

## Eating Disorders Part I: Psychiatric Diagnosis and Dental Implications

Ana Cecília Corrêa Aranha, DDS, MSc, PhD;  
Carlos de Paula Eduardo, DDS, MSc, PhD;  
Táki Athanassios Cordás, MD, PhD



**Aim:** The aim of this article is to present a review of the literature on eating disorders and related oral implications in order to provide oral healthcare professionals and psychiatrists with information that will enable them to recognize and diagnose these disorders and render appropriate treatment.

**Methods and Materials:** A comprehensive review of the literature was conducted with special emphasis on the oral implications of anorexia nervosa and bulimia nervosa.

**Results:** Currently, available knowledge that correlates eating disorders with dental implications is supported by data derived from well-conducted psychiatric and psychological literature. However, little is known about the aspects of oral medicine concerned with the subject. Dental erosion, xerostomia, enlargement of the parotid gland, and other dental implications might be present in individuals with eating disorders.

**Conclusions:** Eating disorders are a serious concern with regard to the oral health of patients. They represent a clinical challenge to dental professionals because of their unique psychological, medical, nutritional, and dental patterns as well as their unique characteristics. However, there is a general lack of awareness of the fundamental importance of the dentist's role in the multidisciplinary treatment of affected patients.

© Seer Publishing

**Clinical Significance:** The failure of oral healthcare professionals to recognize dental characteristics of eating disorders may lead to serious systemic problems in addition to progressive and irreversible damage to the hard tissues. Considering the increasing incidence and prevalence rates of eating disorders the participation of oral healthcare professionals in a multidisciplinary team to provide care for affected patients rises to greater importance.

**Keywords:** Eating disorders, bulimia nervosa, anorexia nervosa, oral implications

**Citation:** Aranha ACC, Eduardo CP, Cordás TA. Eating Disorders Part I: Psychiatric Diagnosis and Dental Implications. J Contemp Dent Pract 2008 September; (9)6:073-081.

## Introduction

Anorexia nervosa and bulimia nervosa are eating disorders of increasing magnitude, incidence, and prevalence causing concern to healthcare professionals. These eating disorders can cause psychological and social harm, apart from the remarkable and significant levels of morbidity and mortality.<sup>1</sup> Both anorexia nervosa and bulimia nervosa are diseases characterized by perturbed eating behavior patterns, a pathological control of body weight, and disturbance in the perception of the body shape. The cause of these eating disorders is unknown, however, genetic, cultural and psychiatric factors appear to play a role in their etiology.<sup>1</sup>



Over the last few decades increasing interest because of its epidemiological and clinical importance has led to discussion of diagnostic criteria for these serious disorders. Because eating disorders are a complex issue a multidisciplinary team approach to treatment involves psychiatrists, psychologists, and nutritionists. Therapy is based on the treatment of psychiatric comorbidities, family care, and treatment of clinical complications.

The success of a complete and integrated program depends on this multidisciplinary team and the use of multiple strategies.

Since 1990, a number of articles have been published in the psychiatric and psychologist literature correlating eating disorders with oral health, however, most of this research has been conducted by medical personnel and published in the medical literature.<sup>1-12</sup> Dentists continue to face challenges associated with the accurate diagnosis and treatment of the oral consequences of the types of eating disorders such as dental erosion, xerostomia, enlargement of the parotid glands, and other oral manifestations that can appear in affected individuals.<sup>1,7,5,10,12</sup> This is the reason participation of a dentist in the treatment of eating disorders is fundamental. Dental treatment should promote oral health, the recovery of masticatory function, and the esthetic characteristics of the dentition.

Dentists see their patients at frequent intervals and may be the healthcare professionals to identify the clinical symptoms suggestive of restrictive behavior, self-induced purging, and may be the professional with whom patients feel comfortable discussing their eating disorders.<sup>1</sup> Early recognition of an eating disorder can result in a more favorable prognosis.<sup>6</sup> Dentists can facilitate a favorable multidisciplinary therapeutic outcome of these patients by knowing the cause, symptoms, and manifestations of eating disorders and making critical referral of these patients to appropriate medical colleagues for treatment.

Because little information is available on the impact of these disorders on other aspects of

oral health, the primary purpose of this review is to provide dentists and psychiatrists with valuable information to enable them to recognize, diagnose, and institute dental treatment in patients with eating disorders.

