

## Crown Lengthening Surgery: An Essential Tool in Overdenture placement

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**Abstract:** Crown lengthening is a surgical procedure which aims at removal of periodontal tissue to increase the clinical crown height and reestablishing the biologic width. It helps to meet both restorative and aesthetic demands of the patient. The clinician needs to have a sound knowledge of the biological width, indications, technique as well as limitations regarding crown lengthening. Taking into account of all these biological factors, crown lengthening can be carried out in a controlled and predictable manner as part of an overall treatment plan. Recently, crown lengthening procedures have become an integral component of the esthetic armamentarium and are utilized with increasing frequency to enhance the appearance and retention of restoration. This case report discusses about the surgical crown lengthening of attrited teeth for adequate prosthetic restoration.

**Keywords:** Crown lengthening, Biologic width, periodontal surgery

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### I. Introduction

Comprehensive dental therapy is founded on team works. Of all disciplines within modern dentistry, periodontics and prosthodontics have the strongest and the most intimate connections. Periodontal health is the pre-requisite of successful comprehensive dentistry. The interrelationship of restorative dentistry and periodontics is a dynamic one. The interactions between restorative dentistry and periodontal health have been well-documented both clinically and histologically. Periodontal health at the restorative gingival interface continues to represent one of the most difficult challenges for the restorative dentist. Optimal aesthetics and restorative results can be attained by performing some specific periodontal procedures like crown lengthening. It involves the surgical removal of hard and soft periodontal tissues to gain supracrestal tooth length, allowing for a longer clinical crown and re-establishment of biologic width.<sup>1-2</sup> Clinical crown-lengthening procedures include gingivectomy, an apically positioned flap (APF), an APF with osseous reduction, forced eruption combined with surgery, and forced eruption combined with fiberotomy.<sup>3</sup> This case report discusses surgical crown lengthening of attrited teeth for adequate prosthetic restoration.

### Case Report

A 62-year-old male patient was referred from the department of prosthodontics to the department of periodontology, with short clinical crowns to accommodate overdenture. On intraoral hard tissue examination, the teeth present were 13,15 and 24. Generalized attrition was present in all the teeth. The crown structures of 13,15 and 24 were found to be inadequate for prosthetic crown preparation to accommodate a overdenture. Soft tissue examination showed healthy gingiva with no pockets. Adequate width of the attached gingiva was present. Systemically, the patient was healthy. Endodontic treatment of the above teeth had already been completed earlier. The treatment plan included full-mouth thorough scaling followed by flap surgery with osteoplasty/ ostectomy. Routine hemogram analysis was carried out. These three teeth had probing depths of 1–2 mm and no mobility was present on these teeth. Patient was informed about the treatment and after obtaining his consent surgical crown lengthening procedure was carried out.

### Surgical Procedure

After achieving adequate local anesthesia in 13 and 15 region by administering a solution of 2% lignocaine with 1:200000 adrenaline by local infiltration, supraosseous gingival dimensions were evaluated and bleeding points were marked on both buccal and palatal areas to expose the desired amount of crown needed for retention of overdenture. An internal bevel incision was made following the bleeding points, maintaining as much as keratinized gingiva as possible. This was followed by a crevicular incision and removal of tissue wedge

with the help of a curette. Vertical releasing incisions and crestal incision was given on the edentulous ridge from the distal aspect of 13 to mesial aspect of 15. Mucoperiosteal flap was elevated and sufficient osseous resection was done to achieve an overall distance of 3mm between the gingival margin and the alveolar crest. Bone was then recontoured to harmonize with tooth surface topography. This was achieved using a slow speed drilling with carbide bur under copious irrigation. Flap was repositioned, sutures (silk 3-0) were placed and the surgical site was covered with periodontal dressing. Following this crown lengthening procedure was carried out in 24 region. After achieving adequate local anesthesia in 24 region by administering a solution of 2% lignocaine with 1:200000 adrenaline by local infiltration, supraosseous gingival dimensions were evaluated and bleeding points were marked on both buccal and palatal areas to expose the desired amount of crown. An internal bevel incision was made following the bleeding points, maintaining as much as keratinized gingiva as possible. Crevicular and vertical releasing incisions are placed along the mesial and distal line angle of 24 and full thickness flap elevated. osseous recontouring done and the flap was repositioned apically and suturing done using 3-0 silk suture and periodontal dressing given.

Patient was prescribed analgesics and antibiotics for three days. 0.2% chlorhexidine digluconate was also prescribed to be used twice daily for 3 weeks. The patient was asked to refrain from tooth brushing at the surgical site for 2 weeks.

