

PROSTHODONTIC REHABILITATION OF SIEBERT'S CLASS III DEFECT WITH ANDREW'S BRIDGE- A BOON FOR BEGUILING SMILE

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ABSTRACT

Rehabilitation of a compromised mandibular anterior dentition when particularly there is a loss of a variable amount of residual ridge and adjacent soft tissue is difficult and unpredictable. Reconstruction of large anterior ridge defects is often a prosthodontic challenge. Such defects require closure of the defect along with the replacement of the missing teeth to achieve proper speech and esthetics. Often, a customized treatment plan has to be drawn to meet the patient's requirement. This case report shows the fabrication of a fixed-removable partial denture using the Andrews Bridge philosophy to meet the requirements for esthetics, comfort, phonetics, hygiene, and favorable stress distribution to the abutments and soft tissue.

KEYWORDS: Anterior ridge defect, Sieberts class III defect, Fixed-removable prosthesis, Aesthetics.

INTRODUCTION

The prosthodontist designs smiles to restore function, satisfy patient comfort and at the same time bring about the natural looking appearance of the teeth.^[1] Many treatment modalities have been chosen for the replacement of missing anterior teeth.^[2] A patient with several missing teeth in the anterior aesthetic region along with a ridge defect poses a greater challenge for prosthodontic rehabilitation. A removable partial denture is usually the treatment option for a long span edentulous space. But most of the patients demand a fixed prosthesis because of better aesthetics, better function and a psychological impact on their mind.^[3]

When Conventional fixed partial denture and implant supported FPD failed to replace the lost soft tissue structures. In such cases the replacement of teeth along with the supporting structures can be achieved by Andrew's Bridge.^[4]

Dr. James Andrews of Amite Louisiana (Institute of Cosmetic Dentistry, Amite, LA, USA) first introduced a fixed-removable prosthesis in 1966.^[5] It is also called as Andrew's Bridge, which consists of a fixed retainer and removable pontics.^[6] The fixed removable partial denture has a pontic assembly that is removed by the patient for preventive maintenance. The retainers are either porcelain

fused to metal (PFM) or full veneer metal, which are permanently cemented to the abutments. The retainers are joined with prefabricated castable bars and then cast together, or a prefabricated metal bar is soldered to the metal copings after casting. Two types of bars are used, a single bar used anteriorly and a twin bar for the posteriors. The removable pontics are retained by a clip on the intaglio surface which fits precisely over the bar attachment.^[7]

Primary indications for this restoration are cases where the abutments are capable of supporting a fixed dental prosthesis (FDP) but the residual ridge has been partially lost due to trauma, congenital defects, or other pathological process, so that a conventional FDP would not adequately restore the patient's missing teeth and supporting structures. It is also indicated when the aesthetic arch positioning of the replacement teeth is not possible using a conventional FPD due to differences in alignment of the opposing arches or segmental deficiency in a particular arch.

Siebert (1983) identified three basic ridge deformities.^[8]

1. Buccolingual loss of tissues (class I)
2. Apicocoronal loss of tissues (class II) and
3. Combination of buccolingual and apicocoronal loss of tissues (class III).

It has been reported that only 9% of the patients with the anterior teeth missing between the two canines did not have ridge defects. The most commonly seen defects are the combined Class III defects (56% of cases), followed by horizontal defects Class I (33 % of the cases).^[9] Vertical defects were reported to be found in 3% of the patients.^[10] Large vertical and horizontal bone defects pose a prosthodontic challenge as it is difficult to restore aesthetics and function along with the complete closure of the defect. Such clinical conditions are not successfully treated by conventional fixed or removable prosthesis.^[11]

This case report describes a case having multiple missing mandibular anterior teeth along with a Siebert's class III ridge defect, which was restored successfully by using the fixed-removable Andrews's bridge system using Preci-Horix Attachment.

