of social networks has made comparison with everyone else almost compulsory. It is true about having a disease, mental illness or not, and weighing a little more or a little less than what the norm says we should weigh. Today, it's mandatory to fit into a certain norm in order not to be categorized as different, and even if mental health is no longer the taboo it once was, it's still difficult for some people to address (Paszynska & al., 2023).

EDs manifest through various oral and systemic health issues (Westmorland & al., 2016). The rapid turnover of epithelial cells in the oral cavity often makes it an early indicator of systemic diseases and nutritional deficiencies (Monda & al., 2021). EDs can cause dental erosion, periodontal diseases, salivary gland disorders, and mucosal lesions. Dental erosion, particularly prevalent among individuals with EDs, is characterized by the gradual and irreversible loss of mineralized tooth structure, often exacerbated by behaviors such as vomiting and the consumption of acidic foods and drinks (Hasan & al., 2020).

Individuals with EDs also face a higher risk of gingival recession due to aggressive tooth brushing and vitamin deficiencies, which can lead to further periodontal complications. Reduced salivary flow, common in bulimia, contributes to dental erosion and caries due to decreased buffering capacity and increased acidity in the oral cavity (Hasan & al., 2020). Frequent vomiting exacerbates these issues, causing dehydration and further reducing saliva production. (Szupiany- Janeczek & al., 2023).

Systemic complications of EDs are extensive. Cardiac issues, including sudden cardiac death, structural changes in the heart, and ECG abnormalities, are common. Hematologically, AN can lead to trilinear hypoplasia, causing anemia, leukopenia, and thrombocytopenia. Dermatological changes such as dry skin, lanugo, hair thinning, and increased acne are also prevalent. Musculoskeletal complications, particularly osteoporosis, occur early in the disease and increase fracture risk.

BED primarily leads to obesity and its associated health risks, such as hypertension and type 2 diabetes. Russell's sign, calluses on the hands from inducing vomiting, is a common physical indicator of bulimia. Pseudo-Barrett’s syndrome, caused by electrolyte imbalances from vomiting, results in metabolic alkalosis and hypokalemia, making patients prone to edema when they stop purging or receive rapid saline infusion (Westmorland & al., 2016).

Altogether, the wide-ranging health impacts of eating disorders underscore the importance of early detection and comprehensive treatment to mitigate these serious complications. The severity and duration of EDs like AN and BN correlate with higher mortality rates and increased suicide risk, exacerbated by factors like prolonged social isolation (Kalindjian, N., & al., 2022). Treatment delays are common, with interventions often occurring years after symptom onset, reducing their effectiveness. Early detection significantly improves recovery chances, especially in younger patients. Dentists play a critical role in early identification, often being the first to notice signs through comprehensive oral examinations. Early treatment, particularly if initiated within six months of symptom onset, can lead to recovery rates of approximately 70% for adolescents with EDs (Chew, K. K., & Temples, H. S., 2022). Taking everything into account, timely and effective treatment and early detection are essential for improving outcomes in patients with EDs

Dentists play a crucial role in advising bulimic patients on oral health, recommending strategies such as limiting acidic food and drink, rinsing the mouth with water post-vomiting, and avoiding immediate tooth brushing to prevent dental damage. It's important to neutralize stomach acid with water or antacids after vomiting, and using 'bite-guards' coated with neutralizing agents during vomiting can also help. Initial dental treatment should focus on reducing obsessive toothbrushing behaviors and improving oral hygiene practices. Dentists should encourage brushing no more than three times daily and using fluoride products to protect teeth. Electric toothbrushes with overpressure monitoring

systems are recommended for effective plaque control and minimizing gingival damage. Regular dental appointments and comprehensive oral hygiene education are essential to prevent dental erosion, caries, gingivitis, and gingival recession in patients with EDs (Paszynska & al., 2023).

To ensure effective dental treatment for patients with EDs, it is essential to build trust and facilitate referrals to a multidisciplinary team that includes psychotherapists, doctors, nutritionists, and dental surgeons. An integrated approach to assessing and managing ED patients involving oral healthcare professionals can significantly improve outcomes by addressing both psychological and physical health issues.

