

ORAL MANIFESTATIONS OF ANOREXIA IN ADOLESCENT PATIENTS

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ABSTRACT

The aim of the study is to analyse and discuss the main mucosal, dental and cutaneous manifestations in the oral area associated with anorexia in adolescent patients, in order to raise awareness among healthcare providers and caregivers about the specific oral health challenges faced by this population and to highlight the need for early intervention and tailored dental care strategies. **Methods:** We performed a systematic search on the PubMed and Embase databases from their inception to March 2024 using specific key-words: ["anorexia"] AND ["adolescent" OR "paediatric" OR "children"] AND ["oral manifestations" OR "oral lesion" OR "oral complication" OR "oral disorder" OR "oral mucosa" OR "oral mucosal disease" OR "teeth"]. **Results:** Oral manifestations in adolescents with anorexia include mucosal, dental, periodontal and gingival tissues manifestations, as well as salivary glands alterations. These manifestations are indicative of nutritional deficiencies and poor oral hygiene practices commonly seen in individuals with anorexia. **Conclusions:** Adolescents with anorexia nervosa often experience a wide range of oral health complications. Regular dental check-ups and proper nutrition are essential in managing oral health issues in this population. Collaboration between healthcare professionals, such as dentists, nutritionists, and mental health specialists, is crucial in providing comprehensive care for these cases.

Key words: anorexia, adolescent, oral health

INTRODUCTION

Anorexia nervosa is a serious eating disorder characterized by restricted food intake, intense fear of gaining weight, and a distorted body image (1). It predominantly affects adolescent patients, with a higher prevalence among females (2). The epidemiological trend of anorexia in adolescents is showing a rise in prevalence rates, highlighting the need for increased awareness and support for early intervention and treatment (2). Moreover, the Covid-19 pandemic exacerbated eating disorders in young people, with lockdowns and quarantines playing a significant role (3).

Anorexia can have serious physical and psychological consequences, including nutritional deficiencies, developmental

delays, emotional distress, which can lead to severe and increased risk of long-term health complications (1). This condition can also result in oral health complications including dental erosion, xerostomia, and periodontal disease due to nutritional deficiencies and frequent purging behaviours (1). The lack of essential nutrients such as calcium and vitamin D can weaken tooth structure and increase susceptibility to decay (4). Chronic malnutrition and electrolyte imbalances associated with anorexia can also contribute to oral mucosal changes and impaired salivary function, further exacerbating oral health issues (5).

In this review, we aimed to analyse and discuss the main mucosal, dental and cutaneous manifestations in the oral area

associated with anorexia in adolescent patients, in order to raise awareness among healthcare providers and caregivers about the specific oral health challenges faced by this population and to highlight the need for early intervention and tailored dental care strategies.

MATERIALS AND METHODS

We performed an electronic literature search using the terms [“anorexia”] AND [“adolescent” OR “paediatric” OR “children”] AND [“oral manifestations” OR “oral lesion” OR “oral complication” OR “oral disorder” OR “oral mucosa” OR “oral mucosal disease” OR “teeth”]. A systematic search was conducted on the PubMed and Embase databases from their inception to March 2024.

The reference lists of articles were meticulously reviewed for additional information. Only English-language articles were included in the analysis. It is important to note that, as with all narrative reviews, the possibility of selection bias cannot be completely ruled out.

RESULTS

1. Oral mucosa manifestations

Oral mucosa manifestations associated with anorexia nervosa include mucosal atrophy, glossitis, oral ulcerations, and erythematous lesions of the soft palate (5). These may be explained by nutritional deficiencies including iron and vitamin deficiency (6). Candidiasis has also been more frequently reported in adolescents with anorexia (7). Opportunistic infections with *Candida albicans* can result from nutritional deficiencies, impaired salivary function, or secondary infection of mucosal lesions caused by trauma (8). Moreover, anorexia was associated with a higher prevalence of

non-*albicans Candida* species such as *C. glabrata*, *C. parapsilosis*, and *C. dubliniensis* localized in the oral cavity, which may indicate that the purging behaviors of these patients can alter the normal flora, increasing the risk of oral candidiasis (9).

