CASE REPORT

Andrew's bridge system: an aesthetic and functional option for rehabilitation of compromised maxillary anterior dentition

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SUMMARY

A patient with several missing teeth in the anterior aesthetic region along with severe ridge defect poses a greater challenge for prosthodontic rehabilitation. In such cases treatment using fixed partial denture (FPD) may not be feasible because of the extent of edentulous span and the periodontal conditions of the abutment teeth. To present a case of multiple missing maxillary anterior teeth with class III ridge defect rehabilitated using FPD-removable partial denture. A 38-year-old female patient was successfully rehabilitated using Andrew's bridge system in the maxillary anterior region. The fixed-removable Andrew's bridge system provides a good prognosis if diagnosed and planned meticulously.

BACKGROUND

Removable partial denture (RPD) is usually the choice for replacement of several missing teeth. It restores the required function and aesthetics for the patient. But most of the patients demand fixed prosthesis because of better aesthetics, better function and has an obvious psychological impact on the patient.

Fixed prosthesis cannot always be indicated especially when several teeth are missing, the remaining teeth in the dentition are periodontally compromised and some defects are present in the edentulous region. In such situations it is wise to select a combination of fixed partial prosthesis and removable partial prosthesis, which is going to tackle most of the existing problems in the compromised dental arches.

The fixed partial denture-removable partial denture system was introduced by Dr James Andrews of Amite, Louisiana, USA in 1965,¹ when fixed or removable partial dentures were not successful in treating ridge defects.

This system incorporates a fixed component on the abutment teeth with removable pontics. The fixed component is made of porcelain fused to metal crowns that are joined together by casted bar cemented on to the prepared abutments. The removable component consists of acrylic teeth on acrylic base to which metal or plastic sleeve tract are embedded. This technique has the advantage of flexibility in arranging the removable partial denture teeth with minimum extension along with better retention and stability.^{1 2}

The indications for fixed-removable Andrews's bridge system are¹⁻⁴

- ▶ 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 aim of the present article is to describe a case having multiple missing anterior teeth along with ridge defect, who was restored successfully by using fixed-removable Andrews's bridge system.

CASE PRESENTATION

Case history: A 38-year-old female patient reported to the department of prosthodontics with a symptom of pain and foul smell in relation to fixed partial denture in the maxillary anterior arch. Her dental history revealed extraction of maxillary anterior teeth 3 years earlier due to mobility. Subsequently a fixed prosthesis using metal fused to acrylic was constructed. This five-unit fixed partial denture (FPD) was extending from right maxillary central incisor to the left maxillary first premolar. For replacement of two missing teeth (ie, maxillary left lateral incisor and canine) maxillary central incisors and left first premolar were used as an abutment (figure 1).

Radiographic examination revealed impacted maxillary left canine causing bone loss in relation to maxillary left central incisors and maxillary left first premolar (figure 2). Clinically maxillary left central incisor and left first premolar had grade III mobility owing to the poor periodontal support, thus there was failure of the FPD due to improper diagnosis and treatment planning.

Figure 1 Preoperative intraoral view.

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Figure 2 Intra oral peri-apical radiograph showing impacted maxillary left canine also bone loss with maxillary left central incisor and first premolar.

It was decided to remove the existing FPD for proper accessibility to the particular area. Ridge area was inflamed due to lack of hygiene. Improper pontic design was the main reason for inflammation and halitosis.

TREATMENT

Treatment started with extraction of grade III mobile maxillary left central incisor and first premolar and surgical removal of the impacted left canine. Periodontal treatment consisted of thorough oral prophylaxis followed by a maintenance programme. The surgery resulted in Seibert's class III ridge defect⁵ in maxillary left anterior aesthetic region (figure 3A). Seibert's class III ridge defect with loss of height and width of tissues resulted in loss of lip support on the left side of the face (figure 3B). Provisional aesthetic restoration of maxillary right central incisor and a treatment RPD for the missing teeth was carried out.

After 2 months, radiographic examination of maxillary right central incisor and maxillary left second premolar showed crestal bone loss adjacent to the edentulous region. Clinical examination showed sound and healthy neighbouring teeth so, the treatment option of pontic supported fixed-removable Andrew's bridge was planned.

The selected abutment teeth were prepared for receiving metal ceramic crowns. Impressions were made using the putty wash impression technique and master casts were poured in the dental stone (Type IV die stone- Gyproc, India). Wax patterns were fabricated on the prepared abutment teeth and were connected using a preformed plastic bar attachment (Life Care Devices—Product Code -99 531030, Mumbai). This entire assembly was then cast in chrome cobalt alloy. The finished and polished metal framework was tried in the patient's mouth for

Figure 3 (A) Intraoral view after surgical removal of impacted maxillary left canine showing Seibert's class III ridge defect. (B) The preoperative photograph showing loss of lip support on the left side of the face.

proper fit and clearance between the bar attachment and underlying soft tissues.

