

# Adverse effects of eating disorders on the oral health of teenagers

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## ABSTRACT

*Eating disorders in teenager's population has a wide range of expressions from a large consumption of sodas or sugar, to binge drinking, anorexia nervosa and anorexia bulimia. Tooth wear or high caries risk could be the clinical expression of such harmful habits and the dental clinical examination could be the way for an early diagnosis of eating disorders.*

*In this kind of situation, discussion with the teenager should be preferred. Epidemiological studies have demonstrated a higher prevalence of such eating behaviors especially for teenagers. Vomiting and gastro esophageal reflux to lead to dental erosion could also be correlated to bruxism and attrition. Prevention and interception of harmful habits are the best way to stop teeth degradation purpose restorative procedure is sometimes required.*

*Orthodontic therapy is a good opportunity for discussion with teenagers to identify risk factors, but an advised selection of biomaterials is also required during the orthodontic treatment.*

## KEYWORDS

*Erosion, attrition, epidemiology, eating disorders, gastro esophageal reflux*

The term eating disorders includes a wide variety of behaviors ranging from simple excesses or harmful habits to much more serious and debilitating pathologies with serious long-term consequences. It is therefore important to detail the different clinical

forms, to establish an early diagnosis, to be aware of the procedures to be followed to communicate with these young patients, and especially to favor interception therapies rather than delaying treatment until more significant dental deterioration develops<sup>12,4</sup>.

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## ANOREXIA NERVOSA: THE DIFFERENT FORMS IN ADOLESCENCE

Anorexia nervosa usually manifests in adolescence in its restrictive forms that lead to weight loss, resulting in a body mass index (BMI) of <17.59. Puberty is a particularly high-risk period, but some cases start before puberty and others just after, during adolescence. In addition to these “restrictive” forms, there are “bulimic” forms that manifest themselves in bouts of bulimia, often in the evening, most often followed by repetitive vomiting<sup>2,3</sup>. The body weight in these latter forms can drop below the BMI threshold of 17.5, but it can be almost normal. These two forms of anorexia may be encountered in adolescence, but it should be noted

that restrictive forms of anorexia might develop secondarily to anorexia bulimia, while the reverse is extremely rare. This disease must be taken very seriously because among psychiatric diseases, it has the highest suicide rate of 5%<sup>8,10</sup>.

Anorexia nervosa is a complex disease with poorly defined etiologies that result in significant changes in self-esteem, a pathological desire to “control” (weight, appetite, sporting, and intellectual performance), and predisposition to addictive behaviors (alcohol, tobacco, sugar, narcotics, sodas, endurance sports, etc.).

## MEDICAL MANAGEMENT OF ANOREXIA NERVOSA

Many medical professionals are concerned by this pathology: general practitioners, pediatricians, psychiatrists, child psychiatrists, emergency physicians, gastroenterologists, nutritionists, etc. These practitioners are used to working as a team and would like to integrate dentists and orthodontists but encounter many difficulties. These difficulties are often linked to a lack of knowledge regarding these pathologies and associated medical care. However, our discipline is able to make an early diagnosis, regular appointments, centered on dental health, and allow for a relationship of trust to develop with adolescents.

Somatic treatments will aim to compensate for deficiencies (mineral salts, vitamins, calcium, various dietary supplements) and in some cases to impose a diet through tube feeding (enteral nutrition). Vomiting causes severe potassium losses that can affect heart rate and may require emergency hospitalization or long-term hospitalization in combination with psychiatric care.

The latter treatment often requires the prescription of antidepressants or neuroleptics, which will always have negative consequences on salivary flow with known consequences in terms of both carious risk and faster progression of erosive lesions<sup>15</sup>.

## OTHER EATING BEHAVIORS WITH AN EROSIIVE RISK

Adolescents are increasingly showing a high prevalence of erosive lesions based on epidemiological data. The consumption of acidic sodas, mainly during outside mealtimes, favors a long period of contact between the acidic beverage and the teeth. More than the pH value, it is the duration of contact time with tooth enamel that creates conditions for acidic dissolution.

Taji and Seow<sup>21</sup> already published alarming results in a 2010 literature review based on an analysis of 17 clinical studies: dental erosion is visible in temporary dentition in 17%–78% of cases and continues into permanent dentition. Many other studies, conducted on adolescents, have revealed that adolescents have a pronounced taste for so-called “sports drinks” that are particularly acidic<sup>6</sup>. Other more recent studies have emphasized the preponderant role of dietary habits, including soda consumption, and an increase in the prevalence of erosive lesions in adolescents<sup>13,16,19,20</sup>.

Early oral manifestations, following an acidic diet, consist of attacks on the cuspidal tip of molars (temporary and permanent) and premolars. The occlusal relief fades and the dentin first appears through the enamel with a yellow color. The vestibular surfaces of the maxillary incisor–canine region are



*Figure 1*  
Characteristic erosions of a chronic behavior of merycism. The erosion contours are poorly defined and the entire dental structure is affected even if the initial lesion is on the lingual side.

affected in cases of heavy consumption of soft drinks with a glass, wherein the teeth are immersed in the acidic drink.

In the presence of vomiting or merycism, the lingual surfaces of the maxillary incisors as well as those of the maxillary premolars and molars (Fig. 1).

In the presence of erosions of intrinsic origin (vomiting and/or gastroesophageal reflux disease), the same types of lesions are observed on the maxillary arch as well as damage to the occlusal surfaces of the mandibular premolars and molars. According to the nature of the food ingested during bouts of bulimia, carious lesions may be associated with erosive lesions (Figs. 2–7).



