

Periodontal status following surgical-orthodontic alignment of impacted teeth

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Treatment of impacted teeth is often a combination between oral surgery and orthodontics. This study evaluates the gingival condition of impacted teeth after surgical-orthodontic treatment, where two different surgical methods were used. In one group (n = 11) the teeth were radically exposed and orthodontically moved to their final position. In the other group (n = 11) the teeth were partially exposed by raising a mucoperiosteal flap. Orthodontic traction was then applied; whereafter the flap was sutured back into place.

The results showed that one of the teeth in the partial exposure group and seven in the radical exposure group showed loss of attachment. This study indicates that a combination of mucoperiosteal flap technique and applied orthodontic traction is preferred to minimize the loss of attachment in cases of displaced impacted teeth.

Keywords: Tooth; oral surgery; orthodontics; periodontium

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Treatment of impacted teeth is often a combination between oral surgery and orthodontics. In these cases the surgical technique most commonly described is a radical exposure of the impacted teeth (11, 2, 12). Spontaneous eruption of impacted teeth after surgical exposure has been shown to be fairly good (9, 1, 12, 13). However, the effects of the surgical procedure upon the periodontium have lately received more attention in literature (5, 7, 10, 14). By using a mucoperiosteal flap technique Wisth, Nordervall & Bøe (15) have reported that this procedure may cause comparatively less periodontal damage.

The aim of this study was to evaluate the gingival condition of impacted teeth after surgical-orthodontic correction where two different surgical methods were employed.

MATERIALS AND METHODS

The material comprised two groups of patients who had been treated for impaction of maxillary incisors or canines (Table 1).

In one group, called the radical exposure group (15), the bone and mucosa covering the crown was removed. After spontaneous

eruption an orthodontic traction was applied. In the other group, called the partial exposure group (15), a mucoperiosteal flap was raised, the bone covering the crown was removed and either a pin was cemented to the crown or an attachment was bonded. Thereafter the flap was replaced and sutured.

Extraction of permanent teeth in order to create space for the impacted tooth was not necessary in any of the patients.

The average age of the patients at the time of the surgical exposure was 13.6 years. Patients treated for impacted incisors had an average age of 10.5 years while those treated for canines 14.5 years. The duration of the orthodontic treatment varied between 11 and 23 months, averaging 19 months.

At the time of the examination of the gingival condition the mean age of the patients was 17.9 years and all patients were past the period of orthodontic retention. The periodontal status was examined with respect to gingival recession and hyperplasia of the free gingival margin on the labial and lingual surfaces. Gingival recession was considered when the gingival margin was apical to the cemento-enamel junction. Gingival hyperplasia was judged when the depth of the pseudopocket exceeded two millimetres and an optically evaluated enlarged and festooned cuff was present.

RESULTS

Gingival recession

The results of the examination with respect to gingival recession of the surgical-orthodontic treated teeth are shown in Table 2. One tooth in the partial group and seven in the radical group showed gingival recession on the labial or lingual surface.

Table 1. *Distribution of the impacted teeth between incisors and canines partially or radically exposed*

	Surgical technique	
	Partial	Radical
Maxillary incisors	3	2
Maxillary canines	8	9

Table 2. *Loss of attachment on labial and lingual surfaces of impacted teeth surgically exposed by partial or radical surgical technique*

Loss of attachment	Surgical technique	
	Partial (n = 11)	Radical (n = 11)
Labial	1	4
Lingual	0	3

Table 3. *Gingival hyperplasia on labial and lingual surfaces of impacted teeth surgically exposed by partial or radical surgical technique*

Gingival hyperplasia	Surgical technique	
	Partial (n = 11)	Radical (n = 11)
Labial	2	4
Lingual	1	4

Gingival hyperplasia

The results of the examination with respect to gingival hyperplasia of the surgical-orthodontic treated impacted teeth are shown in Table 3. Of the eleven teeth in the partial group three showed gingival hyperplasia associated with them. In the radical group seven out of eleven teeth showed associated gingival hyperplasia. In one of these cases hyperplasia was registered on both labial and lingual surfaces.

Initial position

In the radical group three teeth had initially high labial positions. All of these showed gingival recession on the labial surface. Five cases had lingual positions and three of them showed gingival recession on the lingual surface. Of the three cases with a central position one showed gingival recession. In the moderate group the one case that showed gingival recession had an initial labial position.

DISCUSSION

Several authors have studied the effect of the surgical exposure upon the eruption tendency of the impacted teeth (1, 12, 13). However, the results of the surgical exposure upon the periodontal tissue of the impacted tooth have received comparatively less attention. Day (4) and Di Biase (5) have reported unfavorable periodontal health when labially placed impacted teeth have been radically exposed and orthodontically treated. Loss of fiber attachment has also been reported by Hanson & Linder-Aronson (6) and Wisth et al. (16) when lingually placed impacted canines were treated in the same way.

In our study the majority of the impacted teeth in the radical group showed loss of attachment (Table 2). Furthermore a tendency towards correlation was found in this group between initial position of the impacted tooth and the surface which showed gingival recession. All cases with an initial labial position showed gingival labial recession. These cases are characterised by absence of a functional zone of attached gingiva since the teeth were exposed into alveolar mucosa (7). Nevertheless, gingival recession was also found in three of the five cases which were lingually exposed. It seems likely that the periodontal damage could also be related to disturbance of the interaction between oral and odontogenic epithelia (3, 7) and plaque accumulation (17).

By using the partial surgical technique a comparatively better periodontal health was achieved which is in agreement with Wisth et al (15). In our study only one out of eleven in the moderate group showed gingival recession. This surgical flap technique in combination with orthodontic treatment creates several possible advantages. The impacted tooth is guided subgingivally into the attached gingiva in the area for its final position and better oral hygiene is possible during the treatment.

Gingival hyperplasia in connection with orthodontic treatment has been shown to be reversible upon appliance removal (16, 8). In our study, two years after removal of the orthodontic appliance, gingival hyperplasia was registered mainly among the radically operated cases (Table 3). This finding indicates another undesirable effect of the radical surgical technique.

However, further studies are necessary to evaluate the effect of the surgical technique upon the soft tissue reaction after alignment of impacted teeth.

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