



MANAGEMENT OF SIEBERT'S CLASS III CONDITION USING FIXED REMOVABLE PROSTHESIS: ANDREWS BRIDGE

Prosthodontics

Dr. Tushar	BDS, MDS, 3rd year Post Graduate student, Department of Prosthodontics ,Crown and Bridge , ITS Dental college ,Hospital and Research Centre, Greater Noida , UP
Dr. Anju Aggarwal	BDS, MDS, Reader, Department of Prosthodontics, Crown and Bridge, ITS Dental college, Hospital and Research Centre, Greater Noida, UP.
Dr. Srishti Garg	BDS, MDS, 3rd year Post Graduate student, Department of Prosthodontics ,Crown and Bridge , ITS Dental college ,Hospital and Research Centre, Greater Noida, UP.
Dr. Punit RS Khurana	BDS, MDS, Professor & HOD, Department of Prosthodontics ,Crown and Bridge , ITS Dental college, Hospital and Research Centre, Greater Noida, UP.

ABSTRACT

Loss of natural tooth is natural physiological process of ageing and can also be caused by various other factors like pathological conditions and trauma. In almost 91% of cases the most common cause for anterior tooth loss is trauma which is usually associated with variable amount of adjacent hard and soft tissue loss. Majority of such cases are Siebert class III defect and management of these cases require additional hard and soft tissue augmentation or regeneration procedure. However, when loss of tissue is more, complete aesthetic outcome of such surgical procedure is unpredictable and expensive. Fixed removable partial dentures are primarily indicated for such patient with extensive hard and soft tissue loss. This present case report shows fabrication of a ANDREWS BRIDGE-FIXED REMOVABLE PROSTHESIS wherein a prosthesis is retained by bar and sleeve attachment to fixed abutments on either side of edentulous space. This prosthesis met the various requirement of comfort, esthetic, hygiene etc.

KEYWORDS

Andrews bridge, Class III ridge defect, Fixed removable partial denture

INTRODUCTION:

Loss of natural tooth is a common sequelae of ageing process apart of this it can also be caused by various other reasons like Trauma, congenitally missing, pathologic condition like carcinoma etc. However, tooth loss always results in subsequent loss of soft and hard tissue around the tooth, moreover the amount of loss of surrounding tissue depends on severity of trauma or pathological condition. Such cases require replacement of the lost teeth as well as closure of the defect in order to achieve esthetics, phonetics and mastication.(1,2) According to classification by Siebert to describe alveolar ridge defect, it can be classified into 3 classes. Siebert classification 1: bucco-lingual loss of bone, Siebert classification 2: Occluso-cervical loss of bone, Siebert Classification 3: combination of both(FIG.1)

Type of treatment in above described classification will vary for each classification. It has been seen that in almost 91% of cases with anterior tooth loss, sieberts classification III conditions alveolar defect comprises of 56% followed by sieberts II and I by 33% and 3% respectively.(3)

Various treatment options comprises of Conventional fixed partial denture (FPD), Implant supported FPDs, Removable partial denture (RPD) or Fixed-removable partial denture .

Amongst all, class III sieberts defect with anterior ridge defect is the most difficult to treat with conventional FPD and RPD, because of the problem with retention, stability with RPD and esthetics and hygiene problem with FPD due to large pontic size to cover the defect, and implant supported will require additional bone augmentation for proper bony support hence alternate option is FIXED REMOVABLE PROSTHESIS, which has both added advantage of retention, stability support and ease of maintaining oral hygiene.

In 1975 Dr. James Andrews of Amite Louisiana (Institute of Cosmetic Dentistry, Amite, LA, USA) was the first one to coin the fixed removable prosthesis on his name called ANDREWS BRIDGE which consist of a fixed bridge with bar component over which removable dental prosthesis can be attached using attachments.(4)(FIG.2)

This prosthesis has a removable pontic assembly which will be removed by the patient for maintaining oral hygiene and the fixed component are retainers which can be either PFM(Porcelain fused to metal) or Full Veneer metal, that will be permanently cemented to the abutments. The retainers are joined with bar and removable pontic are retained by a clip on the intaglio surface which fits precisely over the

bar attachment .