### Anorexia Nervosa

Anorexia nervosa is characterized by intentional loss of weight due to an extreme aversion to food, strict diet in an unchecked pursuit of slenderness, obsessive fear of getting fat, a grossly distorted self-image of the body, and alterations in the menstrual cycle.<sup>14</sup> Disorders associated with eating were described as early as 1689 when the first medical case of anorexia nervosa was published.<sup>13</sup>



According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), four diagnostic criteria must be present to establish a diagnosis of anorexia nervosa:<sup>15</sup>

1. Refusal to maintain body weight at or above a minimally normal weight for age and height. Underweight is generally defined as weight less than 85% of that considered normal.
2. Intense fear of gaining weight or becoming fat.
3. Distorted perception of body weight or shape. Some patients, whose self-esteem depends on their weight and body shape, perceive themselves as overweight.
4. Absence of at least three consecutive menstrual cycles in post-menarchal women caused by abnormally low levels of estrogen.

Since the 1980's the DSM-IV defines two subtypes of anorexia nervosa based on the presence or

absence of regular binge eating or purging.<sup>15</sup> In restrictive anorexia nervosa weight loss occurs primarily through caloric restriction and excessive exercise. The binge eating/purging type is characterized by regular binge eating and purging behavior. Some individuals with this subtype of anorexia do not binge eat but do purge after consumption of even small quantities of food.

### Prevalence of Anorexia Nervosa

Studies of large populations of patients with anorexia nervosa report the mean age of onset is between 17.1 and 20.8 years.<sup>17,18</sup> Most anorexics (90% to 95%) are young (under 25 years), affluent white woman of at least normal intelligence.<sup>19</sup> Fifty-three percent of anorexics engage in restrictive constant fasting, and 47% in binge eating and purging.<sup>20</sup>

In 1996, 40% of African-American girls interviewed considered themselves to be attractive or very attractive compared with only 9.1% of Caucasian girls in a survey of more than 150 adolescents aged 11 to 17 years, thus, showing increasing prevalence in the Caucasian population.<sup>21</sup> Nielsen,<sup>22</sup> in an extensive literature review of epidemiological studies, estimated the incidence of anorexia nervosa is approximately 8 per 100,000 individuals among women, and in men it would be less than 0.5 per 100,000 individuals per annum in a paired population.

Cultural issues are important in the etiology and prevalence studies of eating disorders.<sup>23</sup> The quest for health and slimness is a powerful force in modern society and may reinforce the fear of fatness in patients with an eating disorder. Modeling, athletics, ballet dancing, and other hobbies and occupations emphasizing body shape, weight, and appearance appear to play a role in eating disorders.<sup>1</sup> Studies have shown eating disorders to be "Western" diseases, occurring more frequently in industrialized and developed countries, but an increase in their occurrence is documented in countries where these diseases had been rare, probably due to cultural influences.<sup>24</sup> According to Stice<sup>24</sup> there is evidence supporting the opinion media in Western cultures promote disturbances of body image and eating, thus, increasing the risks for the occurrence of eating disorders.

## Bulimia Nervosa

Bulimia nervosa is an eating disorder characterized by binge eating and purging behaviors. Individuals with this disorder consume large quantities of food in short periods of time and then they purge through self-induced vomiting.



The description of bulimia nervosa was documented by Gerald Russel in London in 1979 from the description of patients with normal weight and a fear of getting fat, who had episodes of bingeing and purging their food.<sup>25</sup> Generally, this condition is harder to recognize because bulimic patients usually do not present signs and symptoms of the disease and most of the patients show normal body weight. This latter condition is the most distinguishable characteristic to differentiate anorexia from bulimia nervosa.<sup>26</sup>

According to the DSM-IV the essential features of bulimia nervosa are binge eating and inappropriate compensatory methods to prevent weight gain.<sup>15</sup> To qualify for this specific diagnosis, binge eating and other behaviors must occur at least twice a week for three months. The criteria for bulimia nervosa is:<sup>15</sup>

1. Consumption of an amount of food that is definitely larger than most people would eat during a similar period of time or circumstances (usually within any 2-hour period).
2. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating). An abnormal amount of food

consumed rather than a craving for a specific food, with similar quantity of calories as a normal person would consume.

