

A COMPREHENSIVE AESTHETIC AND FUNCTIONAL ORAL REHABILITATION MEDIATED BY PERIODONTAL AND MUCOGINGIVAL SURGERIES WITH A 4-YEAR FOLLOW UP; A CASE REPORT

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ABSTRACT

The use of comprehensive oral rehabilitation techniques is usually for cosmetic or functional purposes or both, and in all cases, many therapeutic procedures are employed to produce the optimal and desired results by both the patient and the doctor. The clinical case described in this article is a classic and scholastic case aimed at restoring the cosmetic and functional aspects of a patient in his thirties. Surgical crown lengthening, gingival depigmentation, and surgical frenectomy have played a key role in achieving the desired results.

KEYWORDS: Surgical crown lengthening, gingival depigmentation, and surgical frenectomy have played a key role in achieving the desired results.

INTRODUCTION

Maintaining a healthy periodontium during teeth reconstruction procedures is a prerequisite for obtaining esthetics and function.

For this purpose, it is necessary to know the correct anatomy and the effects of different dental procedures on the periodontium.^[1]

A significant increase in the range of periodontal treatments is observed today. In addition to the treatment of periodontal diseases, techniques such as recession coverage, alveolar defect corrections, regeneration treatments, augmentation of keratinized gingiva, and papilla reconstruction techniques have emerged.

A common problem encountered with restorative and/or prosthetic procedures is the difficulty in maintaining adequate biological width.

The term "biological width" (or gingival biological width, GBW) refers to the gingival area that is attached to tooth surface, located coronally in relation to the alveolar ridge.

The average value of the epithelial attachment (EA) is 0.97 mm and the connective tissue attachment (CTA) is 1.07 mm. Biological width is calculated as: $GBW = CTA + EA = 2.04$ mm.^[2,3]

This value can vary with the age, movement of teeth, or even orthodontic treatment. In order to precisely determine biological width one must carry out an individual measurement under local anaesthesia, from the edge of the alveolar process to the free gingival margin, passing through the epithelial and connective tissue attachments. The accuracy of measurement is affected by the biotype of the gingiva, the presence of recessions, the shape of root surface, existence of bone dehiscence and the thickness of alveolar bone.^[4]

The relative stability of biological width makes any interference in this area cause a defensive reaction of the body and an attempt to restore these relations.

In both cases, this can lead to retraction of the gingiva and creation of periodontal pockets which would be a result of bone and attachment loss due to inflammation.

The ideal situation for periodontal-prosthetic relationship is to locate the border of fillings/restorations supragingivally, and therefore at least 3 mm from the alveolar ridge. In the esthetic zone, however, where the

polishing limit is located subgingivally, the following rules must be followed:

If the gingival sulcus (GS) ≤ 1.5 mm, the limit of filling may be located 0.5 mm subgingivally.

If GS equals to 1.5–2 mm, the limit of filling may be located 0.7 mm subgingivally.

If GS > 2 mm, the limit of filling may be located 0.5 mm subgingivally.^[5,6,7]

If the distance of the expected filling limit from the edge of the bone violates the preservation of biological width, the treatment plan should take into account a clinical crown lengthening surgery.

Gingival pigmentation is seen in some populations and can be attributed to genetic traits. Melanoblasts are non-keratinocytes, which are responsible for gingival pigmentation.^[8]

This pigmentation may be prevalent across all races, at any age, and is devoid of any gender predilection.^[9,10,11]

Techniques available to correct excessive gingival display and gingival pigmentation usually include surgical methods, and selection of technique should be based on clinical experience and individual preferences.^[12,13]

The frenum may also jeopardize the gingival health by causing gingival recession when they are attached too

closely to the gingival margin, either because of an interference with the proper placement of a toothbrush or through the opening of the gingival crevice because of a muscle pull.^[14]

Various techniques are available to correct a high frenum attachment; namely conventional (classical) frenectomy, Miller's technique, the V-Y Plasty, the Z plasty, and frenectomy which is done by using electrosurgery.

This case demonstrates a comprehensive oral rehabilitation of a patient in the dental clinics of the faculty of dentistry at the International University for Science and Technology (IUST), who was seeking a "better" appearance of his teeth.

