

Andrews Bridge and Gingival Colored Porcelain For Esthetic-Prosthetic Rehabilitation: Treatments Re-Explored!

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Abstract

Universally loss of teeth is followed by the loss of adjacent soft tissue also. Following the literature reports there is an elevated prevalence of 91% of residual ridge deformity due to anterior tooth loss, thus creating preponderance of Class III defects that stand in need of soft tissue surgery to supplement the ridge defects. With the various conventional treatment options, the esthetic surgical replacement is strenuous and uncertain, particularly when dealing with restoring of the esthetic papilla. Superior treatment option is a fixed removable prosthesis retained by an Andrews bar and sleeve system. This design fulfills the requirements of esthetics, phonetics, hygiene, comfort, and appropriate stress distribution to the principle abutments and adjacent soft tissues. One of the major advantages of an Andrews's bridge over fixed prosthesis is that it can be removed by the patient for maintaining oral hygiene. This article emphasizes the bar and sleeve attachment as the best treatment option in these types of hard and soft tissue defects thus restoring the patient's satisfaction.

Keywords: Fixed removable partial denture, Gingival porcelain and Andrews bridge, Prosthesis, Ridge defect of Class III type.

INTRODUCTION

Prosthodontics is a highly artistic and scientific expertise branch involving the replacement and restoration of teeth and its adjacent structures by using synthetic substitutes. The focal point is to re-establish esthetics, function, and comfort of the patient. With the various branches of prosthodontic the fixed prosthodontic, removable prosthodontic or a combination of both can provide extraordinary satisfaction to patient. Among all this fixed-removable prostheses are capable of transforming the unesthetic dentition with detrimental function into a comfortable healthy occlusion with escalated esthetics. The absolute treatment option for any patient depends on basic parameters including case history, clinical examination, and accurate diagnosis.^[1]

Disfigured partially edentulous ridge is an extensive obstacle in restoring esthetic of the anterior region. Deformities can be caused by congenital defects, trauma to the face, traumatic extractions, implant failures, or advanced periodontal disease.^[1] Sibert (1983) identified three basic ridge deformities Buccolingual loss of tissues (class I), Apico-coronal loss of tissues (class II), and combination of buccolingual and apico-coronal loss of tissues (class III).^[2] Hard and soft tissue defects causing residual ridge contour loss lead to unaesthetic gingival embrasures, food impaction,

and accumulation of fluids during speech.^[3] High incidence (91%) of residual ridge deformity following anterior tooth loss,^[2] results in the formation of Class III defects. Patients with Class II and III defects are often dissatisfied with the esthetics of their fixed partial dentures (FPDs), pre-prosthetic surgery to augment the residual ridge must be carefully considered.^[4] Esthetic surgical replacement is difficult and unpredictable, particularly when papilla in the esthetic zone needs to be restored. One choice is a fixed removable prosthesis retained by an Andrews bar and sleeve system. The prosthesis is designed to meet the requirements for esthetics, comfort, phonetics, hygiene, and favorable stress distribution to the abutment and soft tissues.^[5] The Andrews bar joins and splints single or multiple abutment teeth on either side of the edentulous area. A precision fit metal sleeve inserts retentively on the bar. The narrow width and great strength allow for restoration of all natural contours without creating

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Received: Aug 03 2021; **Accepted:** Aug 26 2021; **Published:** Sept 21 2021

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How to cite this article: Demda NT, Sundarkar P, Barabde AS, Somkuwar D, Agrawal S, Mahajan A. Andrews Bridge And Gingival Colored Porcelain For Esthetic-Prosthetic Rehabilitation: Treatments Re-Explored!. J Res Adv Dent 2021;12(6):378-381.

Access this article online

Website:
www.jrad.co.in

DOI:
<https://doi.org/10.53064/jrad.2021.12.6.78>

unnatural bulk.^[6] It is very strong, corrosion-resistant and has a molecular stickiness between metal plated surfaces.^[7]

CASE REPORT

A 37-year-old male patient reported to the fixed prosthetic clinic with the chief complaint of poor appearance owing to the loss of maxillary and mandibular anterior teeth with gingival recession. On clinical examination, teeth 12, 14, 31, 32, 33, 41, 42, 43, 44, 45, 46, and 47 were missing with mild drifting and rotation of adjacent teeth. The patient gave a history of extractions due to trauma and periodontal disease 1 year back. The ridge defect was found to be a severe Seibert's Class III (i.e. deficient in both height and width). A conventional FPD could not be planned for the lower anterior as it would result in overly long slanted pontics in an attempt to contact the deficient ridge underneath with poor facial musculature support, food entrapment, and poor esthetics.

An implant-retained FPD was a viable alternative but would require prior osseous and connective tissue grafts entailing protracted treatment time and high cost. Hence, taking into consideration all the aspects of the examination, a comprehensive treatment plan of fixed prosthesis with gingival colored porcelain was decided for upper first quadrant bridge and custom cast bar and sleeve design Andrews bridge for lower anterior teeth region. The Andrews bridge provides good esthetics, improved phonetics and facial musculature support through its ridge replacing acrylic removable component. Another advantage of Andrews bridge is that it can be removed by the patient for improved hygiene access to the pontic area.

