RESIZING OF THE CRANIOMANDIBULAR RELATION IN THE REHABILITATION OF DENTAL ABRASION

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Abstract
Dental abrasion appears as a complex phenomenon among the multitude of clinical manifestations occurring in patients who require a complex oral rehabilitation. The therapeutical solutions for such cases are quite elaborate, involving interdisciplinary contributions from the part of various specialists. Obviously, elucidation of the complex cases of dental abrasion is possible when their standardized classification and, equally, a well-established therapeutical conduct, considering the class of dental abrasion, are available. Considering the advance of the adhesive techniques, the conservative treatment of dental abrasion is more indicated than the conventional method. Consequently, a 3-stage protocol of coronary reconstruction is recommended in cases of erosion with undersizing of the lower segment. The immediate aesthetic results are satisfactory for the patient, as well as the functional ones, not requiring longer accommodation times. The reconstructions are resistant, due to the progress recorded by the adhesive techniques and composite resins (nano-hybrids, nano-composites).

Keywords: dental abrasion, oral rehabilitation, craniomandibular relation.

1. INTRODUCTION
Dental abrasion, defined as a pathological loss of hard dental tissue, with no bacterial involvement, may be classified into 4 categories, as follows:

1. DENTAL EROSION (Fig. 1) namely, a progressive loss of dental substance through chemical processes, caused by etiopathogenic factors of the following type:
   - carbonated beverage consumption
   - acid aliments in excess (citric fruits, pickles)
   - gastro-oesophagian reflux (hiatal hernia, bulimia)
   - hyposialia (in chronic diseases caused by medication, in autoimmune diseases caused by age).

Fig. 1. Dental erosion
2. **ABFRACTION** (Fig. 2) an abrasion form involving loss of the dental structure through V-shaped detachment at cervical level

3. **ABRASION** (Fig. 3) abnormal wear caused by other factors than mastication:
   - dental brushing
   - reduced teeth mineralization
   - cummulated biomechanical forces (flexion, compression, torsion).

4. **ATHRITIA** (Fig. 4) defined as an abrasion caused by either mastication or parafunctions (varying as a function of the masticatory pattern in dento-alveolar disharmony), manifested only at the level of the occlusal surfaces.

![Fig. 2. Abfraction](image1)

![Fig. 3. Abrasion](image2)

![Fig. 4. Athritia](image3)

Bruxism – defined as an occlusal parafunction manifested through squeezing and/or involuntary friction, either nocturnally or diurnally, of the teeth from the 2 arches.

![Fig. 5. Dental abrasion](image4)

Within these classified manifestations, certain characteristic symptoms should be mentioned:
   - a poor aesthetics
   - coronary undersizing of teeth
   - fissuring, breaking and/or even fracturing of teeth (especially at the incisal margins)
   - dentinary hypersensitivity
   - erosive defects on the occlusal and incisal surfaces, large concavities and smooth surfaces, accompanied by enamel loss and dentin exposure, restorations in excess on the abraded tooth [1].
As dental abrasion is a multifactor and complex issue, manifested in multiple clinical situations, a standardized classification, as the one published by Bartlett et al., also known as BEWE (Basic Erosive Wear Examination) classification, is absolutely necessary [2-6].

The BEWE classification has been unanimously accepted, as it includes both the clinical elements of diagnosis and the treatment to be applied.

### SCORE

<table>
<thead>
<tr>
<th>SCORE</th>
<th>INTERPRETATION</th>
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<tbody>
<tr>
<td>0</td>
<td>No loss of substance</td>
</tr>
<tr>
<td>1</td>
<td>Initial loss of surface texture</td>
</tr>
<tr>
<td>2</td>
<td>Obvious defect, tissue loss on less than 50% of its surface (frequently employing the dentin)</td>
</tr>
<tr>
<td>3</td>
<td>Obvious defect, tissue loss on more than 50% of its surface (frequently employing the dentin)</td>
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</tbody>
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The score, calculated on sextants: lateral right-frontal-lateral left, takes values from 0, 1, 2 to 3. The analysis was completed by LUSSI, Mehta and Muts with the therapeutical classification and insertion of the dimensional modifications of the lower face (DVO), articular and muscular affection [7-9].

Groups 4 (subdivision a and b) and 5 (subdivision a and b) were also present.

