THE DENTAL CLINICS OF NORTH AMERICA

Dent Clin N Am 47 (2003) 395–410

# Recognition and management of eating disorders in the dental office

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More than 5 million Americans suffer from eating disorders. It is estimated that 5% of female and 1% of male Americans have anorexia nervosa (AN), bulimia nervosa (BN), or binge eating disorder (BED) [1]. Considering that women and men are often secretive about their eating disorders, existing epidemiologic studies may underestimate the true prevalence of AN, BN, and BED. An individual of any race, age, sex, or social status may develop an eating disorder. These disorders are more prevalent in industrialized societies than in developing countries. Unhealthy dieting behaviors may be more common among women and girls of higher socioeconomic status; however, based on a health survey of 17,571 United States adolescent girls, socioeconomic status does not appear to be a significant factor among those who meet the psychiatric criteria for an eating disorder [2]. Eating disorders are more frequent among Native Americans, equally common among Hispanic and white women, and less common among black and Asian women [3]. Young people involved in occupations or activities that stress body size are at greater risk for developing eating disorders than their peers. These occupations include athletes, models, culinary professionals, and performers.

Abnormal eating patterns and cognitive distortions related to food and body weight are central issues of all individuals with eating disorders. Many women base their self-esteem on physical appearance. Sociocultural pressures on women to be thin lead some to adopt extreme weight-loss measures that become a serious threat to their physical well-being. With women's actual body weight increasing, it is questionable whether most women can achieve Western society's idealized anorexic body form that includes narrow hips and thin thighs [4]. About 85% of disordered eating originates during adolescence [1].

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doi:10.1016/S0011-8532(02)00108-8

AN and BN are highly complex psychiatric disorders with separate, distinct etiologies that exist along a continuum. At one end of the spectrum are those persons with AN that achieve drastic weight loss by self-starvation. In the center are those with AN who binge on occasion but maintain a much lower than normal body weight and at the other end of the continuum are normal-body-weight persons with BN who binge and purge but are not significantly underweight. Common characteristics include overconcern with body shape and size and ritualistic patterns around food [5]; however, medical, dental, and nutrition concerns and therapy often are quite different.

Although there is no single cause of eating disorders, the most common behavior that precedes AN, BN, or BED is dieting [6]. Multiple interacting factors determine one's vulnerability to developing eating disorders. Genetic predisposition, an unidentified physiologic factor, distorted body image, family dysfunction, and societal pressures are all involved [7,8]. Although food may appear to be the central issue, it is not. Disordered eating evolves as a means to gain self-esteem, to ease unrealistic expectations of achievement, and to win control, approval, and respect from family and friends. A high number of eating disorder patients will have life-long problems with food fears and practice irrational dieting.

Although eating disorders occur mainly in women, a small number of men are affected. The ratio of men to women with a formal diagnosis of AN or BN is 1:10; men represent 5% to 10% of all patients with eating disorders [9]. Although most characteristics of men and women with eating disorders are similar, sexual orientation differs. Homosexuality and bisexuality in bulimic men and asexuality in anorexic men are more common in those with disordered eating [10]. Higher rates of major depression, substance abuse, anxiety disorders, and personality disorders were found among men. The male bulimic is often obese before the onset of an eating disorder. Body mass index, percent body fat, and height-to-weight ratios are more useful in determining whether the male teenager is malnourished than the diagnostic criteria for AN that the person be less than the 85th percentile of ideal body weight [11].

In the past decade, the rates of AN have increased among 10-year-old to 19-year-old girls [12]. Preadolescent girls (grades 4–6) have reported being dissatisfied with their bodies and were dieting to become slim [12,13]. Unhealthy dieting practices during the period of rapid growth may compromise nutrient intake needed for growth. Growth may be stunted and sexual maturation arrested. Body dissatisfaction and dieting among children are strong predictors of future eating disorders. Dental professionals should be cognizant of a child's disparaging comments about their body size. Frequent contact with patients allows the dentist to develop the rapport required to discuss symptoms of disordered eating with young patients.

