

Full-mouth rehabilitation of a patient with bulimia nervosa. A case report

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Anorexia and bulimia nervosa are eating disorders seen mainly in adolescents or young patients. The dentist should be in the position to recognize early signs of the disorder and alert the patient (and the patient's parents, if necessary) of the possible physical, psychological, and dental consequences. Such dental treatment may help motivate the patient to confront the problem. In this paper the full-mouth rehabilitation, using a combination of galvano- and metal-ceramic restorations, of a young patient suffering from bulimia nervosa is described. (*Quintessence Int* 2005;36:501-510)

Key words: bulimia nervosa, eating disorders, galvano-ceramic restorations, metal-ceramic, rehabilitation

Anorexia and bulimia nervosa are disorders associated with food intake based on severe psychologic causes. These conditions are now referred to by the term "eating disorders" in psychiatric literature. The main cause of these conditions is the anxiety of increased body weight.^{1,2} Eating disorders have attracted increased attention within the dental literature and a number of studies on the dental effects of these conditions has been published.³⁻⁷

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Definitions and diagnostic criteria

Anorexia nervosa is defined as an "aversion to food due to psychological causes leading to severe loss of weight."² Two types of anorexia are distinguished, according to the time of onset: prepuberty occurrence and post-puberty occurrence. The main characteristics of anorexia nervosa are:

- Determined food avoidance
- Reduced body weight (15% to 30% of normal, or healthy, value)
- Preoccupation with calories
- Fear of becoming fat
- Vomiting, purging, and excessive exercising
- Amenorrhea and loss of sexual interest (in females)^{8,9}

Bulimia is defined as the "perpetual and voracious appetite for food in large quantities, as a result of increased hunger to a morbid degree."² The characteristics of bulimia are similar to those of anorexia, but food is consumed in extremely large quantities and

vomiting is self-induced. Bulimia patients may have a history of anorexia or anorexic episodes. Some psychiatrists would not differentiate between bulimic disorders with and without a history of an anorexic episode. The psychopathology is the same whether or not psychogenic or self-induced vomiting is used. Psychologic symptoms are excessive concern with body shape, fear of getting fat, and low self-esteem.^{1,7,10}

Epidemiology

Anorexia nervosa is found in predominantly Caucasian patients of the upper-middle social class. The sex ratio is approximately 10 females to 1 male.^{11,12}

The annual incidence in Britain had been estimated to be between 0.6 to 1.6 per 100,000 adolescents of the general population,¹¹ but a later publication showed incidence of 1 in 250 to 1 in 100 for English schoolgirls aged 16 years and over.¹²

Bulimia affects a wider socio-economic group with no class differences.¹³ It is the most common eating disorder currently treated by psychologists and psychiatrists. The incidence in college populations in the United States is 0.4% to 5%.^{14,15} It is estimated that eating disorders are found in some 7.5 million Americans.¹⁶ In a 6-year longitudinal study, the reported recovery rate among patients with anorexia was 12% to 22%, and among those with bulimia the recovery rate was 37%. Risk of relapse and premature death (5% to 10%) was high among patients suffering from eating disorders.¹⁷ Early detection and intervention by a multidisciplinary team offer the best hope for recovery from these eating disorders.¹⁸

DENTAL EFFECTS OF EATING DISORDERS

Dental erosion

Numerous papers have focused on the "classical lingual erosion of the maxillary anterior teeth."¹⁹⁻²² Dental (labial and palatal) erosions are mainly attributed to repeated vomiting, as they appear in virtually all vomiting patients,

but rarely in those who do not continually vomit.⁴ The erosions have also been associated with disturbances in saliva flow rates and dietary intake.^{5,6,23} The dental erosions that are directly attributed to vomiting are located on the lingual surfaces of mandibular teeth and the palatal surfaces of maxillary anterior teeth.²⁴⁻²⁶ Palatal and occlusal teeth erosions have been reported. In these cases the existing occlusal amalgam fillings appear "raised" in relation with the surrounding dental tissues. Dental erosions arising from the excessive consumption of acidic or artificially sweetened carbonated drinks are a common risk for patients with eating disorders.²⁷ Severe dental erosions may cause sensitivity for the patient.²⁴⁻²⁷ A correlation has been suggested between the presence of bilateral parotid swelling (a common symptom in patients with bulimia) and dental erosion.^{28,29}