Primary indication for this restoration are cases where the abutments are capable for supporting a fixed dental prosthesis (FDP) but the residual ridge has been partially lost due to trauma, congenital defects or other pathologic process, so that a conventional FDP would not adequately restore patient's missing teeth and supporting structures. Another indication when the esthetic arch positioning of the replacement teeth is not possible using a conventional FPD due to difference in alignment of the opposing arches or segmental deficiency in a particular arch.(5)

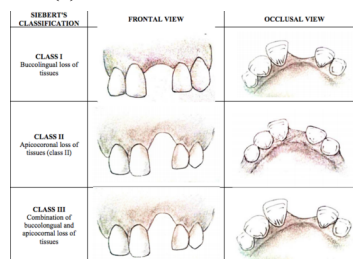


Fig. 1: Siebert classification of anterior ridge defects

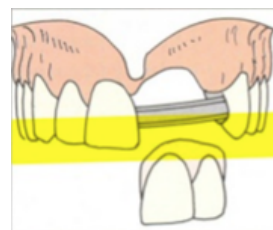


Fig. 2: Andrew's Bridge

Case Report:

A 28 year-old female patient reported to the department of prosthodontics crown and bridge with a chief complaint of poor aesthetics and difficulty in speaking due to missing upper and lower front teeth for past 4 years. Complete medical and dental history was recorded, which revealed that patient had met with an accident 4 years back which led to loss of both upper and lower front teeth along with severe bony defect in maxilla and had fracture in mandibular bone. She was treated for the traumatic injuries

Extraoral examination revealed that patient had reduced upper and lower lip support, facial scar etc. Intra oral examination revealed missing teeth in respect to 12,11,21,22,23,32,31. There was a considerable reduction in the height and width of the residual alveolar ridge in the maxillary anterior region (Sieberts Class III). The bony defect in the mandibular arch was not severe and was classified as a Sieberts Class II defect.

CBCT revealed severe vertical and horizontal defect in maxilla. (FIG.4)

Treatment option for maxillary arch include implant supported FPD along with bone graft, conventional FPD, Fixed-removable denture and conventional RPD. Implant placement would have required block graft followed by soft tissue regeneration which will extend the duration of treatment procedure, cost and outcome may not be predictable.

FDP can restore function and esthetics only to a limited extent. In the maxillary arch, the asymmetry in the arch across midline was not allowing esthetic placement of the artificial teeth without compromising the laws of bio mechanics. If the teeth were to be placed along the ridge, it would not provide adequate lip support that was a primary esthetic concern in this patient. The increased bone loss would have required an increase in the length of the pontics that could have caused esthetic failure. Therefore, the defect would have required corrections by soft tissue grafts and bone grafts to render it suitable for FDP. The conventional removable prosthesis was not satisfying patient's needs, and if not maintained properly, it would have caused decalcification and dental caries of the adjacent teeth, periodontal problems such as inflammation of the gingival tissues.

Patient was informed about various treatment option and cost ,and fixed removable prosthesis was planned for the maxillary arch and conventional RPD for mandibular arch.

The Andrews bridge provides favourable esthetics, improved phonetics, and facial musculature support through its ridge replacing acrylic removable component. Another advantage of Andrews bridge is that it can be removed by the patient for improved hygiene access to the pontic area.(6)

PROCEDURE:

1. Diagnostic impression of the maxillary and mandibular arch were made using irreversible hydrocolloid impression material and study model were obtained.(Fig7).
2. Intentional RCT was performed in respect to 13,14,15 followed by tooth preparation and vital tooth preparation was done in 24(Fig 8(a) and 8(b)). Gingival retraction was performed and final impression was made in stock tray using polyvinyl siloxane impression material in two stage using spacer with putty and light body impression technique.(Fig. 9-11)
3. The prepared teeth were temporized using tooth colored self-cure acrylic resin by indirect technique. The master casts were poured using Type-IV gypsum product and were mounted on a semi-adjustable articulator.
4. Wax pattern for PFM retainers was fabricated in respect to 13,14,15,24 and both side wax pattern connected using CEKA attachment PRECI-LINE followed by casting using nickel chromium alloy and metal framework was retrieved with bar connected to the retainer on either side. Bar should be positioned parallel to ridge on palatal aspect and there should be 2-3 mm of space below bar to the crest of ridge.(Fig 12-17).
5. Metal framework was checked intraorally for clearance with soft tissue in alveolar defect region and antagonistic teeth.(Fig18)
6. Once the trial was done for metal framework, it was subjected for ceramic buildup with shade A2, once ceramic buildup was performed it was cemented intraorally. (Fig 19)
7. Framework was cemented with provisional cement and all undercuts were blocked beneath the bar and pickup impression was made using light body and putty impression for removable component.
8. Final models were obtained with bar in place over which RPD frame work for tooth 12,11,21,22 was fabricated and try in was done in patient's mouth once the try in was done , clip was placed on the bar and wax up was done properly to proceed for normal flasking and RPD is constructed using Heat cure resin.(Fig 20-21).
9. For Mandibular anterior region, conventional RPD was fabricated in 32 and 33.(Fig21)