Extreme exercise may precipitate an eating disorder. Athletes in sports where appearance is important (gymnastics, ballet, ice skating, swimming,

and diving) and sports with a weight criteria (crew and wrestling) are more prone to developing AN or BN [14]. Competitive athletes who diet at an early age are at greater risk of early onset of eating disorders [15]. Athletes and coaches do not see dietary restraint as problematic; however, nutritional status and athletic performance is compromised and risk of injury is increased when eating is restricted. Decreased strength, endurance, speed, and coordination have been observed in athletes with disordered eating [14].

Women with diabetes mellitus who are urged to control weight have a greater frequency of disturbed eating behavior [16]. In a long-term study of young women with type 2 diabetes mellitus, the incidence of eating disorders was 6.5% to 9.0% [17]. Greater psychopathology is seen in diabetic patients with eating disorders compared with diabetic patients without disordered eating. Diabetic youth may overdose on insulin to lose weight.

Although health professionals are aware of restrained eating, bingeing, and self-induced vomiting among young women, early diagnosis of eating disorders often does not occur. The purpose of this article is to inform dental clinicians of the currently recognized psychologic and physical symptoms of disordered eating. Oral manifestations of AN and BN and preventive dental strategies are described.

## Anorexia nervosa

AN, less common than BN, affects from 0.5% to 1% of teens and women [1]. AN typically occurs shortly after puberty. Among Minnesota women, more than half who were studied developed their disorder before age 20 years [12]. Its primary characteristic is voluntary starvation; the daily caloric intake may average 500 to 1000 kilocalories [18]. Anorexics may lose 25% or more of their body weight [4]. The American Psychiatric Association clinical diagnoses are based on physiologic, psychologic, and behavioral characteristics [1].

There are four diagnostic criteria for AN [1]:

- A major medical symptom of AN is refusal to maintain a body weight equal to or greater than 85% of that expected for the patient's age and height.
- An intense fear of gaining weight or becoming fat exists, even though they are underweight.
- A distorted view of one's body weight, size, or shape exists; the emaciated anorexic feels fat.
- In postmenarcheal women and girls, the absence of at least three consecutive menstrual cycles must occur.

There are two subcategories of AN. During episodes of AN, about one half of patients regularly engage in binge eating and purging behavior [7], whereas others with AN solely restrict food intake. Among young women,

the mortality rate for AN is thought to be higher than for any other psychiatric disorder. Specific causes of death include cardiac arrest and multiorgan failure due to starvation, dehydration, and electrolyte imbalance, and suicide due to severe depression [19]. Self-starvers believe that they will be happy and successful if they can obtain a perfect body. Symptoms of depression and anxiety are common in AN and may be related to the person's malnourished status. Persons with AN are perfectionists and overachievers but feel ineffective. Limiting food intake and weight loss gives the person with AN a feeling of being in control. Exercise is used by three fourths of those with AN to prevent weight gain [5].

Physical symptoms of AN are an emaciated appearance (body mass index $<17.5$), lanugo hair covering the face and trunk, low heart rate, low blood pressure, cyanosis of the hands and feet, hypothermia, amenorrhea, and loss of heart and brain tissue [19]. Osteopenia is a serious medical complication in most women with AN that is only partially reversible. Interruption of normal bone accretion and failure to achieve a high peak bone mass occurs in the anorexic teen. Premature osteoporosis has been reported in those with long-term AN. In a study of 130 women with AN, osteopenia was present in 92% of patients at one or more skeletal sites and osteoporosis was detected in 38% of patients [20]. In older women with systemic osteoporosis, the maxilla and mandible appear to be more susceptible to resorption [21]. In anorexic patients, current body weight was the most consistent predictor of bone mineral density at several skeletal sites. This fact suggests that undernutrition may have a primary role in AN-related bone loss. Increasing body weight is the primary goal of medical therapy. The main peril for anorexic patients is vertebral compression fractures precipitated by reduced bone mass. When normal weight is restored, bone density may be improved [22]. Providing exogenous estrogen has no established effect on preserving bone mass in those with AN [20,23].

