

Pre-Prosthetic Surgery

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ABSTRACT

Pre-prosthetic surgery includes procedures such as vestibuloplasty, apically positioned flap and crown lengthening. The choice of technique depends on factors like root proximity, furcation location, occlusion, and aesthetics. This case report illustrates a crown lengthening procedure combined with an apically positioned flap and vestibular deepening for optimal prosthetic outcomes. At 3 months follow-up, stable results with correction of aberrant frenum and increased width of attached gingiva was observed. Narrow gingiva and a shallow vestibular fornix can contribute to the accumulation of food particles during mastication, which in turn may impede proper oral hygiene practices. This can lead to discomfort while brushing and chewing, as well as an increased risk of periodontal issues. In such cases, vestibular deepening should be considered as a solution.

Keywords: crown lengthening, preprosthetic oral surgical procedures, vestibuloplasty.

INTRODUCTION

Pre-prosthetic surgery is performed to help with the construction of prosthetics or to improve the prognosis of prosthodontic care. Pre-prosthetic surgery involves removal of lesions or anomalies in the jaws' hard and soft tissues. In shallow vestibular cases, pre-prosthetic surgery is needed^[1]. Oral hygiene maintenance and the retention of prosthesis, both require the adequate vestibular depth^[2,3]. Inadequate vestibular depth can lead to pathologic outcomes such as gingival inflammation, recession, and pocket development^[4]. Vestibular depth reduction may be caused by a long-term edentulousness, alveolar traumatism, or severe periodontitis^[5]. For vestibule deepening, a variety of surgical procedures have been proposed. Vestibuloplasty is a mucogingival surgery that involves deepening of vestibular trough, repositioning the frenum or muscle attachments, and increasing the attached gingiva⁴. Surgical approaches are used in traditional surgical techniques to extend vestibular length includes Clark's and Kazanjian's^[6].

To correct problems associated with attached gingiva, apically positioned flap is commonly used. This technique allows increasing the attached gingiva by moving the tissue apically and exposing the crestal bone based on the amount of attached gingiva needed^[7,8,9]. Apically positioned flap allows restorative procedures and increases the abutment's retention and resistance^[10,11]. This technique is based on the complete elimination of interdental papilla and complete exposure of the interdental alveolar crest during surgery and even in the healing phase^[12].

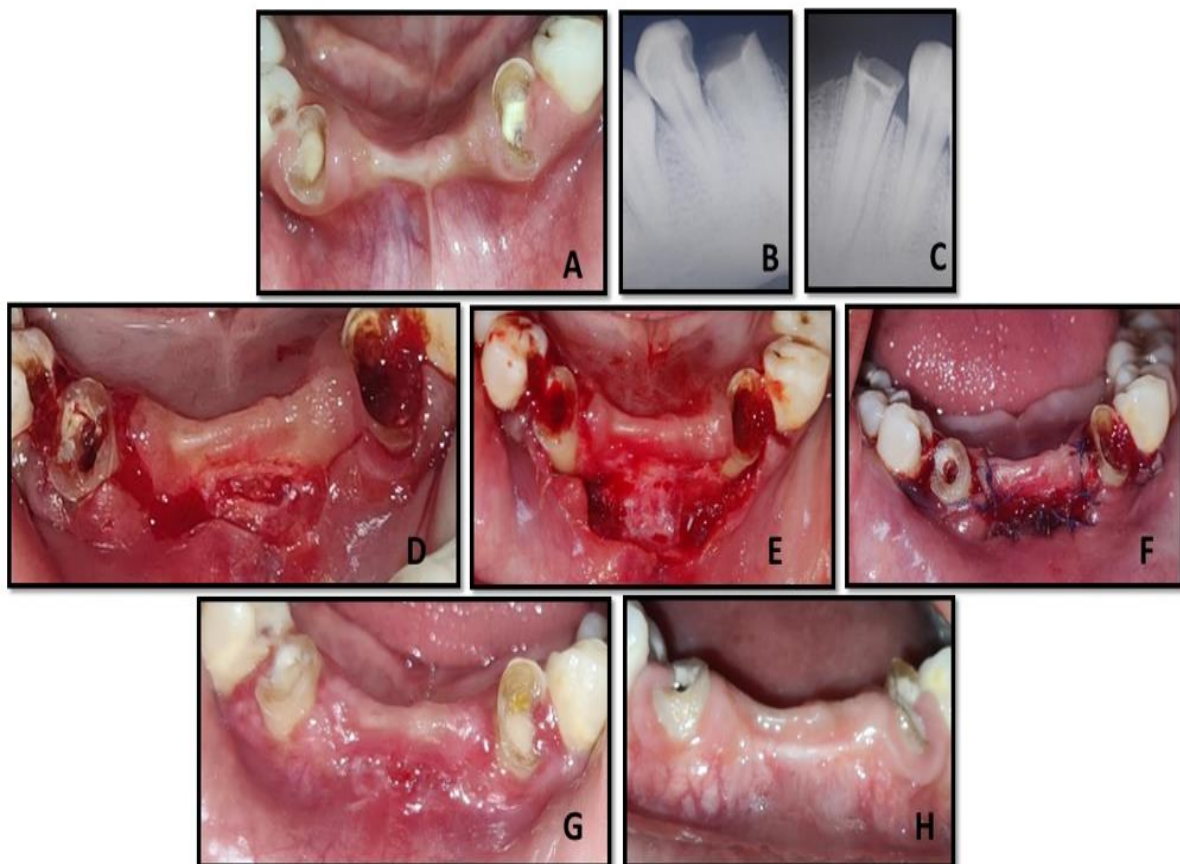
Crown lengthening is used to re-establish the biological width for maintaining overall periodontal health after prosthesis placement^[13]. It helps to achieve a supragingival margin that is more suitable for impression taking, identification of finish line and periodontal maintenance^[14,15]. Biological width is defined as the amount of soft tissue attached to the portion of tooth coronal to the alveolar crest^[16,17]. Studies have concluded that a minimum distance of 3mm between the restorative margin and alveolar crest would be adequate for periodontal health, allowing for 2mm of biological width and 1mm of sulcus depth^[18,19]. Indications for crown lengthening include tooth fractures, teeth with subgingival caries and short clinical crowns caused by incomplete exposure of the anatomic crowns. Various techniques such as gingivectomy, undisplaced flap with or without osseous surgery, apically repositioned flap with or without resective osseous surgery, and orthodontic forced eruption with or without fibrotomy have been proposed for clinical crown lengthening procedure. The selection of one technique over another depends on several patient-related factors such as root proximity, root morphology, furcation location, individual tooth position, the width of attached gingiva, periodontal phenotype, occlusion and aesthetics. Therefore, a multidisciplinary approach that fulfills the prosthetic and surgical requisites should be adopted^[20].

