



AESTHETIC CLINICAL CROWN LENGTHENING: A CASE REPORT

Periodontics

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ABSTRACT

Clinical crown lengthening is a surgical procedure primarily designed to increase the extent of the supragingival tooth structure, so that it could be restored easily. It is commonly used to maintain the dento-gingival complex in optimal conditions and also to correct aesthetic defects through a smile design. Clinical crown lengthening procedure in an anterior aesthetic region could be challenging. Surgical lengthening of clinical crowns represents one of the most commonly used procedures in contemporary periodontics. This case report would highlight about the of surgical clinical crown lengthening in anterior teeth region in a female patient for better aesthetic need.

KEYWORDS

Clinical crown lengthening, dentogingival complex, smile design

INTRODUCTION

Surgical clinical crown lengthening is the most habitual periodontal treatment. The ultimate goal of clinical crown lengthening is to provide a tooth crown dimension adequate for a stable dentogingival complex and for the placement of a restorative margin, so as to achieve the best marginal seal and an aesthetically pleasing final restoration.^[1-3] This surgical crown lengthening procedure (CLP) is also used to achieve an aesthetic smile in case of excessive gingival display aiding in smile designing. However, surgical clinical crown lengthening procedure should be indicated after having performed a careful periodontal and dento-gingival analysis, which are the indispensable aspects in aesthetic dentistry. Several techniques have been proposed for clinical crown lengthening which includes gingivectomy, apically displaced flap with or without resective osseous surgery, and surgical extrusion using periostome.^[3-5] The conventional surgical procedure in these cases would be to remove excess gingival margin tissue with a flap detachment and osteotomy until the establishment of biological distances;

The classic research by Gargiulo et al in 1961 defined the “dento-gingival junction” as three distinct components such as gingival sulcus, junctional epithelium, and connective tissue attachment.^[3-5] The dentogingival junction was later redescribed as the “biologic width” by Cohen as the sum of junctional epithelium and connective tissue attachment. This biologic width averaged 2.04 mm, whereas the mean sulcular depth was 0.69 mm. Despite the inordinate standard deviation and the limited sample size in the study by Gargiulo et al, these numbers have been used as guidelines for decades in clinical practice to determine the extent of bone resection necessary to establish a biologic width. The soft tissue coronal to the osseous crest includes the biologic width and free-gingival margin and has been described as the “dentogingival complex” by Kois and the “supracrestal gingival tissue” by Smukler and Chaibi.^[3-7] Recent reports have indicated that there is considerable intraindividual and interindividual variability to the supracrestal gingival tissue.

Inger et al. suggested that an additional 1 mm might be coronally added to the 2 mm dentogingival junction, as an optimal distance between the bone crest and the margin of a restoration, to permit healing and proper restoration of the tooth.^[6] In addition, during an esthetic crown lengthening procedure, bone removal plays an important role in the final location of the free gingival margin after healing. Therefore, the supracrestal gingival tissue must be estimated for each patient and at each surgical site when surgically recontouring the alveolar bone is needed. The esthetic crown lengthening requires gingivectomy procedures to expose the needed additional tooth structure; therefore, a minimum of 2 to 5 mm of keratinized tissue is necessary to ensure the gingival health.

Therefore, the aim of this case report was to describe the surgical sequence of clinical crown lengthening in anterior teeth region to apically reposition the dentogingival complex, in addition to an esthetic restorative procedure.

Case Report

A thirty two year female patient reported to the department with chief complaint of short upper anterior teeth and excessive gum display during smiling which is causing esthetic discomfort to the patient. The patient was presented with good systemic and oral health with short upper anterior clinical crowns and excessive gingival display on smiling [Figure 1a]. On radiographic examination no periapical radiolucency was noted with no thickening of lamina dura and the crown root ratio was found to be 1:3. At clinical examination, width of the keratinized gingiva was found to be 6 to 7 mm, and pocket depth was found to be 2 mm or less in anterior teeth region. Neither periodontal problems nor teeth mobility was detected.