Low calcium intake is common in young women with AN. Although use of calcium and vitamin D supplements has not been correlated with increased bone density, adequate calcium intake (1300 mg for teens or 1000 mg after 19 years of age and 200 IU of vitamin D per day) should be encouraged [19,24]. To prevent permanent damage to body organs, early detection of AN and aggressive treatment are essential. Anorexic patients often reject medical, psychologic, and nutritional intervention. A 40% recovery rate has been reported for anorexic patients followed for 10 years and bulimic patients followed for 6 years [25,26].

## Bulimia nervosa

BN is found in 1% to 3% of the population and occurs most often in teenage and young adult women, but BN has been reported in men and women over 30 years [1]. A higher number of women, especially college

coeds, participate in the bulimic behaviors of bingeing and purging for weight control but do not meet the diagnostic criteria. Detection of BN is more difficult because afflicted persons are often of normal or near normal weight and are secretive about their disorder. BN is characterized by a chaotic eating pattern: purging follows frequent episodes of binge eating. During a binge, 10,000 kilocalories may be consumed [27]. Purging, engaged in by 80% to 90% of persons with BN, involves self-induced vomiting with or without the aid of the emetic ipecac [5]. The person initiates self-induced vomiting by placing a finger or other object such as a pencil or comb distally against the tongue to trigger the gag reflex. Calluses may be seen on the fingers [28]. Abusing laxatives and/or diuretics, enemas, vigorous compulsive exercise, and/or fasting are other means employed to prevent weight gain. Although the emphasis is placed on the binge/purge behavior, most of the time, those with BN are restricting their diets [11].

The American Psychiatric Association diagnostic criteria for BN [1] include:

- Eating an unusually large amount of food in a discrete time period (within 2 hours).
- A perceived lack of control over eating during an episode.
- Compensatory behavior to rid the body of excess calories and prevent weight gain.
- Binge eating and compensatory behaviors that occur at least twice a week for 3 months.
- A persistent concern with body shape and size.

Medical consequences of vomiting and abusing laxatives and diuretics include a sore throat, esophageal tears, dehydration, electrolyte imbalance that may lead to irregular heartbeat or cardiac arrest, and damage to the liver, bowels, and kidney [29]. Substance abuse or dependency is more common among those with BN than those with restricting AN. Food deprivation may be associated with the high rate of drug use by bulimic women. A history of abusing alcohol, cocaine, marijuana, over-the-counter pills, amphetamines, and tobacco is reported in persons with BN; smoking is twice as common in BN as the general population [30]. Cigarettes are used to depress appetite and to maintain a reduced weight. Food deprivation is thought to increase the desire for alcohol. Alcohol stimulates appetite and leads to bingeing. Thirty percent of persons with BN will have a lifetime history of substance abuse.

Persons with BN eat compulsively to escape painful events in their lives. The overeating or bingeing is accompanied by feelings of guilt, shame, and loss of control over food intake. Mood and anxiety disorders such as depression and obsessive-compulsive disorder are common in those with BN [31]. Substance abuse, bipolar disorder, and personality disorders are also reported [7]. Persons with BN are concerned about their behavior and are more apt to seek therapy than those with AN.

## Eating disorders not otherwise specified

BED falls into the classification of "eating disorders not otherwise specified." Patients in this category account for 1% to 2% of the general population and 50% of those with eating disorders [1]. Mild and moderate psychologic distress is associated with unhealthful weight-control practices, binge eating, and a slightly higher calorie intake. Among persons seeking treatment for weight control, the incidence of binge eating is much higher than the general population [32]. Boys and men represent 40% of the cases of BED [1]. There is a strong association between BED and mood disorders. In a nationally representative sample of the United States adult population, modest symptoms of depression, anxiety, and psychologic distress were strongly associated with unhealthful weight-control practices and binge eating [33].

