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# Andrew's Bridge: Esthetic and Functional Replacement of Large Anterior Edentulous Spaces- Case Series

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**ABSTRACT**: The repair of a composite bone defect is always complex. When it comes to an anterior partially edentulous area, the cosmetic outcome of the prosthesis is paramount. To get an outstanding aesthetic result, a mix of permanent and removable prosthesis, such as Andrew's bridge, might be used.Andrew's bridge repairs orofacial features by replacing natural teeth and supporting tissues that have been removed. This case series details the effective restoration of significant anterior bone deficiencies with the use of Andrew's bridge.

**KEYWORDS:**Andrew's bridge, esthetics, wical and swoope, sieberts, composite defect of alveolar ridge

## I. INTRODUCTION

Prosthetic dentistry involves the replacement of missing and adjacent tissues with artificial substitutes to restore and maintain the balance in the stomatognathic system, aesthetics and overall health of the patient. The restoration of composite bone defects is always a challenge. [1] Complete aesthetic surgical replacement of the lost tissues is difficult and unpredictable, particularly when a greater degree of the residual ridge has been lost due to trauma, congenital defects, or other pathologic processes. [2] When planning a prosthetic rehabilitation for a patient with congenital abnormalities; lack of teeth, intraoral anatomic deformities, inadequate arch development, and inspection of appropriate occlusal vertical dimension must be taken into consideration. It becomes an area of prime concern when it is an anterior edentulous area, and thus aesthetics plays a pivotal role. [2]

Rehabilitation of missing anterior teeth has a varied spectrum of treatment modalities. Fixed partial dentures, implant-supported prostheses, or removable prostheses can successfully restore the defect. [1] When there is a presence of defects, involving alveolar bone loss might lead to an unesthetic appearance with either fixed or removable prosthesis.[1]

These situations will lead to a prudent decision of selecting a treatment modality comprising of both removable and fixed components in a prosthesis. [4] Thus, it solves the majority of the issues prevailing in these compromised dental arches. This type of fixed-removable system was introduced by Dr. James Andrews in 1965 and hence the name Andrews Bridge. [4]

Andrew's bridge consists of both a fixed component and a removable component. [4] The fixed component has abutments with removable pontics and a bar attached to it. This bar engages into the plastic sleeve aiding in more retention and stability. [4] The removable component comprises an acrylic denture base into which a plastic sleeve is incorporated. [4]

It is indicated in situations where multiple teeth are missing along with a defect, dissatisfied removable partial denture patients due to discomfort in palatal region, long edentulous span where fixed partial dentures are not indicated and cleft palate patients. [5]

The advantages of Andrew's bridge system are adequately reported in the literature, which include better aesthetics, hygiene along with better adaptability, and phonetics.[3] It is comfortable and economical for patients. There is no palatal extension as in the case of removable partial dentures. [3] Good soft tissue response can be appreciated due to less soft tissue impingement. This type of prosthesis is more retentive and stable with minimal extension. Thus, it avoids the transfer of unwanted leverage forces to the abutment teeth by acting as a stress breaker. [3]

With consideration of the above-mentioned advantages, this article presents to you a series of case reports where patients were treated

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with Andrew's Bridge to restore function, aesthetics, comfort which brings about favourable stress distribution to soft tissue and abutments.

## II. CASE SERIES

Case 1:

29-year-old male patient referred to department of prosthodontics crown and bridge for rehabilitation of his upper jaw. Patient gives a history of cleft lip and palate and got surgically treated at his young age. Fig 1.1 shows extraoral photographs of the patient. The patient had an impacted upper lateral incisor in second quadrant, missing first premolars on first and second quadrants and grade III mobile central incisors (Fig 1.2). Patient was explained about orthodontic treatment plan and referred to Orthodontic department for an opinion. Patient was not convinced for orthodontic treatment plan due to time constraints. We explained patient about extraction of central incisors and gave a fixed removable treatment plan of Andrews bridge because of long span edentulous area and poor bone support due to cleft lip and palate. Fig 1.3 shows post extraction view of central incisors.

A Diagnostic impression was recorded with irreversible hydrocolloid [DPI Algitex] and diagnostic mock-up was done and showed to the patient. Minimum of two abutments has to be present on either side for the framework for the proper support. In first quadrant lateral incisor, canine and in second quadrant canine and premolar were prepared and additional polyvinyl impression [Elite HD+ Putty Soft - High viscosity addition silicone, Elite HD+ Light Body - Low viscosity addition silicone] was made (Fig 1.4). Putty index was made with diagnostic wax up and provisional prosthesis [Structur 2 SC Voco] was fabricated through direct indirect technique and cemented with temporary cement [GC Freegenol$^{TM}$]. During treatment planning due to large edentulous space, the removable portion was planned to consist of two central and two lateral incisors and in fixed portion the lateral incisor and canine were planned to fabricate as canine and premolar respectively in first quadrant. In second quadrant the canine and premolar tooth were prepared and fabricated for the same. The Metal copings with stud attachment framework has been fabricated (fig 1.5) and tried in patient mouth. Wax trail of anterior removable prosthesis along with bisque trail of crowns was carried out in patient mouth (Fig 1.6). Fig 1.7 shows laboratory pick up with female housing in the final removable prosthesis. Fig 1.8 shows intra oral pre and post operative views of the patient.

