Dental Management of Tooth Wear
PART II

by Effrat Habsha, B.Sc., DDS, Dip. Prostho.

The incidence of natural tooth retention is increasing,[1] and consequently, a greater prevalence of tooth wear is seen in the aging population. The emphasis in management of tooth wear should be on identification of the etiology of the wear and prevention. Thorough history and clinical examinations must be undertaken and appropriate restoration provided. Treatment planning strategies in the management of tooth wear and clinical cases will be reviewed in this article.

MANAGEMENT OF TOOTH WEAR

Case History

Determining the cause of tooth wear is important in its management. Unless the etiology is identified and preventive treatment initiated, the wear will continue. A detailed case history is essential in any investigation of individuals suffering form extensive tooth wear. Table 1 summarizes the salient features of a concise case history. Consideration should be given to the patient's general health, nutritional habits, oral hygiene habits, occupational environment and lifestyle patterns. The presence of diseases, such as gastritis, ulcers, or any condition which may be associated with acid regurgitation, reflux or vomiting must be investigated.[2] Salivary gland dysfunction may result in reduced salivary flow rates, leading to a decreased ability to clear dietary acids from the mouth, and decreased salivary buffering capacity.[3,4] Bruxism and other parafunctional habits should be evaluated and nutritional habits must be assessed. The type and intake frequency of acid-containing products (e.g. citrus fruits, cola, fruit juices, wines) is of particular significance. Oral hygiene habits should be assessed, as the type of toothbrush used, intensity and frequency of brushing and abrasiveness of toothpaste contribute to the rate and

Table 1
Summary of Case History for Individuals with Tooth Wear

Personal data

- age
- gender
- occupational environment
- lifestyle

General health:

- diagnosis
- any condition resulting in GOR or vomiting
- medication
- parafunction

Nutritional habits:

- type of food or beverage (e.g. citrus fruits, wine, cola, citrus fruit drinks)
- frequency of daily intake
- period of consumption

Oral hygiene habits:

- type of tooth brush
- intensity and frequency of brushing
- abrasivity of toothpaste

Table 2
Summary of Clinical Examination for Individuals With Tooth Wear

Examination of wear features

- examination of wear facets
- location of wear facets
- "matching" of opposing facets
- localized or generalized

Mounted study casts

- assess interocclusal relationship
- assess degree of wear

Intra oral radioctraphs

- anterior/posterior bilaterally
- maxillary/mandibular occlusal

Radiographs

- assess pulpal recession
- thickening of lamina dura
- widening of periodontal ligament space

Salivary analysis

- pH
- secretion rate
- buffer capacity

CASE 1

FIGURE 1 Sixty-year-old male with advanced tooth wear. Pre-operative views:

A. Unretracted smile.

B. Retracted smile

C. Maxillary occlusal view.

D. Mandibular occlusal view.

degree of abrasion.[5] The patient's occupational environment and lifestyle patterns should be evaluated to rule out an occupational source of tooth wear. Symptoms of chronic alcoholism may include early morning vomiting which may contribute to dental erosion.[6]

Clinical Examination

A detailed clinical examination includes impressions for diagnostic casts, radiographs, intraoral photographs, grading of the severity of wear, salivary analysis and assessment for TMD[6] (Table 2). An assessment of the severity, location and extent of worn teeth is best accomplished using a combined intraoral and diagnostic cast examination. Study casts, intraoral photographs and radiographs can be useful for diagnosis and follow up. The Tooth Wear Index developed by Smith and Knight[7] quantifies tooth surface loss and is useful in monitoring the progression of tooth wear.

Prevention

Management of tooth wear should be directed toward identification and elimination of etiologic factors. Aggressive oral hygiene habits should be modified and habits involving other intraoral objects should be eliminated. Areas of hyper or malocclusion should be identified and modified when abfraction lesions are suspected. Nutritional habits suspected of contributing to tooth wear should be altered. Consultation with the patient's physician and dietary counseling is essential in cases of suspected erosion in order to identify conditions associated with chronic vomiting or persistent gastro-oesophageal reflux. If bruxism is contributory to tooth wear, an acrylic resin occlusal splint should be fabricated. The wear pattern on the splint could be used to monitor the rate and extent of tooth surface loss.