Diagnostic criteria for BED [1] include the following:

- A larger than normal volume of food is eaten within a 2-hour time period.
- The person feels they cannot stop eating or control how much is eaten.
- Three of the following occur during a binge-eating episode:
  - Eating much faster than normal
  - Eating until feeling uncomfortably full
  - Eating large quantities of food when not feeling hungry
  - Eating alone out of embarrassment
  - Feeling disgusted, depressed, or guilty about overeating

Most persons with BED are overweight and have related chronic diseases such as diabetes, hypertension, heart disease, high blood cholesterol, gall bladder disease, or certain cancers. When left untreated, patients with BED often develop AN or BN [11].

## Oral manifestations

### *Erosion*

Dental providers who are aware of the oral changes associated with eating disorders may be able to make an early diagnosis (Box 1). An early diagnosis is critical because the oral effects of eating disorders may be irreversible. The most visible oral symptom of an eating disorder is perimolysis or enamel erosion of the maxillary anterior teeth [4,34,35]. Erosion may be detectable within 6 months after the onset of vomiting [34]. When vomiting occurs, the lingual surfaces of the maxillary central and lateral incisors are covered with hydrochloric acid from the stomach. In one study, the pH of vomitus ranged between 2.9 and 5.0, with a mean of 3.8 [36]. The critical pH for enamel demineralization to occur is 5.5. A linear relationship between the number of eroded tooth surfaces and the frequency or duration of vomiting has not been shown [13].

**Box 1. Oral symptoms of chronic vomiting associated with eating disorders**

Erosion of lingual surfaces of maxillary anterior teeth
Erosion of occlusal surfaces—loss of cusps or smooth rounded surfaces
Translucent, glassy-appearing maxillary incisors
Raised amalgam restorations with erosion of surrounding tooth structure
Anterior open bite; loss of vertical dimension
Loss of vertical dimension of occlusion
Dentin sensitivity to air, touch, hot, and cold beverages/foods
Dry mouth
Redness of pharynx and soft palate
Enlarged parotid glands—soft, noninflamed, no pain when palpated

When making a differential diagnosis, other intrinsic and extrinsic causes of tooth erosion must be eliminated. Intrinsic factors to consider include gastroesophageal reflux, rumination, gastric ulcers, diabetes, nervous system disorders, and vomiting associated with pregnancy or alcohol abuse [37]. Extrinsic causes of erosion that must be excluded include swimming in highly chlorinated water, chewing vitamin C tablets, pouching of lemons or other citrus fruit between the cheek and buccal tooth surfaces, sucking lemon drops, and frequent intake of highly acidic fruit drinks [38]. It is common for persons with eating disorders to consume large volumes of acidic beverages. In patients with no history of vomiting, a major cause of tooth surface loss may be a high intake of low-pH carbonated beverages [37]. Sport drinks, with a pH range of 2.4 to 4.5, have the potential to cause erosive tooth wear [39]. When food intake was recorded for a small group of persons with BN living in an inpatient unit, the average daily consumption of diet soda was 3.2 L [27]. Dietary sources of acid usually cause erosion of the facial surfaces of teeth; however, the location of the erosion does not always predict the cause [40].

The anterior maxillary teeth usually incur the most erosion and the mandibular anterior teeth the least because the tongue protects the lower teeth from vomitus (Fig. 1). The eroded areas appear smooth and glassy. Erosion of the lower molars may cause loss of occlusal anatomy and cupping of the cusps (Fig. 2). With significant enamel erosion, restoration margins protrude above the occlusal surface of the tooth, forming islands of amalgam (Fig. 3). Composite restorations may fail due to loss of marginal integrity [41]. Further chronic purging results in thinning of the incisal edges

Fig. 1. Severe erosion of the maxillary anterior teeth of a 38-year-old bulimic patient.

of the maxillary anterior teeth and the enamel becomes translucent adjacent to the incisal edges [41]. Eventually, this translucency extends into the body of the tooth [42]. Loss of tooth structure weakens the incisal edges, resulting in chipping and fracturing of the teeth. Loss of the incisal edges of the anterior teeth may result in an anterior open bite [43]. When the patient bites, the front teeth no longer meet.

Toothbrush abrasion may result from vigorous horizontal brushing; however, in one study, toothbrushing practices of persons with and without severe enamel erosion did not appear to differ [36].