Manifestations related to the tongue may include glossitis, atrophy of lingual papillae, glossodynia, dysgeusia, hypogeusia, and burning sensations palate (5). These manifestations can be indicative of nutritional deficiencies, such as iron, folate, or vitamin B12 deficiency, commonly seen in individuals with anorexia (10). Also, metal deficiencies, particularly zinc, are an important contributor in tongue-related manifestations (11).

2. Dental manifestations

Another oral manifestation of anorexia is erosion of dental enamel. The frequent self-induced vomiting and the gastroesophageal reflux disease associated with anorexia nervosa, as well as the consumption of acidic food/drink (e.g. sports drinks, diet soda and citrus fruits) expose the teeth to gastric acid, leading to erosion of the enamel. This can result in tooth sensitivity, discoloration, and an increased risk of dental decay. In severe cases, erosion of dental enamel can lead to irreversible damage to the teeth (5). Besides enamel erosion, tooth sensitivity and caries, anorexia was associated to an increased risk of perimolysis, which is the dental erosion on the palatal surface of the teeth (5). Szupiany-Janeczek et al. reported that patients with eating disorder symptoms are more likely to have dental erosions (in total, 28.81% of cases) (12).

3. Periodontal and gingival tissues

manifestations

Gingivitis and periodontal disease are also common oral manifestations of anorexia in adolescent patients (13). Poor nutrition and compromised immune function can contribute to inflammation of the gums and infection of the supporting structures of the teeth. Left untreated, gingivitis and periodontal disease can lead to tooth loss and systemic health complications. In a study regarding oral health in 69 patients with anorexia nervosa (mean age 18.72 ± 5.1), Rangé et al. reported that among the interviewed inpatients, 33.3% reported experiencing dry mouth, 47.3% reported gum bleeding after toothbrushing, and 37.5% reported tooth hypersensitivity (13).

4. Salivary glands manifestations

One of the most common oral manifestations of anorexia in adolescent patients is xerostomia (14). Also known as dry mouth, xerostomia, refers to the subjective feeling of oral dryness often caused by decreased salivary flow or hyposalivation (15). This condition is often a result of dehydration and malnutrition, both of which are common in individuals with anorexia (16). Xerostomia can lead to discomfort, difficulty in speaking and swallowing, and an increased risk of dental caries and oral infections (17). Besides chronic self-induced vomiting or prolonged fasting and dehydration, certain antidepressant medications such as selective serotonin reuptake inhibitors can reduce saliva production (18). The saliva flow rate in individuals with anorexia has been assessed in multiple research studies (19, 20).

In addition to these oral manifestations, individuals with anorexia may also experience changes in their

salivary composition, which may lead to increased risk of oral mucosal lesions, and delayed wound healing following dental procedures. In a retrospective case-control study encompassing 54 patients with eating disorders (50 female; mean age: 21.5 years old), Johansson et al. reported that 31% of the participants had parotid enlargement probably due to vomiting and binge-eating behaviour (21). Although early stages are intermittent and reversible, late stages show permanent deformation (21).

Peripheral autonomic neuropathy is believed to be the primary cause of sialadenosis, leading to increased acinar protein production and disrupted granular release (22). Accumulation of zymogen granules in acinar cells results in parotid hypertrophy and impaired salivary secretion. As myoepithelial cells and postganglionic sympathetic neurons regulate salivary synthesis and secretion, degenerative changes in these regulatory cells are thought to underlie the development of sialadenosis (5).

These oral health issues can further exacerbate the physical and psychological challenges faced by adolescent patients with anorexia.

DISCUSSIONS

Anorexia nervosa is a serious eating disorder characterized by restricted food intake, intense fear of gaining weight, and distorted body image. Although the overall incidence of anorexia is stable among all age groups, in younger people, especially under 15 years old, it has been on the rise in recent years, with a higher prevalence among females compared to males (2).

