

Patients with Eating Disorders in Dental Office

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Abstract : *Eating disorders such as anorexia mentalis and bulimia nervosa often have first manifestations in the oral cavity. They are mainly caused by the contact of hard dental tissues as well as soft tissues of the oral cavity with endogenous stomach acids. The most common dental manifestations in patients with eating disorders are numerous dental erosions, especially on the palatal surfaces of the upper anterior teeth and occlusal surfaces of the lower molars, enlargement and dysfunction of the salivary glands, hyposalivation or xerostomia, increased tooth decay, halitosis as well as damage of the oral mucosa. The dentist may be the first member of the medical team who can notice these changes and in time send the patient to the appropriate examination. The aim of the paper is to describe the most common dental symptoms in patients with eating disorders and summarize the most important knowledge about medical preventive measures.*

Keywords: *anorexia mentalis, bulimia nervosa, dental erosions, halitosis*

I. Introduction

The eating disorders include abnormal thinking and behavior towards food and own body [1]. Association for Eating Disorders defines these states as "external manifestation of a deep psychological and emotional chaos when an individual uses food to solve his problems" [2]. Thus, patients have a distorted body image and the belief that they are thick up obese [1]. These conditions include primarily anorexia mentalis and bulimia nervosa as well as so called paroxysmal psychogenic overeating and other atypical forms [3]. The eating disorders history goes back to antiquity. The first mention of these states comes from the 5th century BC, when Hippocrates described an eating disorder and named it after the term asithia [3]. The term anorexia (from the Greek "reduction or absence of any sense of appetite") was firstly used in the literature by Galen in the 2nd century AD. Since the 17th century, the term anorexia mentalis is fully used [3]. Mentions of bulimia manifestations (combination of Greek words "Bous" (ox) and "limos" (hunger) can be found at the time of ancient Rome, when the consumption of excessive amounts of food followed by vomiting was customary in the noble classes of society. In 1979, G. Russell first used the term bulimia nervosa. These conditions usually occur in young women and represent socio-cultural diseases of mental origin. It is reported that 8 million people suffer from eating disorders worldwide [1].

Anorexia mentalis is a serious disease of mental origin that consists in limiting or even complete rejection of food for fear of excess weight as well as a distorted perception of own body [1, 4]. Lifetime prevalence of these conditions according to various studies carried out in Europe and USA is 0.5 to 2.2 % for women [5, 6, 7, 8] and 0.3 % for men [9]. In doing so, men account for 10–15 % of all cases of anorexia mentalis [10]. Anorexia primarily affects young women in the age 12–30 in developed societies [1, 2]. Affected by so called cult of thinness young girls become "obsessed" with desire to have a slim figure and gradually reduce the food consumption to its complete rejection. Disease begins by innocent diet and increased physical activity, then there is a significant reduction in body weight (25%) and a serious health complications, such as loss of menstruation, the deceleration of pulse and respiration, reduced body temperature and blood pressure, formation of constipation and anemia, renal disorders, gastrointestinal complications, sexual dysfunction, etc. [1]. There are several etiologic factors of anorexia such as psychological (e.g. psychological trauma), social (influence of media, beauty ideal, the "cult of thinness" etc.), family (presence of eating disorders among family members, critical comments about food, weight and appearance, lack of care) as well as individual factors (disturbance of ego, fear of adulthood, early puberty, body image disorders, personality development, cognitive processes, prenatal trauma) [1].

Bulimia nervosa is the next most common type of eating disorders. It is a syndrome that is characterized by a strong sense of hunger and recurrent attack of overeating followed by vomiting or use of laxatives (due to fear of thickening) [1, 11]. From this disorder primarily suffer women in the age 15–25 years [1]. They are mostly intelligent, ambitious, successful and popular among other people. Patients with bulimia nervosa like patients with anorexia mentalis overly control their weight, but because of frequent episodes of binge eating their weight in contrast to anorexia mentalis is not significantly decreasing [1]. Bulimia can often follow the anorexia [1, 3]. The basic etiologic factors of bulimia are social (already mentioned "cult of

thinness”, beauty ideal, influence of the media, etc.), biological (genetic disposition, as the inheritance of certain traits of character: anxiety, sensitivity to stress, etc.), psychological (severe stress due to a serious life events), family (family crisis, a critical remark about weight and appearance, addiction or divorce of parents, poor eating habits) [1, 3]. Basic data regarding anorexia mentalis and bulimia nervosa are summarized in Table 1.