Case description

A 33-year-old male patient who visited the faculty of dentistry at IUST complaining of an "unpleasant teeth appearance" was referred to the department of oral rehabilitation to get a full consultation.

Upon intraoral examination, it was shown that the patient had upper anterior teeth with significant hard tissue destruction, gingival pigmentation on the upper and lower anterior gingiva, malpositioned upper labial frenal attachment (diagnosed by a movable nearby papilla), and bad oral hygiene manifested by the existence of plaque and even *materia alba* accumulation on the teeth and soft tissues (Figure. 1).



Figure 1: Initial examination of the case.

Treatment plan

The treatment protocol was prepared comprising complete oral prophylaxis, periodontal treatment, endodontic treatment, surgical crown lengthening and prosthetic reconstruction with the use of casted, prefabricated posts, and crowns.

Steps of treatment

Oral hygiene instructions including using the modified "Bass" technique for toothbrushing, whole time, and frequency of brushing had been taught to the patient, and

the correct application and commitment to them had been assured through a 2-week follow up period before any treatment was undertaken.

As a next step, a complete scaling and root planing had been performed and the patient was advised to rinse with Chlorhexidine Gluconate solution (0.12%) on a daily basis for 10 days.

During this period, most of the carious lesions and endodontic treatments were performed.



Figure 2: Completing oral Prophylaxis and Endodontic treatment for the upper anteriors with placement of a G.I.C temporary restorations.

Thereafter, the patient underwent a surgical crown lengthening procedures in the upper anterior area. For this purpose, a local anesthetic infiltration with Lidocaine 1:100.000 on the buccal and palatal aspects was provided, with gingival infiltration at the base of the

papillae of the target teeth to decrease the severity of haemorrhage during the surgery.

Using No.15 blade, an external bevel incision at an angle of 45 degrees was made along the expected gingival line of all target teeth (Figures 3-7).



Figure 3: First incision.

Once gingivectomy procedure was completed to an esthetic and prosthetic pleasing level, the exposed surface was irrigated with saline.

A full-thickness flap was elevated and complete marginal osteotomy was achieved by means of a rounded surgical dental bur under low speed with constant saline irrigation.

Care was undertaken in order to maintain the biologic width by keeping a 3 mm distance between the gingival margins and the coronally aspect of the crestal alveolar bone. For such measurements, Williams' periodontal probe was used.

Repositioning of the flap was then achieved using 4-0 braided silk suture by means of vertical mattress suturing technique.



Figure 4: Completed gingivectomy.

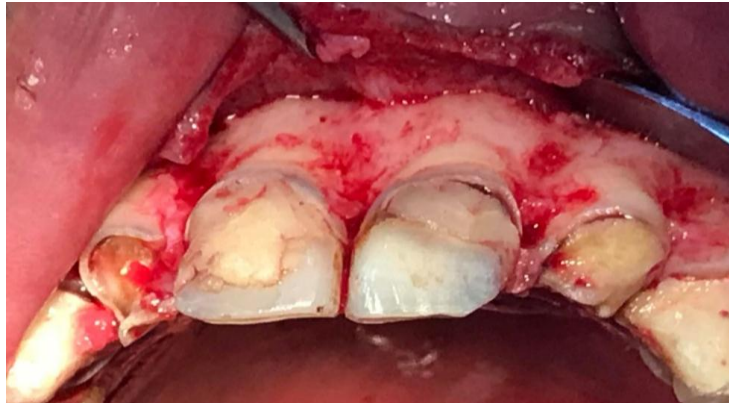


Figure 5: Elevation of a full thickness flap (envelope).



Figure 6: Insuring the appropriate depth.



Figure 7: Suturing with a 4-0 braded silk suture.

Stabilization of the new gingival position was maintained by temporary flowable composite that was applied on the teeth surfaces after suturing (Figure 8).



Figure 8: Flowable composite placed as an interim solution to form the gingival margins.

Post-operative instructions were given to the patient with a prescription of antibiotics (Amoxicillin 500 mg, 4 times daily for 5 days) and analgesics (Ibuprofen 400 mg, 3 times daily for 3 days).

The patient was advised to use Chlorhexidine-containing mouth wash for 2 weeks post-operatively to aid in plaque control. The patient was recalled after 2 weeks for suture removal and healing control.

