

ESTHETIC REHABILITATION WITH RAPID MAXILLARY EXPANSION, LEFORT OSTEOTOMY, AND GINGIVAL VENEER PROSTHESIS: A CASE REPORT

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<https://doi.org/10.51847/KIThWwrzdv>

ABSTRACT

The preservation and reproduction of optimal pink & white esthetics are the fundamental aspects of the rehabilitation of a patient, but this can be difficult to achieve alone from both surgical and prosthetic viewpoints. Esthetic rehabilitation can be done well with proper planning. The best outcome can be achieved only through a multidisciplinary approach. A 17-year-old female patient reported with a chief complaint of missing teeth and an unpleasant smile. Clinical examination revealed a ridge defect and Skeletal Class III malocclusion with constricted maxillary arch and cross bite. An Interdisciplinary approach was planned with Rapid maxillary expansion to correct the cross bite, Following surgical and orthodontic procedures, Lefort 1 osteotomy, fixed orthodontics, and CAD CAM gingival veneer prosthesis were performed to replace the anterior region of the edentulous area and to correct dental defects respectively. With proper planning and team management strategy the overall treatment was effectively achieved. Any successful outcome should always be approached from a multidisciplinary perspective.

Key words: Esthetics, Gingival prosthesis, Residual ridge resorption, Seibert class III defect.

Introduction

Esthetics is a prime consideration for the patient with high esthetic demand. Treatment with a systemic strategy is well recommended. Identification of problems and proper diagnosis leads to a unique patient-specific treatment plan which includes surgical and nonsurgical procedures with an interdisciplinary team approach. Missing a tooth often affects the psychological well being as well function, esthetics of the patients. Therefore, the replacement of missing teeth and the lost alveolar ridge repeatedly poses many difficulties to the clinician. The preservation and reproduction of optimal mucogingival aesthetics are the fundamental aspects of the rehabilitation of a patient, but this can be difficult to achieve from both surgical and prosthetic viewpoints. Matching gingival and tooth proportions by either fixed or removable means to achieve aesthetic harmony could be a difficult procedure [1]. Sometimes challenges may get exacerbated when a patient presents with a so-called 'high smile line' [2, 3], exposing differing lengths of teeth in the aesthetic zone. So, whenever there is significant variation in gingival margin heights, the use of a 'gingival prosthesis' can dramatically improve aesthetics, especially in those patients with a high smile line. Esthetic rehabilitation can be done well with proper planning. The best outcome can be achieved only through a multidisciplinary approach.

Malocclusion, cleft, and constricted maxilla are associated factors for impaired esthetic. For class III malocclusion with the cleft surgical approach is recommended along with maxillary expansion for the constricted maxilla. An orthodontic correction is always a non-invasive approach for teeth alignment. Post orthodontics missing space can be replaced by prosthetic means. A gingival veneer is defined as a prosthesis worn in the labial aspect of the dental arch which aims to re-establish the mucogingival contour and esthetics in areas where periodontal tissue is deficient. Siebert Class III is one of the most common and yet the most challenging to restore due to severe ridge defect both vertically and horizontally. Appropriate diagnosis and a planned management have a crucial role in the success of any restorative Treatment and can produce long-term successes to the patient. Keeping this in mind this case report described the fixed gingival prosthesis to treat a Siebert's Class III anterior ridge defect post-Lefort osteotomy and rapid maxillary expansion.

Case report

A 17-year-old female patient reported to the Department of Prosthodontics with a chief complaint of missing teeth and an unpleasant smile. Clinical examination revealed ridge defect and Skeletal Class III malocclusion with constricted maxillary arch (**Figure 1**). An Interdisciplinary approach was planned to correct the deformity. Rapid maxillary expansion using a bonded hyrax appliance to expand the

maxillary arch followed by Lefort 1 osteotomy was done. Class III malocclusion was corrected by fixed orthodontics (**Figure 2**). After completion of the surgical and orthodontic phase, the patient was referred back to the Dept. of Prosthodontics for an esthetic rehabilitation. Intra-oral examination revealed the horizontal and vertical residual ridge that we know as Class III defect based on Siebert [4] being 5 mm horizontally and 10 mm vertically. Also, the patient had a partially edentulous maxillary arch in relation to 12 with a midline shift which had occurred due to maxillary expansion. Because of insufficient soft tissue in the edentulous region, ridge augmentation with bone graft was questionable. As the lip line of the patient was high, the direct prosthesis of the white ceramic alone will make the tooth elongated and unaesthetic, henceforth, based on the diagnostic findings, an approach for rehabilitation of a ridge defect through a gingival prosthesis was planned to obtain pink and white esthetics with appropriate proportions [4, 5]. The whole procedure along with advantages and disadvantages was explained to the patient, and informed consent was taken.



a)



b)



c)



d)

Figure 1. Preoperative profile before orthodontic and surgical correction



a)



b)

Figure 2. Smile after orthodontic and Surgical correction

The treatment planning started with a diagnostic impression to obtain a cast on which a diagnostic wax-up was done to correct the smile line of the patient and to ensure patient satisfaction. After radiographic evaluation, 11, 21, and 13 were decided as an abutment for the better prognosis of the prosthesis. Tooth preparation in relation to 11, 21 and 13 followed by double cord (00,0)gingival retraction (Ultradent) was done and single stage putty wash impression was made with polyvinyl siloxane(3M ESPE) and the master cast was poured using die stone. Shade selection for the ceramic (VITA Classic shade guide) was selected according to the patient’s age, sex, and personality and to mimic gingival color patient photographs were used.

