Incisal Edge Abrasion Caused By An Unusual Eating Habit
W Amin, A Kassab, N Salim

Abstract
This study investigated the effect on teeth of an unusual eating habit that is common in Jordan manifested by cracking salted and roasted watermelon seeds. A sample of 502 subjects was examined and categorized according to the incisal relationship. The depth of the incisal edge notch was measured and graded into three grades. Simple and multiple linear regression, and R-seq. tests were employed in data analysis. Grade estimation formulas were established and revealed that a proportional relationship existed between the amount of seeds and the duration of consumption with the severity of the incisal edge abrasion. Similar relationship was found between the amounts of seed consumption and the duration of the habit. An index was established for each incisal relationship that correlated the amount and duration of seed consumption with the severity of notching. Simple and pin-retained adhesive resin restorations were used for the treatment of the incisal edge notching.

INTRODUCTION
Tooth wear is a multifactorial process, which encompasses attrition (direct tooth to tooth rubbing), abrasion (physical wear by objects or substances other than another tooth) and erosion (non-bacterial acid dissolution).1-3,4,9

Studies regarding non carious lesions of teeth have attempted to index the possible causes of tooth wear. There were few reported studies, in the dental literature, which attempted to investigate those aspects of tooth tissue loss that were considered unique to the local population of the countries they belonged to.

Occurrence and pattern of tooth wear as a result of cultural and eating habits is of great importance, because the high consumption of certain types of food may cause abrasion and erosion to dentitions. Some eating habits may be considered abnormal if they cause tooth surface loss to a level that is assumed pathological affecting both function and appearance of teeth.

Tooth wear as a result of Pica (a Latin term which refers to the persistent eating of non-nutritive substances as clay, soil, pencil eraser, coal, chalk, wood, needles and cigarette butts) can cause generalized tooth wear manifested by abrasion of the affected dentitions and damage to the present restorations. It is most frequently seen in children, pregnant women and in individuals with learning disabilities.3 A popular eating habit in Jordan and some middle-eastern countries is characterized by cracking salted and roasted watermelon seeds. This habit was found to cause incisal edge notching ranging from a mild to a severe degree as observed in the present study.

These eating disorders not only affected the appearance but function of the anterior dentitions, and therefore should be considered abnormal eating habits.

The incisal edge abrasion caused by cracking watermelon seeds is manifested by a V-shaped notch on the affected tooth (Fig 1).
**MATERIALS AND METHODS**

A sample of 502 patients having incisal edge abrasion was examined during the period from February 2004 to September 2006. They were categorized according to the incisal relationship into Class I (the incisal edge of lower incisor teeth occludes on the cingulum platue of the upper incisor teeth), Class II (the incisal edge of lower incisor teeth occludes posterior to the cingulum of the upper incisor teeth) and Class III (the incisal edge of lower incisor teeth occludes anterior to the cingulum of the upper incisor teeth). The extent of the incisal edge notching was measured on the patients’ dental stone casts, using calipers. The patients were, accordingly, graded into 3 grades; grade 1 (Fig 2) characterized by notching equal to or less than 1.5 mm measured through the length of the clinical crown of the tooth (incisal edge abrasion ≤ 1.5 mm); grade 2 (Fig 3) in which incisal notching was greater than 1.5 mm but less than or equal to 3.5 mm measured through the length of the clinical crown of the tooth (1.5 mm < incisal edge abrasion ≤ 3.5 mm), and grade 3 (Fig 4) which represented notching greater than 3.5 mm but less or equal to 5.5 mm measured through the length of the clinical crown of the tooth (3.5 mm < incisal edge abrasion ≤ 5.5 mm).

Factors that caused tooth wear other than the abnormal eating were diagnosed and the subjects affected by such factors were eliminated. Statistical treatment of data sets was carried out using “Minitab 14 statistical package”.

Treatment of the affected subjects was carried out and the patients were kept under a regular follow up for the evaluation of the treatment prognosis.

**RESULTS AND DISCUSSION**

The results of the measurements of the incisal edge notch.
depth of the 502 patients were normally distributed (figs. 5 and 6a, b, c). Correlation between the severity of notching and the amount and duration of seeds consumption was attempted for each incisal classification. Simple and multiple linear regression tests were applied in order to define the effect of the amount and duration of seed consumption on the severity of incisal notching. This has given rise to numerical formulas which, clearly, illustrated the relationship among the three parameters (Table 1). For all incisal classifications, as the amount and duration of consumption increased the severity of incisal edge notching also increased.

