



RESEARCH ARTICLE

FINDING THE MIDDLE GROUND – AND REW’S BRIDGE

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ABSTRACT

An Andrews bridge takes the benefits of fixed and removable prostheses while doing away with their shortcomings. A reduced denture bulk and mucosal coverage with good retention ensures patient comfort. An Andrews bridge is also physiologically viable since it acts as a stress breaker and reduces harmful leverage forces on the abutments. The aim of the present article is to describe a case having multiple missing mandibular anterior teeth compounded by advanced horizontal and vertical bone loss, restored successfully by using fixed-removable Andrews's bridge system.

Key words:

Localised alveolar ridge defect,
Denture bulk and
Mucosal coverage,
Andrews bridge.

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INTRODUCTION

A class of cases that has always confounded prosthodontists is one wherein a severe loss of alveolar bone is seen. The term localised alveolar ridge defect is intended to refer to volumetric deficit of limited extent in bone and soft tissue within the alveolar process (Studer *et al.*, 1997). Various authors have tried to classify these defects, both qualitatively and quantitatively (Seibert, 1983; Allen *et al.*, 1985). Siebert provided a simple classification for the pattern of alveolar defects from Class I to Class III (Seibert, 1983).

Buccolingual loss of tissues (class I),
Apicocoronal loss of tissues (class II)
Combination of buccolingual and apicocoronal loss of tissues (class III)

Among these, Class III defects take up the lion's share with a reported 56% of all defects (Abrams *et al.*, 1987). Such cases require replacement of the lost teeth as well as closure of the defect in order to achieve aesthetics, phonetics and mastication.

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While a fixed prosthesis would be most desirable for any patient, a number of limitations such as long edentulous spans, the perilous health of the abutment teeth and a questionable aesthetic outcome complicate the process. On the other hand, while advances in implant dentistry have made it possible today to rehabilitate almost any case, but extended treatment times, invasiveness of the procedures, poor patient health and economic reasons are some factors that might prompt one to look at other options. A middle ground was achieved by Dr James Andrews of Amite, Louisiana, USA in 1965, who introduced a fixed partial denture-removable partial denture system, which combined the aesthetics of a removable prosthesis while limiting its extension (Studer *et al.*, 1997). An Andrews bridge takes the benefits of fixed and removable prostheses while doing away with their shortcomings. A reduced denture bulk and mucosal coverage with good retention ensures patient comfort. An Andrews bridge is also physiologically viable since it acts as a stress breaker and reduces harmful leverage forces on the abutments (Studer *et al.*, 1997; Seibert, 1983; Allen *et al.*, 1985). The aim of the present article is to describe a case having multiple missing mandibular anterior teeth compounded by advanced horizontal and vertical bone loss, restored successfully by using fixed-removable Andrews's bridge system.

CASE REPORT

A 24 year old male patient reported to the Department of Prosthodontics complaining of missing teeth in the lower front jaw region. On examination, all the mandibular anterior teeth were seen to be missing with considerable horizontal and vertical bone loss (Siebert's Class III) (Figure 1). An everted lower lip along with incompetence of lips led to complete visibility of the mandibular anterior region. Radiographic examination revealed adequate bone support of the abutment teeth and no other pathology (Figure 2).



Figure 1. Pre-operative Intraoral Frontal View

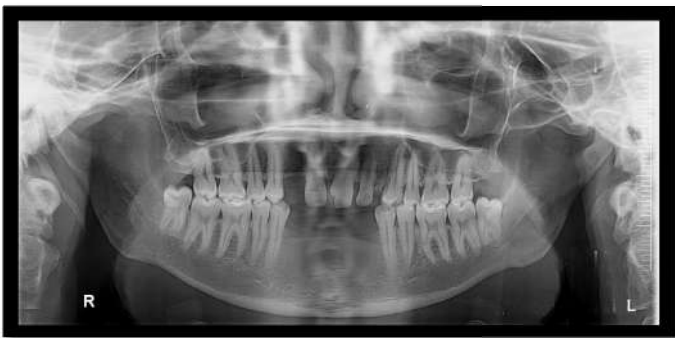


Figure 2. Pre-operative Orthopantomogram

The patient had a history of mental disability since childhood with recurrent episodes of seizures, thus requiring constant support and care. Manual dexterity was seen to be limited. A removable prosthesis was not considered due to the predicted inability of the patient to manoeuvre it and the risk of dislodgement during a seizure which could potentially lead to choking. Implant rehabilitation would require extensive time-consuming surgical procedures which were judged to be inappropriate for the patient. Therefore, an Andrew's bridge was planned to obtain aesthetic and functional rehabilitation while maintaining ease of removal and placement of the prosthesis. Oral prophylaxis was performed in multiple short appointments. Caries excavation was done and provisional restorations provided in the maxillary incisors. The selected abutment teeth (34,44) were prepared for metal ceramic crowns. Impressions were made using the putty wash impression technique (Aquasil® Soft Putty – Regular Set and Aquasil® LV Type III Light Bodied consistency, Dentsply®) and master casts were poured in the Type IV die (Ultrarock; Kalabhai Karson, Mumbai, India). Wax patterns were fabricated on the prepared abutment teeth and were connected using a preformed plastic bar attachment (Life Care Devices, Mumbai). The assembly was cast and the finished and polished metal framework was tried in the patient's mouth.