Silicon index was made over the wax pattern to maintain the contour, shape, and size of the final prosthesis through temporization using Protemp (3M ESPE Protemp 4) necessary adjustments were done in the patient’s mouth using composite material (3M Filtek Universal dental composite) and the patient was recalled after 2 weeks. A complete evaluation was done to ensure proportionate smile line, visibility, and anterior guidance. Gradation, gingival & incisal embrasures, contact areas, and tooth morphology were corrected as well. An alginate impression was made to

transfer the prosthetic outline to the lab for the fabrication of the digital zirconia framework (**Figure 3**) coping which was made after scanning the cast (with temporization) for superimposition. This superimposition of wax-up gave the complete outline of the expected prosthesis during digital workflow in CAD software. In the virtual planning phase, a zirconia substructure replacing the ridge defect and the missing teeth after a midline correction was planned. Modified ridge lap pontics were planned in order to achieve good oral hygiene. A Zirconia framework trial was done to verify the marginal fit and the same was evaluated through a radiograph. The occlusion, anterior guidance, esthetics, and lip fullness were checked during the bisque trial phase. A fit checker was used to identify the pressure spot beneath the pontic on the soft tissue surface in an attempt to avoid ulceration (**Figure 4**). After glazing the fixed component was luted using resin cement (3M ESPE) and oral hygiene instructions were given (**Figure 5**). The patient was recalled after 3 days to analyze the adaptability and success of the final prosthesis and the individual's satisfaction.

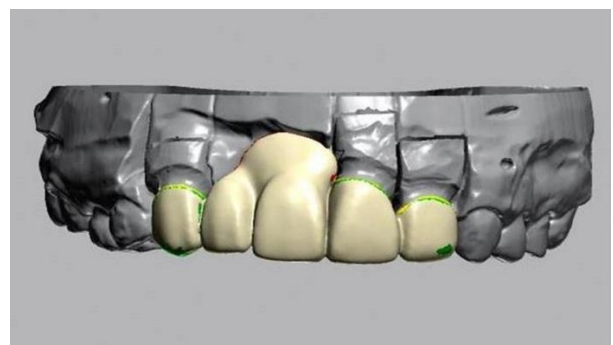


Figure 3. CAD-CAM virtual design for Zirconia Framework



a)



b)



c)

Figure 4. Gingival Prosthesis trial with Fit checker

a)



b)

Figure 5. a) Intraoral gingival veneer prosthesis, b) Post-op extraoral smile

Results and Discussion

Anteroposterior discrepancies are cited as reasons to consider RME (Rapid maxillary expansion) [6]. Patients with skeletal Class II, Division 1 malocclusions with or without a posterior crossbite, patients with Class III malocclusions, and patients with borderline skeletal and pseudo Class III problems are candidates for RME if they have a maxillary constriction or posterior crossbite. Surgical intervention, comprehending expansion and advancement of the maxilla, can be performed in subjects to achieve satisfactory esthetic and functional outcomes as a treatment of choice for class III skeletal malocclusion [7-9]. In the present case report, class III malocclusion along with crossbite associated with cleft palate was the uniqueness of the case. An increased prevalence of ridge deformity is noted after the loss of anterior teeth (91%) which is multifactorial [10, 11] and this varies by location, shape, and severity [12, 13]. The decrease in the bone volume can cause alterations in the facial features as well as reduces lip support. Hence, careful examination of the ridge defect and a proper treatment plan should be devised prior to attempting to restore such defects. Creating prosthetic gingiva can symbolize an esthetic and functional alternative for the

predictable reform of ridge deformities in fixed partial restorations, particularly in patients who do not want to undertake any surgical procedure [14, 15]. Also considering the treatment cost, invasiveness, and treatment period in surgical procedures to reasons behind the avoidance. A fixed prosthesis has many advantages over removable such as patient comfort, self-confidence, and cost-effectiveness with the disadvantage being that a large volume of tissue cannot be replaced [3, 11]. But, in this case, report, a fixed prosthesis was chosen as the defect was localized with feasible hygiene maintenance. In this case, Implants often have a questionable prognosis. This applies to mini implants or short implants as well because the available bone support is compromised and both bone and soft tissue grafts in the following cases have a very bad success rate [2]. Andrew's bridge was not planned in this case considering the patient's age, oral hygiene, removable and it is made up of acrylic material [16]. The main advantages of this gingival prosthesis are it's Metal free, highly Esthetic, has Less chance of stain and bacterial colonization, and also more stable and retentive because it is completely tooth-borne and the occlusal forces are also directed towards the long axis of the supporting teeth. All ceramic (zirconia with layering) was planned to get better aesthetics and longevity of the restoration.

Conclusion

The patient was seen to be comfortable with the prosthesis without any complaint and presented improved esthetics and phonetics. A compromised site found in this case report requires thorough treatment planning and a staged approach so as to rehabilitate function along with esthetics. A multidisciplinary approach is always recommended for any successful outcome.

Acknowledgments: None

Conflict of interest: None

Financial support: None

Ethics statement: None

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