

ANDREWS BAR SYSTEM A PROSTHETIC ALTERNATIVE – A CASE REPORT WITH MODIFIED TECHNIQUE

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Abstract:

The concept and advantages of the conventional Andrew's system are adequately reported in the literature. Andrew's system provides maximum aesthetics and optimum phonetics in cases involving considerable supporting tissue loss, jaw defects and when alignment of the opposing arches and/or aesthetic arch position of the replacement teeth create difficulties. This case presents with cleft palate defect affecting esthetics and phonetics with loss of tooth and minimal bone support.

The Andrew's system is constructed from a fixed bridge with removable pontics. The fixed bridge is made of PFM crowns, fused to a pre-manufactured bar that is permanently cemented to the prepared abutment, while the removable pontics are made of metal sleeve tract embodied within an acrylic removable partial denture. This technique possesses the advantage of flexibility in placing denture teeth as well as the stabilizing qualities of a fixed prosthesis.

This case reports on prosthetic rehabilitation of a patient with bilateral cleft lip and palate using Andrews fixed removable prosthesis designed to fulfill patient's functional and esthetic requirements.

INTRODUCTION

The cleft lip and palate is a congenital deformity that causes a multitude of problems and represents a special challenge to the clinicians. Secondary palate fistula is common complications following cleft palate repair, for which the practical solution seem to be an obturator .The removable appliance have certain disadvantage associated with increase in bacterial count or increasing incidence of dental caries. ¹ Another acceptable alternative is

fixed bridge which not only replaces missing teeth but also maintains orthodontic expansion when it is placed between the segments.²

The fixed bridge unfortunately will not close a palatal fistula and a surgical approach is necessary. However, it is important to remember that adolescents with cleft palate/lip are at an elevated risk for developing psychosocial problems especially those relating to self concept, and appearance. There is a large amount of research dedicated to the psychosocial development of individuals with cleft palate. Self-concept may be adversely affected by the presence of a cleft lip and or cleft palate, particularly among girls.³ Prosthetic treatments allows patient to feel more normal, increases their self esteem & offers them greater opportunity for fulfilling their social potential.⁴

Dr James Andrews of Amit, Louisiana introduced fixed removable Andrew's bridge system. In this technique abutment tooth stabilization is combined with removable partial denture to restore function and esthetics in patients with extensive alveolar bone and tissue loss in the pontic area. The concept of Andrews's bridge system is reported in literature.^{5,6,7}

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The Andrew's system is constructed from a fixed bridge with removable pontics. The fixed bridge is made of PFM crowns, fused to a pre-manufactured bar that is permanently cemented to the prepared abutment, while the removable pontics are made of metal sleeve tract embodied within an acrylic removable partial denture. The principal advantage is the flexibility in placing denture teeth. Physiologic advantage is effective oral hygiene and increased stability of splinted teeth.

CASE REPORT

An 18 year old female patient referred by department of cleft and craniofacial surgery reported to department of prosthodontics with the chief complaint of worn out upper anterior teeth. (Fig 1)



Fig 1: preoperative extra oral view

On clinical examination patient had maxillary anterior 8 units fixed denture prosthesis with chipped porcelain on the facial and lingual surfaces (Fig 2). Her family history was uneventful. Patient had a history of bilateral cleft lip and palate for which bilateral cheiloplasty and rhinoplasty had been performed one year back and was undergoing treatment for the closure of anterior palatal fistulae. Clinical finding also revealed hyperplastic soft tissue covering hard palate defect and a severely resorbed residual alveolar ridge. The maxilla was partially edentulous with missing right and left central and lateral incisor. The upper lip was firm and thin. The missing teeth and maxillary defect greatly influenced patients chewing ability, appearance and speech. She had been treated with fixed partial denture (FPD) by general dentist one year back.



Fig 2: preoperative intraoral view

Treatment planning was discussed with cleft and craniofacial department, where we were advised for removal of FPD in the maxillary anterior region and replace the anterior teeth with removable partial denture till the closure of anterior nasal fistula was performed.

The existing worn out FPD was removed and abutment tooth were evaluated (Fig 3). Diagnostic impression was made with neocolloide alginate impression material (Zhermack, Italy). Face bow transfer was done and mounted on Hanau articulator. Among the various restorative treatment options available for the replacement of anterior missing teeth with ridge defect Andrew's bar system was



Fig 3: preoperative abutment evaluation

selected to stabilize the abutment tooth in combination with removable partial denture as prosthetic alternative to resolve the existing esthetic problem for the patient.

