



## Ridge Mask Prosthesis - A Novel Non-Surgical CAD-CAM Based Treatment for Siebert's Class III Defect

Saloni Kachhara\*, Deepak Nallaswamy, Subhabrata Maiti and Nabeel Ahmed

Department of Prosthodontics and Implantology, Saveetha Dental College, SIMATS, India

\*Corresponding Author: Saloni Kachhara, Department of Prosthodontics and Implantology, Saveetha Dental College, SIMATS, India.

Received: April 24, 2021; Published: May 15, 2021

### Abstract

The treatment of edentulous areas with ridge defects poses a challenging task for the dentist. In terms of esthetics and hygiene, defects in the alveolar ridge can complicate the treatment. This paper describes a novel method to treat a case of severe Seibert's class III ridge defect in anterior maxilla post-surgical excision of calcified epithelial odontogenic tumour. It is a fixed-removable prosthesis which allows for fixed teeth and removable soft tissue. It is primarily indicated in cases where abutments are capable of supporting a fixed partial denture, but residual ridge shows severe loss. It is economical and easy to fabricate with less clinical time involved.

**Keywords:** Siebert's Class III Defect; Silicone Prosthesis; Molloplast B; Anterior Ridge Defect; Esthetics

### Introduction

The treatment of edentulous areas with ridge defects poses a challenging task for the dentist to rehabilitate [1]. In terms of esthetics and hygiene, defects in the alveolar ridge can complicate the design and fabrication of fixed partial dentures. Such defects require not just the replacement of the missing teeth, but also closure of the defect so as to achieve proper speech and esthetics [2]. It is important to strike a balance between the hard and soft tissue replacement for ridge defect cases.

JS Siebert in 1983 [3] classified ridge defects as follows:

1. Class I: Facio lingual loss of tissues with normal ridge height (Horizontal defect), 33%.
2. Class II: Apico coronal loss of tissue with normal ridge width (Vertical defect), 3%.
3. Class III: Combination of bone loss in both dimensions (Combined defect), 56%.

These defects can be restored basically by two methods - surgically by correcting the defect pre-prosthetically or non-surgically using fixed and/or removable prosthesis [4].

The surgical methods include bone augmentation [5], soft tissue surgeries [6,7] followed by implant placement. The non-surgical treatment options include removable partial denture, cast partial denture, fixed partial denture with gingival ceramics and Andrew's bridge system [4]. Dr. James Andrew from Louisiana introduced the Andrew's bridge system, a fixed removable prosthesis with fixed bridge and removable pontics [8] when conventional fixed or removable treatment options were not successful in treating the severe ridge defect cases.

These patients are not only affected physically but also emotionally and psychologically. It is important to improve the overall quality of life of these patients.

This paper aims to bring in a novel fixed-removable treatment for severe Seibert's class III defect cases which allows for fixed teeth and removable soft tissue.

## Clinical Report

A 35 years old female teacher reported to the department of Prosthodontics with chief complaint of missing front teeth and a part of upper jaw. She felt her upper lip dipped inside on the left side and she had a large dip in her confidence. She could not pursue her career and felt ashamed to face anyone. The complete case history of the patient was taken, which revealed that the patient had undergone treatment for calcified epithelial odontogenic tumor (CEOT) in the maxillary left front region. The tumor was surgically excised along with extraction of three teeth in the second quadrant - 21, 22 and 23 a month back.

On clinical examination, we noticed that intraorally the defect was huge and teeth 21, 22 and 23 were missing. The defect was triangular, around 25 mm laterally and 22 mm vertically at the deepest portion from the papilla tip of the tooth adjacent to the defect (Figure 1 and 2). Labially, it extended upto the sulcus and also involved quite a part of the primary palate. The mandibular arch was intact with healthy teeth. On extraoral examination, she had an oval facial form and straight profile. There was shortening of lip and loss of lip support on the left side. Patient had a medium smile line.



**Figure 1:** Intraoral centric view.

It was diagnosed to be a case of Siebert's Class III defect. Various treatment modalities were explained to the patient. The patient was emotionally and psychologically affected, reluctant to undergo



**Figure 2:** Intraoral maxillary occlusal view.

any invasive surgical procedure, was adamant to get fixed teeth and also wanted to be rehabilitated in the shortest time possible so that she could rejoin her job. Considering all the contributing factors, a seven-unit porcelain fused zirconia fixed partial denture from 12 - 25 and removable soft tissue part was decided for the patient in a 5 appointment treatment plan.

