

CASE REPORT

Surgical crown lengthening in the presence of orthodontic bracketsTreena Kabiraj¹, Ellora Madan², Sumedha Sen³, Susmita Majumder³**Abstract:**

Clinical crown lengthening refers to procedures designed to increase the extent of supragingival tooth structure for restorative or esthetic purposes. The aim of this case report is to review the crown lengthening procedure in malaligned teeth which is undergoing orthodontic treatment parallelly and the importance of biologic width and its role in maintaining a healthy periodontium. A 14-year old male patient who had started on orthodontic treatment which was not completed because of short clinical crown and was covered by gingiva. The patient was prepared for gingivectomy by scaling. Periodontal surgery included crown lengthening without osteoplasty. Antibiotic prophylaxis along with analgesic and antacid was given for 5 days. The patient responded well to the surgical treatment and neither bleeding pockets nor probing depth exceeding 4 mm were detected at the follow-up examinations. Three months later the orthodontic therapy was restarted.

Key Words: Crown lengthening, Biologic width, Gingivectomy, Osseous recontouring

Introduction

Crown lengthening is defined as the removal of bone tissue with concomitant removal or repositioning of the soft tissue around the tooth¹. A short clinical crown may lead to poor retention form thereby leading to improper tooth preparation. Surgical crown lengthening procedure is done to increase the clinical crown length without violating the biologic width². Crown lengthening can be obtained by either gingivectomy only or by removing gingiva and alveolar bone³.

Biologic width is defined as the physiologic dimension of the junctional epithelium and connective tissue attachment, according to Gargiulo et al⁴. On average in humans, it is 2.04 mm (Connective tissue attachment is 1.07 mm and junctional epithelium, below the base of the sulcus is 0.97 mm).

Apart from the plethora of obligate facultative anaerobic microflora such as the *Stomatococcus Mucilaginosus* and *Rothia dentocariosa*, *Actinomyces* and *Prevotella* species may also be present in such infection.⁷ Amongst acute oral

There are multiple etiological factors for short clinical crown. According to the American Academy of Periodontology (Practice Profile Survey) 2003, crown lengthening is the most habitual surgical periodontal treatment.

Case Report

A 14 year old boy was referred to the Department of Periodontology, Kothiwal Dental College from the Department of Orthodontics of the same institution. The patient presented with a good general health and maxillary right central incisor with short, rotated clinical crown (Fig.1). No periapical radiolucency was present in the orthopantomogram (OPG).

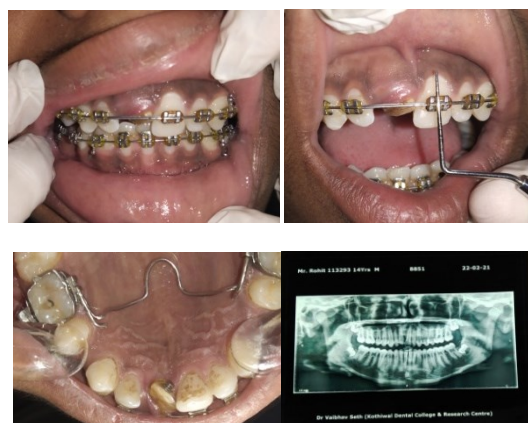


Figure 1: Pre-operative labial (above) and palatal (below) view of tooth no. 11 and OPG

There was no mobile tooth on clinical examination. The prime concern of this patient was rotated and short upper front tooth, for which the patient was undergoing orthodontic therapy with brackets. But during the treatment,

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clinical crown exposure of 3 mm was needed, after which the tooth would be orthodontically rotated to restore it to the normal arch form. As there was adequate amount of attached gingiva, it was assessed that upto 3 mm of gingiva could be resected while retaining an adequate amount of attached gingiva. According to Ernesto classification (2004), this falls under Type I where sufficient soft tissue allows gingival excision without osseous recontouring. For this, the patient was referred to the Department of Periodontology, where meticulous scaling and root planing was first performed as the patient had fair oral hygiene.

Treatment procedure

Sulcular method of tooth brushing was taught to the patient. Local anesthesia was given by infiltration using 1:80000 lignocaine hydrochloride. After achieving adequate anesthesia, Internal bevel incision was done using a 15 no blade, followed by crevicular incision. 1 mm of gingival tissue was removed, following the contour of the adjacent tooth (Fig.2).



Figure 2: Gingivectomy done and gingival tissue was excised

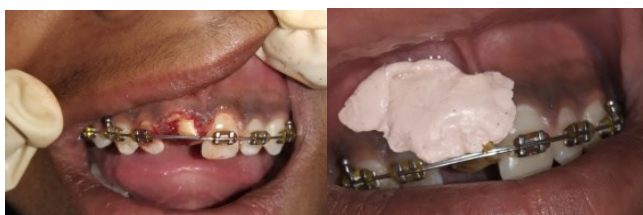


Figure 3: Post-operative homeostasis achieved and Coe-Pak was given

Non-eugenol CoPak dressing was given and recalled after 1 week. The patient was prescribed antibiotic prophylaxis of Amoxicillin-Clavulanic acid combination along with analgesic of ketorolac and antacid of Pantoprazole for 5 days. Post-operative instructions were given and the patient was recalled after 1 month and 6 months for follow up (Fig.6a,6b)

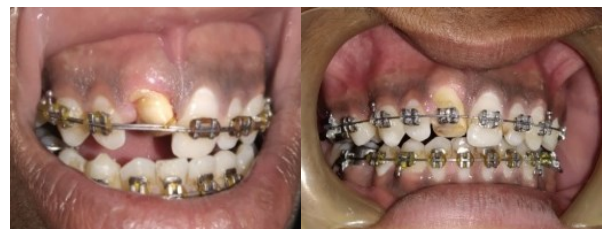


Figure 4: 1 month (left) and 6 months (right) post-operative follow up

Discussion

Crown lengthening is required for aesthetic improvement during restorations and orthodontic tooth alignment. It 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^{5,6}. Osseous contouring is necessary for the interproximal tissues to coronally proliferate but in this case it was not necessary as the distance from the bone crest to the base of the contact area was 3mm (Normal is about 5mm or less)^{8,9}. Several studies suggest that the biologic width reestablishes itself after crown lengthening procedures, in 6 months¹⁰⁻¹³. Studies have suggested that at least 2-3 mm of attached gingiva should be present to maintain periodontal health⁵⁻⁶. Wagenberg et al found that the length of clinical crown, furcation locations and esthetic considerations were the factors limiting the crown lengthening surgery and suggested a 5 mm distance from bone to the restorative margin¹⁷. So maintaining appropriate gingival biological width is a challenge. Surgical treatment is a faster and preferred procedure for indirect reconstruction, where achieving high clinical crown is necessary¹⁵.

The crown lengthening procedure is commonly used to maintain the dentogingival complex in optimal conditions and to correct esthetic defects through a smile design¹⁶. For this reason, in the present case report the orthodontic treatment was carried out after the healing period of the gingiva, in order to obtain the aesthetic position of the prosthetic margin. These patients present with a need for orthodontic alignment of their teeth and have excessive gingival coverage of their clinical crowns due to altered passive eruption¹⁴.

Conclusion

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

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