Dental caries

Caries activity in patients with eating disorders seems to be as variable as it is in the general population. However, for patients with active caries, the rate at which new caries develop makes treatment virtually impossible.^{23,30}

Periodontal disease

There is conflicting evidence on periodontal disease in patients with eating disorders. Differences were noted in the periodontal status of patients with bulimia and control groups.^{6,7,23,29} Patients with anorexia are more likely to show changes indicative of gingivitis, but not necessarily of periodontitis, compared to control subjects. The oral flora did not show any significant changes.³¹ In patients who often vomited, the interdental papillae are often enlarged as a result of the constant irritation of the acidic vomitus. The gingival status may also be affected by medicaments prescribed for psychologic modification. Some of them are anticholinergic and result in xerostomia as well as in enlarged papillae. These tissues do not bleed upon probing nor is there any attachment loss.³⁰ The role of toothbrushing after vomiting is also unclear. In vitro studies have shown that cyclical exposure to abrasive and erosive elements leads to catastrophic wear of dental hard tissue.³²

To reduce enamel damage, a fluoride rinse instead of brushing is often recommended for use after vomiting.³⁰

Flowrate and composition of saliva and dental tissue structure

Reduced saliva flowrate and xerostomia have been reported in patients with bulimia who frequently vomit.⁴ The saliva pH values were shown to be lower in patients with bulimia who do not vomit frequently,³¹ and alterations in calcium and phosphate contents in both tooth tissues and saliva were noted in a case report.³³ The dental tissues affected by erosion showed etched patterns with some evidence of new crystal formation.³³ In another study no difference was found in the salivary chemistry between bulimic patients and those in the control group.³⁴

CASE PRESENTATION

A 19-year-old female patient presented in the Postgraduate Prosthodontic Clinic at the University of Athens for dental treatment. The patient's main complaint was the reduced length of the maxillary anterior teeth and severe sensitivity to cold in all maxillary teeth. The patient showed physiologic growth, was relatively short in height (155 cm), and her body weight was 45 kg.

Medical record

The patient's medical record did not reveal anything pathologic. The patient was not receiving any medications. After the oral examination and prolonged discussion, the patient admitted self-induced vomiting once or twice daily for a period of 2 years. The patient reported a psychologic problem with her mother. Her 15-year-old brother had a similar eating disorder.

Clinical examination

The clinical examination revealed generalized dental erosions mainly located on the palatal surfaces of the maxillary anterior teeth and on the lingual surfaces of the mandibular anterior teeth. The enamel was almost completely eroded on these surfaces (Figs 1 and

2). The maxillary anterior teeth showed reduced length due to abrasion and fractures. The existing composite restorations appeared "raised" from the surrounding dental tissues, indicating an increased marginal gap (Fig 3). Severe erosions were also detected on the palatal surfaces of the maxillary premolars (Figs 4 and 5).

The mandibular first molars were extracted several years ago and the second and third molars had migrated to the existing space (Fig 6). There was no vertical and horizontal overlap and the patient showed an "edge-to-edge" interarch relation. The vertical dimension was reduced approximately 4 mm.

The periodontal tissues were healthy, with no sign of inflammation or pocket formation.

Radiologic examination

The radiologic examination of the patient consisted of a panoramic radiograph and full-mouth intraoral radiographs (Fig 7). The maxillary third molars had been extracted. The maxillary central incisors had been treated endodontically and there was a radiolucent area at the apex of tooth 21. The erosions were noticeable on the radiographs mainly on the maxillary teeth. On the maxillary anterior teeth (tooth 23), the pulp chambers were almost exposed, covered only by a thin dentin layer. The bone crest was intact around all existing teeth. The alveolar crest showed slight resorption on the extraction sites.

Initial treatment steps

After the final clinical and radiologic examination, alginate impressions (Fast setting alginate, Zhermac) were obtained from the maxillary and mandibular teeth, and study casts were constructed using extra-hard dental stone. The casts were mounted on a semi-adjustable articulator (Hanau) using an intraoral centric relation registration with an anterior deprogrammer made of autopolymerizing resin (Pattern Resin, GC). The vertical dimension was increased approximately 3 mm compared to the initial situation. A full wax-up was performed on all maxillary and mandibular posterior teeth on the mounted study casts (Figs 8 and 9).