This case report describes the crown lengthening procedure with an apically positioned flap along with vestibular deepening.

CASE REPORT

A 22-year-old female patient reported to the Department of Periodontics with the chief complaint of broken teeth in the upper and lower anterior due to trauma. The patient was a non-smoker with no contributing medical history. Extraoral examination revealed no significant findings. On intra-oral examination, broken crown till CEJ in relation to 32 and 42 was present with missing 31 and 41 teeth. Very thin alveolar ridge was present bucco-lingually along with reduced ridge height apico-coronally in edentulous teeth site. High frenal attachment on labial surface of lower jaw was noticed due to reduced ridge height. Probing depth of 1 mm with absence of zone of attached gingiva apical to 32 and 42 was evident. Intra-oral periapical radiograph revealed adequate bone around 32 and 42.

Phase I therapy was completed. A treatment plan was formulated in consultation with the endodontist and crown lengthening was recommended to increase the amount of supragingival tooth structure so as to allow a healthy, optimal relationship between the restoration and the periodontium. Firstly, endodontic treatment was performed in 32 and 42. Routine haematological investigations were within normal limits. Patient was made comfortable at the dental chair. Local anesthesia was administered. For crown lengthening, surgical blade was used to give sulcular incision around 32 and 42 and full thickness mucoperiosteal flap was reflected. Bone recontouring was performed using rotating diamond burs under copious saline irrigation to establish the biological width. Then sulcular incision was extended to vestibular area to deepen the vestibule. Horizontal incision was given in the vestibule at mucogingival junction and split thickness flap was raised. Periosteal fenestration was created by removing the strip of periosteum at the level of mucogingival junction. Flap was apically positioned and flap was sutured apically in the depth of vestibule with resorbable 5-0 vicryl suture. Periodontal dressing was placed and post-operative instructions were explained to patient. Amoxicillin 500 mg thrice daily and Ibuprofen 400mg as and when required were prescribed to patient for 3 days. Patient was recalled after 14 days for suture removal. Healing was uneventful. Patient was again followed up after 3 months which showed stable results with correction of aberrant frenum and increased width of attached gingiva.



[Figure-1]: A) Preoperative image showing aberrant frenal attachment, inadequate attached gingiva and shallow vestibular depth. B,C) Intra-oral periapical radiograph. D) Intra-operative clinical picture showing periosteal fenestration window. E) Intra-operative clinical picture showing apically displaced flap. F) After suturing the flap. G) 1 week follow-up. H) 3 months follow up

DISCUSSION

The establishment of biological width and maintenance of adequate keratinized gingiva around the tooth are the two important principles of crown lengthening procedure^[16]. If possible, adequate width of keratinized gingiva, $\geq 2\text{mm}$ should be maintained around the teeth for gingival health^[21]. When subgingival margins are indicated, care must be taken not to disrupt the junctional epithelium or connective tissue apparatus. Subgingival margin extension should be limited to 0.5-1mm^[18]. When the prosthesis is placed too far subgingivally, it impinges on gingival attachment apparatus and creates a violation of biological width. It can lead to two possibilities, one being the bone loss and gingival recession, as body tries to recreate the space between the alveolar bone and the margin to allow space for tissue reattachment. This is more likely to occur in thin bone. Another possibility is that bone level remains unchanged but gingival inflammation develops^[20]. Gingival recession can occur between 6 weeks to 6 months after the surgery^[22]. If prosthesis is planned, recession must be closely observed during the healing phase. Temporary crowns should be retained until the wound is completely healed (possibly up to 6 months), after which final crown preparation and prosthesis insertion can be done. If this protocol is followed, the gingival recession can be minimized^[20]. In this case, we have delivered the permanent prosthesis after 6 months without temporary prosthesis.

It is considered that narrow gingiva with a shallow vestibular fornix might favour the accumulation of food particles during mastication, and impede proper oral hygiene measurement^[23]. Hence, vestibular deepening should be considered where patients experience discomfort during brushing and mastication^[24]. For vestibular deepening procedure, we raised partial thickness flap for preserving the periosteum in order to minimize postsurgical bone resorption and to facilitate the apical suturing of the flap.

CONCLUSION

Crown lengthening is a viable procedure that enables restoration of teeth having a short clinical crown, extensive subgingival caries, and subgingival tooth fractures. When it is performed in ideal clinical conditions, crown lengthening gives satisfactory results both from a functional as well as esthetic point of view.

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Conflict of Interest

The authors declare no conflicts of interest related to this study.

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