Reconstructive management:

The type of restoration and choice of restorative material depends on the degree and cause of tooth wear.

CASE 1

FIGURE 2 Stabilization splint at recovered increased vertical dimension of occlusion.

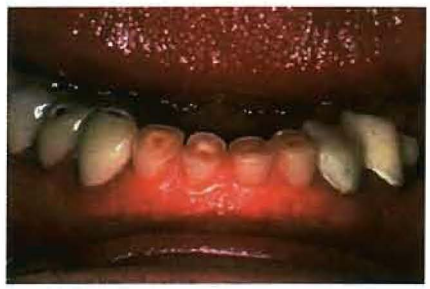

FIGURE 3 A. Short anterior teeth lack required length for adequate crown retention.

FIGURE 3 B. Crown lengthening procedure removing bone to expose 3mm of root surface beyond anticipated position of crown margins.

FIGURE 4 Provisional restorations at previously established VDO.

FIGURE 5 Post operative views: **A.** Unretracted smile.

FIGURE 5 B. Retracted smile.

FIGURE 5 C. Maxillary occlusal view.

FIGURE 5 D. Mandibular occlusal view.

FIGURE 6 Final epoxy casts. **A.** Two screw-type dental implants restoring 35, 36.

FIGURE 6 B. Implant supported prosthesis.

FIGURE 7 Mandibular stabilization splint.

For lesions limited to enamel, the approach is generally conservative and composite resin or porcelain veneers may be indicated for esthetic reasons.[8] The use of desensitization agents may provide relief in cases of dentinal hypersensitivity. Other modalities of hypersensitivity treatment include the use of fluorides or dentine bonding agents.[9,10,11] The indications for restorative treatment depend on whether the structural integrity of the tooth is threatened, the defect is esthetically unacceptable and poses a functional compromise to the patient, if tooth sensitivity or pain cannot be controlled conservatively or if pulpal exposure is likely.[8]

Type of restoration

It is virtually impossible to give general recommendations with regards to the type of treatment to provide in any single case, as each case is unique. The type of restoration depends on the degree and cause of tooth wear. Composite resin or resin modified glass ionomer restorations are suitable in

CASE 2

FIGURE 8 Forty six year old male with moderate dental erosion. Pre-operative views: **A.** Unretracted smile.

B. Retracted smile.

C. Maxillary occlusal view.

FIGURE 9 Crown lengthening procedure.

FIGURE 10 Post-operative views: **A.** Unretracted smile.

B. Labial composite veneers.

cases of minimal tooth surface loss.[12,13] In cases where wear is limited mainly to the palatal surfaces of the maxillary incisors, composite resin or palatal porcelain veneers may be indicated.[12] In cases of extensive tooth destruction, full coverage restorations are indicated. The choice of full coverage restoration depends on the etiologic factors. If the wear is mainly due to attrition, the use of metal occlusal surfaces should be considered, especially if the opposing occlusion is unrestored. Removable partial dentures or overdentures are also treatment options for patients with heavily worn dentitions.

Special considerations in restoration:

Cases of extensive tooth wear often result in difficulties encountered with a reduced interocclusal distance. Loss of vertical dimension of occlusion (VDO) can accompany excessive tooth wear. The clinician, however, must be cognizant of the fact that not all cases of extensive tooth wear result in loss of VDO, as compensatory eruption of the dentition and alveolar process may compensate for loss of tooth structure, thus maintaining the original VDO.[14] The VDO must be clinically assessed prior to extensive restoration. If an increase in the VDO is necessary to accommodate for material thickness, clinical experience has demonstrated that increases of 1.5-2.0mm in either jaw are well tolerated.[15,16] Space for the restorative material may also be obtained by orthodontically induced intrusion or extrusion or surgical crown lengthening procedures.[17]

Maintenance

It is important to emphasize to the patient the life long commitment to maintenance of the dentition. Regular recall of patients is essential in order to monitor the progression of tooth wear, the integrity of restorations and occlusal splint and to detect secondary decay at restoration and crown margins. The provision of an occlusal splint is recommended to protect restorations and minimize further tooth wear.