Dentists may misdiagnose an eating disorder if extensive erosion is not present. Other oral symptoms to look for include recent dental caries, dentin hypersensitivity, dry mouth, enlarged parotids, and an anterior open bite.

*Dental caries*

Patients who binge on sweet foods are at increased risk for dental decay. Variable caries rates have been reported in eating disorder patients, which suggests that risk for caries is highly individual. When standard dental indices (decayed, missing and filled teeth [DMFT] or decayed, missing and filled tooth surfaces [DMFS]) were used to measure caries prevalence, some investigators found a low caries rate in bulimic patients [44,45]. More recently, higher lactobacillus and streptococci counts and DMFS scores were reported in eating disorder patients [46,47]. Pit and fissure caries occur

Fig. 2. Severe cupping out of occlusal surfaces of molars due to erosion in a 40-year-old bulimic patient.

Fig. 3. Erosion of enamel of occlusal and lingual surfaces around the raised amalgam restorations in a 40-year-old bulimic patient.

more frequently, but smooth surface caries are found where enamel decalcification exists [34]. Patients' awareness of the potential damage that sugars can cause to eroded dental enamel may motivate them to alter their snacking practices. A high caries experience is more likely when oral hygiene is poor and xerostomia exists. The depressed anorexic that neglects body hygiene may be at higher risk for caries.

*Dentin hypersensitivity*

Dentin hypersensitivity often causes the eating disorder patient to seek treatment in the dental office. Severe enamel erosion results in exposed dentin. The patient may be unable to tolerate small changes in temperature or touching the affected tooth with a toothbrush. Eating, drinking, and toothbrushing become painful [47]. The treatment of hypersensitivity is paramount for persons with BN. The effectiveness of desensitizing agents in persons with active BN has not been reported [34].

*Xerostomia*

Adequate saliva flow is important to maintain the oral tissues. Eating disorder patients often report dry mouth or xerostomia [47]. Saliva plays a protective role by lubricating the oral mucosa, which is critical in chewing, in formation of a food bolus, and in swallowing. Protective immunoglobulins are found in saliva, and the buffering ions (bicarbonate, phosphate, and urea) found in saliva neutralize the gastric acids. Unstimulated salivary flow rates are lower in bulimic subjects than in healthy control subjects, but stimulated saliva flow rates are normal [47,48]. No significant difference in the concentration of potassium, chloride, calcium, urea nitrogen, or albumin was found between control and bulimic subjects. Factors that may contribute to xerostomia in eating disorder patients include persistent vomiting, depression, use of antidepressants or other psychoactive medications, and misuse of appetite suppressants and diuretics. To reduce the dehydration associated with repeated vomiting, bulimic patients may consume large volumes of acidic diet soft drinks.

*Salivary gland hypertrophy*

Intermittent enlargement of one or both parotid glands and occasionally the submandibular glands has been reported in some but not all bulimic patients (Fig. 4) [49]. Unilateral or bilateral parotid gland swelling has been estimated to occur in 10% to 50% of patients who binge eat and purge [49,50]. Enlargement usually occurs 2 to 6 days after purging [48]. The degree of enlargement is directly proportional to the frequency of vomiting. The swollen parotid is soft to palpation and generally painless; the parotid ducts are patent and the orifices are not inflamed. The enlarged glands may give the jaw a square looking appearance; this cosmetic change in appearance is distressing to the patient. Biopsy of the parotids reveals normal tissue. No treatment is available for the gland swelling except to recommend good eating habits and cessation of self-induced vomiting.

*Periodontal disease*

The periodontal status of eating disorder patients is similar to their healthy peers. Bulimic and control groups had similar mean scores on the gingival index and plaque index. No significant difference in gingival bleeding, inflammation, or active periodontal disease scores was observed between bulimic and age-matched control groups [44,45,51]. Anorexic patients who are depressed or apathetic would be more likely to have poor oral hygiene practices and, therefore, be at greater risk of periodontal disease.