The importance of a multidisciplinary team in treating EDs lies in its comprehensive and coordinated approach, which addresses the multifaceted nature of these conditions. Dentists play a critical role in early detection. They are often the first to observe the physical signs of EDs, such as dental erosion, enamel wear, and other oral health issues that arise from behaviors like frequent vomiting and poor nutrition.

Nutritionists are essential in managing the dietary aspects of EDs. They work closely with patients to correct nutritional deficiencies, develop balanced eating plans, and promote healthy eating behaviors. Nutritionists provide education on the importance of a balanced diet and the physiological impacts of disordered eating, helping patients restore and maintain their nutritional health. Their guidance is crucial in re-establishing normal eating patterns and supporting the physical recovery process (Daniel, C. P., & al.,2015).

Psychologists provide vital mental health support, addressing the psychological underpinnings of EDs. They offer therapeutic interventions such as cognitive-behavioral therapy (CBT), which can help patients develop healthier thought patterns and behaviors related to food and body image. Psychologists also teach coping strategies to manage stress, anxiety, and other emotional triggers that contribute to disordered eating. Their support is fundamental in addressing the mental health aspects of EDs, fostering long-term recovery (Kisely, 2016).

General practitioners (GPs) oversee the overall physical health of patients with EDs. They monitor vital signs, manage comorbid conditions, and coordinate care among specialists. GPs ensure that all aspects of a patient’s health are considered, from metabolic and cardiovascular health to psychological well-being. Their role is crucial in providing a

holistic view of the patient's health and ensuring that all medical needs are addressed in a coordinated manner (Paszynska & al., 2023).

The collaborative effort of these professionals forms the backbone of a multidisciplinary team. This integrated approach ensures that all dimensions of the disorder are treated, providing a holistic care model that addresses both the physical and psychological aspects of EDs. Each specialist brings a unique perspective and set of skills that, when combined, enhance the overall treatment plan.

For instance, a dentist might notice signs of dental erosion and refer the patient to a nutritionist and psychologist. The nutritionist then addresses dietary deficiencies and the psychologist works on the underlying mental health issues. Meanwhile, the GP monitors the patient's overall health and coordinates these efforts, ensuring a unified treatment strategy.

This comprehensive care model significantly improves treatment outcomes. Patients benefit from early detection and intervention, which can prevent the progression of the disorder and reduce the risk of severe complications. By addressing the root causes and manifestations of EDs, a multidisciplinary team helps patients achieve better physical and mental health outcomes, supporting a more effective and sustainable recovery process (Allen & al., 2023).

In summary, the integration of various healthcare specialists in treating EDs is not just beneficial but essential. It ensures that every aspect of the disorder is addressed, providing patients with a robust support system that enhances their chances of recovery and long-term health. The coordinated efforts of dentists, nutritionists, psychologists, and general practitioners exemplify the best practices in managing complex, multifaceted health conditions like EDs.

The European Federation of Conservative Dentistry highlights the importance of preventing dental caries and erosion through regular screenings, maintaining oral hygiene, providing remineralization treatments, and offering dietary advice. A multidisciplinary care strategy that includes oral health professionals can enhance the management of ED-related complications. Oral health professionals should be aware that treating ED patients is demanding and time-consuming. Oral treatment should be part of a personalized care plan coordinated by GPs and psychiatrists, favoring non-invasive treatments where possible. In severe cases, restorative treatments or periodontal surgery

may be required (Paszynska & al., 2022).

There are still relatively few studies on the necessity of early diagnosis of EDs. Most existing research focuses primarily on women, leaving a gap in our understanding of how EDs affect men. Additionally, there is a significant lack of studies examining the impact of EDs on transgender and non-binary individuals. Addressing these gaps through inclusive research is crucial for developing effective diagnostic and treatment strategies for all affected populations.

Therefore, this review provided an overview that underscores the critical need for early detection, comprehensive treatment, and inclusive research to address the multifaceted health impacts of EDs. By incorporating these insights into daily practice, healthcare professionals can improve outcomes and provide more effective care for individuals with EDs.