Analysis of the smile-line revealed excessive gingival display and flat, thick type of gingival biotype was also noted on clinical examination. Since, the primary concerns of this patient is excessive gummy exposure during smiling and excessive dissatisfaction with the size and shape of teeth. The primary treatment plan proposed to the patient was an orthodontic option; however, the patient disagreed with this modality due to the wide duration time and personal preferences.

Therefore, the treatment plan was thought to be the surgical crown lengthening of elements 13, 12, 11, 21, 22, and 23. The patient was informed and explained about the treatment procedure and informed consent was obtained.

Initially a diagnostic waxing was accomplished and a transparent acrylic resin template was fabricated to anticipate gingival contour of the crowns [Figure 1b]. Sounding of the alveolar crest was accomplished, under local anaesthesia, to determine the height of supracrestal gingival tissue, which was averaged to be about 4 mm [Figure 1c]. The surgical template was inserted in mouth and the new gingival margin was registered with a scalpel under local anaesthesia [Figure 1d, Figure 1e]. Thus, a full-thickness mucoperiosteal flap was elevated and the gingival collar extracted with a Gracey curette. A facial scalloped surgical incision was outlined 2 mm submarginal, following the surgical template from maxillary left canine to right canine [Figure 1f]. The palatal incision was 3 mm submarginal and paralleled to the crestal bone. For the bone recontouring measurement of the distance between the guide edge and the cervical bone was recorded.



Figure 1. Clinical photograph of the patient (a.) Pre-operative photograph showing excessive gingival display during smiling.

(b.)Surgical template made with acrylic resin. (c).Bone sounding done prior to surgical procedure. (d).Initial surgical incision marked with the help of template.(e).Surgical incision given under anaesthesia. (f).Excised gingival tissue.

This distance should be about 3 mm, for the biologic width maintenance. The creation of a precise biologic width requires, in addition, a precise osseous contouring, which was performed carbide/diamond burs with adequate irrigation, for preventing bone necrosis, then, the flaps were sutured with 3-0 silk vertical mattress interrupted sutures[Figure 2a,Figure 2b]. A non-steroidal anti-inflammatory drugs was prescribed and postoperative instructions detailed. The patient was instructed to rinse with 0.2% chlorhexidine mouthwash until mechanical removal of plaque was resumed. Healing was found to be uneventful and the patient was recalled at one month, three months[Figure 2c,Figure 2d]and six months post operatively.



Figure 2.Clinical photograph of the patient (a)Bone contouring done under local anaesthesia. (b).Suture given.(c)One week post op.(d). One month post op.

DISCUSSION

Surgical clinical crown lengthening is usually performed for aesthetic improvement during smile designing in case of excessive gingival display and also in teeth with subgingival caries or fractures; in addition, this surgical procedure can also establish an accurate bone width and correct gingival asymmetries. The esthetic crown lengthening requires gingivectomy procedures to expose the needed additional tooth structure; therefore, a minimum of 2 to 5 mm of keratinized tissue is necessary to ensure the gingival health. Moreover, the management of the papilla is another important aspect of the surgery. The interproximal bone should be carefully removed in order to maintain the anatomic structures, so that the interproximal tissues are allowed to coronally proliferate; the papilla should replace the distance from the bone crest to the base of the contact area (about 5 mm or less).In this case, the female patient was reported with short clinical crown length and excessive gingival display which was primarily causing aesthetic discomfort to the patient .Surgical clinical crown lengthening with the help of proper surgical template and adequate osseous recontouring would help to get better result.

Osseous resective surgery for clinical crown extension is an irreversible procedure that commonly requires the reduction of supporting bone. A strategic plan of bone recontouring must be programmed to achieve a satisfactory and biologically acceptable result. A diagnostic waxing is essential and used as a guide to fabricate a surgical template. Many factors must be considered when crown lengthening is contemplated, such as root form and dimension, position of adjacent teeth, furcations, anatomic factors, gingival characteristics, and proximity of roots. The template may assist the restorative team to analyze limiting factors and may be modified as a radiographic template to visualize the amount of root would remain in bone after the surgery. Anatomic determinants such as gingival architecture and consistency and individual supracrestal gingival tissue must be previously recorded and may limit bone recontouring.

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