Table 1 Basic characteristics of patients with anorexia mentalis and bulimia nervosa [1, 2, 3]

Characteristics	Anorexia mentalis	Bulimia nervosa
Body weight	Low (less than 85 %)	Normal
Occurrence of amenorrhoea	60–100 % (depending on weight loss and hormonal substitution)	10–30 %
Occurrence of vomiting	15–30 %	75–90 %
Self-control	Increased	Decreased
Diet habits	Slow eating tempo, small mouthfuls, choosiness, small intake of liquids	Fast eating tempo, large mouthfuls, large intake of liquids
Age rate of disease occurrence	13–20 years, exceptionally later	14–30 years, exceptionally earlier
Prevalence of disease in risk group (women 15–30 let)	0.5–0.8 %	2.5–6 %
Ratio of disease prevalence in different genders- female:male	(10–15):1	20:1
Occurrence of depressions	10–60 %	20–90 %
Use of alcohol	Exceptionally	Often
Metabolism strangenesses	Low rate of metabolism	Imbalance of electrolytes
Motivation for treatment	Just by compulsion due to health problems or by relatives and friends	Effort to get rid of overeating, sometimes effort to slim down

Besides these characteristic symptoms anorexia mentalis and bulimia nervosa are also accompanied by oral symptoms. In particular, the specific manifestations in the oral cavity may encourage patients to visit the dentist, who can be the first specialist of the medical team, who can deduce the presence of eating disorder and timely send the patient to the appropriate special examination. Therefore, it is very important that every dentist can be able to recognize the oral manifestations of this serious disease.

The aim of the paper is to describe the most common oral manifestations in patients with eating disorders, detailed algorithm of stomatological examination, summarize the most important findings about possible ways of treatment of these oral manifestations as well as provide preventive recommendations appropriating for these patients group.

II. Oral manifestations of eating disorders

Manifestations in the oral cavity in some case for the first time bring the patients with eating disorders to the dentist's office. The most typical symptom is the dental erosion caused by frequent contact of the hard dental tissues with acidic contents of the stomach during the vomiting [2]. Erosive defects mainly attack the tooth surfaces that are in the largest contact with the gastric contents like palatal surfaces of the upper anterior teeth and occlusal surfaces of molars (Fig. 1, 2). Erosive defects occur after about 6 months of vomiting. Decisive factors are the frequency of vomiting and quality of oral hygiene [3]. Dental erosions in this case are characterized as irreversible progressive loss of enamel, in advanced stages also dentin, at the tooth surface due to a combination of chemical and mechanical damage caused by acid regurgitation (pH 3.8) coming into contact with the teeth during the episodes of vomiting and activated movements of the tongue and soft tissues of the oral cavity [2]. In the case, when the patient with eating disorder uses the traumatic toothbrushing technique, toothbrush with hard bristles or toothpaste with high content of abrasive particles, the erosive process is

associated with so called additional abrasive effect. In this case combined erosive-abrasive defects of hard dental tissues are occurred. Patients with eating disorders are characterized by either complete neglect of oral hygiene, or vice versa exaggerated care about their oral health [3]. Especially those of them who thoroughly clean the teeth immediately after vomiting to get rid of unpleasant feeling in the mouth, have the extensive loss of hard dental tissues contingent by mechanical removal of softened enamel after etching by acid stomach. Additional abrasive effect is also presented in patients with parafunctions (bruxism, bruxomania), piercing in orofacial area, living or working in a dusty environment, during the consumption of hard food or chronic traumatization (holding of various objects in the mouth, biting of threads or nails) [2]. Advanced stages of erosive defects are accompanied by violation of aesthetics and sensitivity of teeth, as well as other serious changes in the stomatognathic system (reduction of bite height, failure of the occlusal function, temporomandibular joint disorders etc.) that often bring patients to the dentist [2].