The causes of anorexia in adolescents are multifactorial, including genetic predisposition, psychological

factors, societal pressures, and environmental influences (23). Complex disturbances in appetite-stimulating hormones have been discussed: individuals with anorexia nervosa may exhibit a diminished feeding response to ghrelin, even when experiencing hunger, indicating a potential disruption in the reward circuitry that could play a role in the development and persistence of the disorder (23). Higher levels of ghrelin in adolescents with anorexia nervosa may be essential for regulating glucose levels, acting as a compensatory mechanism to maintain normal blood sugar levels during severe malnutrition. The secretion of ghrelin appears to be influenced by insulin levels, indicating a mutual regulation between these two hormones (23). Recent research also reveals that individuals with anorexia nervosa may have differences in the composition and diversity of their gut microbiota compared to healthy individuals, which may impact various physiological processes, including nutrient absorption, energy metabolism, and immune function (24). In this context, treatments targeting the gut microbiota in individuals with anorexia nervosa may show hope in restoring the microbial balance and improving the gut-brain communication. In animal studies, the administration of *Bacteroides vulgatus* reversed compulsive behaviour in female mice, but with no substantial effect on body weight. (25) In humans, a clinical trial investigating the gut microbiota in patients with anorexia nervosa compared to healthy controls is currently conducted with the results to be available after the summer of 2025 (26). NORMA, or The Norwegian microbiota study in anorexia nervosa will potentially lead to improved treatment options, including specific dietary advice and prebiotic supplements (26). With a goal

of recruiting 90 patients with anorexia nervosa and 90 healthy controls from August 2023 to summer 2025, NORMA is set to be the largest study on anorexia nervosa and gut microbiota internationally (26).

The impact of anorexia on adolescents can be profound, affecting not only their physical health but also their emotional well-being and social functioning. Adolescents with anorexia often experience nutritional deficiencies, hormonal imbalances, and compromised immune function, leading to a range of health complications (1). These may include cardiovascular issues, bone density loss, and gastrointestinal problems (1). In addition to the systemic effects, anorexia can also have significant consequences on oral health in adolescents. Nutritional deficiencies associated with anorexia are the main causes for a wide range of oral manifestations (13). Various nutritional deficiencies can have profound effects on oral health: zinc and copper deficiencies can lead to increased enamel acid solubility, vitamin D deficiency is linked to periodontitis and gingival inflammation, inadequate intake of vitamin A may result in salivary gland atrophy, deficiencies in B complex vitamins can manifest as burning mouth, cracked lips, oral ulcers, and angular cheilitis, calcium deficiency can contribute to decreased alveolar bone density, increasing the risk of periodontal disease, iron deficiency may manifest as pica, vitamin C deficiency can affect periodontal ligament health, leading to gingivitis and spontaneous bleeding (7, 11, 13). Furthermore, poor oral hygiene practices and reduced saliva production further exacerbate these oral health issues, increasing the risk of dental caries, periodontal disease, and other oral infections (13). Addressing these nutritional

deficiencies through proper dietary interventions and supplementation is crucial for supporting oral health in these individuals as the relationship between anorexia nervosa and malnutrition creates a vicious cycle (Figure 1) with potential serious complications.

Early detection and intervention are crucial in managing anorexia in adolescents and addressing its impact on oral health. In 2023, The American Psychiatric Association

disorder-focused family-based treatment, which should include caregiver education aimed at normalizing eating and weight control behaviours and restoring weight (27).