V. Conclusion :

Early identification of EDs in young individuals significantly enhances the effectiveness of treatment. EDs are complex conditions that affect both mental and physical health, with early oral health indicators providing critical opportunities for intervention. Dentists play a pivotal role in this early detection, offering a unique vantage point to identify symptoms and integrate patients into comprehensive, multidisciplinary treatment programs. By including ED recognition in dental education and providing ongoing professional training, dentists can become more adept at identifying these disorders. This early detection not only facilitates timely psychological and medical intervention but also reduces the risk of long-term health complications, ultimately improving patient outcomes.

VI.Appendix and Bibliography

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Appendix

Table 1. Articles about dental health and eating disorders.

Articles	References	type of study	Aim of the study	sample	Results
Oral and Physical Manifestations of Anorexia and Bulimia Nervosa	Lourenço, M., and al. 2018	Case-control Study	To Determine the health of the oral cavity of patients with ED, particularly those those with purging behaviors.	55 women outpatients with AN or BN and out of the 55, 33 agreed to a questionnaire and examination of their oral status.	ED patients presented a significantly higher incidence of oral complications and an inferior oral health status in comparison to gender- and age-matched controls. Some of the attained alterations were highly correlated with the self-induced vomit behavior.

Eating Disorders through the periodontal length	Rangé, H., and al., 2021	Narrative Review in Periodontology 2000	Summarize the manifestations of ED on tooth and periodontal tissue	X	The earliest and most visible consequences of AN, BN, and BED are in the oral sphere. In fact, erosive lesions are the most obvious manifestations to be observed on the lingual and oclusal surfaces. Mucosal lesions are also important signs of these diseases. The role of the dentist must be anchored in the multidisciplinary treatment of these diseases, while at the same time emphasising the urgent need for additional training for patients in detecting the signs of these diseases.

Medical Complications of Anorexia and Bulimia Nervosa	Westmoreland, P., and al., 2016	A review in The American Journal of Medicine	Review of the medical complications associated with AN and BN, the treatment possible, and also the epidemiology and psychiatric comorbidities in relation to those pathologies.	X	This article describes the many systemic risks of AN and BN. These serious mental/psychiatric illnesses cause numerous irreversible problems in the gastrointestinal, cardiac, hematological, musculoskeletal, dermatological, and oral systems. All are due to a disturbance in the body's homeostasis, which the body is trying to re-establish. We note that lack of food is the main cause of AN symptoms, while the methods used by BN patients cause acid-base changes due to purging behaviors.

Articles	References	type of study	Aim of the study	sample	Results
Bulimia Nervosa - Medical complications	Mehler, P. S., and al., 2015	A review in the Journal of Eating Disorders	To list the complications caused by the purging behaviors used by patients with EDs.	X	This article describes the various complications of BN, which vary according to the purging behaviors used by the patient. The use of diuretics copies the acid-base problems caused by self-induced vomiting.

Oral Manifestations of eating disorders in adolescent patients. A review	Monda, M., and al., 2021	A review article in the European Journal of Paediatric Dentistry vol. 22/2-2021	Review the medical complications generated by BN and the different types of purging used by the patients, vomiting, and laxatives abuse.	X	This article describes the various complications of bulimia nervosa and the 'purging behaviors' practices used by patients. These are initially cutaneous, facial, and dental, and the dentist is the first to see the signs of self-induced vomiting. These long-term vomiting habits cause numerous cardiac and pulmonary alterations. Finally, the use of laxatives leads to acid-base and electrolyte changes similar to those of self-induced vomiting.

The impact of bulimia nervosa on oral health a Review of the literature	Rosten, A., & Newton, T., 2017	A review of the literature	To determine the most frequent manifestations of bulimia and to identify the specific behaviors of this illness that generate these manifestations.	X	This review found that the most common symptoms of bulimia are dental erosion, reduced salivary flow, and dental caries, which are caused by the dietary habits of bulimics, such as binge eating, eating highly acidic foods, or taking antidepressants. The review, therefore, concludes that it is necessary to include the signals and symptoms of this disease in the dental curriculum in order to train practitioners to detect it.

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Eating disorders and Dental Erosion: A systematic review	Nijakowski, K., and al., 2023	Systematic review	The aim of this review is to determine if there is a relationship between dental erosion and eating disorders.	X	Indeed, there is a link between dental erosion and ED, particularly in patients with self-induced vomiting and those suffering from BN. It has also been shown that half of bulimics have dental erosion.

