Original Research Paper

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Periodontology

CROWN LENGTHENING: DECISIVE FOR SUSTENANCE OF BIOLOGICAL WIDTH

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ABSTRACT A majority of periodontal procedures performed today are related with clinical crown extension for esthetic or functional needs related to varied etiologies. Difficulty in maintaining appropriate gingival biological width is a frequent problem which is encountered in such type of reconstruction. Various techniques are used for crown lengthening. Techniques such as gingivectomy, flap with osseous resection, apically positioned flap with or without the osseous resection have been used for crown lengthening procedure.

Methodology: Article consists of a case report of a female patient with the requirement of crown lengthening. Bone mapping under LA was done using the Goldman fox probe. Inverse- beveled incision was given followed by sulcular incision and the gingival collar was removed. In this case to perform osseous resection, flap was elevated and bone cutting was done.

Result: In this case the desired lengthening of crown was achieved with the good healed surrounding.

Conclusion: Crown Lengthening is a surgical procedure that requires exposure of adequate tooth structure for restorative procedures. The scope of crown lengthening procedure is really wide and refinement in the treatment modalities are needed.

KEYWORDS : Crown Lengthening, Osseous Resection, Biological Width, Aesthetic.

INTRODUCTION

Grossly decayed or mutilated teeth may lead to poor retention posing problem to the restorative dentists during their treatment.[1] Hence crown lengthening procedure prior to restorative treatment is unavoidable during the management of such teeth. The concept of tooth lengthening was first introduced by D. W. Cohen (1962). Clinical crown lengthening refers to procedures designed to increase the extent of supragingival tooth structure for restorative or esthetic purposes.[2]

Passive eruption is the continued apical movement of the free gingival margin epithelial attachment or junctional epithelium and connective tissue attachment that occurs after the tooth reaches functional occlusion (Gottlieb and Orban, 1922; Manson, 1963). Goldman and Cohen (1968) termed the failure of the tissue to adequately recede to a level apical to the cervical convexity of the crown as "**altered passive eruption**".[3]

Indications[1]

The indications for crown lengthening are:

- Restorative needs
- To increase clinical crown height lost due to caries, fracture or wear
- To access subgingival caries
- To produce a 'ferrule' for restoration
- To access a perforation in the coronal third of the root
- To relocate margins of restorations that are impinging on biological width.
- Aesthetic
- Short teeth
- Uneven gingival contour
- Gummy smile.

Contraindications And Limiting Factors[3]

- Inadequate crown-to-root ratio
- Nonrestorability of caries or root fracture
- Esthetic compromise
- High furcation
- Inadequate predictability
- Tooth arch relationship inadequacy
- Compromise of adjacent periodontium or esthetics
- Insufficient restorative space
- Nonmaintainability

Diagnosis[3]

Differential diagnosis is accomplished by determining

- Width of keratinized gingiva
- Position of the mucogingival junction
- Alveolar crest location by transgingival probing through the sulcus under anesthesia to the crest of bone

Classification Of Delayed Or Altered Passive Eruption[3]

Coslet and colleagues (1977) proposed a classification: -

Gingival-Anatomic Crown Relationships

Type I. The gingival margin is incisal or occlusal to the CEJ, and the mucogingival junction is apical to the crest of bone, and there is a wider gingival dimension than generally accepted as the mean, as given by Bowers (1963) and Löe and Aniamo (1966).

Type II. The gingival dimension is normal. The free gingival margin is incisal or occlusal to the CEJ, and the mucogingival junction is positioned at the CEJ.

Alveolar Crest–CEJ Relationships

Subgroup A. The alveolar crest is located 1.5 to 2 mm from the CEJ.

Subgroup B. The alveolar crest is coincident with the CEJ.

Table 1

Treatment For The Gummy Smile Or Altered Passive Eruption	
CONDITION	TREATMENT
Type I-A	Gingivectomy
Type I-B	Gingivectomy or scalloped inverse-beveled flap to the CEJ, positioned (unrepositioned) flap, and osseous resection
Type II-A	Apically positioned flap (repositioned flap)
Type II-B	Apically positioned flap with osseous resection

Case Report: -

A 23 years old female patient, was referred for periodontal consultation from Department of Endodontics to Department of Periodontology, with the requirement of crown lengthening irt 45, 46 for Post & core fabrication (Figure 1a & 1b).

