

ESTHETIC MANAGEMENT OF ANTERIOR RIDGE DEFECT WITH FIXED AND REMOVABLE PROSTHESIS USING SEMI-PRECISION ATTACHMENT: A CASE REPORT

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ABSTRACT:

Tooth loss occurs due to caries, periodontitis, trauma and extraction as a part of surgical excision of tumours. This results in subsequent loss of adjacent alveolar process and the soft tissues surrounding it. Despite many recent advances in prosthetic dentistry techniques and materials, replacing missing anterior teeth with a large ridge defect is a challenge to the clinician.

Such defects require not only replacement of missing teeth but also restoration of bone defect, aesthetics and phonetics. While conventional treatment approaches like implant supported fixed partial denture may not justify the restoration, the combination of fixed and removable restoration provides for a good alternative.

The aim and purpose of this case report is to describe treatment plan for a patient with missing anterior teeth and Siebert's class III anterior ridge defect due to trauma using a modified Andrew's bridge.

Key words: Andrew's bridge, Modified Andrew's Bridge, Anterior ridge defect, fixed removable prosthesis.

INTRODUCTION:

The resorption of bone following tooth loss is an inevitable outcome. This resorption is further magnified in cases of trauma. Anterior ridge defects form one of the major challenges, especially from an aesthetic point of view.

The key to successful prosthodontic therapy lies in precise execution of the treatment plan formulated by evaluation of a complete comprehensive history and thorough examination.^[2] Such a treatment plan must be based on De Van's principle "the preservation of that

which remains rather than meticulous replacement of that which is missing."^[3]

Aesthetics is an ultimate goal of any prosthesis to replace the missing teeth and also restore the deficient supporting structure. The treatment options for a short span edentulous clinical situation includes Conventional fixed partial denture (FPD), Implant supported FPD's, Removable partial denture (RPD) and Fixed- removable partial denture.^[1]

The fixed-removable partial denture was introduced by Dr. James Andrew's of Amite, Louisiana (Institute of cosmetic

Dentistry, Amite, L.A.).^[4]It is also known as Andrew's bridge system which consists of a fixed bridge with removable pontics.^[5] This technique possesses the advantage of flexibility in placing denture teeth as well as the stabilizing qualities of a fixed prosthesis.^[6]

CASE DETAIL:

A 38 year old female patient reported with a chief complaint of missing teeth in the upper front tooth region for past 5 years due to trauma. She had sensitivity in all her remaining upper teeth and desired a fixed replacement for the missing teeth.

Clinically 11, 12,21,22,23 and 24 were missing and anterior edentulous ridge showed Siebert's Class III residual ridge resorption with loss of height and width(fig i). Radiographic interpretation revealed both vertical and horizontal bone loss in the maxillary anterior region (fig ii).

Based on radiographic interpretation and crown root ratio 13, 14, 15, 16, 24, 26 and 27 were selected as abutment.

The treatment options offered varied from a removable partial denture, fixed partial denture using remaining natural teeth as abutments, guided bone regeneration procedure followed by replacement with implants to fixed removable prosthesis.

Fixed partial denture with gingival porcelain was an alternative treatment option that could be offered. However, due to extended length of edentulous span, anterior ridge defect and compromised periodontal condition of

immediate abutment teeth, this option was avoided.

On explaining the positive and negative consequences of each treatment option the patient decided to go with the least invasive and most retentive option of fixed removable prosthesis.

Treatment was initiated with intentional root canal therapy was done for 14, 15,16,25,26 and 27.

13, 14, 15, 25 and 26 were prepared to receive porcelain fused to metal full coverage retainers. 16 and 27 were prepared for all metal crowns. Abutment teeth were prepared with more reduction on axial walls approximating the pontic to allow space for joining the Andrew's bar and metal retainer. This reduces the chances of breakage of the bar and the retainer at this junction. Putty relining impression technique was used to make the final impression using light and medium body elastomeric impression material. Provisional bridge was fabricated and cemented with zinc oxide non-eugenol cement.

Master casts were fabricated with type IV gypsum products and dies were prepared using PINDEX system and mounted on a semi adjustable articulator. The wax patterns for the abutment teeth, 13 and 25 were made using inlay wax (BEGO Ltd.). The bar of modified Andrew's bridge was fabricated with inlay wax and attached to the wax pattern of abutment teeth at the middle third. Two male parts of semi precision attachments were attached to the bar, which were

equidistant from adjacent retainers (13 and 25). This final wax pattern consisting of modified Andrew's bridge with two male parts attached along with the wax pattern of retainers formed the substructure (Fig iii). The male part consisted of a ball that fits in the socket shaped female part. The bar, which is positioned in the least restrictive path of insertion, provided more than 1.5mm of occlusal clearance and positioned in the same horizontal position as the centre of the pontic teeth. Inlay wax pattern was also made on 14, 15, 25, 26 (for metal coping) and on 16 and 27 (for all metal crown).