3. Recurrent use of inappropriate compensatory behaviors to prevent weight gain, such as self-induced vomiting after an episode of binge eating. As purging expels only about two thirds of a binge, bulimics maintain normal or nearly normal weight. The misuse of laxatives or diuretics and excessive exercise are also included as additional compensatory behaviors.
4. Excessive and inappropriate emphasis on body shape and weight, making self-esteem directly associated with body shape and size.

## Prevalence of Bulimia Nervosa

The reported prevalence of bulimia nervosa varies based on the criteria used for the diagnosis. Ranges of 1 to 16% in junior and senior high school populations, 1 to 13% in college populations, and less than 1 to 13% in community samples have been reported.<sup>27</sup> Using the criteria of the American Psychiatric Association, prevalence among adolescent and young adult women is approximately 1 to 3%, with the rate of occurrence in men being one tenth of the prevalence in females.

The literature indicates the risk for bulimia nervosa is associated with age, gender, and race. Most bulimic patients are women in late adolescent or early adult years. As with the anorexic group, specific populations, such as athletes, dancers, or models, showed higher risk for the development of eating disorders. Reports have found an average age of onset between 17.7 and 21 years in Caucasian women.<sup>28</sup>

## Oral Manifestations of Eating Disorders

### Dental Erosion, Perimylolysis, and Tooth Wear

The chronic regurgitation of gastric contents causes enamel erosion and demineralization. There is agreement in the literature enamel erosion is the most common and dramatic oral manifestation of chronic regurgitation typical of eating disorders.<sup>1,7</sup>

Erosion is an event in which the dental tissue is removed through a chemical process.<sup>29</sup> This oral manifestation is the first enabling dentists to make a differential diagnosis to distinguish a case of eating disorder from other causes. Self-induced vomiting is the method most used by anorexic and



bulimic patients to prevent them from gaining weight and is a destructive process that affects the hard dental tissues in the oral cavity. Patients with bulimia nervosa and anorexia nervosa of the purgative subtype present a classic erosion of the lingual surfaces of maxillary teeth. This specific type of enamel erosion is termed perimyololysis and is defined as the erosion of enamel on the lingual, occlusal, and incisal surfaces of the teeth as a result of chemical and mechanical effects caused mainly by regurgitation of gastric contents and activated by the movements of the tongue. Typically, this erosion is seen on the palatal surfaces of the maxillary anterior teeth and has a smooth, glossy appearance.<sup>1,7</sup>

Robb<sup>30</sup> reported anorexic patients with an absence of purgative episodes showed more extensive dental erosion than a control group but less erosion than a group with vomiting episodes. Dental erosion was predominant on the buccal and occlusal aspects of the teeth. In the same study no correlation was found between the frequency of self-induced vomiting episodes, duration, oral hygiene, and dental erosion. This was attributed to different susceptibility to dental erosion among patients and differences in the buffering capacity of saliva, flow rate, and pH have been proposed. In addition, there is the question of the reliability of patient information.

There is agreement dental erosion is not detected until vomiting behaviors have occurred for at least two years of self-induced vomiting, although there is a study showing dental erosion after a six month period of purging.<sup>31</sup> In severe cases a decrease in the length of clinical crowns of the teeth and a decrease in vertical dimension can be observed.<sup>9</sup> Often, dental erosion is not present in cases of restrictive anorexia nervosa and binge eating.<sup>30</sup>

Several research limitations should be noted. First, some, but not all studies refer to the standardized diagnostic criteria mentioned earlier. Second, there are no standardized methods and dental examinations for determining correlations and reproducibility.

Usually, dental erosion and dentin exposure are followed by pain, due to dentin hypersensitivity. Dentin hypersensitivity or cervical dental hypersensitivity is defined as a short and sharp pain arising from exposed dentin typically in response to chemical, thermal, tactile, or osmotic stimuli which cannot be explained as arising from other forms of old dental defects or pathologies.<sup>32-34</sup> The discomfort can influence the patient's eating behavior and dental hygiene.

The severity of dental erosion depends on the duration of purging incidents per day, frequency of purging incidents per day, oral hygiene habits (especially following a vomiting incident), the degree of acid dilution by means of water rinsing or drinking neutralizing liquids such as milk, and timing of tooth cleaning. According to some reports, dental erosion is not necessarily a sequela of vomiting because perimyololysis does not have a direct or linear association with the duration or frequency of vomiting.<sup>11</sup> New research is needed to correlate the frequency of purgative self-induced vomiting episodes and the clinical characteristics of perimyololysis.

