Effectiveness of oral hygiene protocol in patients with post-traumatic splinting

S. PASINI, E. BARDELLINI, I. CASULA, P. FLOCCHINI, A. MAJORANA

ABSTRACT. Aim In dental trauma with severe periodontal tissue involvement, as dental avulsion and severe luxation, the splinting procedure requires the patient to maintain a scrupulous hygiene of the affected zone, so to allow an effective tissue healing. The aim of this study was to assess the effectiveness of a specific oral hygiene protocol in the treatment of patients with post-traumatic splinting, comparing the plaque indexes of dental hygienist-helped patients versus not helped. Materials and methods. This study was carried out on 82 selected patients with post-traumatic splinting due to traumatic avulsion and severe luxation. They were divided into 2 groups, comparable for age, sex, type of trauma and splinting. The group A patients underwent an oral hygiene protocol, managed by a dental hygienist, while the group B patients were followed without the help of the hygienist. Plaque indexes were observed and compared in all cases during 6 weeks follow up. Results. Our results showed that at the 6th week follow up the plaque indexes of dental hygienist-assisted traumatized patients were significantly (p=0.001) lower than those of not assisted patients. Conclusion. Therefore, the role of dental hygienists is essential in the management of dental trauma with periodontal damage, which needs specific oral hygiene protocols.

KEYWORDS: Dental trauma, Post-traumatic splinting, Oral hygiene.

Introduction
In traumatic dental avulsion and severe luxation, the damage of periodontal tissues represents the predominant aspect of the traumatic event, conditioning the medical approach [Perez R. et al., 1991; Areasen FM et al., 1991; Majorana A et al., 2002; Majorana A et al., 2003].

The therapeutic strategies call for splinting in order to stabilize both damaged teeth and periodontal tissues [Barret E.J. et al., 1997; Chappuis V. et al., 2005; Dehen M. et al., 1991; Stellini E. et al., 2005]. The serious involvement of the periodontal tissues requires the patient to maintain a careful oral hygiene of the affected zone in order to obtain a complete tissues healing [Von Arx T. et al., 2001; Sander F.M. et al., 2005; Filippi A. et al., 2002]. Therefore, the role of the dental hygienist is essential in the management of traumatized patients, needing specific oral hygiene session, during the treatment of dental trauma.

The aims of this study were:
- to observe patients with dental trauma, visited at Dental Clinic of the Brescia University from November 1st 2004 to August 31st 2005, in particular the cases in which the treatment plan included splinting after the correct repositioning of traumatized teeth;
- to assess the effectiveness of a specific oral hygiene protocol for the treatment of patients with post-traumatic splinting aiming to reduce the oral bacterial load, in order to avoid complications and overinfections during recovery;
- finally, to compare the plaque indexes of dental hygienist-assisted traumatized patients versus not assisted traumatized patients.

Materials and methods
522 subjects with dental trauma (450 males and 72 females) coming at the Dental Clinic of Brescia University from November 1st 2004 to August 31st 2005 were observed.

This study was carried out on 82 selected patients (41 males and 41 females, aged 7-18 years) with post-traumatic splinting due to traumatic avulsion and severe extrusive and lateral luxation. The 82 patients were divided into two randomised groups, group A (41 patients) and group B (41 patients), matched for age, sex, type of trauma and splinting. Group A patients...
underwent an oral hygiene protocol, managed by a dental hygienist in order to motivate them about the correct oral hygiene methods, while group B patients were followed without the help of the hygienist. Patients enrolled in the study were checked by the same operator both at the first examination and at the subsequent follow-ups.

As regards group A, the oral hygiene protocol included:

- **During 1st week**: oral hygiene instructions, mouthwash with chlorhexidine 0.12% (3 times a day for 1 minute);
- **Second week**: use of an ultra-soft toothbrush with a chlorhexidine-based toothpaste;
- **Third week**: splinting removal; survey of the health status of the oral mucosa and of the periodontal tissues; soft toothbrush and fluoridated toothpaste and mouthwashes;
- **Four weeks follow-up**: motivational reinforcement, flossing;
- **Five weeks follow-up**: professional oral hygiene; fluoride prophylaxis;
- **Six weeks follow-up**: motivational reinforcement.

During all the protocol phases, the same dental hygienist assessed the plaque scores according to the Löe plaque index (Table 1).

As regards group B, the patients were controlled by the dental hygienist only at the first week and at the last follow-up (6th week), for the plaque index assessment.

