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(CASE REPORT)

Conventional crown lengthening procedure with bone reduction (*Osseus resection*)

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Abstract

Background: Crown lengthening procedures are often required to restore proper tooth proportions and re-establish biological width prior to restorative treatment. This article presents a case of conventional crown lengthening with bone reduction (osseous resection) performed on the anterior maxilla. The surgical procedure involved a full-thickness flap, osseous recontouring, and apical repositioning of the gingival margin. The postoperative evaluation of the treatment shows good healing, proper biological width and apical reposition of the gingival margin.

Purpose: The purpose of writing this article is to describe crown lengthening process accompanied by bone reduction to correct excessive gingival display in a patient that requires esthetic improvement of the maxillary anterior teeth.

Case: A 21-year-old female who was from the Department of Conservative Dentistry to the Department of Periodontics, Faculty of Dental Medicine, Airlangga University with a complaint of wanting to fix the front teeth for esthetic improvement. The patient currently undergoes a treatment in the conservative department and was referred for gingival reduction of the front teeth to become more esthetic. Patient had no systemic illness or allergy history and had last scaling done one year ago.

Case Management: After periodontal evaluation and bone sounding, crown lengthening with bone reduction was performed. A full thickness flap, osseous recontouring and apical repositioning of the gingival margin were carried out to re-establish the biological width and enhance the esthetics.

Keywords: Crown Lengthening; Osseous Resection; Case Report; Biologic Width

1. Introduction

An ideal relationship between the gingival margin and tooth structure is essential for achieving functional stability and esthetic harmony in restorative dentistry. In some cases, excessive gingival display, short clinical crowns, or subgingival caries can compromise both the esthetic appearance and the retention of restorations. These conditions may arise due to altered passive eruption, tooth wear, or extensive caries extending below the gingival margin.

When restorative margins extend into the biological width, it may lead to gingival inflammations, clinical attachment loss and alveolar bone resorption [2]. To prevent these complications, surgical crown lengthening procedures are performed to re-establish the biologic width and expose adequate tooth structure for proper restoration. Crown

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lengthening is a surgical procedure aimed to increase the extent of the supragingival tooth structure with a purpose of restorative or aesthetic by apically positioning the gingival margin, removing supporting bone or both.

Various techniques have been employed to achieve this, including gingivectomy, apically repositioned flap, and osseous recontouring. The choice of technique depends on the amount of clinical crown exposure required, esthetic demands, and the location of the tooth involved. The present case report describes an esthetic crown lengthening procedure performed in the anterior maxilla to improve both the functional and esthetic outcomes prior to prosthetic rehabilitation.

2. Case Report

A 21-year-old female who was from the Department of Conservative Dentistry to the Department of Periodontics, Faculty of Dental Medicine, Airlangga University with a chief complaint of wanting to fix the front teeth for esthetic improvement. Patient currently undergoes a treatment in the conservative department and was referred for gingival reduction of the front teeth to become more esthetic. Patient had no systemic illness or allergy history and has last scaling done one year ago.

Figure 1 Bone sounding examination of teeth 13, 12, 11, 21, 22, 23 before crown lengthening surgery

Clinical examination revealed plaque and calculus deposits, generalized gingival hyperplasia and positive bleeding on probing. Caries was found on teeth 12, 11, and 21, with malposition of 23 and 43 and teeth 36, 46, and 47 were missing.

Figure 2 Dental Panoramic Examination

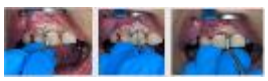
Figure 3 Digital Smile Design

3. Case Management

Pre-Surgical Protocol: A patient treatment plan is developed to achieve optimal periodontal tissue results and good aesthetics. The first phase (phase I) begins with dental health education and scaling and root planing to remove plaque and calculus. After initial treatment, an evaluation (phase 4) is conducted to assess plaque and calculus, inflammation, tooth mobility, and pocket depth. The results of this evaluation are used to determine the continuation of treatment to the next stage. In phase 2, pro crown lengthening is planned for teeth 13–23 to improve the clinical crown proportion and facilitate restoration, as well as the placement of implants in teeth 36, 46, and 47 to replace missing teeth and restore masticatory function. Phase 3 includes restorative and orthodontic stages, namely the fabrication of crown restorations and orthodontic treatment to improve occlusion and enhance overall dental aesthetics.

To determine the need for bone reduction prior to crown lengthening procedures, bone sounding examinations are performed on teeth 13–23. This examination aims to assess the relationship between the gingival margin, pocket base, and alveolar bone crest, as well as to ensure adequate biological space for final restoration. Bone sounding was performed after the initial phase of periodontal therapy to determine the distance between the gingival margin and the alveolar bone crest and to estimate the need for bone reduction prior to the crown lengthening procedure. The examination was performed using a periodontal probe at three measurement points, namely distal (D), facial (F), and mesial (M) on the maxillary anterior teeth.