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Early detection of eating disorders: a scoping review	Kalindjian, N., and al., 2022	Scoping review	The aim of this review is to establish what the current scientific evidence is for the early detection of EDs.	X	EDs can be detected in many different sectors in contact with young people and young adults. For example, at school, in sport or in the health sector. We therefore need to increase prevention in these environments, but also improve training for these professionals to enable better detection.

Adolescent Eating Disorders: Early Identification and Management in Primary Care	Chew, K. K., & Temples, H. S., 2022	An article from a scientific journal - Journal of Pediatric Health Care	The aim of this educational article for healthcare professionals is to describe the etiology and risk factors of EDs, the diagnosis of the different EDs according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, as well as all the clinical signs and treatments available.	X	Adolescents are the population most at risk of ED, and its prevalence has risen by 25% worldwide. There are many risk factors, particularly in adolescents who are prone to perfectionism, poor self-image, and body image, which are subject to bullying, etc. The role of doctors is to make early diagnoses, which can be done by systematically measuring the height and weight of their patients, as well as using The Eating Disorder Examination Questionnaire.

Oral cavity and eating disorders: An insight to holistic health	Hasan, S., and al., 2020	Review Article	The aim of this article is to describe the etiology and oral manifestations of EDs and to describe the role of oral health practitioners in a multidisciplinary approach to better prevent the consequences of EDs.	X	The article describes the main oral features of EDs, starting with dental erosions generally associated with BN and gastroesophageal reflux disease. Dental caries has a multifactorial aetiology and cannot be solely associated with EDs, but in these patients it tends to be cervical with tough dentinal lesions. Patients with EDs are at risk of periodontal disease due to a lack of dental hygiene or, conversely, overly traumatic tooth brushing or vitamin C deficiency.

A framework for conceptualising early intervention for eating disorders	Allen, K. L., and al., 2023	Research Article	The aim of this article is to present the fundamentals of early intervention in EDs and to propose recommendations and research to advance early intervention in EDs.	X	This article describes the benefits of early intervention in the ED, which could reduce the cost of these diseases and improve treatment results. The best results are achieved in the first three years of the disease and showed in testimonials, firstly from a 20-year-old who developed ED because she was afraid of gaining weight, who consulted a doctor on the advice of her sister, who referred her to a specialist and who now considers herself cured. The second one developed ED at the age of 8 as a result of childhood trauma, attempted suicide several times, was admitted to a psychiatric hospital to have his illness monitored, and then, at the age of 18, was hospitalized

					because his weight was too low.

Diet Traps During Eating Disorders among Dentate Patients at an Oral Health Glance	Paszynska, E., and al., 2023	Review	The aim of this article is to determine the different EDs in relation to the behavior of patients with EDs and also to update preventive measures and technological innovations.	X	This article differentiates between the different EDs and their risk factors. The article points out that patients with ED rarely seek help from dieticians, whereas they do seek help from doctors or dentists to relieve complications caused by their ED. These oral complications are gingival recession caused by brushing teeth too quickly and too hard, which leads to tooth erosion and hypersensitivity. There is also damage to the mucosa and caries lesions due to additional risk factors in ED patients. The dentist, with these consequences of ED on both soft and hard dental tissues, maybe the first to notice the symptoms of the disease.

No Mental Health without Oral health	Kisely S., 2016	Review Article	The aim of this article is to show the relationship between mental health and oral health.	X	This article discusses the association between oral health and mental health. Although mental health has not been a primary concern since the 17th century, it is becoming increasingly so, and many mental illnesses have major repercussions on oral health, including tooth loss and erosion. A new collaboration between clinicians and dentists would enable better prevention of these diseases and better education for patients.