Fig 1 Initial clinical situation (frontal view).



Fig 2 Maxillary teeth (occlusal view).



Fig 3 Maxillary anterior teeth with severe erosions.



Figs 4 and 5 Severe erosions on the palatal surfaces of maxillary premolars.



Fig 6 Mandibular teeth (occlusal view).



Fig 7 Initial panoramic radiograph.



Figs 8 and 9 Study casts with diagnostic wax-up.

Treatment planning

The treatment planning for this patient was as follows:

- Initial treatment with an occlusal centric relation splint to restore vertical dimension
- Endodontic treatment of the maxillary anterior teeth
- Cast posts and cores for teeth 13 through 23
- Preparation of all maxillary teeth
- Preparation of all mandibular posterior teeth
- Placement of long-term provisionals on the prepared teeth
- Galvano-ceramic restorations (single crowns) for teeth 13 through 23
- Metal-ceramic restorations (single crowns) for teeth 14 through 17 and 24 through 27
- Metal-ceramic restorations (single crowns) for teeth 47 and 34
- Metal-ceramic restorations (splinted crowns) for teeth 43 and 44
- Metal-ceramic restoration (fixed partial denture) for teeth 44 through 47
- Construction of a maxillary centric relation splint as a nightguard

The treatment goal for this patient was functional and esthetic rehabilitation, as well as protection from further damage.

Endodontic treatment: Cast posts and cores

After endodontic treatment of teeth 13 through 23, cast posts and cores were constructed with the direct technique from a high-content gold alloy (Degulor M, Degussa). The high-gold alloy was selected to avoid galvanic phenomena from the galvano-ceramic crowns.

Tooth preparation and provisional restorations

The teeth were prepared in segments with heavy chamfer finishing line (Fig 10). The margin line was 1 mm below the gingival crest. A thin retraction cord (000, Ultrapack, Ultradent) was inserted in the sulcus prior to the preparation to avoid gingival injuries. The provisional restorations were constructed chair-side from autopolymerizing acrylic resin using a matrix obtained from the completed wax-up. The provisional restorations were in place for 3 months to evaluate the result and the patient's response (Fig 11).

Impressions

Final impressions were obtained in segments using a polyether material (Impregum Penta, ESPE-3M), and separate master casts were constructed. The segmented impressions were used because the patient could not sustain long appointments and had an extreme



Fig 10 Teeth preparation.



Fig 11 Provisional restorations.

vomiting reflex. Occlusal registrations were obtained with a silicone material (Occlufast, Zhermack) and the use of an anterior deprogrammer.

Laboratory construction and finishing the restorations

The metal frameworks for all restorations (metal- and galvano-ceramic) were tried in the patient's mouth at the same clinical session, and a new centric relation record was obtained.

The restorations were veneered with feldspathic porcelain, tried in the biscuit stage, glazed (Figs 12 and 13), and cemented with glass-ionomer cement (Cetac-cem, ESPE-3M). The patient was satisfied with the final functional and esthetic result (Figs 14 to 16). A central relation maxillary splint was constructed for the patient to use as a nightguard. The restorations have been in use for 2 years, and the patient has not reported any problems or any sign of relapse at the various recall appointments.

DISCUSSION

Treating patients with eating disorders presents a significant challenge to the clinician. Eating disorders affect every part of the body, but the effects on dental tissues may be irreversible. The extent of treatment is often determined by the existing damage of the hard

tissues. The treatment goal should be the functional and esthetic restoration of the patient, as well as prevention of further damage to the existing dentition. If extended loss of tooth structure has occurred, dental care often entails complete mouth rehabilitation with complete-coverage restorations, as in the described case. The dental treatment of these patients is very similar or identical to treatment of patients with severe dentition wear.³⁵

The treatment planning for this patient was focused on the functional and esthetic rehabilitation on one side of the mouth, and on the protection of the existing teeth from further damage on the other side. The endodontic treatment for maxillary anterior teeth and the cast posts and cores were considered necessary due to extreme destruction of the hard tissues of the crowns. The restoration (with full-coverage restorations) offered a safe solution for functional and esthetic rehabilitation for this patient. Another advantage of full-coverage restorations is the protection of the remaining tooth structure in case of a possible relapse of the eating disorder, including frequent vomiting. The edentulous space of tooth 36 was restricted due to mesial shift and inclination of tooth 37. Ideally, orthodontic treatment would be the treatment of choice, but the patient declined this option. For this reason no pontic was used in this area. The crowns of teeth 34 and 35 were splinted to prevent further distal inclination of tooth 35.