Patient was recalled after 1 week, sutures and periodontal dressing was removed and the surgical area was flushed with antimicrobial solution. This is followed by fabrication of Tooth supported Overdenture.

## **II. Discussion**

Clinical crown of the tooth is the distance from gingival margin to incisal or occlusal surface of the tooth. A short clinical crown is a tooth with less than 2 mm of sound, opposing parallel walls remaining after occlusal and axial reduction which might be because of subgingival caries, subgingival crown fractures, too short tooth crown for restoration retention, excess of gingiva and partially opened anatomical tooth crown<sup>4</sup> One of the processes to obtain appropriate size of clinical crown is crown lengthening. According to the definition of the American Academy of Periodontology, Crown Lengthening is “a surgical procedure designed to increase the extent of the supragingival tooth structure for restorative or esthetic purposes by apically positioning the gingival margin, removing supporting bone or both”.<sup>5</sup>

Crown lengthening is a surgical procedure which aims to increase the clinical crown height. It is a technique by which a clinician can address both restorative and aesthetic demands of the patient. Surgical crown lengthening represents one of the most commonly used procedures in contemporary periodontics.

### **Indications include:**<sup>6</sup>

- (1) Lack of sufficient length of a clinical crown to ensure a tooth preparation for the placement of prosthesis with retentive and resistance form;
- (2) Preexisting dental caries or restorations in the vicinity of the free gingival margins that prevent preparation of finish lines for restorative margins coronal to the biologic width;
- (3) The need to develop a ferrule for pulpless teeth restored with posts; and
- (4) Unesthetic gingival architecture as a result of altered passive eruption.

### **Contra-indications & Limiting Factors includes:**<sup>7</sup>

- (1) Esthetic compromise
- (2) Non restorability of caries or root fracture
- (3) Inadequate crown-root ratio
- (4) High furcation
- (5) Inadequate predictability
- (6) Tooth arch relationship inadequacy
- (7) Insufficient restorative space

Crown lengthening treatment is based on two principles: establishment of Biologic Width (BW) and maintenance of adequate keratinized gingiva (KG) around the tooth. The dimension of space that the healthy gingival tissue occupies coronal to the alveolar bone is defined as the biologic width. Biologic width is essential for — the preservation of periodontium and removal of irritation that might damage the periodontium.<sup>8</sup> Whenever crown lengthening is planned, the biological width must be considered. The concept of biologic width stems from a histologic description of the dentogingival complex by Gargiulo<sup>9</sup> Magnitude or length of dentogingival complex was reported as mean sulcus depth 0.69mm, epithelial attachment 0.97mm and connective tissue 1.07mm, with total length of gingival complex being 2.04mm. Based on these dimensions several authors suggested that 3mm of supracrestal tooth structure should be obtained during surgical crown lengthening.

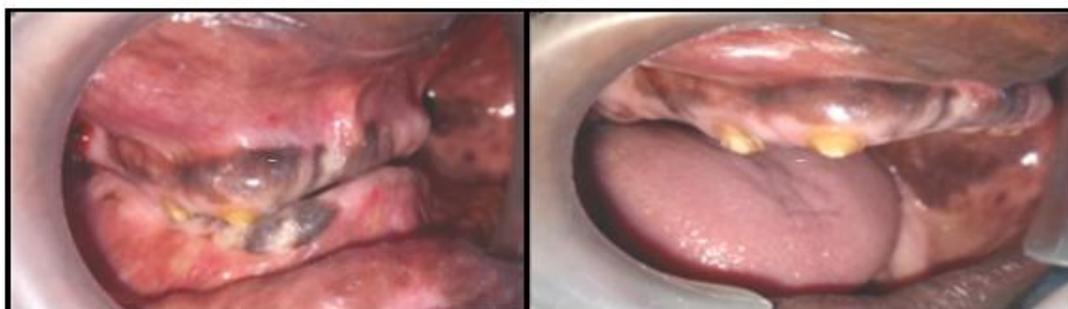
**Surgical Options For Crown Lengthening Procedures<sup>10</sup>**

- A) Gingivectomy
  - Conventional (Scalpel or Kirkland knife)
  - Laser
  - Electrocautery
- B) Internal Bevel Gingivectomy with or without ostectomy
- C) Apical placement of flap with or without ostectomy

In the current case report crown lengthening with osseous resection was selected as a treatment modality for treating the generalized toothwear which resulted in shortened teeth; making overdenture prosthesis of these teeth problematic. Overdenture is a removable partial or complete denture that covers and rests on one or more remaining natural teeth, roots, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, tooth roots, and/or dental implants. It is also called as overlay denture, overlay prosthesis and superimposed prosthesis.<sup>11</sup>

