

## Surgical Lengthening Of the Clinical Crown- A Case Report

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**Abstract:** Crown lengthening is a common procedure performed by restorative dentists. Crown lengthening aimed at removal of periodontal tissue to increase the clinical crown height. In this case report we have lengthen the crown surgically. Before using this technique of crown lengthening we need to understand the biological width, indications and contra indication, other treatment options, surgical procedure, as well as the prognosis and the follow up of specific case.

**Key Words:** Biologic width, Dentogingival complex, Osteotomy.

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### I. Introduction

Crown lengthening is a surgical procedure performed on a healthy periodontium that requires exposure of adequate tooth structure to increase the length of clinical tooth for prosthetic interventions. This can be achieved by various techniques depending upon: proposed location of the restorative margin, location of the alveolar crest and gingival margin, width of the keratinized attached tissue, amount of exposed tooth structure available.

The common causes of short clinical crown include dental caries, erosion, tooth malformation, fracture, attrition, abrasion, over tooth preparation, eruption disharmony and genetic variation<sup>1</sup>. Therefore, this deficiency in clinical crown length should be increased when margins of caries or margins of the tooth fractures are subgingivally placed, the crown is too short for retention of the restoration, there is an excess of gingiva, and anatomical tooth crown is partially erupted<sup>2</sup>.

The indications for crown lengthening are<sup>3</sup>:

- To increase clinical crown height
- Deep subgingival carious lesions
- To produce a 'ferrule' for post crown provision
- To access a perforation in the coronal third of the root
- To relocate margin of restorations that are impinging on biological width.
- Aesthetics improvement in case of high smile line, and so called gummy smile
- Uneven gingival contour
- In combination with root amputation, hemisections or tunnelling procedure to provide access for oral hygiene practice

The contraindication for crown lengthening are<sup>4</sup>:

- Inadequate crown to root ratio
- Inability to restore caries or root fracture
- Aesthetic compromise
- Defects involving furcation
- Inadequate predictability
- Tooth arch relationship inadequacy
- Compromising of adjacent periodontium or aesthetics

- Insufficient restorative space
- Non-maintainability

**Classification of Crown-Lengthening Procedures, Gingival reduction only—bone removal not required<sup>5</sup>:**

A Gingivectomy

B Gingival flap surgery

A. One-stage procedures, which require one of the following:

(1) Flaps, ostectomy, apical positioning

(2) Flaps, ostectomy, gingivectomy, Positioning

(3) Gingivectomy, flaps, ostectomy, Positioning

B. Two-stage procedure, which requires:

Flaps, ostectomy, and repositioning

4 to 6 weeks later—gingivectomy

The ultimate goal of 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.

Concept of biologic width<sup>6</sup>:

The concept of biologic width is widely utilized as a clinical guideline during the evaluation of periodontal restorative interrelationships. The biologic width encompasses the junctional epithelium and the connective tissue attachment.

The average dimension of the epithelial attachment was 0.97 mm and the average dimension of the connective tissue attachment was measured at 1.07 mm — yielding the combined dimension of 2.04 mm known as the biologic width.

Clinical observation indicates that impingement of the biologic width will result in attempts by the gingival tissue to re-establish its original dimension through bone resorption or, in the presence of thick alveolar bone, chronic gingival inflammation<sup>7,8</sup>.

This width should be carefully diagnosed and evaluated when planning crown lengthening procedure.

## **II. Case Report**

A 45 year old man came to our Department of Prosthodontics with the chief complaint of unaesthetic appearance of mandibular teeth and dissatisfaction with the size and shape of teeth. The patient presented a good general health and mandibular anterior teeth with short clinical crowns and diastemas (Figures 1 and 2). At clinical examination, attached gingiva band was 6 to 7mm in width, and periodontal pocket depth was 3mm or less. Neither periodontal problems nor teeth mobility was detected. On radiographic examination, no periapical radiolucency was found and mandibular anterior teeth were endodontically treated.



Fig-1



Fig-2

The aim of this case report was to describe the surgical sequence of crown lengthening to apically reposition of the dentogingival complex, in addition to an aesthetic restorative procedure. There are various ways by which crown lengthening of crown can be successfully done by gingivectomy (external or internal bevel incision), apical repositioning of flap (with or without osteotomy) and by orthodontics.

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 financial burden. Therefore, the treatment plan realized was the crown lengthening of 33, 32, 31, 41, 42, and 43 and the fabrication of tooth crowns. The patient was informed about the treatment and a written consent was obtained.



Fig-3



Fig-4

Initially, an alginate primary impression of the mandibular teeth were obtained to do the diagnosis wax-, and then the restorative margin was anticipated. Thus, a full-thickness mucoperiosteal flap was elevated (Figure 3) and the gingival collar extracted. For the osteotomy, measurement of the distance between the anticipated margin of restoration and the cervical bone was recorded. This distance should be about 3mm, for the biologic width maintenance and installation of prosthesis. The creation of a precise biologic width requires, in addition, a precise osseous contouring (Figure 4), which was performed using manual instruments (surgical chisels and mallet) then, the flaps were sutured(Figure 5). After 6-month healing and thorough recall checkups, tooth preparations (Figure 6) were done and definitive prostheses were delivered (Figure 7) .



Fig-5



Fig-6



Fig-7

### **III. Discussion**

Crown lengthening is apical repositioning of flap along with concomitant osteoplasty. It is performed for aesthetic enhancement during restorations in addition, this surgical procedure can establish an accurate bone width and correct gingival asymmetries. It requires gingivectomy procedures to expose the needed additional tooth structure; therefore, a minimum of 2 to 5mm of keratinized tissue is necessary to ensure the gingival health<sup>9</sup>. 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 proliferate coronally. To have a harmonious and successfull long-term restoration, the distance between the crestal bone and prosthetic margins, which allows recreating the biological width, should be at least

3mm<sup>10</sup>. This can be surgically achieved by crown lengthening, as presented in this case report, or orthodontically by forced tooth eruption or by a combination of both procedures. Several studies suggest that the biologic width re-establishes itself after crown lengthening procedures, in 6 months. For this reason, in the present case report the installation of definitive prosthesis was carried out after the healing period of the gingiva, in order to obtain the aesthetic position of the prosthetic margin.

#### **IV. Conclusion**

Crown lengthening surgery is a viable option for facilitating restorative therapy or improving aesthetic appearance. However, to plan a crown lengthening procedure, thorough periodontal condition of the patients and their hygiene habits must be evaluated. Furthermore, an accurate diagnostic and interdisciplinary approach is mandatory for obtaining improved, conservative, and predictable results in aesthetic areas.

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