The entire wax assembly was then invested and casted in Co-Cr alloy. Finishing and polishing of metal framework was done in the conventional manner (Fig iv).

Metal framework was inserted in the patient's mouth and metal try in was done to verify the proximal, marginal and occlusal relationships and the shade selection was done (Fig v). The porcelain build up was done in relation to 13, 14, 15, 25 and 26.

The suprastructure was fabricated using self cure denture base resin in which a 0.5mm deep groove was made on the intaglio surface to house the female part. This engages the male part which is present in the substructure. Occlusal rim with modelling wax was adapted over the denture base. Bite registration was done with elastomeric impression material. Teeth arrangement was carried out (Fig vi a and vi b) and patient try-in was done

and checked for esthetics, lip fullness and occlusion.

Acrylic suprastructure was then processed with heat cure acrylic resin, finished and polished (Fig vii a and vii b). This suprastructure was verified for the proximity over the substructure which formed the final prosthesis (fig viii).

Final cementation of the crown- bar assembly (substructure) was done using glass ionomer cement (TypeI) in luting consistency (Fig ix). The acrylic suprastructure was inserted, where the female part of suprastructure engages the male part of substructure (fig x)

Occlusion was verified again. Post insertion instructions were given and periodic recalls were carried out to assess the comfort and function of the final prosthesis.

The patient was satisfied with the aesthetic outcome of the final prosthesis and objective analysis showed enhanced lip support, clarity of speech and improved masticatory efficiency (Fig xi).

DISCUSSION:

Clinicians often come across clinical situation with localized alveolar ridge defects. It has been reported that only 9% of the patients with the anterior teeth missing between the two canines did not have ridge defects.^[7] The most commonly seen ridge defects are the combined class III defects (56%), followed by horizontal defect class I (33%).^[7] Vertical defects were reported in 3 % of the patients.^[8] Rehabilitation of such cases is challenging

and has a wide variety of options that include removable partial dentures, fixed partial dentures and implant therapy. Fixed removable prosthesis offers a unique solution to Siebert's class three condition which is characterized by a large vertical and horizontal wall defect. [7,9]

Andrew's bridge attributes to these fixed and removable properties. It provides a better therapeutic and emergency treatment.^[10] Andrew's system provides maximum esthetics and optimum phonetics in cases involving considerable supporting tissue loss, jaw defects and when the alignment of the opposing arches and/or esthetic arch position of the replacement teeth create difficulties.^[1] Another favourable property of the Andrew's bar system is that it can be removed by the patient thereby providing access for maintaining hygiene around the abutments and surrounding tissues. One major advantage is that the pontic assembly can be realigned as the ridge resorbs.^[11] Compared to a conventional RPD, the fixed-removable partial denture is more stable because it is totally tooth borne, and the occlusal forces are directed more along the long axes of the abutment teeth.^[11] Another advantage over a conventional RPD is that the

prosthesis is retained over a bar retainer. Hence, the normal perception of taste is maintained as the flange need not be extended palatally for support.^[1] In addition, the semi precision attachment improves the retention and fit of the prosthesis. It provides the advantages of a normal Andrew's bridge along with the benefits of a FPD.

Limited reports of the failure of a fixed removable prosthesis are found in the literature.^[12] The failures are mainly due to inadequate soldering. However, this was totally eliminated by attaching retainers to the bar in a single casting.^[12]

CONCLUSION:

In the given clinical scenario, a modified Andrew's bridge was not only a better option than the conventional Andrew's bridge but also an optimum treatment plan for a long term aesthetic and functional success.^[5] The modified bridge with semi precision attachments enhances the retention and gives a fixed prosthesis feel. Andrew's bridge is a treatment option for severe residual ridge resorption or jaw defect cases. It overcomes the problems of esthetics, cost, comfort and phonetics.

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FIGURES:



Fig i : Pre-operative photographs (Extraoral and intraoral view)