10. The patient was trained for placement and removal of prosthesis. The use of interdental brush under the bar attachment was suggested for maintenance of oral hygiene along with routine oral hygiene instructions. The periodic recall was emphasized to check for the success of the treatment.(Fig23)

DISCUSSION:

It has been observed that most of the anterior tooth loss patient that report to the prosthodontist always represent with severe bony defect mostly 90% of cases and only 9% don't have any ridge defect. Out of these only 56% cases comprise of Class III siebert classification followed by class II and class I defect 33% and 3% respectively.(7,8)

In such case conventional FPD should always be ruled out because of limitation in esthetic and hygiene problems. Because of these reasons FIXED REMOVABLE PROSTHESIS is the recommended prosthesis mainly called as ANDREWS BRIDGE .

Advantages of Andrew's Bridge:

1. These are those type of RPD which has reduced bulk with both vertical and horizontal extensions, good aesthetics and little wear.
2. It can be easily used in area with reduced height and width I.e. cases with sieberts class III defects
3. Compared with conventional RPD it has added retention and stability due to its tooth borne conditions and attachments used .(9)
4. Can be easily removed and positioned in mouth hence patient's hygiene can be maintained .(10)
5. Since the prosthesis is retained by a bar retainer, the normal perception of taste is maintained as the flange need not to be extended palatally for support.(11)
6. Since, surgical correction of the defects using grafts and placement of implants is expensive Fixed removable partial denture can be a better alternative .
7. Andrew's system provides improved aesthetics and phonetics in cases involving considerable supporting tissue loss, jaw defects.(10)

So in condition where treatment cost and extensive procedure is not feasible for the patient with extensive bony defect in esthetic region Andrew's bridge system is advisable as alternative to other fixed treatment procedure with better aesthetics phonetics and function.

CONCLUSION:

Andrew's bridge provides a better option to rehabilitate the patient with congenital and acquired defects when conventional treatments are not possible. This fixed-removable prosthesis effectively restores the esthetics and speech of the patient by replacing the missing teeth and achieving complete closure of the defect.



Fig 3: Pre operative frontal view of patient.



Fig 4: Intraoral view of both maxilla and mandible with siebert class III defect in maxilla and class II defect in mandible

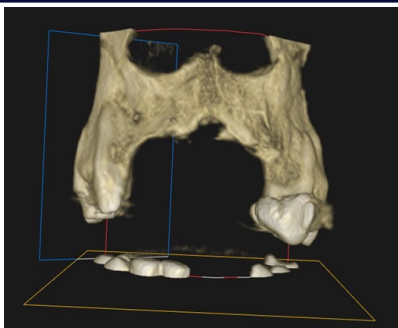


Fig 5: CBCT view of maxilla (single quadrant with Field of view of 5x5cm)



Fig 6: CBCT view of maxilla revealing RCT in respect to 13,14,15.

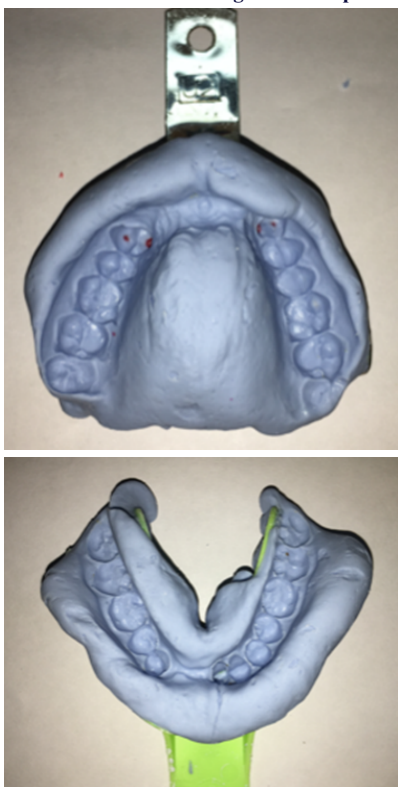


Fig 7: Diagnostic impression of both maxilla and mandible with alginate



Fig 8(a): Tooth prep done in respect to 13,14,15



Fig 8(b): Vital tooth prep done in respect to 24



Fig 9: Occlusal view of maxillary arch with tooth preparation in relation to 13,14,15,23 with retraction code.



