

**CASE REPORT**

## The importance of periodontal plastic surgery as a pre-orthodontic procedure.

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### Abstract

The development of new orthodontic appliances has encouraged a growing number of adults to benefit from treatment. The goal of preventive mucogingival surgery is to increase soft tissue coverage before the start of the orthodontic treatment.

The aim of this case report is to present the clinical outcomes of periodontal plastic microsurgery technique as a pre-orthodontic procedure in a 28 years-old female patient with gingival recessions in quadrant II and thin gingival biotype. After a session of prophylaxis and the cervical lesion's treatment, a bilaminar technique with coronally advanced envelope flap was performed. The connective tissue grafts were sutured over the denuded root surfaces with resorbable sutures. The sutures were removed after two weeks postop and the healing was uneventful. The results have been maintained during the orthodontic treatment and no dentin hypersensitivity was reported after the periodontal plastic surgery.

In conclusion, this procedure represents a predictive treatment of recessions and can minimize further recessions and exposure of the roots during the orthodontic forces.

**Keywords:** periodontics, orthodontics, plastic surgery

### Introduction

Although gingival biotype represented by the keratinized tissue and attached gingiva is determined genetically, it may be affected by the presence of plaque-associated inflammation or by the action of certain surgical or mechanical interventions like scaling and root planning.

In the literature, numerous techniques like guided tissue regeneration and guided bone regeneration are presented, but they must be applied according to the type and nature of the periodontal defect.

The aim of this paper is to present the clinical outcomes of periodontal plastic microsurgery technique as a pre-orthodontic procedure.

A number of periodontal plastic procedures to strengthen thin, weak gum tissue and to enhance the appearance of the soft tissues are available. They help maintain the teeth, treat sensitivity, or improve the aesthetics of smile. These include soft tissue grafts and aesthetic crown lengthening procedures.[1]

Adult patients are more and more interested in having orthodontic treatment but many of

them have periodontal problems. Periodontal disease can be treated by the patient's general dental practitioner or, if more complex treatment is required, referred to a specialist. Periodontal problems should be addressed prior to orthodontic treatment.[2]

The two primary etiologic factors in the pathogenesis of gingival recessions are periodontal diseases and mechanical trauma. Traumatic tooth brushing appears to be one of the important factors associated with gingival recessions. Other secondary etiologic factors may include bone dehiscences, smoking, intraoral and perioral piercings.[3]

At first, periodontal examination of the affected teeth was performed essentially only clinically without standardized radiographic evidence, thus limiting the identification of the unfavourable sequelae to the clinically detectable signs of gingival recession, with almost no information about the bone levels.[4]

Cone beam computed tomography provides clinically relevant information on this issue, even with its limitations regarding the

overestimation of bone fenestrations and dehiscences.[5-7]

Kahn et al [1] underline that the scientific evidence shows that the subepithelial connective tissue graft promotes higher levels of root coverage, high predictability and provides more gingival thickness.

The development of new orthodontic appliances, that are partially or completely undetectable, has encouraged a growing number of adults to benefit from treatment.

Multi-disciplinary treatments are generally required to obtain a satisfying clinical result that improves aesthetic appearance. The goal of preventive mucogingival surgery is to increase soft tissue coverage before the start of the orthodontic treatment. In fact, treating gingival recessions is more predictable and easier if it is performed before it intensifies [8].

Muco-gingival defects, gingival recession among others occur frequently in adults, have a disposition to increase with age, and occur in populations with standards of oral hygiene that are both high and low. The exposure of the root surface is frequently associated with impaired aesthetics, dentinal hypersensitivity and carious and non-carious cervical lesions.[9]