<table>
<thead>
<tr>
<th>SUBSTANCE LOSS</th>
<th>TREATMENT OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>Superficial enamel (coronarily), dentin (radically)</td>
</tr>
<tr>
<td></td>
<td>Prophylactic measures and advices</td>
</tr>
<tr>
<td></td>
<td>Counterindicated restoration</td>
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<tr>
<td>Group 2</td>
<td>Moderate and isolated, enamel and dentin</td>
</tr>
<tr>
<td></td>
<td>No functional disability</td>
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<td></td>
<td>Direct or indirect adhesive restoration</td>
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<td></td>
<td>Periodontal rehabilitation often necessary</td>
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<tr>
<td>Group 3</td>
<td>Moderate, affecting a group of teeth without functional disability</td>
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<tr>
<td></td>
<td>Direct or indirect adhesive restoration</td>
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<tr>
<td></td>
<td>Periodontal rehabilitation often necessary</td>
</tr>
<tr>
<td>Group 4</td>
<td>Severe and multiple deterioration of the articular relation with no disfunctional articular syndrome</td>
</tr>
<tr>
<td>(4a and 4b)</td>
<td>No decrease of the vertical dimension (4a)</td>
</tr>
<tr>
<td></td>
<td>Decrease of the vertical dimension (4b)</td>
</tr>
<tr>
<td></td>
<td>Restoration of the mandibulo-cranial relations</td>
</tr>
<tr>
<td></td>
<td>Direct or indirect adhesive, prosthetic restoration, with or without increase of the vertical dimension</td>
</tr>
<tr>
<td>Group 5</td>
<td>Severe and generalized Articular disfunctional syndrome</td>
</tr>
<tr>
<td>(5a and 5 b)</td>
<td>No decrease of the vertical dimension (5a)</td>
</tr>
<tr>
<td></td>
<td>Decrease of the vertical dimension (5b)</td>
</tr>
<tr>
<td></td>
<td>Two-stage total oral rehabilitation of the two arches:</td>
</tr>
<tr>
<td></td>
<td>- adhesive reconstruction of the two arches for functional and aesthetic purposes</td>
</tr>
<tr>
<td></td>
<td>- prosthetic, sometimes implanto-prosthetic treatment</td>
</tr>
<tr>
<td></td>
<td>With or without increase of the vertical dimension</td>
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</table>
For a detailed estimation of dental abrasion in the frontal area, in the year 2012 Francesca Vailati proposed the ACE classification, meant at orienting specialists towards alternative treatments, as well [10-13].

A group of 5 specialists elaborated a review of all studies devoted to dental abrasion and to the possible treatment options, published in the literature of the field in the last 10 years, putting together the treatment protocols of complex dental abrasion, and stating that the ideal therapeutical method should involve 5 essential steps [6-14]:

1. wax-up diagnostic (DW)
2. occlusal positioning (RC; RO)
3. increase of the vertical dimension (3-5 mm) by means of occlusal devices
4. provisional and final restoration
5. mobile protection (tray) and a periodical post-treatment follow-up

Considering the advance of the adhesive techniques, the conservative treatment of dental abrasion is more indicated than the conventional method [14]. Consequently, a 3-stage protocol of coronary reconstruction is recommended in cases of erosion with undersizing of the lower segment.

2. CASE STUDIES

Male patient H.G., 56 year-old

- Diurnal bruxism (Fig. 6), inverse left canine tooth arrangement resolved with a prosthesis applied 12 years ago
- Addressed the stomatologist with pain at 1.6. and also for the substitution of the old prosthetic devices
- Pulpectomy and treatment of the partial purulent pulptis were preformed at 1.6
- 4 b BEWE score
- V ACE class - extended dentinary exposure at palatinal level, loss of tooth height (>2 mm), loss of the vestibular enamel.

Fig. 6. Pacient with diurnal bruxism
Fig. 7. Reconstruction with composite resin by direct method

Fig. 8. Reconstruction of canine teeth and of the maxillary premolars

Fig. 8. Reconstruction of the upper molars and of lower premolars 2

Fig. 9. Reconstruction of the central and lateral maxillary incisors

Fig. 10. Lower frontal group

Fig. 11. Final aspect
Female patient C.A., 35 year-old
- Nocturnal bruxism (Fig. 12) – did not use the tray prescribed 1 year after prosthesis application
- Gastro-oesophagian reflux
- Unidental edentation 3.6., 4.6. with conjunct metalo-ceramic prosthesis applied 8 years ago
- Small obturations in excess or fracturated in time, caused by extended dental abrasion

Fig. 12. Nocturnal bruxism
- V ACE - extended dentinary exposure at palatinal level, loss of tooth height (>2 mm), loss of the vestibular enamel
- 4b BEWE score

Fig. 13. Loss of the coronary frontal dimension as well as of the vertical occlusal dimension

The preferred method was the direct coronary reconstruction (Gradia GC) with 3 mm lifting.

Fig. 14. Reconstruction of canine teeth (palatinally and incisally) and of the upper molars (occlusally)
3. CONCLUSIONS

The immediate aesthetic results are satisfactory for the patient, as well as the functional ones, not requiring longer accommodation times.

The reconstructions are resistant, due to the progress recorded by the adhesive techniques and composite resins (nano-hybrids, nano-composites).

The direct method of occlusal resizing does not assure total precision for the establishment of an exact tooth lifting – however, the selected patients did not complain of articular and muscular pain either prior to or after rehabilitation.

The necessary manoeuvres are quite long, and possibly tiresome for the patient and undoubtedly for the stomatologist. For each patient, occlusal resizings were performed within 3 consecutive days.

References

1. Vailati F., Gruetter L., Belser U.C. Full-mouth Adhesive Rehabilitation of a Several Eroded Dentition:


