

# Maxillary Anterior Crown Lengthening - An Aesthetic Enhancement Two Infected

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## ABSTRACT

In the anterior segment of maxilla, the position of labial margin of gingiva is an important parameter in the achievement of an ideal smile. Abnormalities in symmetry and contour can significantly affect the harmonious appearance of the natural or prosthetic dentition. There is a tremendous focus on cosmetics today. Dentists are blessed with the unique ability to not only improve patient's health but also enhance their attractiveness. The aim of crown lengthening for aesthetic reasons to correct either a gummy smile or gingival overgrowth. Thorough planning and adherence to biologic principles are the keys to predictable treatment.

**Keywords:** aesthetic crown lengthening, biological width, gummy smile.

## INTRODUCTION

The appearance of the gingival tissues surrounding the teeth plays an important role in the aesthetics of the anterior maxillary region of the mouth. Now a days patients have demands for more aesthetic results which may influence treatment choice.

An essential goal of treatment is long-term stability of the result; for this to be achieved the integrity of the dentogingival junction must be respected, and dental restorations and the periodontium must be in harmony. A predictable, successful outcome can only be expected if a complete and accurate diagnosis is obtained and used to generate an appropriate treatment plan.

The aim of crown lengthening for aesthetic reasons to correct either a gummy smile or gingival overgrowth (Fig. 1). The periodontal status of the involved teeth is first assessed. In the presence of periodontal disease with an

absence of gingival overgrowth, regular periodontal treatment will resolve the gingival inflammation and swelling with removal of local irritating factors<sup>1</sup>. In cases in which tissues are inflamed with the presence of gingival overgrowth, a gingivectomy/ gingivoplasty procedure may be indicated if the gingival overgrowth persists even after gingival inflammation has been reduced through initial periodontal therapy (e.g., in drug-induced gingival enlargements associated with cyclosporin and/or calcium channel blockers). For a gummy smile with a healthy periodontium, the patient's facial proportion has to be assessed. A normal human face is divided into thirds, and 2 to 3 mm of tooth is usually shown with relaxed lips.<sup>2,3</sup> If the facial proportion is normal, shallow probing depths (<4 mm) may indicate tooth malposition, and this can be corrected with orthodontic intrusion;

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deep probing depths (>4 mm) may indicate altered passive eruption (delayed apical migration of the gingival margin), and this can be corrected with crown-lengthening surgery.

The amount of keratinized gingiva (KG) present around teeth and the distance of the alveolar bone crest level in relation to the cemento enamel junction (CEJ–bone) is next determined clinically and radiographically. One of four possible treatment modalities may be considered as described by Coslet et al.<sup>4</sup> For Type I cases with adequate KG (>2 mm), if CEJ–bone is >2 mm (subgroup A), a gingivectomy/gingivoplasty procedure can be done. If CEJ–bone is <2 mm or CEJ is at the same level as the alveolar bone crest (subgroup B), then a flap with osseous surgery is done. In Type II cases with inadequate KG (<2mm), an apically positioned flap (APF) is indicated for subgroup A. For subgroup B, an APF with osseous surgery is done.

### Biological considerations

#### Biological width

When crown lengthening is planned to increase the length of available tooth, the biological width needs to be considered and not encroached upon as this may lead to periodontal breakdown. Gargiulo et al.<sup>5</sup> described the 'biological width' in a histological study. The average measurement was 0.69 mm mean sulcus depth, 0.97 mm epithelial attachment and 1.07 mm for connective tissue attachment. This then totals 2.73 mm mean length of the dentogingival complex. Owing to the concept of 'biological width', it has been proposed that there should be 3 mm of supracrestal tooth tissue between the bone and the margin of the proposed restoration. While these measurements are provided as a guide, one needs to remember that there are variations between individuals and around different teeth. It was observed that there was a re-establishment of the biological width in teeth that were crown lengthened by 6 months. The re-established biological width was found to be

the same vertical dimension as the pre-surgery measurement<sup>6</sup>.

#### Bone Sounding

The level of the alveolar crest must be determined prior to any considerations regarding aesthetic crown lengthening. Bone sounding is utilized to determine the location of the alveolar crest, primarily on the labial aspect but additionally including the proximal areas. Following the administration of a local anaesthetic, a graduated periodontal probe is utilized to puncture and penetrate transgingivally until contact is made with the underlying bone perforating the junctional epithelium and gingival connective tissue in the process. During this periodontal evaluation, bone sounding assists in determining the level of the alveolar crest and thus the need for osseous contouring.<sup>7</sup> The acuity of digital perception as it relates to the actual position of the alveolar crest will vary depending on the periodontal biotype and site-specific characteristics, including recession, root anatomy, and tooth morphology. Conditions that favor the presence of a thicker plate of bone (eg- with thick and flat periodontium) will result in a more accurate assessment of the alveolar crest position through bone sounding. Alternatively, scenarios associated with bone dehiscence or a thin labial osseous plate, may make identification of the alveolar crest more difficult. This, in retrospect, may be of less consequence since thin or dehisced labial plates are more likely to resorb postoperatively.