Differentiating active lesions from inactive ones may be important to determine whether the induced vomiting has been discontinued. Active erosions are smooth and unstained and generally are not sensitive to either cold or hot stimuli.<sup>35</sup> When self-induced vomiting ceases, the exposed dentin on the palatal surfaces of the teeth becomes stained over the course of time. Perimyololysis is sometimes the only oral manifestation evident in patients who induce vomiting.

It is important to differentiate between erosions caused by eating habits and those caused by habitual vomiting. Buccal or facial surface erosion may result from an over consumption of highly acidic foods. This is particularly true of raw citrus fruits consumed in excess by anorexia nervosa patients because they are low calorie foods with high acidity which adversely affect the dentition.<sup>11</sup>

Additionally, buccal or facial surface erosion may have a dished-out appearance in contrast to the smooth, glossy texture of perimyolysis. When case control studies were undertaken, patients with anorexia nervosa and bulimia nervosa demonstrated higher levels of tooth wear than did controls that did not have eating disorders.<sup>10</sup>

The role of purging episodes as the causative agent of enamel erosion has been emphasized, but dietary intake in eating disorders has not been taken into account. According to Frydrych<sup>7</sup> this is a surprising omission as dietary factors are known risks for tooth related pathology. The pattern of dental erosion differs depending on whether the source of eroding acids are extrinsic or intrinsic in nature. Patients with bulimia nervosa, who consume low acid diets, initially exhibit dental erosion confined to the palatal and occlusal surfaces of maxillary teeth. However, when acidic drinks are also consumed the initial erosion lesions are confined to palatal and buccal surfaces of teeth. Valena<sup>36</sup> found when erosive lesions occur on the lingual aspects of mandibular anterior teeth they can reliably distinguish between patients with bulimia nervosa or chronic gastroesophageal reflux and those with dental erosion due to extrinsic acids. Other reports emphasize the importance of observing the aspect and location of the lesions to make differential diagnosis of one of the oral manifestations in eating disorders.<sup>7</sup>

Finally, patients with anorexia nervosa and bulimia nervosa may consume more acidic drinks and foods as well as engage in parafunctional habits, thus, being susceptible to dental erosions.<sup>10</sup> According to Bartlett<sup>37</sup> although restorations might be indicated, prevention and monitoring remain important strategies in maintaining the life of the teeth.

### Dental Caries

Dental caries becomes a problem in individuals whose diet is rich in cariogenic food, have poor oral hygiene, and manifest salivary disturbances. The issue of dental caries in eating disorder patients has been addressed with somewhat conflicting conclusions.

Stege<sup>20</sup> reported anorexics exhibited a high caries rate attributed to consumption of high-carbohydrate foods and citrus fruits, bingeing, and poor oral hygiene. Apart from the high



consumption of high-carbohydrate foods, antidepressants used to treat anorexia nervosa cause xerostomia and may increase the incidence of cervical carious lesions. In contrast, Hurst,<sup>38</sup> Crisp,<sup>39</sup> and also Milosevic<sup>11</sup> reported the incidence of caries in anorexia nervosa patients was similar to the incidence in the non-affected population. Data from Roberts<sup>40</sup> did not suggest anorexia nervosa or bulimia nervosa patients were more susceptible to dental caries than patients who did not have eating disorders.

The only eating-disorder patients that may show significant increases in caries rates are those with a binge-eating disorder due to the consumption of high caloric and high-carbohydrate foods. Typically, most people eat five to six times a day but when that frequency increases significantly, the caries risk also increases.<sup>13</sup>

The differences in caries rates among eating disorder patients can be attributed to personal characteristics, such as the individual's oral hygiene, cariogenicity of the diet, malnutrition, genetic predisposition, fluoride experience during tooth development, and ingestion of certain types of medications.<sup>40</sup> Consistent with a general consensus in the reviewed literature caries incidence in eating disorder patients is variable. However, studies provide conflicting results that can be attributed to factors such as the size of the population, type of eating disorder studied, differences in the groups that do or do not use medications, and evaluation of buffer capacity. Because dental caries in eating disorder patients is a complex, multifactorial, and controversial subject, investigations should include the analysis of diet, salivary issues, and details of behavioral purgative episodes of self-induced vomiting.

### Effects on Periodontal Tissue

As with caries, data regarding the periodontal status of eating-disorder patients are inconsistent. The etiology of periodontal disease is complex and multifactorial. Any factors that influence the composition of the microbiota, host-defense mechanisms against chronic bacterial insult, or host-soft tissue repair mechanisms may have an influence on both the establishment and progression of periodontal conditions.