### Treatment procedure:

1. Photographs (with patient's consent), Diagnostic impressions using irreversible hydrocolloid material (Zhermack, tropical-gin).
2. Tooth preparations (12, 11, 24 and 25) (Figure 3), master impression and temporization.
3. Zirconia coping trial.
4. Intraoral wax pattern try-in and bisque try-in of fixed prosthesis.
5. Final cementation of the bridge and delivery of the soft tissue prosthesis.

The diagnostic impressions were poured in dental stone (Kalabhai, kalstone) and the obtained casts were scanned using a lab scanner (Medit). Temporaries were designed using 3 shape designing software and milled in polymethylmethacrylate blank (Huge dent) in a 5 axis CNC milling machine imes-icore (CORiTEC 350i, Germany). The master impression was made by single stage putty light



**Figure 3:** Tooth preparation with double cord packing.



**Figure 4:** Wax pattern for soft tissue.

body impression technique with double cord packing (Ultradent, ultrapak cord #00 and #0). Temporary soft liner was used for soft tissue restoration and pre-milled polymethylmethacrylate temporaries were given to the patient. The master cast was scanned and zirconia coping was designed in the 3 shape software. Smile was properly designed in the software and anatomical copings were chosen.

Wax pattern was fabricated on the master cast using hard modelling wax keeping in mind the pink and white esthetic ratio (Figure 4). The lateral surface of the defect was scrapped slightly (around 0.5 mm) for increasing retention. Apart from that retention was obtained from the undercuts of the defect and the deep embrasures of the fixed prosthesis (Figure 5). The wax pattern was moulded intraorally to obtain adequate lip support. The final pattern was invested and mold was obtained using the lost wax technique. Molloplast B (DETAX) a silicon based heat cured polymer was used for final prosthesis. It was pressure packed in the mold and heat cured for 2 hours. The final prosthesis required minor polishing for which silicon finishing trimmer wheels were used. The final fixed prosthesis was cemented using glass ionomer cement for luting (Shofu Inc, HY bond GIC) and the soft tissue prosthesis was delivered to the patient (Figure 6 and 7). All the functional movements along with phonetics were checked for the patient (Figure 8). The patient was recalled after a week, oral hygiene instructions were reinforced, pressure spots under the ridge mask were checked and minor adjustments were done. Routine



**Figure 5:** Final prosthesis on cast.



**Figure 6:** Intraoral view of final prosthesis.



**Figure 7:** Maxillary occlusal view of final prosthesis.



**Figure 8:** Extraoral pre and post op of the patient.

recall visits are important and the patient was checked at 1, 3 and 6 months. The patient's satisfaction score was 27 using the Short Assessment of Patient Satisfaction scale (SAPS) which meant the patient was very satisfied with the treatment received [9].

**Discussion**

Pleasant smile aesthetics is an important contributory factor to the psychosocial well-being of a person. A pleasant smile makes the person confident and boosts his/her performance [10]. The main aim of any clinician should be to satisfactorily meet the demands of his patient while maintaining the basic requirements of

health care [11]. A novel treatment method of a removable soft tissue prosthesis along with a fixed partial denture was planned for the patient without the use of any attachments.

In the present case scenario, the patient was not confident of her smile due to the defect which in turn affected her psycho-social well-being. Treatment options depend upon the severity of condition as well as patient's demands. A conventional removable partial denture would allow the forces to be directed to the underlying tissues, which would cause further bone resorption. Andrew's bridge system is commonly used for treating such defects [1] but it gives removable teeth which was not acceptable to our patient. The metal bar may also lead to corrosion after a few years. Fixed treatment with implants would require block graft placement for which the patient was unwilling. Even with the bone grafting in such cases, the success of osseointegration was questionable [12].

The treatment provided to the patient met her demands and also improved her quality of life.

Any material which would be stiff enough to stay in the defect but also resilient enough to be easily removed and placed back was needed for this condition. Molloplast B which is silicone based permanent denture relining material was chosen as it met the requirements. It also has anti-fungal and anti-plaque properties with longevity of about 83% upto 6 years [13]. It has high wear resistance and good colour stability due to low water sorption [14], is easy to manipulate and is durable. Other heat cured permanent liners do not have all these properties. Self cure liners would be difficult to manipulate intraorally.