Figure 1 Erosive defects on palatal surfaces of upper frontal teeth and occlusal surfaces of upper premolars and molars in anorectic patient



Figure 2 Erosive defects of upper teeth in bulimic patient

Other factors causing frequent vomiting, which can lead to dental erosions, can be hyperemesis gravidarum, rumination, pathologies of the gastrointestinal tract (gastro-oesophageal reflux, hiatus hernia etc.), chronic alcoholism, cytostatic therapy, chemotherapy, uremia, exposure to acid environment in employment etc. [2, 3, 12]. The dentist and dental hygienist should therefore always correctly detect the cause of erosive changes of the patient's teeth. They can be the first who will suppose the presence of an eating disorder and send the patient to the appropriate examination and ensure the timely initiation of treatment.

Xerostomia is another common oral symptom of eating disorders. It can be caused by the use of antidepressants [3]. It was also found that the saliva of patients with eating disorders has a lower pH [13]. Xerostomia, particularly in combination with insufficient oral hygiene or malnutrition, can lead to numerous caries lesions, but this usually is not a typical symptom for the patients with eating disorders. The occurrence of

caries lesions, inter alia, depends on the presence of dental plaque, time of absence of minerals (calcium, phosphorus, fluoride) and vitamins in the diet, the frequency of fluoridation etc. [3].

Patients with eating disorders often have swelling and enlargement of the salivary glands, especially the parotid salivary glands that are swollen, painless on palpation. Swelling of the salivary glands is caused by the frequent invocation of vomiting and can lead to swelling of face (so called "squirrel face") [3].

Relatively often these patients have inflammatory changes or traumatic damage of oral and esophageal mucosa. Patients with frequent vomiting have both increased and bleeding interdental papilla. The causes of gingivitis are in particular chronic irritation of acidic gastric content, pharmacotherapy of eating disorders, which may cause xerostomia and increase of papillae, malhygiene or malnutrition (vitamin C deficiency) [3]. Traumatic damaging of oral mucosa is caused by use of a finger or a variety of subjects to induce the vomiting. Most often localization of this damaging is the soft palate, where the mucous membrane may be swollen, reddened or bruised. In the case when a patient suffering from eating disorder uses the fingers to induce the vomiting, specific changes in nails and skin of fingers (particularly on the forefinger and middle finger) can be observed. Patients may also have the impression of teeth on the dorsal surface of the hands. Serious complications of chronic irritation by acid stomach content are varicose veins, or even rupture of the esophagus [2, 3]. Like other oral symptoms multiple sores (due to deficiency of vitamin B) or glossitis (due to deficiency of iron and vitamin B12) may be presented [3].

Burning or sour taste in the mouth and halitosis are other frequent oral symptoms of eating disorders [3].

III. Stomatological examination of patients with eating disorders

Patients with eating disorders often visit dentist's office as the first medical facility, due to impaired aesthetics or increased tooth sensitivity as a result of large erosive defects of hard dental tissues [2]. Oral examination of patients with erosive lesions consists of several steps (Fig. 3). The basis is a detailed medical history, which may help uncover the cause of the lesion. For this purpose special questionnaires aimed to the habits in oral hygiene, a regular medication, possible risk factors in employment etc. can be used. It is also very important to receive the information about eating and drinking habits of the patient, which can be detected by monitoring the diet at least during four consecutive days [2]. The amount and time of food and drinks including food supplements consumption should be recorded. Dietary and drinking habits during weekdays and weekends which may differ significantly must be both monitored [2]. The dentist will evaluate the erosive potential of acidic foodstuffs and drinks as well as the frequency of their consumption during main meals and snacks, that will determine the total daily risk associated with the consumption of different foodstuffs and beverages. Patients with four or more consumptions of dietary acids (e.g. contained in fresh fruit and vegetables, fruit juices and teas, flavored mineral waters, carbonated beverages, etc.) have a higher risk of erosive wear [2].

After the history will follow extraoral and careful examination of the oral cavity using a dental mirror and a probe. During the intraoral examination the dentist will record the stage and localization of erosive defects and other typical changes in oral cavity. Dental erosion in patients with eating disorders primarily attacks palatal surfaces of the upper incisors and premolars, because they are not protected by tongue, buccal mucosa or lips and acidic stomach contents comes with them into direct contact. The erosive defects can be also observed on the occlusal surfaces of lower molars, where softened eroded hard dental tissues may be lost during mastication or brushing [14]. These typical lesions can help to the dentists to detect endogenous cause of dental erosion and consider, among other things, the possible presence of an eating disorder [2, 14].