As most of the eating disorder patients are young, it is not surprising advanced periodontal disease is rarely diagnosed. Poor oral hygiene has been reported more commonly in anorexia nervosa patients than in bulimia nervosa patients but without statistical significance.<sup>40</sup> This observation is particularly true if depression accompanies the eating-disorder. Brown<sup>4</sup> stated anorexics are less interested in oral hygiene practices than bulimics. This lack of interest may be caused by the more serious psychopathologic nature of anorexia nervosa. Because bulimia nervosa patients may have a more realistic body image and may be more concerned about their appearance, they might be more likely to take meticulous care of their teeth and gingival tissues.

Hurst<sup>38</sup> reported a high rate of gingival inflammation in patients with restrictive anorexia compared with the other types of eating disorders. In contrast, Milosevic and Slade<sup>11</sup> showed no statistical significance in plaque and bleeding indices in anorexic and bulimic patients compared with control subjects of a similar age. Other studies showed no differences in gingival inflammation in patients with anorexia nervosa.<sup>12</sup> As with dental caries studies, methodologies may account for discrepancies in the results. Moreover, none of the articles discussed whether any of the patients were smokers. Smoking is a well-recognized risk factor for periodontal disease.

### Traumatized Oral Mucosa Membranes and Pharynx

Many oral mucosal lesions are related to nutritional deficiencies that can impair the repair and regenerative potential of the oral mucosa.<sup>7</sup> Trauma to the mucosal membranes, pharynx, and soft palate is universally recognizable and can be observed in patients engaged in binge eating and self-induced vomiting. The trauma can be

caused both by the rapid ingestion of food and by the force of regurgitation.<sup>41</sup> The soft palate may be injured by objects used to induce vomiting. Furthermore, patients' hands may present additional physical signs. Cases of angular cheilitis are also reported as a consequence of malnutrition and trauma.<sup>4,7</sup> Oral candidiasis is associated with both nutritional deficiencies and salivary dysfunction.

### Effects on Salivary Glands

#### Xerostomia

The effects of eating disorders on salivary glands, saliva, and serum amylase levels constitute the most studied topics. Xerostomia is a common side effect of the many psychotropic medications prescribed for eating disorders patients.<sup>3</sup> Additional factors such as fluid imbalance caused by overuse of diuretics and laxatives taken to prevent weight gain and by persistent vomiting, may be contributory. Several investigators reported reduced rates of unstimulated salivary flow in patients who binge eat or induce vomiting, however, no reductions in stimulated salivary rates were observed.<sup>42</sup> This indicates there is no alteration in the secretion of salivary glands but rather smaller quantities of saliva are secreted due to the ingested medicaments.<sup>42</sup>

#### Enlargement of the Parotid Gland

Patients with eating disorders frequently have enlarged parotid glands. Generally, this finding is manifested in individuals who purge. The occurrence and extent of parotid swelling is proportional to the duration and severity of the



purging behavior. The incidence of unilateral or bilateral parotid swelling has been estimated to range from 10 to 50%.<sup>43</sup>

In the early stages of the eating disorder gland enlargement may appear and disappear; but as the eating disorder progresses, the swelling becomes more persistent. Facial deformity presents a widened and square appearance to the mandible which may become a complicating factor in the overall psychological state of an eating disorder patient. Upon palpation, the gland is soft and generally painless. Intraoral examination reveals a patent duct, normal salivary flow, and no inflammation.<sup>43</sup> Histopathology generally reveals an increase in acinar size, number of secretory granules, and fatty infiltration with noninflammatory fibrosis having also been reported.<sup>42</sup>

The etiology of salivary gland enlargement is uncertain. Roberts<sup>40</sup> attributed the hypertrophy to binge eating and the relationship between the rapid consumption and massive quantities of food.<sup>40</sup> Most investigators have associated parotid enlargement with recurrent vomiting.<sup>43</sup> Cholinergic stimulation of the glands during vomiting or

autonomic stimulation of the glands by activation of the taste buds are the mechanisms proposed for this salivary gland swelling.<sup>43</sup>

The oral manifestations of eating disorders have been presented. Dental clinicians need to recognize the dental features of eating disorders; failure to do so may lead to serious systemic problems in addition to progressive and irreversible damage to the hard tissues of the oral cavity.