Figs 12 and 13 The completed restorations on the models.



Figs 14 to 16 The restorations in the mouth after cementation.



Galvano-ceramic restorations were used on the maxillary anterior teeth as this combination provides an excellent esthetic result (similar to all-ceramic restorations) with improved mechanical strength.

The use of long-term provisional restorations was considered necessary in order to stabilize the changes in the clinical condition and also evaluate the patient's response to the treatment. The clinician can also verify the functional and esthetic result over a period of time and make the necessary corrections or adjustments. The use of a maxillary centric relation splint as a nightguard offers protection from potential bruxism.

The rehabilitation with complete-coverage restorations is a safe and predictable treatment method that allows reconstruction of the damaged teeth in the desired shape. It also offers the maximum protection of the remaining dentition for the long-term. The use of partial-coverage restorations (resin restorations, onlays) requires minimal preparation of the teeth and has been described.^{27,30} However, if the patient has a relapse and frequently induced vomiting occurs, the restoration margins may be different.

All-ceramic materials offer certain advantages, including biocompatibility, precision of fit, and esthetic performance. The authors have reported the successful use of all-ceramic restorations in patients with dentinogenesis imperfecta.³⁶ In this case, however, metal-ceramic restoration was considered a safer solution for this patient, as possible relapse could not be ruled out. Approximately one-third of patients with eating disorders suffer a relapse within 4 years.^{37,38} The rehabilitation of patients with eating disorders with metal-ceramic restorations has been documented.^{39,40}

Although patients may be eager to improve their dental esthetics and may be very compliant in following prescribed preventive dental measures, they often continue to practice self-induced vomiting. This is a problem because there is a high risk that restorations will fail due to the erosive effect of vomitus on any exposed tooth structure. Continued purging (vomiting after eating) greatly complicates the provisional phase of a reconstructive treatment. As provisional restorations are readily eroded by an acid environment, dissolution

of the provisional cement is common, with rapid destruction of the abutment teeth as a result of erosion and carious activity.³⁰

There has been some debate about the timing of dental intervention, although it is agreed that routine dental care for the management of caries and periodontal problems should proceed as required. If progressive erosion is present it is better to wait until the eating disorder has been controlled before extensive restorative treatment is undertaken. The dental treatment, however, may help the patient confront the health problem. Improving the patient's appearance by providing dental restoration may, if correctly timed, be an important factor in patient management and recovery.⁷

Securing the cooperation of patients with anorexia can be difficult while they are actively displaying anorexic behaviors. Cooperation will improve significantly once the patient begins to recover from the eating disorder.²⁷ In the dental office a patient, fearing the clinician's disapproval, may deny having an eating disorder. While patients with anorexia often appear emaciated, giving a clue to the disorder, a patient with bulimia may be more difficult to identify, because such patients often maintain a fairly average weight and appear to be healthy and sociable. Unless the patient is in recovery, many with eating disorders are secretive about their eating habits and may be reluctant to seek help.^{30,41}

The clinician has an important role in the diagnosis of a patient with eating disorders. Although the patient may initially deny having an eating disorder, with continued dialogue during initial dental treatment the patient may disclose the cause of dental erosions. Early diagnosis is beneficial to the patient's dentition and overall health. Failure to recognize symptoms of an eating disorder may result in further damage to the dentition. An appreciation of the psychologic complexity of these disorders can aid the practitioner in appropriately managing the necessary referrals, as well as anticipating the difficulties in the treatment of these patients.³⁰

The dental professional can serve as an important link between the patient with eating disorders and professional therapy.^{42,43} Clinicians may fail to diagnose an eating dis-

order if extensive or characteristic erosion is not obvious. Severe erosion of the anterior teeth is present in one-third of individuals with bulimia. The practitioner should always evaluate all oral and physical symptoms to establish a clinical diagnosis.^{39,43}

CONCLUSION

Eating disorders are serious conditions found in many young patients. Dental practitioners are in the position to detect these disorders at an early stage and help patients manage these problems, together with other health care specialists. The dental treatment of these patients can be very challenging, and the treatment options allow complete functional and esthetic restoration of the damaged dentition.

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