

CASE REPORT

Pre Prosthetic Crown Preparation with Apically Repositioned Flap – A Case Report

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Abstract

An adequate amount of attached gingiva is required to protect the periodontium and promote periodontal health and also increase resistance and stabilization of gingival margin against frictional forces and external injury. A variety of factors including teeth form/position and gingival tissue levels may influence the overall smile aesthetics. A short clinical crown occurs as a result of deep subgingival caries, tooth fracture, iatrogenic factors may lead to poor retention form which allow for proper tooth preparation. Along with gingival recessions, the excessive gingival display during smiling is a frequent condition impairing smile and esthetics. Surgical crown lengthening procedure is done to increase the clinical crown length without violating the biologic width. In the last decade a great interest was focused on plastic periodontal surgery as a reliable tool to enhance esthetics.

Keywords: Attached gingiva, Apically repositioned flap, Crown lengthening, Biologic width.

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Introduction

Attached gingiva is the distance between the mucogingival junction and the projection on the external surface of the bottom of gingival sulcus or the periodontal pocket. The width of the attached gingiva varies in different individuals and on different teeth of the same individual.¹ It is composed of keratinized epithelium and dense connective tissue periosteum, while it plays an essential role in the protection of periodontal structures.² The attached gingiva increases the resistance of the periodontium to external injury, contributing to the stabilization of the gingival margin position and thus aids in the dissipation of physiological forces that are exerted by the muscular fibers of the alveolar mucosa onto the gingival tissues, besides facilitating plaque control. Abnormalities in symmetry and contour

can significantly affect the harmonious appearance of the natural or prosthetic dentition.³

Successful restorative treatment of teeth usually requires preparation of well-defined restoration margins easily accessible for conservative measures and impression taking current filling of prosthetic crowns and adequate plaque control. There are clinical situations, however when these requirements cannot be fulfilled.⁴ In fact the presence of carious lesion, endodontic perforation, crown root fracture or preexisting margins of failing restorations in a deep subgingival location may hamper access for proper restorative measures. In addition due to destructive caries, altered passive eruption or pathological wear, the supragingival available tooth structure may not be sufficient to correct gingival margin asymmetries for esthetic reasons.

Concept of Biologic Width

Concept of the biologic width was first originated by research conducted by Gargiulo, Wentz and Orban where the distance between the apical end of the gingival sulcus and the crest of the alveolar bone was measured on several cadaver specimens.^{5,6} In areas that present with periodontal health, that distance, now regarded as the biologic width, was reported to be an average of 2.04 mm, where approximately 0.97 mm is occupied by the junctional epithelium and 1.07 mm is occupied by connective tissue attachment to the root surface.

The methods of surgical clinical tooth crown restorations are:⁷

1. Gingivectomy;
2. Apically positioned flap;
3. Apically positioned flap with bone reduction.

It is chosen according biotype of periodontium:⁸

1. In case of thin periodontium with sufficient width of attached gingiva, gingivectomy is recommended;
2. In case of thin periodontium with short width of attached gingiva, apically positioned flap is recommended.
3. In case of thick periodontium, apically positioned flap with osteoplasty is recommended. Furthermore, by altering the inciso-gingival length and mesiodistal width of the periodontal tissues in the anterior maxillary region, the crown-lengthening procedure can build a harmonious appearance and improve the symmetry of the tissues.

Indications for the apically positioned flap include

1. Surgical crown lengthening procedures and
2. The treatment of periodontal disease where preserving the maximum amount of keratinized gingiva is the desired outcome. The contraindications for the apically positioned flap include root hypersensitivity, high rate of root caries, esthetic limitations, anatomic limitations, inadequate clinical attachment, and deep infra-bony defects.

Case Report

A 24 year old male patient complaining of unesthetic smile and he wants to restore the upper front teeth region since 3 months visited the department of Periodontics, Sree Sai Dental College and Research Institute, Srikakulam. On examination, the patient had a Deep bite with high smile line which displayed almost 4 mm of gingival tissue. Periodontal examination revealed mild gingivitis with plaque and calculus, Shallow probing depth, no evidence of mobility, adequate amount of keratinized gingiva, favorable Crown root ratio and Crestal bone levels were within limits. Ethical clearance was obtained from the ethical committee of the institution and patient was informed regarding the treatment protocol and written consent was taken.