Furthermore, it is advisable to carry out an examination of saliva like the detection of pH and buffering capacity as well as total amount of resting and stimulated saliva flow rate.

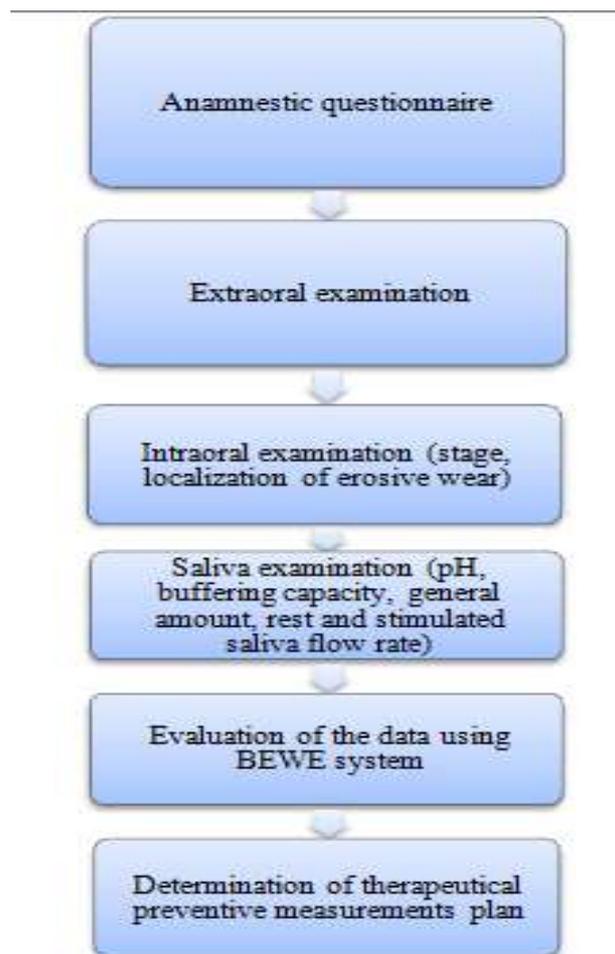


Figure 3 Algorithm of patient's examination with dental erosions [15]

IV. Stomatological care for patients with eating disorders

Main oral problem that must be solved in patients with eating disorders are the dental erosions and possible reduction of bite height. The treatment of erosive defects depends on their stage and other changes in the stomatognathic system. The general rule of therapy for all stages of dental erosion is the detection and elimination of causative factors. In the case of eating disorders an internal source of acids is presented and it is therefore necessary to establish cooperation with psychiatrists who treat the primary disease.

The treatment of erosive lesions is focused on acidic environment sources eliminating in the oral cavity, stopping of the lesions progression and reconstruction of existing defects. The incipient erosive lesions therapy including disabilities in enamel aims to prevent the development of functional and aesthetic problems. Application of remineralization means for strengthening of demineralized tissue structure is the most common way of these defects treatment. For these purposes the means with fluoride, calcium-sodium fosfosilicate, casein-phosphopeptide amorphous calcium phosphate (CPP-ACP) are mostly used. They can be applied both in the dental office and at home. In advanced stages of dental erosions there is usually the baring of dentin that causes its hypersensitivity, which may be influenced by application of different desensitizing agents for home or professional use [16]. Further minimal invasive method of dentin hypersensitivity treatment is the sealing of tooth surfaces using dentin sealants or adhesive systems. In more severe stages, which are usually accompanied by aesthetic or functional complications, the restorative treatment using composite materials is used [17, 18]. The composite filling in patients with dental erosions is generally indicated in the case of hard dental tissues loss to 2 mm in the vertical direction [2]. Larger loss of hard dental tissues (2–4 mm) is an indication for the reconstruction by indirect composite or ceramic inlays and onlays. In the case of huge defects, in which the hard dental tissues loss is more than 4 mm in the vertical direction, it is recommended to make the ceramic crown [2]. For the treatment of erosive defects of the upper teeth palatal surfaces caused by reflux or vomiting metal or composite veneer can be used [18]. In advanced stages of dental erosions it is often necessary to solve the issue of bite decrease. It is very important to plan the treatment. Before tooth crown reconstruction and prosthetic rehabilitation it is sometimes necessary to provide periodontal or endodontic treatment, surgical extension of

clinical crown, implementing and fixing of the root pin or orthodontic repositioning of teeth. In the case of extensive wear of antagonist teeth their possible wear by the materials that were used for the reconstruction of the teeth on the opposite jaw should be taken into account [18]. A detailed description of reconstructive measures in advanced erosive-abrasive defects exceeds the scope of the paper and requires a separate publication.