Oral Cavity Clinical Evaluation in Psychiatric Patients with Eating Disorders: A Case-control Study	Szupiany-Janeczek, T., and al., 2023	Case-control Study	The aim of the study is to assess the clinical condition of the oral cavity, dental erosion and gingival recession and to establish whether or not there is a correlation between these symptoms and EDs.	The study was carried out on 60 patients at the "Day Hospital for Neurotic and Behavioral Disorders of the Psychotherapy Department in the University Hospital in Krakow" and compared to a "control group ».	The article describes ED as a mental illness with oral repercussions. The dentist may be the first to notice symptoms in the patient. Although the exact etiopathogenesis of the disease is not known, it predominantly affects young women. The most frequent consequence of ED is perimolysis or dental erosion. The article goes on to describe an increase in caries and periodontal disease. Salivary gland enlargement can become permanent and can be bilateral. Between the patient's group and the control group, a difference with erosion but not with recession was found. For the treatment of these diseases, it is important to combine dental treatment with follow-up.

Risk of Dental Caries and Erosive Tooth Wear in 117 Children and Adolescents' Anorexia Nervosa Population - A Case-control Study	Paszynska, E., and al., 2022	Case-Control Study	The aim of this case-control study was to compare dental health and gingival inflammation in 117 teenage girls with AN with 103 women of the same age.	117 teenage girls with AN with 103 women of the same age	The dental status of anorexia nervosa (AN) patients was assessed using DMFT for caries, BEWE for erosive wear, BOP for gingival condition, and PCR for plaque deposition, and compared with age-matched female dental patients. AN patients showed more caries lesions (DMFT 3.8 vs. 1.9, $p = 0.005$), greater erosive wear (BEWE 18.9% vs. 2.9%, $p < 0.001$), poorer plaque control (PCR 43.8% vs. 13.7%, $p < 0.001$), and higher gingival inflammation (BOP 20.0% vs. 3.9%, $p < 0.001$). Additionally, there was a significant correlation between the duration of AN and increased BOP, BEWE, decayed and filled teeth, and PCR scores ($p < 0.05$).

Perimolysis: Case report	Daniel, C. P., and al., 2015	Case report	The aim of this study is to describe the treatment of a person suffering from perimolysis.	A 38-year-old patient at the Araquara University Center dental clinic	This article describes perimolysis through a clinical case of a 38-year-old patient with dental erosion and sensitivity at Araquara University Center. The patient had a history of depression and bulimia nervosa (BN). Examination revealed significant dental erosion but no soft tissue lesions, caries, or periodontal disease. The proposed multidisciplinary treatment included psychiatric care for BN and dental care involving composite resin restoration and prevention. The study concludes that treating perimolysis requires a multidisciplinary team of doctors, dentists, psychologists, and nutritionists. Dentists should stay informed about the causes, manifestations, and

					treatments of perimolysis.

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Transtornos alimentares na infância e na adolescência - Eating Disorders in Childhood and adolescence	Gonçalves, J. and al., 2013	Review	The aim of the study is to discuss about the EDs's risks factors and characteristics in children and adolescents.	X	The two main EDs are AN and BN, as well as BED. Risk factors for these EDs include the impact of the media and the social and family environment associated with the cult of thinness. These EDs cause nutritional, social and oral problems such as angular queilitis, dental erosion, periodontitis and salivary gland hypertrophy.

Transtornos alimentares de ordem comportemental e seus efeitos sobre a saúde bucal na adolescência	Traebert, J., & Moreira, E. A. M.2001	Article of the Pesquisa Odontológica Brasileira	The aim of this review was to describe the signs and symptoms of Eds, helping the dentist to detect them early, offer appropriate dental treatment and refer the patient for specialized care.	X	This article looks at the relationship between AN and BN and oral health and describes the signals and symptoms that dentists can detect at an early stage in order to refer patients to a professional as soon as possible. In most cases, it is dental erosion that should alert the dentist, and when a dental erosion is suspected, he must conduct a thorough anamnesis in order to build a relationship of trust with the patient. The dentist's role is multifaceted: he must resolve urgent problems, educate patients and provide restorative and maintenance care.

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Bidirectional association between eating disorder and temporomandibular joint disorder: A retrospective longitudinal nationwide population-based cohort study	Tseng, H. J., and al., 2024	Original Article from the Journal of Dental Sciences	The aim of the study is to investigate the association between ED and temporomandibular disorder.	Study 1 involved 15,059 patients with TMJD, and 150,590 matched controls and the Study 2 involved 1219 patients with ED and 12,190 matched controls	This article shows the link between TMJ disorders and ED. The bidirectional link means that one can engender the other and vice versa.