Figure 3. Pre-operative Extraoral view showing everted lower lip and lip incompetence

An arbitrary wax rim was adapted onto the casted bar, teeth arrangement done and tried in the patient's mouth. During processing of the denture, preformed plastic sleeves and their metal housings were snapped onto the casted bar before packing heat cure polymethyl methacrylate (Dental Products of India DPI, Mumbai) in the denture base space. The removable part of Andrew's bridge was then fabricated using heat cured polymethylmethacrylate (PMMA) resin. The retrieved denture, with the plastic sleeves now incorporated on its intaglio surface, was finished and polished.(Figure 4) The metal copings were then veneered with ceramic of the appropriate shade.



Figure 4. Removable Component of Andrew's bridge with incorporated Plastic Sleeves

A bisque trial was done, occlusal adjustments made and the prosthesis was glazed. In the final appointment, the fixed component of the Andrews bridge was cemented using glass ionomer luting cement (Hy-bond Glass ionomer CX, Shofu Inc., Kyoto, Japan) (Figure 5). All the excess cement was removed using dental floss and a straight explorer. The removable component was snapped onto the casted bar in the mouth about an hour after cementation, to prevent dislodgment of the cemented prosthesis while placing and removing the removable component for occlusal adjustments.(Figure 6,7) The patient and his relative were explained about prosthesis placement, removal and maintenance. Recalls were done after 24 hours and then after a week.



Figure 5. Cemented fixed component of Andrew's bridge



Figure 6. Inserted removable component of Andrew's bridge



Figure 7. Post-operative Extraoral view

DISCUSSION

Rehabilitation of multiple missing teeth with severe bone loss is conducted routinely with removable partial denture treatment (Shillingburgh *et al.*, 1997). However, removable prostheses, especially with diminished bone support, are less retentive, less stable and have poor comfort as compared to fixed prosthesis. As aforementioned, conventional fixed prostheses and implant-supported ones, are complicated by a number of factors. In such situations fixed-removable Andrews's bridge system is one of the preferred treatment modalities. An Andrew's bridge is designed to meet the

requirements for aesthetics, comfort, phonetics, hygiene and favourable stress distribution to the abutments and soft tissue. The design consists of two porcelain-fused-to-metal (PFM) crowns over the abutments connected by a bar that runs over and along the ridge with adequate clearance underneath, to enable maintenance of oral hygiene. This assembly is permanently cemented to the prepared abutments, while the missing teeth are replaced by a removable portion incorporated with preformed plastic sleeves in metal housings on the tissue surface of the removable component. Another main advantage is the ability of the patient to clean the area underneath the bar using a gauze piece, this maintaining tissue health. Thus, this system allows a precision fit between fixed and removable components without compromising the retention (Mueninghoff and Johnson, 1982).

The indications for fixed-removable Andrews's bridge system are (Immeleus and Aramany, 1975; Shillingburgh *et al.*, 1997; Mueninghoff *et al.*, 1982; Preiskel, 1968; Sadig, 1995)

- Several missing teeth along with defect in the edentulous ridge;
- Failure of removable partial denture because of discomfort related to its palatal extension;
- Long edentulous space where fixed partial denture has failed;
- Cleft palate patients.

The presented case report describes the rehabilitation of an anterior mandibular edentulous span with considerable horizontal and vertical bone loss using an Andrew's bridge. In addition to the technical disadvantages of a removable partial denture, the mental disability, limited manual dexterity and history of seizures demanded a retentive prosthesis without the danger of dislodgment. Due to these factors, the appointments were kept short and a relative always present in the dental operatory with the patient to reduce anxiety. Immeleus JE and Aramany M in 1975 described the use of fixed-removable partial denture for cleft palate patients, with congenital or acquired defects, when conventional methods are contraindicated, by replacing lost teeth as well as supporting structures (Immeleus and Aramany, 1975). The Andrew's system is usually of two types based on the area of bar attachment (Immeleus and Aramany, 1975; Shillingburgh *et al.*, 1997; Mueninghoff *et al.*, 1982; Preiskel, 1968; Sadig, 1995).

- Pontic supported Andrew's bar system.
- Bone anchored or implant supported Andrew's bar system.

Taylor CL and Satterthwaite JD in 2014 stated an alternative solution for a complex prosthodontic problem wherein they rehabilitated a posterior mandibular defect left after the excision of an odontogenic myxoma using a modified Andrew's bridge with resin bonded retainers and a Hader bar. Considering the size and location of the restoration, rehabilitation using modified Andrew's bridge provided a minimally invasive medium-term solution (Taylor and Satterthwaite, 2014).

Conclusion

A case report was presented detailing the rehabilitation of a compromised residual alveolar ridge in a long edentulous span

using a fixed-removable partial denture i.e. Andrews bridge, that restored function and aesthetics while being retentive and comfortable.

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