Fig 10: Occlusal view of mandibular arch with missing 31,32,41.



Fig 11: Final impression of both maxilla and mandibular arch made using two stage putty and light body impression.



Fig 12: CEKA Preci-line Bar Attachment with plastic sleeve for attachment of removable partial denture to fixed bar retainer.



Fig 13: Wax pattern fabricated art 13,14,15,24 and joined with CEKA PRECI-LINE plastic bar, which moulded according to the arch form.

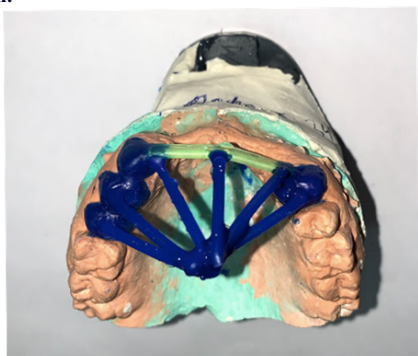


Fig 14: Spruing was done for the same wax pattern

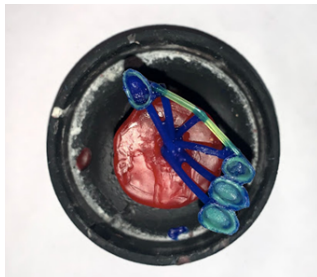


Fig 15: Wax pattern was attached to the crucible base



Fig 16: Casted framework



Fig 17: Casted metal framework was adapted onto the cast, Bar should follow the counter of the defect present in the maxilla.



Fig 18: Casted metal framework was tried intraorally for clearance with opposite teeth.



Fig 20: Wax trial was done for both the arch.



Fig 19: Ceramic build up was done and metal bar was polished, followed by final impression for maxillary arch with metal framework in place for fabrication of removable component.



Fig 21: Andrews's bridge was luted in maxillary arch which was retained in place by bar and sleeves. Mandibular anterior region was restored by Conventional RPD.



Fig 22: Preoperative frontal view with missing tooth



Fig 23: Postoperative frontal view with esthetic smile.

REFERENCES:

1. Bhapkar P, Botre A, Menon P, Gubrelly P. Andrew's Bridge System: An Esthetic Option. *J Dent Allied Sci* [serial online] 2015 [cited 2020 Feb 23];4:36-40.
2. Sajjad A. Andrews bridge revisited: A new custom cast ribbed bar and sleeve design fixed removable partial denture. *J Dent Allied Sci* [serial online] 2017 6:44-7.
3. Abrams H, Kopczyk RA, Kaplan AL. Incidence of anterior ridge deformities in partially edentulous patients. *J Prosthet Dent* 1987;57: 191-4.
4. Andrews JA. The Andrew's Bridge: A Clinical Guide. Covington, LA: Institute of Cosmetic Dentistry; 1976. p. 3, 7.
5. Everhart RJ, Cavazos E Jr. Evaluation of a fixed removable partial denture: Andrews bridge system. *J Prosthet Dent* 1983;50: 180-4.
6. Sadig WM. Bone anchored Andrew's bar system – A prosthetic alternative. *Cairo Dent J* 1995;11:11-5.
7. Abrams H, Kopczyk RA, Kaplan AL. Incidence of anterior ridge deformities in partially edentulous patients. *J Prosthet Dent* 1987;57: 191-4.
8. Garber DA, Rosenberg ES. The edentulous ridge in fixed prosthodontics. *Compend Con-tin Educ Dent* 1981;2:212-23.
9. Mueninghoff KA, Johnson MH. Fixed-removable partial denture. *J Prosthet Dent* 1982;48:547-50.
10. Andrews JA, Biggs WF. The Andrews bar-and-sleeve-retained bridge: A clinical report. *Dent Today* 1999;18:94-6, 98-9.
11. Sadig WM. Bone anchored Andrews Bar system, a prosthetic alternative. *Cairo Dent J* 1995;11:11-5.
12. DeBoer J. Edentulous implants: Overdenture versus fixed. *J Prosthet Dent* 1993;69:386-90.