CLINICAL CASE PRESENTATIONS

The following cases demonstrate the management of tooth wear.

CASE 1:

Case history and clinical examination

A sixty-year-old male patient presented with advanced wear of his remaining teeth and restorations which he attributed to nocturnal and diurnal parafunction.

He claimed that the rate of wear has been increasing remarkably over the last five years. A thorough clinical and radiographic examination was conducted and diagnostic casts and photographs were obtained. The patient had a loss in the vertical dimension of occlusion (VDO), a deep overbite relationship and his unrestored mandibular anteriors and fixed prostheses displayed advanced wear (Figures 1a, 1b, 1c, 1d). The etiology of the wear

Proper management of tooth wear involves a thorough case history, clinical examination, prevention and reconstruction, when necessary.

was primarily due to a combination of bruxism and clenching.

Reconstructive phase
Treatment options were presented to the patient and the final plan consisted of restoration of the maxillary and mandibular arches with a combination of fixed partial dentures and implants at a clinically determined recovered VDO. The patient's tolerance to the recovered VDO was assessed initially with a mandibular stabilization splint prior to initiation of treatment (Figure 2). The extensively worn mandibular anterior teeth lacked the required tooth structure necessary for adequate retention of crowns (Figure 3a), thus a surgical crown lengthening procedure was performed (Figure 3b). The teeth were prepared for full coverage restorations and were temporized at the same VDO previously established with the removable stabilization splint (Figure 4). The patient was monitored for a period of four months with the provisional restorations and exhibited no signs of discomfort or impeded function at the recovered VDO and the final prostheses were restored at the original clinically determined increased VDO (Figures 5a, 5b, 5c, 5d). The posterior left mandibular quadrant was restored with an implant supported prosthesis supported by two screw-type dental implants (Figures 6a, 6b).

Maintenance:
The patient was placed on a biannual recall program and given detailed oral hygiene instructions. A mandibular stabilization splint was provided to the patient for his parafunctional habits and to protect his restorations (Figure 7).

CASE 2:
Case history and clinical examination
A forty-six-year-old male patient presented with advanced generalized wear which he attributed to gastroesophageal reflux. His condition was left untreated for over ten years, after which he had surgical correction of his condition. A thorough clinical and radiographic examination was conducted and diagnostic casts and photographs were obtained. Consultation with the patient's physician indicated that his gastroesophageal reflux was controlled. The patient displayed advanced wear on the palatal surfaces of his maxillary teeth and labial surfaces of the mandibular incisors (Figures 8a, 8b, 8c). The etiology of the wear was primarily due to acid erosion due to years of untreated gastroesophageal reflux.

Reconstructive phase
Treatment options were presented to the patient. The extensively worn maxillary anterior teeth lacked the required tooth structure necessary for adequate retention of crowns, thus a surgical crown lengthening procedure was performed (Figure 9). Restoration consisted of full coverage of the maxillary incisors and direct labial composite veneers on mandibular incisors (Figures 10a, 10b).

CONCLUSIONS
Tooth wear can manifest as abrasion, attrition, abfraction and erosion. The emphasis in management of tooth wear should be on identification of the etiology and prevention of the wear. Proper management of tooth wear involves a thorough case history, clinical examination, prevention and reconstruction, when necessary.

Dr. Habsha completed her DDS and Prosthodontic training at the University of Toronto. She is currently researching the effects of smoking on osseointegration. She is a staff prosthodontist at Mount Sinai Hospital and an Associate in Dentistry, University of Toronto. Her practice is limited to prosthodontics and implant dentistry in Toronto.

Dr. Neena D'Souza co-authored Part I: The Etiology and Pathogenesis of Tooth Wear, *Oral Health, October 1999. She is currently enrolled in the Master of Science program in the University of Toronto.*

Oral Health welcomes this original article.

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