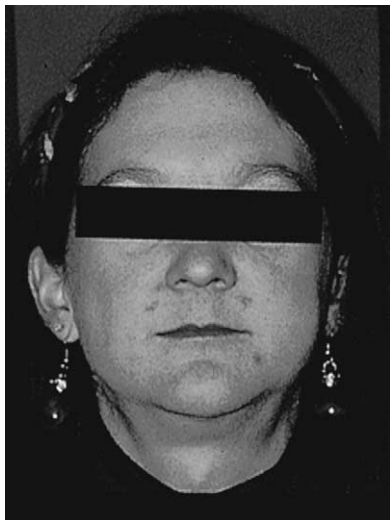

Fig. 4. Bilateral enlarged parotid glands in a 28-year-old anorexic patient. (*From* Hazelton LR, Faine MP. Diagnosis and dental management of eating disorder patients. Int J Prosthet 1996;9:65–73; with permission.)

*Soft tissue lesions*

Cheilosis (dry, cracking lips) may result from dehydration of the oral membranes or a deficiency of the vitamin B complex. The acid pH of the saliva may be a local irritant. Redness of the oral mucosa may result from chronic irritation of the tissues by the acidic gastric contents. Soreness and erythema of the pharynx and palate results from trauma associated with use of a finger, comb, or toothbrush handle to induce vomiting.

## Preventive dental treatment

Because of the complex psychosocial, medical, nutritional, and dental–related issues associated with eating disorders, an interdisciplinary team is needed to successfully manage an individual's care. The dentist may be the first health professional to see an eating disorder patient. Long delays between the onset of symptoms and initiation of treatment are common [19]. Patients identified in dental clinics are often younger than those diagnosed in eating disorder clinics [4]. Early diagnosis is more apt to result in a favorable prognosis. The dentist may play a key role in referring a patient to a physician, psychotherapist, and nutritionist [28]. It is important that referrals be made to caregivers who are skilled in working with eating disorder patients. For those who cannot afford private care, community mental health clinics may provide treatment.

Eating disorder patients have low self-esteem and seek approval from others. A nonthreatening, nonconfrontational approach by the dental clinician will help gain the patient's confidence [35]. Even though the dental provider can detect enamel erosion, the patient may deny vomiting during early office visits. Two questions that have high sensitivity and specificity for diagnosing BN and AN can be included in the health history form and may help the clinician identify persons with BN and AN [52]. The questions "Are you satisfied with your eating pattern?" and "Do you ever eat in secret?" require a yes or no response.

There is evidence that treatment programs that include nutrition counseling are more effective than those that do not [53]. Nutrition counseling will aid the dentist in reducing the behaviors related to eating disorders. The patient must understand that dieting and recovery from an eating disorder are incompatible. When the patient consumes too few calories, there are constant feelings of hunger and frequent urges to binge. The dietitian develops an eating plan with the patient aimed at normalizing eating patterns. The nutrition professional helps the patient to understand the nutritional needs and how to make healthy food choices [11]. The importance of calcium to achieve peak bone mass and food sources of calcium can be identified. The harmful effects of frequent intake of retentive sweet foods on teeth can be explained. Acceptable snack alternatives to high-acid beverages and sticky fermentable carbohydrates are determined. The risk of an eating

disorder progressing is greater when dieting by athletes is unsupervised. Healthy exercise patterns can be encouraged for pleasure and to promote fitness instead of as a means to achieve weight loss.

A conservative approach to dental treatment of eating disorder patients is recommended. A comprehensive treatment plan should include measures to relieve pain, patient education, preventive therapy, and sequencing of the restorative care that is predicated on cessation of vomiting (Box 2). The patient will gain confidence in the dentist when pain is relieved, temporary restorations are placed, dentin sensitivity is reduced, and facial appearance improves. Persons who vomit frequently are often unaware that dental erosion has occurred. When patients understand the relationship of vomiting to dental erosion, they may become more motivated to reduce the vomiting behavior. Relapse is common during recovery. The timing of restorative care is controversial. If vomiting continues, there is a high risk that restorations will fail. Comprehensive restoration of the mouth is best delayed until the patient's psychologic status has improved and, ideally, vomiting behavior has ceased [54,55].