### Conclusions

Eating disorders, such as anorexia and bulimia nervosa, are a serious concern with regard to the oral health of patients and a clinical challenge to dental professionals. Eating disorders present unique psychological, medical, nutritional, and dental patterns. However, there is a lack of awareness of the fundamental importance of the dentist's participation in multidisciplinary treatment of affected patients. The dental team may be the first healthcare providers to detect, diagnose, and lead the patient to medical treatment, thereby, providing multidisciplinary treatment with a favorable prognosis.

## References

1. Little JW. Eating Disorders: Dental implications. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002; 93:138-143.
2. Abrams RA, Ruff JC. Oral signs and symptoms in the diagnosis of bulimia. *J Am Dent Assoc* 1986; 113:761-764.
3. Bartlett DW, Smith BGN. The dental impact of eating disorders. *Dent Update* 1994; 21:404-407.
4. Brown S, Bonifazi DZ. An overview of anorexia e bulimia nervosa, and the impact of eating disorders on the oral cavity. *Compend Contin Educ Dent* 1993; 14:1594-1608.
5. De Moor RJG. Eating disorder-induced dental complication: a case report. *J Oral Rehabil* 2004; 31:725-732.
6. DeBate RD, Plichta SB, Tedesco LA, Kerschbaum WE. Integration of Oral health care and Mental Health Services: Dental Hygienists's Readiness and Capacity for Secondary Prevention of Eating Disorders. *J Behav Health Serv Res* 2006; 113-125.
7. Frydrych AM, Davies GR, McDermott BM. Eating disorders and oral health: A review of the literature. *Australian Dent Journal* 2005; 50:6-15.
8. Hielsen KL. Treating dental patients with eating disorders. *Dent Today* 2006; 25:106-107.
9. Kleier DJ, Aragon SB, Averbach RE. Dental management of the chronic vomiting patient. *J Am Dent Assoc* 1984; 108:618-621.
10. Milosevic A, Slade PD. The orodental status on anorexics and bulimics. *Br Dent J* 1989; 167:66-70.
11. Milosevic A, Brodie DA, Slade PD. Dental erosion, Oral Hygiene, and Nutrition in Eating Disorders. *International Journal of Eating Disorders* 1997; 21:195-199.
12. Philipp E, Willershhausen-Zonnchen B, Hamm G, Pirke KM. Oral and dental characteristics in bulimia and anorectic patients. *Int J Eat Disord* 1991; 10:423-431.
13. Studen-Pavlovich D, Elliott MA. Eating disorders in women's oral health. *Dent Clin North A* 2001; 45:491-511.
14. Halmi KA. Anorexia nervosa: Recent investigations. *Annu Rev Med* 1978; 29:137-148.
15. American Psychiatric Association. Eating disorders. In: *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV TR)*. 4th ed. Washington: American Psychiatric Association 2000; 583-597.
16. Practice Guideline for the treatment of patients with eating disorders American Psychiatric Association Practice Guidelines. Third Edition, 2006.
17. Beaumont PJ, George GC, Smart DE. Dieters, vomiters and purges in anorexia nervosa. *Psychol Med* 1976; 6:617-622.
18. Hsu Lk, Crisp AH, Harding B. Outcome on anorexia nervosa. *Lancet* 1979; 1:61-65.
19. Waldman HB. Is your next young patient pre-anorexic or pre-bulimic? *J Dent Child* 1998; 65:52-56.
20. Stege P, Visco-Dangler L, Rye L. Anorexia nervosa: review including oral and dental manifestations. *J Am Dent Assoc* 1982; 104:648-652.
21. Melpomene Institute: Study shows girls' body image is a black and white issue. St Paul, MN, Melpomene Institute, 1996.
22. Nielsen S. Epidemiology and Mortality of Eating Disorders. *Psychiatr Clin North Am* 2001; 24:201-214.
23. Klein DA, Walsh T. Eating disorders: Clinical Features and Pathophysiology. *Physiol Behav* 2004; 81:359-374.
24. Stice E. Risk and maintenance factors for eating pathology: a meta-analytic review. *Psychol Bull.* 2002; 128:825-848.
25. Russell GFM. Bulimia nervosa: An ominous variant of anorexia nervosa. *Psychol Med* 1979; 9:429-448.
26. Woodmansey KF. Recognition of bulimia nervosa in dental patients: Implications for dental care providers. *Gen Dent* 2000; 48:48-52.
27. Crowther JH, Wolf EM, Sherwood NE. Epidemiology of bulimia nervosa. In Crowther JH, Tennebaum DL, Hobfoll SE, Stephens MAP (eds): *The etiology of bulimia nervosa: the individual and familial context*. Washington, DC, Hemisphere Publishing Corporation 1992; 1-26.
28. Fairburn GG, Cooper PJ. The clinical features of bulimia nervosa. *Br J Psychiatry* 1984; 144:238-246.