An important aspect of oral rehabilitation in patients with eating disorders affects the quality and quantity of saliva. For the prevention or treatment of hyposalivation it is recommended to use sugarless chewing gum containing non-cariogenic sweeteners (especially xylitol) and other active substances (e.g. CPP-ACP, fluoride, sodium bicarbonate, which increases the pH of stimulated saliva), dragee or candies increasing the saliva secretion, which do not have an acidic pH, or a mouthwashes with essential oils [18]. For xerostomia treatment cholinergic agonists (e.g. pilocarpine) are effective. To reduce the unpleasant feeling of dryness in the mouth and associated symptoms it is recommended the application of artificial saliva. These means contain various polymeric thickeners, such as cellulose and mucin. They are available in the form of sprays, gels, gargles or bonbons.

The most common ways of hard dental tissues protection against harmful effects of erosive substances are limiting of their impact on the teeth surface as well as increase of hard dental tissues resistance. Strengthening of dental enamel by various means of oral hygiene is one of the effective methods of protection against the erosive effects. A very important aspect is the protection of eroded tooth tissue further loss due to abrasive action of the soft tissues of the mouth and tongue, as well as during the toothbrushing when the abrasive effect of toothbrush and toothpaste is presented. It was proved that the toothbrushing by a toothbrush without toothpaste has no strong abrasive effect on hard dental tissues such as the toothbrushing with toothpaste [19, 20]. Therefore, the patients with dental erosions or an increased risk of their formation should use for daily dental care special means to support the structure of hard dental tissues and increase their resistance (e.g. with a fluoride or ions of polyvalent metals). Toothpastes for such patients should be friendly to the eroded hard dental tissues and should have low abrasiveness. An indicator of toothpaste abrasiveness degree is relative dentin abrasivity (RDA) [19, 21]. The toothpastes for patients with dental erosion should have a RDA value less than 70 [22].

For patients suffering from eating disorders and frequent vomiting it is recommended to apply the following preventive measures. It is advisable before the episode of vomiting to drink a glass of water to dilute the acid content of the stomach that allows its faster progress through the oral cavity and reduces its negative effects on hard dental tissues [14]. Immediately after vomiting the patients must be avoided toothbrushing, which can remove the surface layer of softened decalcified enamel, and instead this to rinse the mouth with water, milk or mouthwash containing fluoride or ions of polyvalent metals (Ti, Sn) as well as to remove the vomit residues from the tongue [2]. Some authors recommend to use after vomiting an individual occlusal splint with thickness 0.5 mm and to put into it the alkaline substances (magnesium hydroxide, sodium bicarbonate) which will neutralize gastric acids [18]. The splint can be also used for application of remineralization means to strengthen the structure of hard dental tissues [18].

In the treatment and prevention of oral manifestations of eating disorders it is important to keep in mind that the desired effect can be only achieved in cooperation with the patient, who is well motivated and interested in their general and oral health.

V. Conclusion

Eating disorder is a serious mental disease that requires early diagnosis and early treatment. The diseases, among others, have typical oral symptoms, such as severe erosive defects of hard dental tissues localized on palatal surfaces of maxillary anterior teeth that are caused by vomiting. Dental office is often considered as the first medical facility, where patients with eating disorders can ask for a help. The dentist or dental hygienist can thus be the first who expresses suspicion about the presence of systemic disease and in proper time sends the patient to a psychiatrist for diagnosis and initiation of treatment. Similarly, the psychiatrist should be aware of the possible occurrence of severe dental complications in patients with eating disorders and send them to a stomatological examination. Quality and complex therapy of these patients is only possible with interdisciplinary collaboration of psychiatrist and dentist.

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