Two abutments were chosen on either side of the defect to allow wide distribution of stress. Due to the size of the defect a single abutment would have poor prognosis and may lead to its mobility in future. The embrasures of the fixed prosthesis were purposely kept deep for providing mechanical locking to the removable prosthesis. The confirmatory approach of occlusion was followed and all anterior contacts were removed. Special care was given to good color matching and proper translucency on the anteriors.

The advantages for this prosthesis are psychological benefit of fixed teeth, easy maintenance, no tissue suffocation, good phonetics and high in function and esthetics. The entire procedure re-

quires minimum efforts and gives maximum outputs. But one of the limitations is that it is difficult to characterize this prosthesis and hence cannot be used for high smile line cases. It is important to preserve the cast of the patient to remake the prosthesis.

### Summary

Through this treatment plan, keeping into account all the contributing factors of time, cost, patient's will and prosthetic protocols we could accomplish our goal of providing the patient with fixed teeth. The removable soft tissue part was comfortable to the patient, covered the defect and also provided nice aesthetics. The future scope for this treatment could be 3D printed silicone prosthesis.

### Bibliography

1. Rathee M, Sikka N, Jindal S, Kaushik A. Prosthetic rehabilitation of severe Siebert's Class III defect with modified Andrews bridge system. *Contemporary clinical dentistry*. 2015;6(1):S114-S116.
2. Kaurani P, Kaur Samra R, Kaurani M, Padiyar N. Prosthodontic Rehabilitation of a Case with an Anterior Ridge Defect Using Andrews Bridge. *Indian Journal of Dental Sciences*. 2013;5(2).
3. Seibert JS. Reconstruction of deformed, partially edentulous ridges, using full thickness onlay grafts. Part II. Prosthetic/periodontal interrelationships. *Compend Contin Educ Dent*. 1983;4(6):549-562.
4. Ram SM. Management of Anterior Ridge Defect with Andrew's Bridge. *Journal of Contemporary Dentistry*. 2016;6(3):208-213.
5. Pushparajan S, Thiagarajan R, Namasi A, Emmadi P, Saravanan H. Efficacy of guided bone regeneration using composite bone graft and resorbable collagen membrane in Siebert's Class I ridge defects: radiological evaluation. *Journal of Oral Implantology*. 2013;39(4):455-462.
6. Akcalı A, Schneider D, Ünlü F, Bıçakçı N, Köse T, Hämmerle CH. Soft tissue augmentation of ridge defects in the maxillary anterior area using two different methods: a randomized controlled clinical trial. *Clinical oral implants research*. 2015;26(6):688-695.
7. Jain AR. A prosthetic alternative treatment for severe anterior ridge defect using fixed removable partial denture Andrew's bar system. *World J Dent*. 2013;4(4):282-285.
8. Everhart RJ, Cavazos Jr E. Evaluation of a fixed removable partial denture: Andrews bridge system. *The Journal of prosthetic dentistry*. 1983;50(2):180-184.
9. Hawthorne G, Sansoni J, Hayes L, Marosszeky N, Sansoni E. Measuring patient satisfaction with health care treatment using the Short Assessment of Patient Satisfaction measure delivered superior and robust satisfaction estimates. *Journal of clinical epidemiology*. 2014;67(5):527-537.
10. Lukez A, Pavlic A, Trinajstić Zrinski M, Spalj S. The unique contribution of elements of smile aesthetics to psychosocial well-being. *Journal of oral rehabilitation*. 2015;42(4):275-281.
11. Sabin JE. Clinical skills for the 1990s: Six lessons from HMO practice. *Psychiatric Services*. 1991;42(6):605-608.
12. Monje A, Pikos MA, Chan HL, Suarez F, Gargallo-Albiol J, Hernández-Alfaro F, Galindo-Moreno P, Wang HL. On the feasibility of utilizing allogeneic bone blocks for atrophic maxillary augmentation. *BioMed research international*. 2014.
13. Schmidt WF, Smith DE. A six-year retrospective study of Molloplast-B-lined dentures. Part II: Liner serviceability. *Journal of Prosthetic Dentistry*. 1983;50(4):459-465.
14. Yankova M, Yordanov B, Dimova-Gabrovska M, Apostolov N. Resilient Lining Materials for Removable Dentures: Types, Composition and Technology. *Journal of IMAB-Annual Proceeding Scientific Papers*. 2019;25(3):2632-2639.

**Volume 4 Issue 6 June 2021**

© All rights are reserved by Saloni Kachhara, et al.