The patient was given oral hygiene instructions and underwent scaling as a phase I treatment. After 2 weeks of time, surgical crown lengthening was done in relation to 11. Firstly, Crevicular incision was given, followed by initial elevation of the flap, then interdental incision are performed, and the wedge of tissue that contains the pocket wall is removed (Fig.1). Excessive gingiva was removed by using Kirkland's knife (Fig.2). Vertical incisions should be made extending from the gingiva into the alveolar mucosa to permit ease of access to the operative area and provide flexibility in operating (Fig.3). Split thickness flap was elevated using sharp dissection with a Bard-Parker knife to split it, leaving a layer of connective tissue, including the periosteum on the bone. After removal of all granulation tissue, scaling and root planning, and performing osseous surgery for about 1-1.5 mm (Fig.4). Debridement was performed and then flaps were approximated and interrupted sling sutures were given (Fig.5).

A dry foil is placed over the flap before covering it with the dressing to prevent the introduction of pack under the flap. One week post surgery, healing was assessed and sutures were removed. Preliminary review was done 2 weeks post surgery (Fig. 6). Ceramic crowns were inserted 6 months after periodontal surgery in relation to 11 (Fig.7).

Fig.1 Crevicular incision was given



Fig.2 Excessive gingiva was removed by Kirkland's knife



Fig. 3 Vertical incisions given



Fig. 4 Flap elevation done



Osseous reduction done



Fig. 5 Sutures placed



Periodontal dressing placed



Fig. 6 One week postoperative



Fig. 7 1month postoperative



6months postoperative



Discussion

Unerupted maxillary central incisors, although not common, may present practitioners with management problems. This case has emphasized the importance of maintaining an attached marginal gingiva on the labial surface of front teeth during their eruption following surgical exposure. Some authors have suggested that 2 mm is the desired width to maintain gingival health, although the role of attached gingiva has been disputed. The literature does suggest, however, that failure to provide an adequate zone of attached gingiva may result in the loss of periodontal tissue attachment, with subsequent marginal bone loss and potential shortening of the life of the tooth. Mucogingival problems following apical repositioning of flaps have been reported, but are avoidable with proper marginal tissue placement, absence of inflammation, careful, atraumatic surgery and ensuring that correct gingival attachment during any subsequent tooth movement is achieved.⁹

The standard approach to labially impacted teeth is to make an incision along the edentulous ridge. Of course, this approach will be successful only if there is a sufficient band of attached gingiva that can be apically repositioned. In the case described, the restorative procedure was done, such that a crestal incision (coronal incision in this patient) would have resulted in the absence of any keratinized mucosa, and so the decision was taken to advance the incision to the palatal mucosa to incorporate this tissue into the apically repositioned flap. Following the flap elevation, if any connective tissue is removed from labial aspects of tooth or if any bone is interfering with the position of flap it should be trimmed.

It is recommended by many authors that bone is not removed from the cemento-enamel junction as it is in this area that the attached gingiva is required to gain its attachment if successful grafting is to be achieved. Ideally, the flap should also cover 2-3 mm of the crown. As a result of this position, optimal tissue attachment to radicular and cemental tissues is achieved, junctional epithelial seals are protected and even in those cases where teeth move long distance there is ability for some marginal migration, but continuing protection of underlying bone. The role of the general practitioner should also be

emphasized, as it is vital to maintain periodontal health of this newly positioned mucosa if long-term success is to be expected.

Conclusion

The apically repositioned flap is a quick, simple and reliable method for exposing most teeth that are impacted labially or within the line of the arch. It is suitable for tooth exposure in both children and adults and will help to minimize potential problems. However, its use is limited if the tooth is positioned very high in the buccal sulcus or is palatally impacted. The technique allows accurate control of the amount of keratinized gingivae postoperatively and helps maintenance of the mucogingival complex, which will help to ensure a healthy long-term prognosis for the tooth. The tooth can easily be inspected at follow-up appointments; debonding of the attachment is readily detected and repairs simple. Healing is by primary intention, which is rapid and will reduce scarring. Minimal bone loss occurs, which, combined with good oral hygiene, will usually produce excellent postoperative results.

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