**III. Conclusion**

All phases of clinical dentistry are intimately related to a common objective: The preservation and maintenance of the natural dentition in health. In an multidisciplinary approach to dental care, it is logical that periodontal treatment precede final restorative procedures. Hence for successful oral rehabilitation of the patient the multidisiplinary approach is required where ideas can be exchanged for sake of sound oral health. Crown lengthening is a viable procedure that enables to restore teeth having a short clinical crown, extensive subgingival caries, and subgingival tooth fractures at dentogingival junction. When performed in ideal clinical conditions, crown lengthening gives satisfactory results both from a functional as well as esthetic point of view.



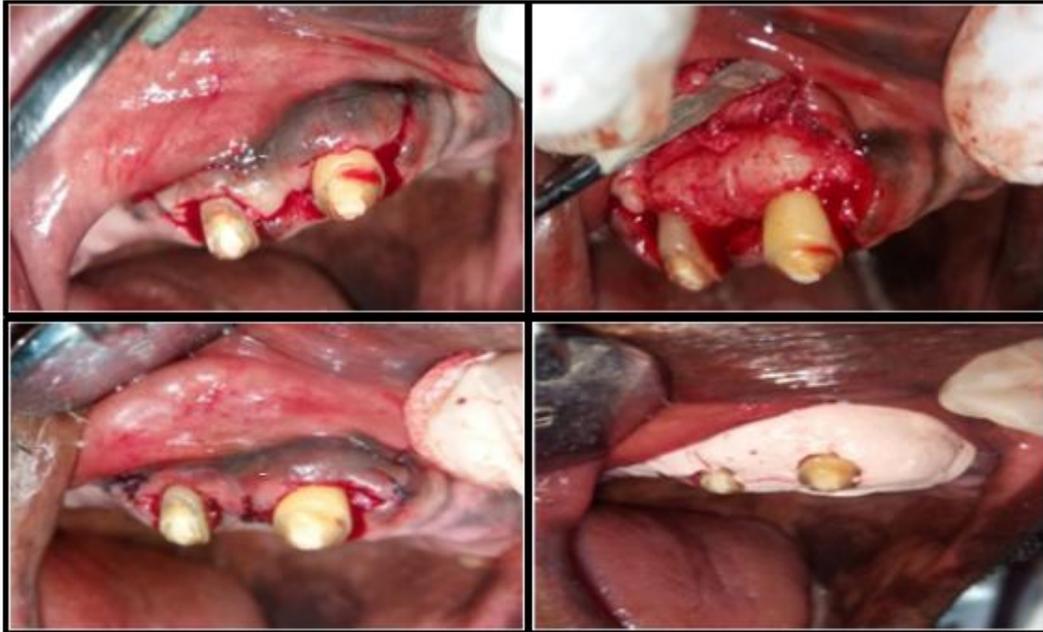
**Fig 1:Preoperative view of 13 and 15**



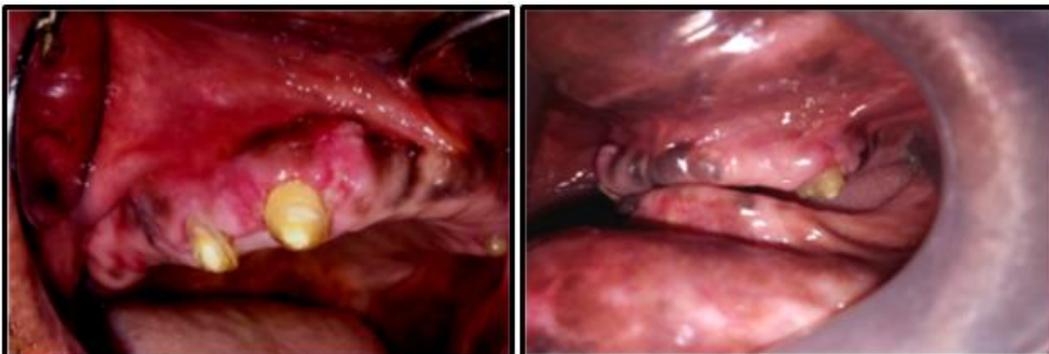
**Fig 2:Preoperative view of 24**



**Fig 3: Intraoperative view of 24**



**Fig 4: Intraoperative view of 13 and 15**



**Fig 5: Postoperative view of 13 and 15**

**Fig 6: Postoperative view of 24**



**Fig 6:Overdenture inserted**

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