The missing teeth were arranged on the wax occlusal rim fabricated on to the edentulous area of the cast and tried for aesthetic approval by the patient. The removable part of Andrew's bridge was then fabricated using heat cured polymethylmethacrylate (PMMA) resin (Dental Products of India DPI, Mumbai). Plastic clip and metal housing (Life Care Devices, Mumbai—Product Code -99531060, 10) were placed on to the cast bar before packing of acrylic resin. Metal copings were then veneered with ceramic and the whole restoration was finished and polished (figure 4).

The fixed component of the Andrew's system was cemented over the prepared teeth (figure 5). After 1 hour a removable component was inserted and occlusal adjustments were carried out (figure 6). The patient was recalled after the first day then after a week. The patient was happy with the aesthetics and functions of the prosthesis and was advised for regular recall visits (figure 7).

DISCUSSION

Rehabilitation of multiple missing teeth with severe bone loss is conducted routinely with removable partial denture treatment. Especially Seibert's class III ridge defect presenting inadequate height and width⁵ can be treated using removable prosthesis. Removable prosthesis are less retentive, less stable and have poor comfort as compared to fixed prosthesis. Because of this most of the patients prefer fixed prosthesis. But, the treatment with fixed prosthesis will have poor long-term prognosis. In

Figure 4 Removable and fixed components of Andrew's bridge.

such situations fixed-removable Andrews's bridge system is one of the preferred treatment modalities.

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 removable partial dentures. Good soft tissue response 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.¹⁻⁵

Preiskel^{4,6} listed few more advantages of this system. Those are the RPD with reduced bulk (minimal vertical and horizontal extensions), good retention with little wear. 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.^{1,4}

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

Such an assembly provides maximum aesthetics and phonetics in class III ridge defect cases, when other traditional treatment options prove to be a failure (like implants/FPD). Another main advantage is the removable part which can be easily used by the patient for hygienic access to abutments and surrounding structures. A gauze piece can be used to clean the areas below the

Figure 5 Cemented fixed component of Andrew's bridge.

Figure 6 Inserted removable component of Andrew's bridge.

bar. The system allows a precision fit between fixed and removable components without compromising the retention.

The bone anchored Andrew's bar system is another prosthetic alternative. In some cases the Andrew's bar system is superior to the implant-supported removable prosthesis and other implant supported fixed prosthesis. It can be indicated when alignment of the opposing arches and/or aesthetics arch position of the replacement teeth create difficulties because of its flexibility in arranging teeth.^{6,7} In the present case, implant placement was a questionable procedure due to the absence of good quality and quantity of bone.

Immeleus JE and Aramany M in 1975 described the use of fixed-removable partial denture for cleft palate patients. The Andrew's bridge permits rehabilitation with a FPD-RPD used in treating cleft-palate patients with congenital or acquired defects when conventional methods are contraindicated. It permits the replacement of the lost teeth and supportive structures.⁴

In case of compromised arches due to Seibert's class III ridge defect along with multiple missing teeth rehabilitation, Andrew's bridge system can restore the aesthetics and function, along with that it will improve the accessibility to maintain hygiene. This type of prosthesis has minimal soft tissue trauma and has comparable fit between the fixed as well as removable components used in it.⁸

Figure 7 The postoperative photograph of the patient with functional and aesthetic Andrew's fixed-removable partial denture.

Taylor CL and Satterthwaite JD in 2014 stated an alternative solution for a complex prosthodontic problem. The rehabilitation of posterior mandibular defect after the excision of an odontogenic myxoma was achieved using a modified Andrews's fixed dental prosthesis. The prosthesis design consisted resin-bonded retainers with Hader bar attached to it and partial removable dental prosthesis. Considering the size and location of the restoration, rehabilitation using modified Andrew's bridge provides a minimally invasive medium-term solution.⁹

Learning points

- ▶ Proper diagnosis and treatment planning is the key for successful prosthetic treatment.
- ▶ The patient was treated with Andrew's bar system which was evaluated over 6 months and the patient had good adaptability, was comfortable with the prosthesis along with aesthetics and phonetics as desired.
- ▶ It can be concluded that, in patients with ridges defects, aesthetics and function can be achieved successfully using fixed-removable Andrew's bridge system.

Competing interests None.

Patient consent Obtained.

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