Mandibular impression was made, radiograph was taken & Bone sounding was done under LA.

The cast was analysed & according to Coslet & colleagues (1977), it was Type 1 Subgroup B (Table 1).

The treatment for Type 1 Subgroup B Altered passive eruption is gingivectomy or scalloped inverse beveled flap to the CEJ, positioned flap & osseous resection and the procedure was performed.

On her first visit Mandibular impression was made and was recalled after the very next day. On her next visit firstly, the area was anesthetized and bone mapping was done using the Goldman fox probe and explorer. Inverse- beveled incision was given followed by sulcular

incision and the tissue tag was removed (Figure 1c). Since it was I-B Type, to perform osseous resection, flap was elevated using periosteal elevator and then bone cutting was done (Figure 1d & 1e). Then the area was irrigated using betadine and sutured (Figure 1f). Coe -pak was applied and the patient was recalled after 7 days for follow up (Figure 1g & 1h). Sutures were removed after one week and follow up was done for three weeks post-surgery until final fixed prosthesis was delivered (Figure 1i & 1j).

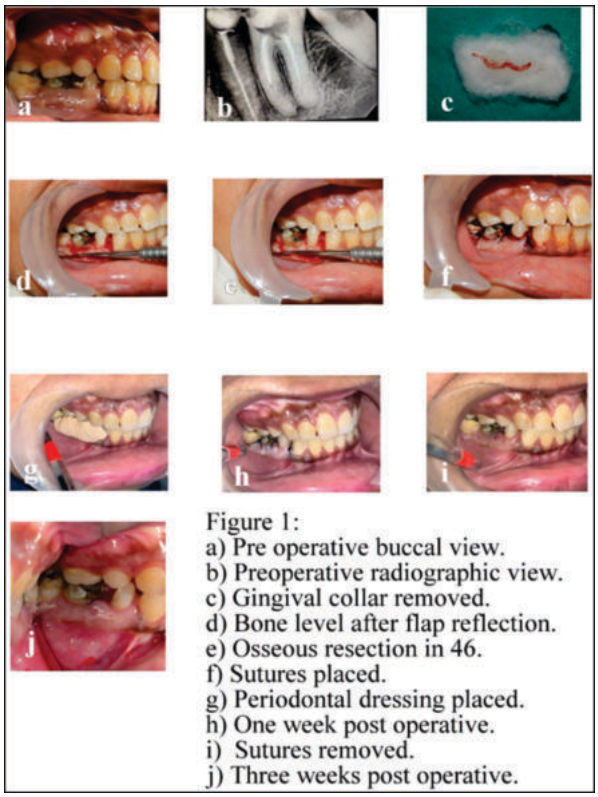

Figure 1:
a) Pre operative buccal view.
b) Preoperative radiographic view.
c) Gingival collar removed.
d) Bone level after flap reflection.
e) Osseous resection in 46.
f) Sutures placed.
g) Periodontal dressing placed.
h) One week post operative.
i) Sutures removed.
j) Three weeks post operative.

DISCUSSION

Treatment of crown lengthening procedure is based on two principles – establishment of Biological Width (BW) and adequate keratinized gingiva (KG) maintenance around the tooth. The BW is defined as the dimension of soft tissue that is attached to the portion of the tooth coronal to the alveolar bone crest[4]. Whenever possible, an adequate width of KG (≥2 mm) should be maintained around a tooth for gingival health[5]. Several studies suggest that the biologic width reestablishes itself after crown lengthening procedures, in 6 months[6].

The esthetic crown lengthening requires gingivectomy procedure 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 [7,8]. Management of the papilla is also an important aspect of the surgery.

To have a harmonious and successfully long-term restoration, the distance between the crestal bone and prosthetic margins, which allows recreating the biological width, should be at least 3 mm[9].

CONCLUSION

Crown lengthening is an operable procedure that enables restoration of teeth having a short clinical crown, extensive subgingival caries, and subgingival tooth fractures at dentogingival junction. When it is performed under an ideal clinical condition, it gives both functional as well as esthetic satisfactory results.

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