Two weeks later, surgical depigmentation of the gingiva along with frenectomy were performed under local anaesthesia for the upper anterior teeth (i.e. from second right to second left premolar) using the same armamentarium as in the previous surgery, but instead of a surgical handpiece we used a turbine handpiece with a flame-shaped diamond bur for the depigmentation of the gingiva in the upper and lower jaws.



Figure 9: Post-operative site immediately after depigmentation and connective tissue exposure.

Frenectomy was undertaken with the one hemostat technique and a scalpel using a No.15 blade, then

loosening of the surrounding tissues. Attention was given not to leave any frenal attachments.



Figure 10: Frenum position before excision.



Figure 11: Excising the frenum.



Figure 12: Frenectomy is done.



Figure 13: Suturing With 4-0 braided silk suture.



Figure 14: Surgical wound was covered by a periodontal dressing.

Same post-operative instructions were given to the patient regarding oral hygiene and medications.

As a next step, endodontic treatment was performed for teeth number: 17-13-12-11/21-22-23-24-25-26/37-35-34-33-32/44-45-47, endodontic re-treatment was performed

for tooth number: 36, extraction was performed for teeth number: 18/28/46-48, prefabricated posts were performed on teeth number: 13-11/21-24-25-26/35-34-33-32/44-45, and casted post and core was performed for teeth number: 17-12/22-23-/37-36/44-54.



Figure 15: Final result.



Figure 16: Final result.

On a 4-year follow-up the following points were noticed: Presence of a mild marginal gingival inflammation along with a very good status of the existing prosthetic crowns

and bridges. The patient was fully satisfied with the accomplished results both aesthetically and functionally.



Figure 17: 4-year follow-up.

DISCUSSION

Dental treatment should aim at giving functional and aesthetic restoration with minimum complications and longevity.

In the present case a functional and aesthetic full-mouth rehabilitation was performed using a combination of treatment methods in a regular sequence starting with

maintaining a healthy periodontium going through full crowning of teeth to recreate a normal functional aspect.

Aesthetic crown lengthening was an essential part of this case. With such surgical procedure, an appropriate proportion of the anterior teeth, along with pleasing gingival symmetry could be provided.^[7] During a crown lengthening procedure, maintaining a 3 mm of biological width is necessary to satisfy the requirements for a sound periodontium (2.04 mm, biologic width; 1 mm, sulcus depth). Violation of the biologic width may result in inflammation and bone resorption.^[6]

In our case, aesthetic considerations in smile design have focused mainly on the anterior teeth region and details such as the smile line gingival zenith (apical point of the free gingival margin), gingival position and level, as well as the surgical correction of brownish gingival pigmentation.

Gingival pigmentation is a major concern for a large number of patients visiting the dentist. The patients with excessive gingival display and pigmentation are more concerned aesthetically. Most pigmentation is caused by five primary pigments out of which melanin shows the maximum incidence rate. Melanin hyper pigmentation usually does not present as a medical problem, but patients may complain about their unesthetic black gums. The gingiva is the most frequently pigmented intraoral tissue, with the highest rate observed in the area of the incisors aesthetic periodontal plastic surgery is a boon in patients having “dark gums” and “gummy smile”^[15] In our case, satisfying results of hand-piece-mediated- gingival depigmentation had been achieved, and more aesthetic appearance preferred by the patient was approached.

In order to prevent future possibility of gingival recession and/or any mucogingival complications in the upper anterior area, a surgical frenectomy was performed due the fact that abnormal frenum attachment is an anatomical factor that may contribute to gingival recession.^[16]

CONCLUSION

Successful management of a patient during the first visit build good patient dentist relationship thus completing comprehensive dental treatment. Ideally, before initiating treatment, an aesthetic assessment is essential to achieve the best outcome.

Excessive gingival display and gingival hyper pigmentation are major concerns for large number of patients. Although several techniques are currently in use, the scalpel technique is still the most widely employed. Lasers and cryosurgery may offer less post-operative pain. However, the choice of the technique should be dependent on clinical expertise and patient affordability. Thus, depigmentation of hyperpigmented gingiva by scalpel surgery is simple, easy to perform,

cost-effective and above all it causes less discomfort and is aesthetically acceptable to the patient.

In our case, a satisfying result for the patient was achieved by regaining both aesthetic and functional aspects.

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