CASE REPORT

A 49 years old female patient reported to the department of prosthodontics with chief complaint of an unpleasant smile due to the missing of lower front teeth. A complete medical and dental history was obtained. The history revealed that she had met with a road traffic accident 1 year back in which she lost her lower front teeth. Extra-oral examination revealed a lack of lip support. Intra-oral examination showed the missing teeth (31, 32, 41, 42) and their associated alveolar structure. She also had a unilateral complete cross bite. The bony defect in the mandibular arch was not severe and could be classified as a Sieberts Class III defect (Figure 1).



Figure 1: Pre-Op Intraoral view (Frontal View).

After complete evaluation, the patient was suggested the following treatment options namely, a removable partial denture, a fixed partial denture from 33-43, bone augmentation surgery followed by an implant supported prosthesis or a fixed removable prosthesis. She also did not prefer surgical treatment for prosthetic rehabilitation of her missing teeth. On further discussion with the patient, she preferred a fixed-removable prosthesis for the mandibular arch.

PROCEDURE

1. Diagnostic impressions of the maxillary and mandibular arches were made using irreversible hydrocolloid impression material, and study casts were poured in type 3 dental stone.

2. Tooth preparation was done irt 33 and 43 to receive

PFM crowns that would be connected with a bar attachment (Figure 2). Gingival retraction was done usingchemico-mechanical method.



Figure 2: Tooth Preparation with 33 and 43.

3. Impressions were made using the putty wash impression technique using poly-vinyl siloxane impression material and the impression was sent to the laboratory for fabrication of fixed component of Andrew's bridge system.

4. Provisional acrylic crowns were cemented irt 33 and 43 with intermediate restorative material.

5. In the laboratory, wax patterns were fabricated on the prepared abutment teeth (33 and 43) and were connected using a prefabricated cast able plastic bar attachment (Ceka Preci Horix) (Figure 3). To facilitate maintenance of oral hygiene by the patient, a 2-3 mm clearance was made between the bar and the crest of the alveolar ridge. Then the entire assembly was casted using chrome cobalt alloy.



Figure 3: Preci- Horix bar assembly.

6. This entire assembly was then cast in chrome cobalt alloy. The finished and polished metal framework was tried in the patient's mouth for proper fit and clearance between the bar and underlying soft tissues (Figure 4).



Figure 4: Metal coping try in with bar attachment in place.

7. Shade selection was done under adequate lighting for

the ceramic and acrylic teeth. Ceramic layering was done on the retainers 33 and 43 (Figure 5).



Figure 5: Fixed Component of Andrew's bridge.

8. After the bisque try in, the final fixed part of the prosthetic assembly (retainers joined by the bar) was polished and then cemented in the patient's mouth with a Type I GIC luting agent (Figure 6).



Figure 6: Cemented fixed component of Andrews Bridge.

9. An impression was made again post cementation with a putty wash impression after blocking out the undersurface of the bar and was poured with type 4 dental stone for fabrication of removal part of the prosthesis (Figure 7).



Figure 7: Putty wash impression.

10. The missing teeth were arranged on the wax occlusal rim fabricated onto the edentulous area of the cast and tried for aesthetic approval by the patient (Figure 8).



Figure 8: Try-in of the Removable Component.

11. The removable part of Andrew's bridge was then fabricated using heat cured polymethylmethacrylate (PMMA) resin (Dental Products of India DPI, Mumbai). A Plastic clip and metal housing were placed onto the

cast bar before packing the acrylicresin.

12. The prosthesis was finished and polished and it was checked for retention of the bar and clip, aesthetics, and phonetics (Figure 8).



Figure 8: Final prosthesis-polished and intaglio surface after pickup of yellow retentive sleeves.

13. The patient was trained to properly insert and remove the RPD fabricated over the fixed component of Andrew's Bridge and proper oral hygiene instructions were given to the patient (Figure 9). The patient was scheduled for follow-up visits every 3 months.



Figure 9: Removable component of Andrews Bridge in situ.

14. On evaluation over 1 year, it was found that the patient had very well adapted and was comfortable with the prosthesis. The patient was also satisfied with the restoration of function and aesthetics.