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3



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Figures 2–4

*Intraoral pictures of a young patient in late adolescence with anorexia bulimia and alcohol consumption. 2: During the examination, it is easy to notice the effects on the intercuspal arches along the incisor–canine maxillary edges. 3: Note the erosion of the occlusal surfaces of the premolars and molars with cup-shaped lesions on the cuspidal tips. 4: This image of the maxillary arch reveals lesions on the lingual surfaces of the incisor–canine region, which are characteristic of vomiting, and the presence of erosions on the areas of the cuspid teeth with yellow staining following the reduction of enamel thickness and early proximal carious lesions.*



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Figures 5–7

*X-ray images of the same patient. 5: The panoramic image reveals the loss of enamel on the occlusal sides of the cuspidal teeth with disappearance of the occlusal relief. 6: Retro-alveolar or retro-coronal images are necessary to objectify early carious lesions. 7: This view of the posterior mandibular region makes it possible to objectify enamel erosion and the progressive disappearance of the occlusal relief.*

## OTHER DISORDERS ASSOCIATED WITH EATING DISORDERS

Acid reflux may be related to high consumption of carbonated drinks, particularly sodas, and may occur during the day and at night. Nocturnal reflux occurs in an unbuffered environment in the absence of salivary secretion and is particularly harmful. They cause asymmetrical lesions, particularly on the mandibular teeth. The example illustrated by a clinical case makes it possible to better understand the value of a careful clinical examination (Fig. 8).

Some recent works have demonstrated a link between bruxism and the presence of acid in the back of the throat<sup>14,17,18</sup>. This would explain the clinical situations that we frequently encounter in which we observe attrition phenomena combined with erosion patterns during our specialized consultation on eating disorders at Rothschild Hospital.

Gingival recessions, caused by repeated acid attacks and/or traumatic brushing, are observed in cases of anorexia bulimia, but are rare in adolescents. They are found mainly in adults<sup>5</sup>.

Obsessive compulsive disorders are frequently associated with eating disorders. They can take a wide variety of forms, including compulsive brushing of teeth repeated 10–15 times a



*Figure 8*

*This occlusal view of the mandibular arch reveals asymmetric erosions on premolars and molars, characteristics associated with nocturnal gastroesophageal reflux when a person sleeps on their side.*

day, a focus on hygiene, onychophagy contributing to the phenomenon of attrition, and almost continuous consumption of chewing gum.

Other addictions may be associated with eating disorders such as smoking, alcohol, narcotics, and sugar as previously mentioned. Carious disease can then become actively associated with erosive phenomena. When a pathology such as anorexia bulimia is diagnosed, it is important to question the nature of food consumed during bouts of bulimia because we often find sugary foods that explain the presence of carious lesions.

## PREVENTION AND/OR INTERCEPTION METHODS

Dietary questions can be asked by odontologists to teenagers without objections as long as they are not intrusive. This may be the opportunity to build a relationship of trust outside the family circle. Teaching brushing methods and

explanations on consumption of sodas, such as the use of straws or avoiding consumption by sips over an extended period make it possible to not completely ban sugary drinks but to emphasize patient responsibility concerning their

dental health. A number of recommendations were published at a European consensus conference, allowing for a more detailed approach to the different procedures. However, follow-ups are important not only to assess the evolution of tissue loss but also to

raise awareness and empower adolescents. A charitable association<sup>1</sup>, such as AFDAS-TCA receive confidential calls from teenagers, with a dedicated telephone line, and provide all types of useful information to both professionals and patients.

## RESTORATIVE TREATMENTS

These treatments mainly concern direct restorations with composite resin<sup>11</sup>. In the case of active carious disease, glass ionomer cements may be recommended, with or without composite resins. The prognosis of these restorations is related to the control of etiological factors, the extent and number of restorations, as well as whether it is combined with attrition phenomenon. When a dentin–material interface

needs to be covered by an orthodontic device, a conventional glass ionomer cement seems preferable, whereas an enamel–material interface can be more securely protected with a composite resin. Of course, these are only transient restorations for orthodontic treatment. This approach is especially supported by the risk of degradation of the bonded joints in an aggressive oral environment<sup>7</sup>.

## SOME ADVICE FOR THE ORTHODONTIST

In the presence of erosive lesions, the causes should be investigated and the adolescent should be involved in a positive approach to functional and esthetic restoration, including orthodontic treatment and preservation of tooth enamel.

When an eating disorder with vomiting is diagnosed, the benefit/risk ratio must be seriously assessed. If the teenager is willing, it may be a good opportunity to improve self-image despite erosion

risks. In cases of bulimia nervosa and high carious risk, it is better to postpone treatment but not to reject the possibility.

Beware of the dry mouth associated with antidepressants, which always increases the erosive risk and carious risk simultaneously.

Finally, the use of glass ionomer cements to fix orthodontic braces is preferable to limit the risk of secondary caries in the presence of eating disorders.

## CONCLUSIONS

Dentists, and more particularly orthodontists, occupy a privileged place in the exchange with teenagers: regular appointments, medical context but evoking the esthetics of the smile, possibility of diagnosis of initial lesions related to the diet, and legitimacy of the discourse on eating habits. A targeted and attentive clinical

examination makes it possible to identify risky eating behaviors and to be sometimes at the origin of the diagnosis of anorexia nervosa; therefore, it forms the first step in appropriate medical management.

*Conflict of interest: The authors declare no conflicts of interest.*

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