Abutment tooth finish lines were modified and impression was made using light and medium body addition silicon (3M ESPE, ExpressTM XT). The cast poured using die stone (Type IV, Kalrock, Kalabhai) and the obtained cast was duplicated using agar impression material (Castogel, BEGO, Germany) and poured with refractory material (wirovest, BEGO, Germany) by strictly following manufacturer's instructions during all the

above procedures. (Fig 4) Die preparation was done on the master cast and wax pattern (CrowaxHard, Renfert) was fabricated on the canine and first premolar on each side. In order to stabilize the prosthesis the appropriate bar following the residual ridge was positioned in the center of replacement teeth was attached to the copings on either side. This wax pattern assembly was transferred on to the duplicated refractory



Fig 4 : master stone cast duplicated and poured with refractory material



Fig 5: wax pattern on the refractory cast



Fig 6: wax milling

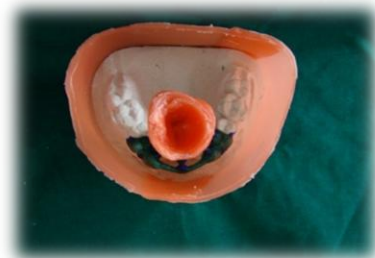


Fig 7 :sprued pattern before investing and casting procedure

cast (Fig5), milled (Fig 6) and sprued (Sprue wax, Renfert). This method of ring less casting was preferred to avoid possible shrinkage of bar that would occur during normal casting procedure. Casting is done using nickel chromium alloy (Wiron 99, BEGO, Germany). After finishing and polishing of metal, metal try in was done to the patient (Fig 7) to assess the adaptation of the casting on margins both in labial and palatal side. Pick up impression was made with A – silicon putty(3M ESPE, ExpressTM XT) impression material (Fig 8)

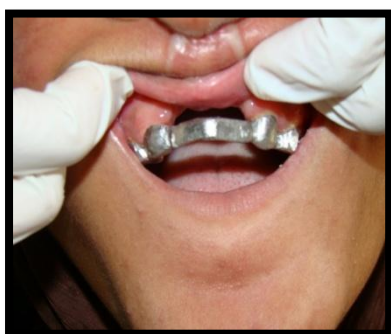


Fig 8: Metal tryin on patient 's mouth



Fig 9: metal coping stabilized with retentive rod and pattern resin in the pick up impression obtained



Fig 10: metal milling ...

impression obtained was assessed for the accuracy. A 18 gauge orthodontic wire was placed in the center of metal coping in the impression and was looped at the end this was stabilized by filling the coping with pattern resin to stabilize in order to prevent breakage of abutment

teeth during metal milling. Remaining surface was filled with die stone and cast obtained was held on surveyor to carry out metal milling (Fig9) ceramic facing was given on to abutment and examined for the marginal adaptation and esthetics (Fig 10) after which the bar assembly was transferred on to the cast.

Bar was coated with petroleum jelly and pattern resin was added on to the surface with increments to make two sleeves encircling the bar .(fig 11) casting was done using cobalt chromium (WirobondC,BEGO,Germany) and fitted on the surface of bar after proper finishing and polishing.(fig 12) once active fit is obtained the remaining surface on the bar was blocked with plaster and both upper and lower cast were mounted on the articulator and maxillary anterior teeth was arranged considering esthetics, anterior over jet and overbite and flange completed with wax..(Fig 13) cast is now invested,dewaxed and packed with heat cure acrylic resin(to obtain the removable component of Andrew's bar system.(fig 14,15)



Fig 11 : examination for marginal adaptation after ceramic build up



Fig 12: sleeves made with pattern resin on metal bar



Fig 13: sleeves casted with cobalt chrom 1



Fig 14: arrangement of maxillary anterior



Fig 15: Fixed and removable components



Fig 16: post insertion



Fig 17 : Post operative facial profile

The fixed component was inserted on to the abutment using type I GIC(GC gold label,GCCorporation,Japan). Removable component was engaged through sleeves on to the metal bar of fixed component (fig 16). Final assessment was done to check for esthetics and phonetics. (Fig 17)

DISCUSSION

It's challenging for a Prosthodontist to design a dental prosthesis to bilateral cleft lip and palate patients to fulfill the esthetics as well as functional requirement. In the present case due to extensive supporting tissue loss the clinical factors and patients desire contributed to the selection of Andrew's bar system. The 2mm vertical bar supported the removable component of the system by providing strength to the prosthesis via fixed component. This assembly allowed for the coverage of large defect providing optimal esthetics. The bar was placed in such a way that there was no tissue proliferation and also patient could maintain casual oral hygiene procedure. This in turn led to the preservation of supporting structures along with replacement of lost tooth and tissue structure.

Previous study⁵ demonstrated the use of solder joint which reported with the disadvantage of fracture at the joint over a period of time due to force exerted during repeated removal and insertion in the same direction. But in the present technique the entire assembly was cast using nickel chromium as a single unit.

In the present clinical report care was taken during casting procedure to avoid the possible shrinkage that would occur with normal casting using ring.

CONCLUSION

Most patients today not only appreciate the functional improvements provided by the prosthodontic rehabilitation, but also remarkable improvements in their social and spiritual well being as a result of the changes in their appearance. Although techniques continue to evolve over the decades, the basic principles of cleft surgery and prosthetic rehabilitation remain the same. Thus, while keeping the basic principles in mind, management of bilateral cleft lip becomes valuable and rewarding

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