Table 1 Clinical measurements of probing depth, bone sounding, and bone reduction in teeth 13–23

No	Clinical Photo	Teeth	Probing Depth (mm)	Bone Sounding (mm)	Bone Reduction (mm)
1.		13	4-2-2	4-3-3	2-1-1
2.		12	3-3-3	5-5-3	0-0-2
3.		11	3-1-3	4-3-4	1-0-1
4.		21	2-2-2	4-4-5	0-0-0
5.		22	2-2-3	2-4-3	2-0-2
6.		23	2-2-2	2-3-3	2-1-2

From the bone sounding results, it was found that the distance between the sulcus base and the bone crest was still insufficient for the creation of a restoration with a subgingival margin without violating the biological width. Therefore, crown lengthening was planned for teeth 13–23 with bone reduction as needed, as shown in the table above.

Surgical Protocol: The surgical site is sterilized and anesthetized using local infiltration anesthesia (e.g., 2% lidocaine with 1:80,000 epinephrine or equivalent). Preparation is carried out by extraoral and intraoral cleaning using 10% povidone iodine. The instruments and materials used include sterile surgical drapes, metal suction tips, stainless steel bowls, 10 cc and 3 cc syringes, Minnesota retractors, lip retractors, Kirkland and Orban surgical knives, pocket marker forceps, periodontal probes (UNC and WHO), Chu-gauge, bone sounding instruments, low-speed handpiece with small round bone bur, scalpel handle with blade no. 15C, needle holder, 4.0 nylon thread, tissue scissors, tissue forceps, periodontal pack, gauze, tampon, and 10% povidone iodine antiseptic solution. Topical anesthesia (Xylo nor) was administered first, followed by infiltration anesthesia (Phenacaine) in the mucobuccal region 13–23.

After adequate anesthesia, pocket exploration was performed in the gingiva to be operated on with a probe and marked using pocket marker forceps (PMF) on three sides (mesial, facial, distal). Based on the measurement results, an incision is made approximately 1–2 mm more apical than the bleeding point using a No. 15c scalpel, forming a 45-degree external bevel to the coronal. The interdental area is cut with an Orban knife to obtain the desired tissue, then the pocket wall is thoroughly cleaned.

Initial irrigation was performed to remove tissue debris. Next, a sulcular incision was made using the papilla preservation technique, followed by full-thickness flap elevation so that the bone to be reduced was visible. Once the bone was visible, bone reduction was performed using a low-speed handpiece and round bur until the desired osseous contour was achieved. Once the bone contour matches the plan, it is reconfirmed with bone sounding to ensure that the distance between the alveolar bone crest and the planned restoration margin is 2-3 mm so that the biological width is well maintained. After bone reduction is complete, irrigation with saline solution is performed. Suturing is performed using 4.0 nylon thread.

Figure 4 Crown lengthening surgical procedure

(A) EO and IO asepsis with 10% povidone iodine. (B) Topical anesthesia and infiltration anesthesia at the mucobuccal fold. (C) Bleeding point results using PMF in regions 13, 12, 11, 21, 22, and 23. (D) Gingival incision following the bleeding point (E) Trim the interdental area with an Orban knife (F) Irrigation of the working area. (G) Bone sounding (H) Full thickness flap in zones 13, 12, 11, 21, 22, and 23. (I) Bone reduction using a low-speed handpiece and bone bur. (J) Irrigate with saline after confirming bone reduction with bone sounding. (K) Suturing with Nylon 4.0 (L) Suture removal on day 14.

Figure 5 (A) Pre-operative clinical photograph before crown lengthening. (B) Post-operative clinical photograph after crown lengthening

4. Discussion

Among the various periodontal surgical procedures, crown lengthening is the most commonly performed procedure, especially in patients with healthy periodontal tissue. This procedure is generally indicated when increased exposure of the tooth structure is needed, either due to a naturally short clinical crown or as a result of loss of coronal tooth structure. The main goal is to position the gingival and bone tissue more apically to create appropriate biological dimensions and prevent periodontal inflammation after restorative procedures [7].

In order to reposition the periodontal flap in a more apical location with advantageous periodontal tissue architecture, the clinical crown lengthening procedure involves executing an osteoplasty technique in conjunction with a periarticular ostectomy of a few millimeters (1 to 2 mm). despite the change in normal gingival morphology, the health of the treated area is maintained. Aesthetic evaluation and an evaluation of the position and condition of the surrounding periodontal tissue must be included in clinical application [8].

The classic histologic investigation by Gargiulo et al., which measured the average size of the human connective tissue attachment (1.07 mm) and epithelial junction (0.97 mm), is where the idea of biologic breadth originated. The biologic width was calculated by adding these measurements, and the average measurement came out to be 2.04 mm [4]. The average sulcus depth is 0.69 mm, the junctional epithelial length is 0.97 mm, and the connective tissue length is 1.07 mm, resulting in a total dent gingival complex of approximately 2.73 mm. Based on these dimensions, a minimum distance of approximately 3 mm from the alveolar bone crest to the restoration margin is required to maintain periodontal tissue health [4].