29. Chabanski MB, Gillam DG. Etiology, prevalence and clinical features of cervical dentine sensitivity. *J Oral Rehabil* 1997; 24:15-19.
30. Robb Nd, Smith BG. Anorexia e bulimia nervosa: Conditions of interest for the dental practitioner. *J Dent* 1996; 24:7-16.
31. Anderson L, Shaw J, McCargar L. Physiological effects of bulimia nervosa on the gastrointestinal tract. *Can J Gastroenterol* 1997; 11:451-459.
32. Collaert B, Fischer C. Dentin hypersensitivity. *Endod Dent Traumatol* 1991; 7:145-152.
33. Addy M, Urquhart E. Dentine hypersensitivity: its prevalence, etiology and clinical management. *Dent Update* 1992; 19:407-417.
34. Jacobsen PL, Bruce G. Clinical Dentin hypersensitivity: Understanding the Causes and Prescribing a Treatment. *J Contemp Dent Prac* 2001; 2:1-8.
35. Smith BGN, Knight JK. An index for measuring the wear of teeth. *Br Dent J* 1984; 156:435-8.
36. Valena V, Young WG. Dental erosion patterns from intrinsic acid regurgitation and vomiting. *Aust Dent J* 2002; 47:106-115.
37. Bartlett DW. The role of erosion in tooth wear: aetiology, prevention and management. *Int Dent J*. 2005; 55:277-84.
38. Hurst PS, Lacey JH, Crisp AH. Teeth, vomiting and diet, a study of the dental characteristics of seventeen anorexia nervosa patients. *Postgrad Med J* 1977; 53:298-305.
39. Crisp AH. The possible significance of some behavioral correlates of weight and carbohydrate intake. *J Psychos Res* 1967; 11:117-131.
40. Roberts MW, Li SH. Oral findings in anorexia e bulimia nervosa: A study of 47 cases. *J Am Dent Assoc* 1987; 115:407-410.
41. Ruff JD, Koch MD, Perkins S. Bulimia: Dentomedical complications. *Gen Dent* 1992; 48:48-52.
42. Tylenda CA, Roberts MW, Elin RJ, Li SH, Altemus M. Bulimia nervosa: its effects on salivary chemistry. *J Am Dent Assoc* 1991; 12:37-41.
43. Mandel L, Kaynar A. Bulimia and parotid swelling: A review and case report. *J Oral Maxillofac Surg* 1992; 50:1122-1125.

## About the Authors

Ana Cecília Corrêa Aranha, DDS, MSc, PhD



Dr. Aranha is an Assistant Professor in the Department of Restorative Dentistry of the School of Dentistry at the University of São Paulo, SP, Brazil. She is responsible for the Special Laboratory of Lasers in Dentistry (LELO).

e-mail: [acca@usp.br](mailto:acca@usp.br)

Carlos de Paula Eduardo, DDS, MSc, PhD



Dr. Eduardo is a Full Professor in the Department of Restorative Dentistry of the School of Dentistry of the University of São Paulo, SP, Brazil. He is the Coordinator of the Special Laboratory of Lasers in Dentistry (LELO).

e-mail: [cpeduard@usp.br](mailto:cpeduard@usp.br)

Tâki Athanassios Cordás, MD, PhD



Dr. Cordás is a Psychiatrist in the Institute of Psychiatry of the School of Medicine at the University of São Paulo, SP, Brazil. He is the Coordinator of the Ambulatory of Bulimics and Eating Disorders (AMBULIM) service.

e-mail: [cordas@usp.br](mailto:cordas@usp.br)

## Acknowledgements

This work is a result of the partnership between the School of Medicine (Psychiatric Institute - Ambulatory Clinic for Bulimics and Eating Disorders/AMBULIM) and the School of Dentistry of University of São Paulo (Department of Restorative Dentistry – Special Laboratory of Lasers in Dentistry - LELO).