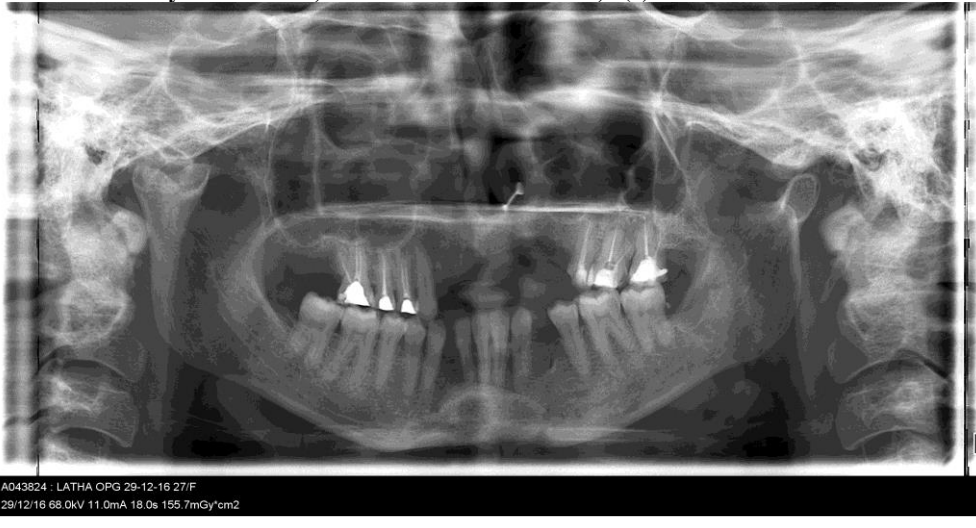


Fig ii : Pre-operative radiograph

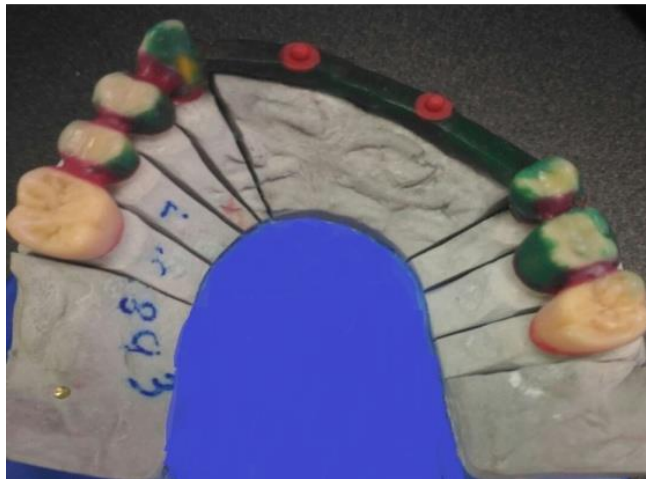


Fig iii : Wax pattern fabrication

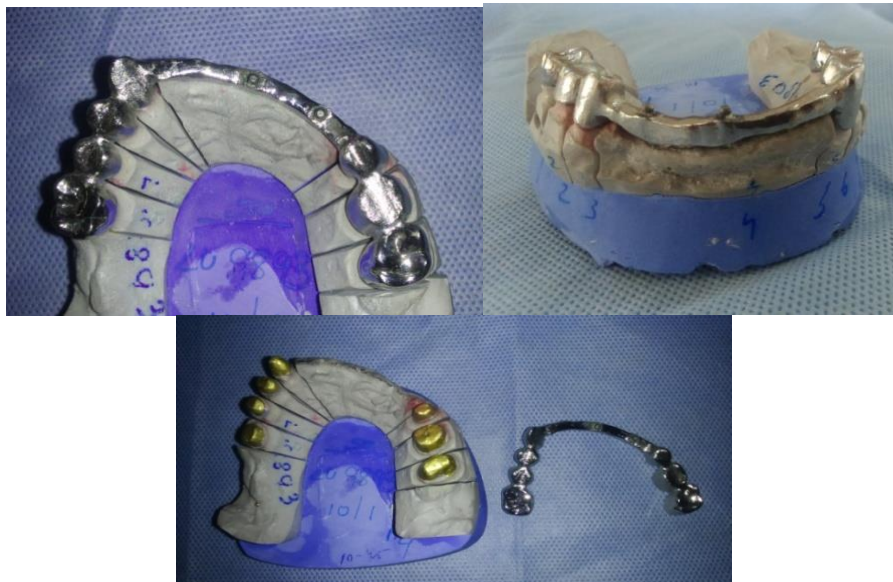


Fig iv : Metal substructure with two male parts



Fig v: Patient metal try-in

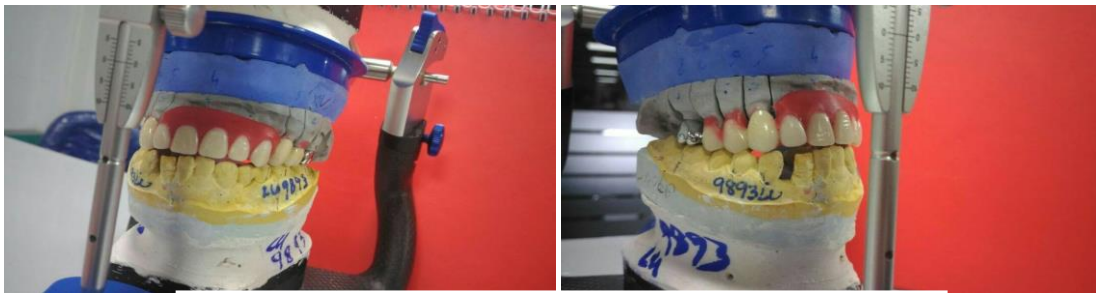


Fig vi (a,b) : Mounting on an articulator



Fig vi c: Teeth arrangement



Fig vii a: Suprastructure



Fig vii b: Intaglio surface of suprastructure with two female parts.



Fig viii: Final prosthesis



Fig ix: Intra oral view of substructure after cementation



Fig x : Intra oral view of final prosthesis



Fig xi : Post insertion photograph