The splinting procedures consisted of:

- orthodontic splinting with brackets (edgewise) and standard wire;
- splinting with composite resins;
- splinting with composite resins and wire;

Several factors affect the choice of the different types of splinting used: the kind of lesion, the patient age and the degree of cooperation, operator experience and the possible involvement of the soft tissues. In

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<th>Plaque index classification according to Löe.</th>
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<tbody>
<tr>
<td>0</td>
<td>Absence of plaque</td>
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<tr>
<td>1</td>
<td>Presence of plaque on the cervical edge</td>
</tr>
<tr>
<td>2</td>
<td>Presence of plaque for _ of the tooth crown</td>
</tr>
<tr>
<td>3</td>
<td>Presence of plaque on the whole tooth crown</td>
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**TABLE 1**

**FIG. 1A** - Patient not undergoing the oral hygiene protocol: crown fracture of right upper incisor; extrusive luxation of left upper incisor.

**FIG. 1B** - Patient not undergoing the oral hygiene protocol: orthodontic splinting.

**FIG. 1C** - Patient not undergoing the oral hygiene protocol: 6th week follow up.
fact, orthodontic splinting with brackets and wire is less tolerated in patients with injured soft tissues; however, this splinting is usually recommended as it allows a better execution of the oral hygiene maneuvers by the patient [Dehen M et al., 1991; Stellini E et al., 2005; von Arx T et al., 2001]. On the contrary, the resin splint leads to an increased and significantly higher irritation of the gingiva due to a significant increase in cleaning difficulties [Sander FM et al., 2005; Filippi A et al., 2002]. All data were collected in a data entry form and photographic records were taken.

**Results**

The 82 patients enrolled in the study reported 36 traumatic avulsions, followed by dental replantation, and 46 severe extrusive and lateral luxations.

As regards group A, among the 18 traumatic avulsions, 11 were stabilised with an orthodontic splinting, 5 with composite resins splinting and orthodontic wire, and 2 with just composite splinting.

Within the 23 severe extrusive and lateral luxations 17 cases required splinting with composite resins and orthodontic wire and 6 required an orthodontic splinting.

As regards group B, among the 18 traumatic avulsions 7 were stabilised with an orthodontic splinting, 6 with a splintage made by composite resins and orthodontic wire, and 5 with only composite splinting. Among the 23 luxations 12 cases required a composite resins splinting, 10 a composite resins and orthodontic wire splinting and 1 case required an orthodontic splinting.

The plaque indexes at the first week and at 6 months follow-ups are reported in Tables 2 and 3 for both groups. At the first week follow up, the plaque index (PI) scores in group A were: 1/41 patient (2.4%) scored 0; 15/41 (36.5%) scores 1; 22/41 (53.65%) scored 2 and 3/41 (7.31%) scored 3, while, in group B, 2/41 patients (4.87%) scored 0; 11/41 (26.82%) scored 1; 24/41 (58.53%) scored 2 and 4/41 (9.75%) scored 3 (Table 2). At the 6th week-follow up, PI scores in group A were: 24/41 patients (58.53%) scored 0; 16/41
(39.02%) scored 1; 1/41 (2.4%) scored 2 and 0/41 (0%) scored 3, while in group B 6/41 patients (14.63%) scored 0; 22/41 (53.65%) scored 1; 5/41 (12.19%) scored 2 and 2/41 (4.87%) scored 3 (Table 3).

Comparing the plaque indexes, we found that while at first week- follow up there were no significant differences between the two groups (p>0.05), at the 6th week follow up the plaque indexes of dental hygienist-assisted traumatised patients were significantly (p=0.001) lower than those of not assisted patients.

**Discussion**

The high rate of periodontal tissues involvement in dental trauma and the frequent need of splinting in order to stabilise teeth and damaged periodontal tissues require a correct oral hygiene protocol to help tissues recovery.

Considering patients with the same oral hygiene conditions, group A supported by the dental hygiene protocol improved significantly the plaque indexes in comparison to group B, not supported [Filippi A et al., 2002]. These results underline the importance of a correct therapeutic approach in case of dental trauma both by the dentist, through the use of splintages to get the stabilization and to favor the recovery of the dental elements and periodontal tissues, and by the hygienist whose intervention allows an effective control of the oral bacterial load. So, it is essential that post-traumatic management includes specific oral hygiene protocols carried out by dental hygienists, according to the treatment plan.

**Conclusion**

Our study suggests to introduce the dental hygienist during the dental trauma follow-up, in order to improve the recovery of oral tissues especially in all case with splinting appliance.

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<tr>
<th>Group A (41 pt)</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<tbody>
<tr>
<td>Group B (41 pt)</td>
<td>2</td>
<td>11</td>
<td>24</td>
<td>4</td>
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**Table 2 - Plaque index at the first week- follow up.**

<table>
<thead>
<tr>
<th>Group A (41 pt)</th>
<th>24</th>
<th>16</th>
<th>1</th>
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<tbody>
<tr>
<td>Group B (35 pt)</td>
<td>6</td>
<td>22</td>
<td>5</td>
<td>2</td>
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**Table 3 - Plaque index at the 6th week- follow up.**

**References**