Grade estimation formulas were established based on high “R-seq” values. These formulas helped estimate the grade of incisal edge abrasion depending on the amount and duration of seed consumption. It is noteworthy, that these formulas have defined the mathematical boundaries to each grade beyond which a transition to a severer grade would occur. This was because the amount and duration of consumption were proportionally related, i.e. an increase in the duration of seed consumption would be accompanied by a similar increase in the amount of seeds consumption. This direct proportional relationship (Fig 7) suggested a phenomenon manifested by subjects’ addiction to this abnormal eating habit. Table 2 presents the border line values by which the grade of incisal edge abrasion can be anticipated.

Linearity in the relationship between the amount and the duration of seed consumption was a common behavior demonstrated by all subjects regardless of their incisal classifications (fig 7). However, the three classes varied in the slope of the linear relationship between the amount and duration of seed consumption. Class I and II incisal relationships showed no significant difference, while class III revealed a different duration impact as the magnitude of the slope in the relation between the duration and the amount of seed consumed had a lower value compared to class I or II. This means that the increase in the duration of seed consumption in class III was associated with a concomitant increase in the amount of consumption and the severity of the incisal edge notching. It was evident that for a constant duration, the incisal edge abrasion progressed more aggressively in class III incisal relationship patients compared to patients with class I or class II relationships.
Figure 7: (a, b, c) Relationships between the duration and amount of seeds consumption.

Figure 8: Treatment of Grade 1 incisal edge abrasion on the upper right central incisor by composite restoration.

Table 2: Severity estimation guide for incisal edge abrasion caused by cracking salted and roasted watermelon seeds (duration, amount).

<table>
<thead>
<tr>
<th></th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>(0.0, 2) to (3.4, 2)</td>
<td>(3.4, 2) to (6.4, 7)</td>
<td>More than or equal to (6.4, 7)</td>
</tr>
<tr>
<td>Class II</td>
<td>(0.0, 2) to (3.2, 5)</td>
<td>(3.2, 5) to (6.7, 8)</td>
<td>More than or equal to (6.7, 6)</td>
</tr>
<tr>
<td>Class III</td>
<td>(0.0, 2) to (3.0, 3)</td>
<td>(3.0, 3) to (5.3, 7)</td>
<td>More than or equal to (5.3, 7)</td>
</tr>
</tbody>
</table>

**CLINICAL MANAGEMENT OF INCISAL EDGE ABRASION**

Tooth wear has definitive effect on patients' satisfaction with different aspects of their dentition, therefore it was essential to provide tooth wear patients with appropriate management to avoid negative effects of tooth wear on quality of life.

The treatment of tooth wear is complex and demanding in terms of both the dentist's time and the compliance and cost to the patient. The complexity of the treatment, in severe
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cases, arises from the loss in the clinical crown height which, in turn, may affect the occlusal vertical dimension. Variety of treatment options is available depending on the site and extension of tooth loss. Clinical evidence exist in support of using composite resin to restore worn anterior teeth which is considered the treatment of choice if the incisal aspect was involved.

Composite resin restorations were placed, employing adhesive dentistry, to all studied subjects. Composite-retention pins were used when needed to reinforce the retention of the restoration. Grade 1 incisal edge abrasion patients were treated by composite restoration on the affected tooth without the use of composite-retention pins (Fig 8), Grade 2 incisal edge abrasion patients were treated by using composite resin restoration with one dentine-retention pin (Fig 9a, b), and Grade 3 incisal edge abrasion patients were treated by using composite resin restorations with two dentine pins (figure 10a, b).

If the palatal surface was involved, composite would be difficult to apply and it would be liable to fracture. In these situations the treatment of choice was to restore the incisal aspect with composite resin and the palatal aspect with a more

Figure 15
Figure 9: (a, b). treatment of grade 2 incisal edge abrasion. 9a. one composite retention pin was used. 9 b. final restoration by composite.

Figure 16

composite on the posterior teeth or by using bite raising appliance. It was a matter of judgment as to how much the vertical dimension should be increased. In general, it was believed, that the new vertical dimension should be estimated from the original crown height which was most conveniently achieved by diagnostic wax-up.

Where the clinical crown height was to be preserved, surgical crown lengthening was indicated. Monitoring tooth wear progression was as essential as the choice of the restorative material, by which habit cessation and treatment needs were evaluated.

CORRESPONDENCE TO

Professor Wala M. Amin PhD, MSc, BDS, FICS, Dip.Ed.M P. O. Box 13455 Amman 11942 Jordan Telefax: +962 6 5330304 Email: wami@ju.edu.jo or profwala@gmail.com

References

Author Information

Wala M. Amin
Professor of prosthodontics and Dental Materials Science, Faculty of Dentistry, University of Jordan

Ammar MS Kassab
Intern House Surgeon, Faculty of Dentistry, University of Jordan

Nesreen A. Salim
Teaching assistant and clinical instructor, Faculty of Dentistry, University of Jordan