Depending on the direction of the orthodontic movement, a possibility of gingival recession initiation or progression during or after orthodontic treatment may occur. Several authors have demonstrated that gingival recession may develop during or after orthodontic therapy. The reported prevalence varies from 5% to 12% at the end of treatment. Authors report an increase of the prevalence up to 47% in long-term observation (5 years). However, it has been showed that, when a buccally positioned tooth is moved in a lingual direction within its alveolar process, the apico-coronal tissue dimension on its buccal aspect will increase in width. A recent systematic review concluded that the direction of the tooth movement and the bucco-lingual thickness of the gingiva play important roles in soft tissue adjustment during orthodontic treatment. There is a higher probability of recession during tooth movement in areas with less than 2 mm of gingiva. Gingival augmentation can be indicated before the start of orthodontic treatment in areas with <2 mm gingival thickness. These conclusions are

mainly based on clinical observations and recommendations (low level of evidence).[10-12]

Different factors such as aging, the condition or absence of the interdental periodontal tissue, and especially of the presence of an attached KT band < 2 mm can influence root coverage predictability and explain the lack of stability of the gingival margin in almost half of the treated sites during 20 years of observation.[13,14]

### Case presentation

A 28 years-old female patient, was referred by the orthodontist due to the concerning gingival recessions in quadrant II and the thin gingival biotype.

Her chief complaint was the teeth hypersensitivity in the left upper quadrant and the unaesthetic position of the teeth. The patient's medical history revealed no systemic conditions that may contraindicate the plastic periodontal treatment.

Clinical examination showed a Miller class I recession of approximately 3.5 mm for teeth 2.6, 2.5, 2.4 and 0.5 mm for tooth 2.3 (Figure 1). Beside the recessions, the bicuspid (2.4, 2.5) and the molar (2.6) showed cervical non-carious lesions. The overall periodontal examination showed no pathologic probing depths and no bleeding on probing with a plaque score of 8%.

The rationale for improving the periodontal conditions before the orthodontic treatment was to avoid a further and more complicated or untreatable recession.



Figure 1. Initial clinical aspect of the recession in quadrant II

### Pre-surgical phase

Before performing the plastic periodontal treatment, the main goal was to obtain the

maximum root coverage (MRC) of the recessions. The patient received a session of prophylaxis to remove microbial deposits with ultrasonic scaling, rubber cup, polishing paste and airflow, including oral hygiene instructions on using a coronally directed roll technique to minimize toothbrushing trauma to the periodontal soft tissue margin.

After obtaining the MRC, it was decided to treat the cervical non-carious lesions at the exact MRC level (Figure 2).



Figure 2. The cervical fillings were placed at the MRC

### Surgical phase

At one week after the cervical lesion's treatment, a bilaminar technique with coronally advanced envelope flap was performed.

Following local anesthesia, a split thickness

incision was performed extending mesial and distal with one tooth from the recession site, leaving the periosteum attached to the bone (Figures 3, 4). With a microsurgical elevator the periosteum was elevated 3-5 mm on the buccal aspect of the receding teeth (Figure 5).

After elevating the entire flap, root debridement was performed using manual Gracey curettes and EDTA gel 24% was applied for 2 minutes. The remaining facial portion for the anatomical papillae was de-epithelized to create connective tissue beds to which the surgical papillae of the coronally advanced buccal flap were secured during suturing.

A free subepithelial connective tissue graft of 22 mm in length, 5 mm in width and 1.5 mm in thickness was harvested from the palate. The graft was de-epithelized using a 15C blade and divided into three sections. The connective tissue grafts were sutured over the denuded root surfaces with resorbable sutures (Figure 6).

The flap was secured with double loop sutures and double vertical and horizontal mattress sutures were performed in the buccal fornix (Figure 7). The sutures were removed after two weeks postop and the healing was uneventful.



Figure 3. Design of the coronally advance envelope flap



Figure 4. Split thickness flap leaving the periosteum attached to the bone and de-epithelization of the anatomical papillae.