Procedure

1. A detailed medical and dental history was taken at the first appointment. The patient was medically fit. A comprehensive clinical and radiographic examination was then undertaken after thorough oral prophylaxis
2. Diagnostic irreversible hydrocolloid (dentsply) impressions were made and study casts were obtained and examined
3. A face-bow record and articulation of mandibular cast were done to assess the existing vertical dimension and occlusion condition to design the treatment plan using semi-adjustable articulator
4. After the assessment of the existing vertical dimension and occlusion, it was decided to fabricate the prosthesis at the existing vertical dimension with group function occlusion scheme
5. A diagnostic mock-up was performed, and a labial putty index was fabricated which would be used as a guide to determine the optimal position of the bar during wax-up later. Same mock-up was used for fabrication of temporary bridge after the tooth preparation procedure
6. At the second visit, tooth preparations for 12, 14, 33, 35, 37, 45, 46, and 47 were done and two-step polyvinyl siloxane impression (3M ESPE) was made in a stock tray
7. following gingival retraction (sure cord) and poured with type IV (Figures 1 and 2)
8. Again a face-bow record was made and articulation of the casts were done on semi-adjustable articulator using bite registration records (Figure 3)
9. Temporary bridge was cemented in first quadrant and lower anterior using *zinc oxide* non-eugenol cement
10. The bar and coping assembly were waxed and the indexed labial putty matrix was used to determine the position and angulation of the bar. The wax pattern was then sprued, following standard manufacturer's recommendations
11. The casting was divested, cleaned, and finished. Using a disk very shallow horizontal grooves were scored along the length of the bar to create a "ribbed" effect. The mesial surfaces of both the copings were ground flat and parallel to each other to create guide planes for the removable component
12. The wax pattern was sprued, invested, and casted using Ni-Cr alloy following the manufacturer's recommendations
13. Next, the copings for teeth with 12, 14, 33, 45, 46, and 47 were fully veneered with feldspathic porcelain and



Figure 1: Tooth preparation with gingival retraction done on 33, 35, 37, 45, 47



Figure 2: Tooth preparation with gingival retraction done on 12, 14

gingival porcelain with exact shade selection except on the guide plane surface after which the “ribbed” bar was buffed to a high shine (Preci-horix combi attachment “Ribbed bar”)

13. The removable denture component was set up using acrylic teeth. The try-in was performed, and when the patient was satisfied with the esthetics, the denture was acrylized using heat cure polymethyl methacrylate and a long curing cycle was followed
14. At the final visit, the fit-in of the removable partial denture component was done and checked for passive fit and satisfactory retention of the cast sleeve over the ribbed bar. Occlusal high points were checked and eliminated following group function occlusion. With the overall assessment of occlusion and comfort of the patient the maxillary first quadrant bridge with gingival porcelain was cemented using type I glass ionomer cement. The patient was then trained how to insert and remove the removable pontic component of the Andrews bridge and educated about the oral hygiene maintenance measures (Figure 4)
15. The patient was recalled at intervals of 1 week, 1 month, 3 months, and 6 months for evaluation. The patient

was satisfied with the Andrew’s bridge and maxillary bridge with gingival porcelain and had no difficulty in maintaining the oral hygiene.

DISCUSSION

In course of treatment planning, case selection is the supreme part of treatment as there was severe bone loss. Esthetic replacement of anterior teeth is a difficult challenge, particularly with maxillary and mandibular anterior teeth with the presence of any ridge deformity. These defects may seriously compromise the aesthetic of the final restoration. Almost all the treatment choices were explained to the patient, with the patient’s approval the Andrew’s Bridge was decided in treatment plan.^[8]

In this case, two clinical situations are treated, the one with conventional FPD using gingival porcelain for anterior first quadrant region due to deficient soft tissue and Andrew’s Bridge for the lower anterior region with ridge defect.

Based on the area of bar attachments Andrew’s bridge design is commonly of two types; pontic supported and bone anchored or implant supported Andrew’s bar system. In the case of pontic supported Andrew’s bridge system, the bar and sleeve serve direct retention which allows the pontic to seat on the ridge before the sleeve bottoms out on the bar preventing full bar seating, allowing the pontic to be entirely ridge borne.^[8] The fixed-removable partial denture is more stable compared to regular removable partial denture because it is totally tooth-borne and occlusal forces are directed more along the long axis of the principle abutment. The location and position of bar neighboring the gingival margin and decreased mobility of the splinted teeth support the two principles of physics in increasing the stability of the abutments. The prosthesis is fabricated of metal-ceramic retainers which can be contoured and stained at the try-in appointment.^[9,10]

In contrast to the traditional fixed partial denture, pontic teeth are designed during the esthetic try-in visit so that aesthetic changes can be done chairside. Enhancing the phonetics, esthetics, and comfort and to hold the torque forces during various dynamic functions, the flange of the pontic assembly is contoured accordingly.^[11,12] In addition, the pontic fabrication is removed to facilitate hygiene maintenance and can be relined as the ridge resorbs over the period of time, compensating the soft tissue defects.^[13] Sometimes, the only drawback seen in the bar is due to inadequate soldering, and this failure can be corrected by casting the retainers directly to the bar in one step.^[14] Some of the wear and fracture situations seen in pontic fabrication are similar to those found in traditional removable partial dentures and can be easily repaired.^[15-17]

CONCLUSION

In this case report, an effort to describe in detail with clarity in the fabrication of Andrews bridge including the chairside and laboratory procedure to encourage this treatment was done.



Figure 3: Facebow recording



Figure 4: Mandibular and maxillary with porcelain fused to metal-ceramic with removable anterior

This treatment design has not only provided the functional improvements, but also exceptional improvements in their daily social and spiritual well-being as a result of the aesthetic. Although not routinely used, the Andrews bridge offers an easy, convenient, and economic feasible to conventional FPDs and soft tissue surgical procedures for restoring pontic ridge defects of Class II and Class III. The outmost success of the Andrews system is, it acknowledges the pontic to be thoroughly ridge borne and only retained and stabilized by the bar support. Although various techniques are evolving every decade, the basic principles of prosthetic rehabilitation are the same. Thus, focusing on the basic principles, management of ridge defects has become precious and gratifying.

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