The following are objectives for a dental prevention program for eating disorder patients [56]:

1. Reduce the frequency of acid exposure on the teeth.
2. Enhance salivary flow.
3. Neutralize acids in the mouth.
4. Increase resistance of enamel to demineralization.
5. Minimize abrasive oral hygiene measures.
6. Protect early enamel lesions from further erosion.

An immediate goal that can be attempted in collaboration with the patient's psychotherapist is to eliminate bathing the teeth in gastric acids. To determine whether vomiting has been curtailed, erosion can be monitored. Comparing the current clinical state of the teeth with initial study models

**Box 2. Preventive dental treatment for eating disorder patients**

Prescribe daily fluoride rinse.
Provide custom trays for home application of fluoride gel.
Recommend using an alkaline mouth rinse ($NaHCO_3$) after vomiting.
Instruct patient to use soft toothbrush, circular brushing, and floss daily.
Recommend cheese, nuts, whole fruits, and vegetables for snacks.
Suggest sugar-free mints, paraffin wax, and chewing gum to stimulate saliva.
Place temporary restorations.

will indicate whether further tooth surface has been lost. Acid drinks and sodas should be consumed through a straw. Substituting sparkling waters for high-acid fruit juices or low-pH carbonated beverages can be recommended. Increasing saliva flow will increase the patient's comfort and provide the alkaline environment for remineralizing dental enamel. Salivary flow is stimulated by the use of sugar-free gum or chewing paraffin wax. Patients can be advised to carry a sport bottle filled with water with them during the day to lubricate oral tissues. If drugs used by the patient cause xerostomia, consultation with the patient's physician may result in an alternative drug being prescribed.

Rinsing after vomiting is recommended to neutralize acids and raise the pH in the mouth. Sodium bicarbonate in water or magnesium hydroxide solution, liquid sugar-free antacids, water, or milk are recommended mouth rinses. Fluoride is the other mineral that can aid in repairing demineralized enamel. Daily rinses with 0.5% sodium fluoride and a 1.1% neutral fluoride gel used in custom trays will promote remineralization and, therefore, should be part of the home oral hygiene regime. Placement of sealants and use of sodium fluoride varnish on early erosive lesions are being studied [56].

Because of the concern about physical appearance, patients will be compliant with oral hygiene instructions. In fact, they may be compulsive about toothbrushing. Although opinion differs among researchers, most believe that toothbrushing after vomiting should be avoided because the softened deminerialized enamel is more susceptible to toothbrush abrasion [36,56,57]. A soft toothbrush and a fluoridated nonabrasive dentifrice should be used for brushing. The patient needs to clearly understand that gentle circular toothbrushing rather than horizontal brushing will prevent abrasion of the enamel. The appropriate length of time to wait before brushing is unknown.

Many individuals do not understand the increased caries risk associated with frequent eating. Snacks should be limited to once between meals or three times a day. Education about the role of sweets and cooked sugar-starch combinations—cake, cookies, candy, pastries, breads, snack chips, and crackers—in tooth decay and the erosive effects of citrus fruits and juices and low-pH carbonated beverages should be provided [58]. Snack foods of low cariogenicity include nuts, cheeses, whole grain products, vegetables, popcorn, and raw whole fruits.

## Summary

Extensive damage to the teeth may result from self-induced vomiting. Recognition of the oral signs of eating disorders is a responsibility of dental care providers. Young women with BN and AN may seek dental care before seeking medical treatment because they are concerned about their appearance. Early identification of oral changes by the dental practitioner and referral to medical and psychiatric therapists can reduce the risk of

further physical damage to the body or greater loss of tooth surface enamel. Home care instructions will be followed when the reasons for timing of toothbrushing, rinsing after vomiting, and use of fluoride are explained. Careful selection of beverages and snacks will help reduce the risk of further erosion and dental caries. Comprehensive dental procedures should not be undertaken until significant improvement in vomiting behavior or complete recovery has occurred.

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