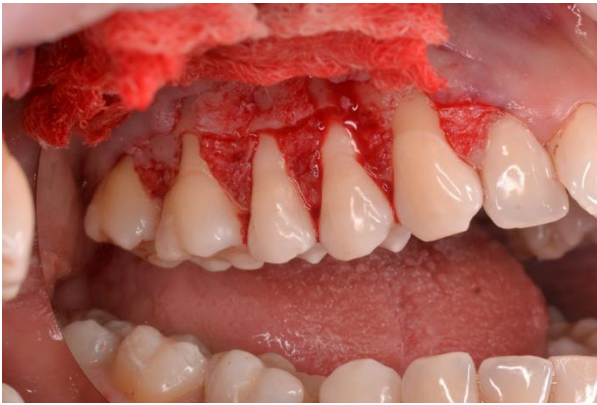


Figure 5. Periosteum elevation of the buccal aspect of the receding teeth

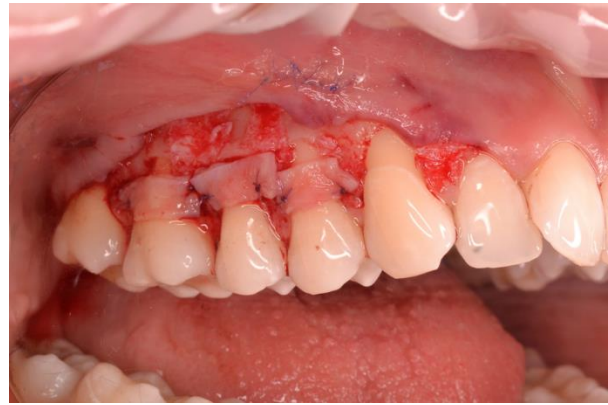


Figure 6. The three sections of connective tissue graft sutured to the periosteum



Figure 7. Double vertical and horizontal mattress suture in the buccal fornix

### Post-surgical phase

Two weeks later, the sutures were removed. Patient was instructed not to brush in the treated area, only to rinse for 1 minute with an alcohol and chlorhexidine free mouthwash. After suture removal, plaque control was

performed by the periodontal plastic surgeon with rotary brushes and polishing paste at low rotating speed (1500 – 2000 rpm). The patient was instructed in mechanical tooth cleaning using an ultrasoft toothbrush for 1 month and told to rinse with alcohol and chlorhexidine free mouthwash twice a day.

At three months postoperative, the patient was referred back to the orthodontist to begin the orthodontic treatment.

Patient was recalled for prophylaxis at 1 month, 3 months, 6 months (Figure 8) and at 1 year postoperative (Figure 9).

The clinical outcomes of this case report showed a complete root coverage, thick gingival biotype, which has been maintained during the orthodontic treatment despite the buccal orthodontic forces for more than one year. No dentin hypersensitivity was reported after the periodontal plastic surgery.



Figure 8. Clinical aspect at 6 months postop



Figure 9. Clinical aspect at 1 year postop.

### Discussions

An accurate periodontal diagnosis can be formed only after an accurate and reproducible clinical examination of the periodontium. The

results of this examination will lead to either initiating orthodontic treatment or to a two-step process of corrective therapy, prior to orthodontic treatment. A thickening procedure

of the mucosa and a gingival graft must be performed before the orthodontic treatment can begin.[8]

Contradictory results were found regarding a possible statistically significant correlation between the amount of incisor proclination and the extent of gingival recession during treatment, width of attached gingiva, periodontal condition, thickness of the symphysis and hygiene.[4]

Several parameters that influence the results, such as interproximal attachment loss, recession size, dimension of the papilla and flap thickness, have also been identified.

It can be anticipated that if the gingival margin maintains an appropriate thickness after orthodontic treatment, the tissue would be more resistant and less affected by tension from excessive proclination.

Despite the clinical experience that soft tissue augmentation of bucco-lingual gingival dimensions before orthodontic treatment may be a clinically viable treatment option in patients considered at risk, this treatment approach is not based on solid scientific evidence.[15]

There are no high significance animal or clinical studies on this topic. Movement of the incisors out of the osseous envelope of the alveolar process may be associated with a higher tendency for developing gingival recessions, consequently, the risk for developing gingival recession could be significantly reduced.[16]

## Conclusions

When dealing with patients that require orthodontic treatments with the presence of gingival recessions and thin biotype, periodontal plastic surgery represents a mandatory pre-orthodontic procedure. This procedure represents a predictive treatment of recessions and can minimize further recessions and exposure of the roots during the orthodontic forces.

**Conflict of interest:** None to declare.

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