Before the procedure, the clinical condition showed gingival hyperplasia in the anterior region, accompanied by generalized plaque and calculus, as well as 100% positive bleeding on probing (BOP) in all regions. The probing depth ranged from 1–3 mm, indicating no significant attachment loss. Thus, crown lengthening was performed not because of destructive periodontal disease, but to improve the aesthetic proportions of the clinical crown of the anterior teeth [9]

Crown lengthening was performed using the bone reduction technique (osseous reduction) with a full-thickness flap. Bone sounding was performed with a bone reduction of 1–2 mm to maintain a 3-mm distance between the restoration margin and the alveolar bone crest, as recommended by Gargiulo et al. and Lanning et al., with the aim of preventing violation of the biological width [4].

The surgical procedure was performed using the full-thickness flap technique and osseous recontouring with the guidance of a chu aesthetic gauge using a low-speed bone bur to ensure bone reduction in accordance with biological and aesthetic principles. After the procedure, the gingival contour became more symmetrical and harmonious, and the clinical crown height of the anterior teeth increased. The gingival tissue showed good healing results, appearing coral pink in color and showing no signs of inflammation or swelling [4, 6]

These clinical results are consistent with studies by Lanning et al. and Shobha et al., who reported that stabilization of the gingival margin position and re-establishment of biological width occurred within 3–6 months after crown lengthening. The use of the Chu aesthetic gauge helps ensure a balance between aesthetic needs and biological dimensions, allowing restoration to be performed without compromising periodontal tissue integrity [4, 8]

The success of this procedure is also influenced by relatively thick gingival biotype, good oral hygiene, and optimal post-operative plaque control. Additionally, early planning that includes scaling and root planning before surgery plays an important role in reducing preoperative inflammation, allowing healing to proceed without complications. This is in line with the principle that periodontal surgery should be performed on healthy, inflammation-free tissue [1, 9]

Based on clinical results and post-operative evaluation, conventional crown lengthening procedures have proven effective in improving clinical crown proportions, maintaining biological space, and achieving satisfactory aesthetic results without periodontal complications. Understanding biological principles and healing stages is crucial to prevent long-term restoration failure [3, 6]

5. Conclusion

Conventional crown lengthening techniques have been shown to be successful in conserving biological space, enhancing clinical crown proportions, and producing excellent cosmetic outcomes without periodontal problems, according to clinical data and post-operative examination. Preventing long-term restorative failure requires an understanding of biological principles and the stages of healing.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Alrmali, A., Melker, D., Zalucha, J., and Wang, H. L. (2024). Biological shaping as a conservative alternative for crown lengthening: A review. In Clinical and Experimental Dental Research (Vol. 10, Issue 2). John Wiley and Sons Inc. pp. 6-8 https://doi.org/10.1002/cre2.873

[2] Arora, S., Gupta, G., and Parimoo, R. (2021). Clinical significance of biological width in crown lengthening. International Journal of Health Sciences, 5(S2), 285–289. https://doi.org/10.53730/ijhs.v5nS2.5773

[3] Coachman, C., Valavanis, K., Silveira, F. C., Kahn, S., Tavares, A. D., Mahn, E., Parize, H., and Saliba, F. M. P. (2023). The crown lengthening double guide and the digital Perio analysis. Journal of Esthetic and Restorative Dentistry, 35(1), pp. 215–221. https://doi.org/10.1111/jerd.12920

[4] Lanning, S. K., Waldrop, T. C., Gunsolley, J. C., and Maynard, J. G. (2003). Surgical Crown Lengthening: Evaluation of the Biological Width. In J Periodontol (Vol. 74). pp. 468-474

[5] Marzadori, M., Stefanini, M., Sangiorgi, M., Mounssif, I., Monaco, C., and Zucchelli, G. (2018). Crown lengthening and restorative procedures in the esthetic zone. In Periodontology 2000 (Vol. 77, Issue 1, pp. 84–92). Blackwell Munksgaard. pp. 1-3 https://doi.org/10.1111/prd.12208

[6] Nautiyal, A., Gujjari, S., and Kumar, V. (2016). Aesthetic crown lengthening using Chu aesthetic gauges and evaluation of biologic width healing. Journal of Clinical and Diagnostic Research, 10(1), ZC51–ZC55. pp. 54-55 https://doi.org/10.7860/JCDR/2016/14115.7110

[7] Newman, M. G., Klokkevold, P. R., Elangovan, S., L., H.-K. Y., Carranza, F. A., and Takei, H. H, 2024, 'Newman and Carranza's clinical periodontology and Implantology'. Elsevier. pp. 834-836

[8] S, S. K., Siddhartha, S., and Seshan, H. (n.d.). Clinical evaluation of the biological width following surgical crown-lengthening procedure: A prospective study. Journal of Indian Society of Periodontology, 14. p. 164 https://doi.org/10.4103/0972

[9] Tomar, N., Bansal, T., Bhandari, M., and Sharma, A. (2013). The perio-esthetic-restorative approach for anterior rehabilitation. Journal of Indian Society of Periodontology, 17(4), pp. 535–538. https://doi.org/10.4103/0972-124X.118332