#### CASE REPORT

A 18 year old female patient reported to Department of Periodontology, with the chief complaint of gummy smile. The patient was in excellent general health with no known allergies, did not take any medication and denied use of tobacco. Extraoral examination revealed no significant findings. Intraoral examination revealed good oral hygiene with minimal plaque and calculus deposits and significant amount of gingiva visible on smiling and clinical crown length appear smaller. The

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gingiva was pink and firm, and the papillae were intact. Clinical examination revealed Probing pocket depth was in the range of 4-5 mm in the whole anterior segment of maxilla, no mobility and adequate amounts of attached gingiva. Bone sounding is utilized to determine the thickness of the soft tissue layer and proximity of the alveolar bone during the planning stages of various surgical procedures. Following the administration of a local anaesthetic, a periodontal probe is utilized to puncture and penetrate through until contact is made with the underlying bone. Thickness of the gingival was determined using the endodontic file inserted perpendicular to the gingival surface and was found >1 mm. On considering the probing depth it was decided to remove the 2-3 mm gingiva with gingivectomy procedure without violating the biological width. The detailed treatment plan was explained to the patient and a written informed consent was obtained before commencement of the surgery. Scaling and root planing was done to obtain the firm and healthy gingiva and recalled after 1 week. Patient was also advised for the routine blood examination.

At recall visit after one week, the intraoral examination reveals healthy gingiva with excellent oral hygiene (Fig-1). The routine blood examination report was not significant. The infiltration technique was utilized to obtain the anesthesia in maxillary anterior region. The initial inverse bevel incision was performed using the #15 blade, so as to achieve the ideal contour on the anterior teeth. This incision is carried out in a parabolic manner, with the most apical point or gingival zenith for the central incisors and canines located just distal to the tooth axis and the gingival zenith for the lateral incisors coinciding with the tooth axis (Fig-2). The marginal gingival height for the maxillary central incisors is at approximately the same level as the height for the canines, whereas the marginal gingival height for the lateral incisor is slightly lower than central incisor and canines<sup>8</sup>(Fig-3). Care was taken to ensure that the incisions blended with the gingival contour of the posterior teeth.

Patient was advised to take antibiotic (amoxicillin 500 mg tid for 5 days) and analgesic (ibuprofen 400 mg tid for 3 days) postoperatively. Oral hygiene instruction was explained and also advised to gargle with 0.2% chlorhexidine for two weeks postoperatively.



Fig-1- Preoperative



Fig-2- Extrenal bevel incision



Fig-3- Immediate post-operatively



Fig-4- Six month post-operatively

## DISCUSSION

Symmetrical smiles are deemed aesthetically pleasing and, ideally, there should be 1 mm of gingivae visible when smiling. The proportions of the crown lengths are also important. The length of the centrals should be equal to the canines and the laterals slightly shorter than both (Figure 4). The highest point of the scallop should be slightly distal for the centrals, mid-point for the laterals and slightly distal for the canines.<sup>9</sup> If there is sufficient supracrestal tissue, this outcome may be achieved with a gingivectomy alone; otherwise, bone removal is required. Whichever method is used, it is very important that the interdental papillae are maintained through careful planning and consideration of biological and anatomical factors.

In regions of the mouth where aesthetics are important, wound-healing after crown-lengthening surgery must be allowed to proceed to completion if optimal results are to be achieved. Any disruption of the wound-healing process can lead to undesirable consequences. After crown-lengthening surgery, the periodontium continues to remodel and mature. Cigarette smoking, a relative contraindication for periodontal surgery, can impair wound healing and is detrimental to the success of the surgery.<sup>10</sup> Hence, patients who smoke may experience unpredictable surgical outcomes. Other factors such as patient compliance, oral hygiene and history of periodontal disease can also influence surgical outcome. The dentist should carefully consider

these key factors in preparation for treatment in aesthetically demanding areas.

## Clinical relevance

- The soft and hard tissue component of the smile can be manipulated to create a beautiful smile.
- A multidisciplinary role between the restorative dentist and periodontist should be considered before designing the smile.
- Careful surgical removal of the excessive gingiva is often required to expose the adequate tooth structure for altering the patient's smile.

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