Recent research indicates that the global COVID-19 pandemic has led to a rise in the prevalence of eating disorders, particularly among teenagers. As a result, primary care providers are facing increased responsibility in evaluating, diagnosing, and

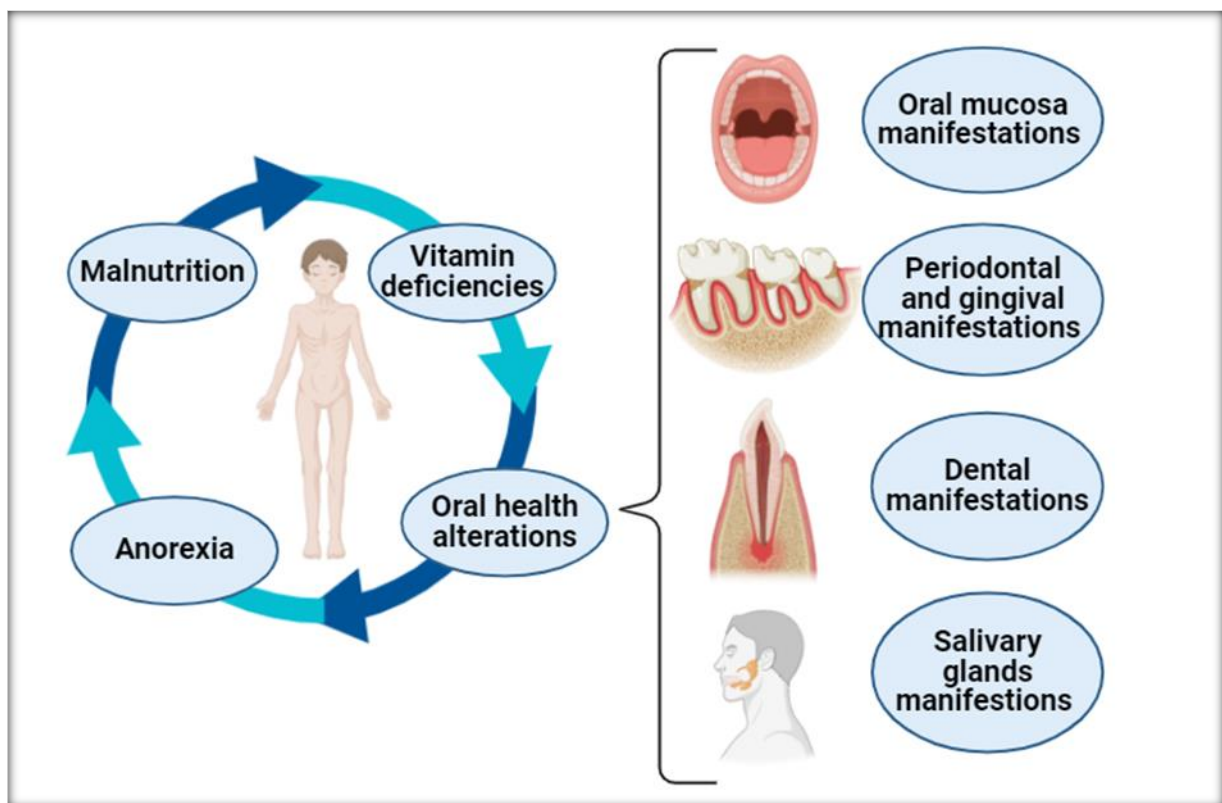


Figure 1: The vicious cycle of anorexia nervosa: a real a threat for the oral health (Created with BioRender.com)

published an updated practice guideline for the treatment of patients with eating disorders, including anorexia nervosa (27). Individualized goals set for weekly weight gain are recommended for nutritional rehabilitations (27). Also, these adolescents and emerging adults who have an involved caregiver should be treated with eating

treating these disorders (28). A multidisciplinary approach involving healthcare professionals, including dentists, nutritionists, and mental health specialists, is essential in providing comprehensive care for adolescents with anorexia (28). Education and awareness about the oral health implications of anorexia are key in

promoting early intervention and improving overall well-being in affected individuals.

CONCLUSIONS

Adolescents with anorexia nervosa often experience a wide range of oral health complications. Regular dental check-ups and proper nutrition are essential in managing oral health issues in this population.

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Collaboration between healthcare professionals, such as dentists, nutritionists, and mental health specialists, is crucial in providing comprehensive care for these cases. Early detection and intervention can help mitigate the oral health consequences of anorexia and improve the overall well-being of affected individuals.

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