DISCUSSION

Restoration or rehabilitation of multiple missing teeth with severe bone loss is done on a routine basis with removable partial denture treatment. But these removable prostheses are less retentive, less stable and have poor comfort as compared to fixed prosthesis. For this reason, patients prefer fixed prosthesis.^[12] Rehabilitation of an anterior long span edentulous area with resultant bone loss creates an unfavorable situation for fixed prosthesis as it results in poor long-term prognosis of the abutment teeth. Even implant prosthesis will need added pre-prosthetic surgery for bone augmentation.^[13,14]

In such situations, the Andrew's bridge system is one of the preferred treatment modalities. The Andrew's Bridge system incorporates a removable partial denture of gingival coloured acrylic resin and acrylic denture teeth for the missing dentition.^[15]

The advantages of the Andrew's bridge system are adequately reported in the literature, which includes better aesthetics, hygiene along with better adaptability and phonetics. It is comfortable and economical for patients. There is no palatal extension as in the case of maxillary removable partial dentures. Good soft tissue response is achieved due to less soft tissue impingement. This type of prosthesis is more retentive and stable with minimal extension. The system avoids transfer of unwanted leverage forces to the abutment teeth by acting as a stress breaker.^[16-19]

Preiskel listed a few more advantages of this system^[18,20]

- 1) RPD with reduced bulk (minimal vertical and horizontal extensions),
- 2) Good retention with little wear.
- 3) Duplicate removable prostheses can be made quickly because special transfer sleeves are available.

The Andrew's system is usually of two types based on the area of bar attachment.^[16,19]

- Pontiac supported Andrew's bar system.
- Bone anchored or implants supported Andrew's bar system.

There are various retentive systems used for the Andrew's bridge system. There are case reports of using a coffee straw for the retentive bar element.^[21] Magnets can also be used instead of the bar and sleeve attachment.^[22] This case report describes the use of Ceka Preci-Horix attachment for the fabrication of the bar and sleeve retentive system. It consists of plastic castable bar attachment connected to the abutment teeth and casted along with it in a single piece thus minimizing the chances of fracture. The metal housing and yellow retentive sleeves provide an excellent precision retentive fit to the prosthesis. The support mechanism is shared by the tooth and the tissues to some extent and the bar serves as a retentive and stabilizing tool for the removable segment. It can be removed by the patient, thereby providing access for maintaining hygiene around the abutments and surrounding tissues. The flange of the pontic assembly can be contoured to improve aesthetics and phonetics, and to resist torque during mastication. Replacement of the teeth along with an acrylic denture flange is an added advantage as it does not require a separate prosthesis for the gingival defect as in the FPD. Since the prosthesis is attached to a bar retainer, the normal taste perception is maintained as the flange need not be extended palatally for support. The patient was comfortable with the final outcome and had pleasing aesthetics and phonetics.

There are few disadvantages with Andrew's bridge system like the wearing away of the plastic clip which needs replacement from time to time. There are additional lab steps and it needs meticulous planning regarding the placement of the bar to prevent tissue impingement and also provide adequate relief between the metal bar and the tissues to allow proper oral hygiene

maintenance by the patient. This fixed removable prosthesis can be used for short edentulous span, if used for long spans; there will be increased flexure of the metal bar and which will lead to failure of the prosthesis.^[23]

Very limited reports of the failure of such fixed removable prosthesis are documented in the literature. The failures are mainly due to inadequate soldering. However, this was completely eliminated by attaching retainers to the bar in a single casting.

CONCLUSION

Anterior dento-alveolar ridge defects are difficult to rehabilitate and the Andrew's bridge system is a good option when compared with conventional tooth supported fixed or tissue supported removable partial denture. Dental implants, if possible, can be the best means to replace the missing part but they have their own limitations. Owing to these facts, the Andrew's bridge system is still a viable option in prosthodontics. It can be a boon for patients who do not prefer implant surgery due to surgical intervention, economical reasons, long duration of multiple appointments etc. The presented technique is simple, economical, provides better support, stability, retention, aesthetics and requires few chair side procedure appointments. The Preci-Horix attachment provided a very predictable precision fit for the retention of this fixed-removable prosthesis.

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