CASE REPORT

The combined augmentation/vestibuloplasty procedure preventing gingival recession in orthodontically/surgically treated prognathic patient: a 14 year follow-up

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Abstract

A novel technique is presented combining bone augmentation with vestibuloplasty to prevent gingival recession in prognathic mandible treated surgically and orthodontically that was followed up for 14 years.

Introduction

Orthodontics is frequently chosen to achieve a correct correlation and alignment of the teeth in an individual. A variety of periodontal problems have been seen in such patients ranging from simple plaque-associated gingival inflammation to gingival recession, loss of bone and root resorption\textsuperscript{1–6}. Orthodontic movement of lower incisors in such cases, particularly pronounced sagittal incisor movements and de-rotation or de-compensation during routine fixed appliance therapy, may be critical and lead to progressive bone loss of lingual and/or labial cortical plates\textsuperscript{9–14}.

There have been very few reports in the literature about cases warranting de-compensation of mandibular lower incisors in prognathic mandibles undergoing preventive treatment for such complications\textsuperscript{11,15}.

We present, therefore, a case with mandibular prognathism subjected to orthognathic surgery and pre- and post-operative orthodontic treatment with a 14 year follow-up in whom a unique treatment approach was used to prevent the bone loss and gingival recession in the mandibular anteriors.

Case report

A 19 year-old male with mandibular prognathism subjected to mandibular set-back via the bilateral sagittal split osteotomy; the wire osteosynthesis and the intermaxillary fixation were referred postoperatively by his orthodontist for a consultation and possible treatment for his condition regarding an unfavourable response to postoperative orthodontic treatment. During the final orthodontic adjustment, it was noted that the roots of the lower incisors were seen on the lingual side pushed through the bone appearing underneath the gingiva. An attempt was then made to de-rotate or push the apices of the roots towards the
labial side. However, the same condition appeared then on the labial side.

Clinical examination revealed visible roots of the lower incisors and the canines on the labial side as well as a thin gingival biotype with slightly noticeable gingival recession (Fig. 1).

**Surgical technique**

The procedure was performed under local anaesthesia where a copious amount of local anaesthetic solution was injected into the submucous plane to separate the mucosa from the underlying muscles. A semi-lunar incision, using the no 15 blade, was placed in the labial mucosa terminating near the mucogingival junction at the level of the lower second premolars (Figs 2 and 3A). The mucosa was then, cranially, dissected off the submucosa and the mentalis muscle reaching the attached gingiva (Fig. 3B). The periosteum was incised at this level and was stripped off the bone together with the muscle down to the projection of the apices of the roots (Figs. 3C and 4) leaving sufficient muscular tissues attached to the vestibular periosteum to avoid a sagging chin. A biocompatible porus bone substitute (Bio-Oss®, Geistlich Pharma AG, Wolhusen, Switzerland), size small, was placed covering the roots and particularly filling up the inter-radicular spaces (size large) (Figs 3D and 5). The collagen membrane (Bio-Gide® Geistlich Pharma AG) was cut to the size and placed over the graft.

The mucosal flap was advanced and sutured to the periosteum with a 4-0 resorbable mattress stay sutures on a round needle at the level of the future bottom of the sulcus by leaving a 5 mm-wide free mucosal

Figure 1 Preoperative condition with visible roots of the lower incisors and canines.

Figure 2 Semi-lunar incision placed in the alveolar mucosa terminating near muco-gingival junction.

Figure 3 Cross section, diagrammatic representation of the surgical technique; (A) Place of the incision (arrow). (B) The mucosa is lifted of the Mentalis muscle. (C) The periosteum is incised at the border of the attached gingival and stripped off the bone down to the projection of the apices of the teeth. (D) The grafted material applied with the barrier membrane, the mucosal flap is sutured to the periosteum at bottom of the sulcus with mattress suture. (E) The free end of the mucosal flap was stretched and sutured to the incision line in the lip.
margin (Fig. 3D). This mucosal strip was stretched and its periphery sutured to the free edge of the labial incision with very little tension (Figs 3E and 6).

The patient was followed up for 14 years in terms of the skeletal and occlusal stability, condition of the gingivae, occurrence of recession and inflammation. At the last recall, the marginal gingivae was stable, and no progression of gingival recession was noted (Fig. 7). However, the occlusion deteriorated over time, whereas the skeletal stability was maintained.

**Discussion**

A reasonably long follow-up period of 14 years of our patient has disclosed interesting findings over time. The combined orthodontic/orthognathic treatment has rendered a skeletal stability that was associated with dental relapse. The periodontal status in terms of gingival margin levels has remained relatively stable especially when the lower teeth that were subjected to the treatment were concerned. The stability of the gingival margins in turn indicates stable bone levels which was the aim of our guided tissue regeneration.

It can be speculated that that the periodontal status of the teeth in the symphyseal region would have been unchanged even if the described procedure had not been applied. We are of the opinion that it is unlikely and that our treatment concept has prevented gingival recession particularly when the data from the literature are taken into consideration.

The uniqueness of such cases is a twofold problem starting with the anatomic variation and later on the amount and direction of teeth movement needed. Anatomically, prognathic mandibles have been found to be elongated, narrow and especially thin with thin bone in the lower incisors region. In such patients, a pronounced sagittal or antero-posterior incisor...
movements during routine orthodontic treatment might lead to progressive bone loss of the lingual and labial cortical plates, resulting in alveolar bone fenestration or gingival recession that compromises periodontal health and aesthetics\(^3,10,20,21\).

The vestibuloplasty per se has created a band of the fixed mucosa (Fig. 7), thus preventing the muscle pull and the loss of the keratinised gingivae. The particulate bone has apparently integrated and prevented further bone dehiscence over the roots. This has created a support to the soft tissues and its stability in addition to bone dehiscence over the roots. We think that our incision design is superior to the marginal incision because the papillae are left undisturbed and the crestal incision design is superior to the marginal incision for the prevention of further bone loss and the loss of the keratinised gingivae. The particulate fixed mucosa (Fig. 7), thus preventing the muscle pull movements during routine orthodontic treatment might lead to progressive bone loss of the lingual and labial cortical plates, resulting in alveolar bone fenestration or gingival recession that compromises periodontal health and aesthetics\(^3,10,20,21\).

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We have been using the described surgical technique of vestibuloplasty for over 18 years for various indications such as vestibuloplasty in edentulous jaws or localised vestibuloplasty associated with submucous free grafts in the treatment of peri-implant loss of the attached gingiva as well as peri-implantitis. It has proven its versatility and the predictability in terms of the maintenance of the created width of the fixed mucosa. Based on the results achieved in our patient, the described technique appears to be a promising procedure for the prevention of further bone loss and the gingival recession in patients with the thin symphysis such as patients with mandibular prognathism undergoing orthodontic treatment. Further applications of this technique and clinical studies may reinforce our statements and reveal possible limitations and drawbacks.

**Conflict of interest**

The authors confirm that they have no conflict of interest.

**References**