Case 2

36-year-old female patient, reported with multiple periodontally compromised teeth. After evaluating the periodontal condition, it was advised for a full arch extraction in the mandibular arch. In the maxillary arch; only 13, 14,23,24, 25 exhibited a good periodontal prognosis. Hence only these teeth were retained and others were extracted (Fig 2.1).

A diagnostic impression recorded with irreversible hydrocolloid (Algitex, DPI) and tentative jaw relation (Fig 2.2) was evaluated to check for the prosthetic space available. Impression of the prepared teeth was made with putty (elite HD+, Zhermack) and light body (elite HD+, Zhermack) consistency elastomeric impression material. Wax pattern was fabricated on the die stone (Kalrock, Kalabhai) model. Plastic coffee stirrer (Zeonly mart, Amazon India) was used as bar connecting the abutments (Fig 2.3). Casting was carriedby lost wax technique. The prefabricated metal housing was checked for fitting (Fig 2.4). Later the routine clinical steps like metal framework trial, bisque trial, pick up impression, jaw relation, denture trial and insertion of the denture (Fig 2.5).

Case 3

A 65-year-old male patient reported with multiple missing teeth with aesthetics being his main concern. He wanted rehabilitation for the lower front teeth. On evaluation, the teeth numbered 26,27 31,32,36, 37,41,42,46 and 47 were clinically missing (Fig 3.1, 3.2 and 3.3). The remaining natural teeth showed gingival recession falling in Miller's class 1 and class 2 classification. There was no mobility present in the remaining natural teeth. For the mandibular anterior region, the prosthesis planned was Andrews' bridge, taking support from 33,34,43 and 44.

A diagnostic impression was made using irreversible hydrocolloid (Algitex, DPI). A facebow transfer was recorded and wax mock-up was done for the area to be rehabilitated (Fig 3.4). The teeth numbered 33,34,43 and 44 were prepared to receive porcelain-fused to metal crowns (Figure 3.5) and impression was recorded using light body(elite HD+, Zhermack) and putty consistency of polyvinyl siloxane material (elite HD+, Zhermack). A wax pattern (Kalrock, Kalabhai) for the porcelain fused metal crown and the supporting bar was prepared and casted. A trial was done with the metal framework (Fig 3.6) and a pick-up impression with the metal framework was recorded using polyvinyl siloxane material (Fig 3.7). A pre-glaze trial was done along with the arranged teeth for the acrylic component (Fig 3.8). The processing

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of the acrylic component and the glazing of the porcelain fused metal crown was done, after which the cementation of the final prosthesis was completed (Fig 3.9).

1.1 Extraoral view

Fig 1.2 Intraoral views

Fig 1.3 Post extraction view

Fig 1.4 Tooth preparation in 13,12,23,24

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Fig 1.5 stud attachment Metal framework trail

Fig 1.6 Bisque trail of ceramic crowns with framework (left) and anterior teeth arrangement (right)

Fig 1.7 Removable denture with female housing

Fig 1.8 Pre & post operative view

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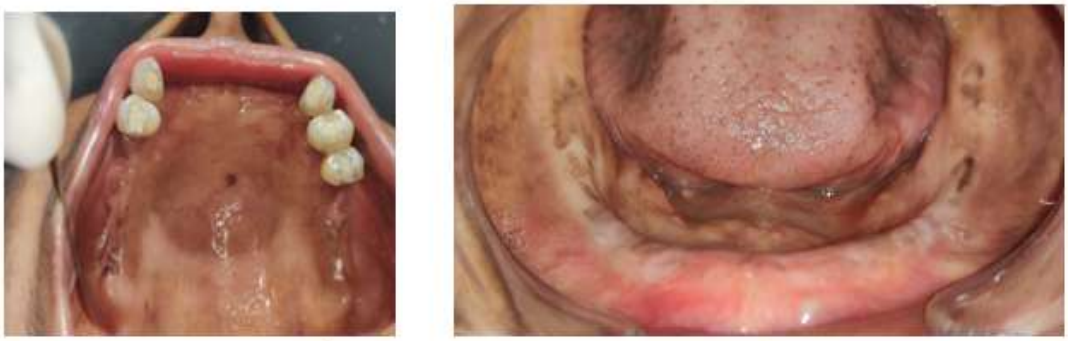

Fig 2.1 Preoperative intra oral view

Fig 2.2 Tentative jaw relation and teeth preparation

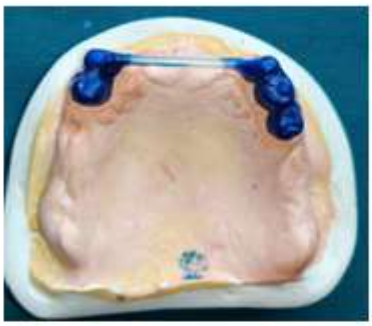

FIG 2.3 Wax pattern using plastic coffee stirrer

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Fig 2.4 Framework trial in patient

Fig 2.5 Insertion of the prosthesis

Fig 2.6 Post operative extra oral view

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Fig 3.1 Pre-operative maxillary arch

Fig 3.2 Pre-operative- teeth in oicclusion

Fig 3.3 Pre-operative mandibular arch

Fig 3.4 Facebow transfer and wax mock up

Fig 3.5 Tooth preparation in 33,34,43 and 44

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Fig 3.6 Metal Trial

Fig 3.7 Impression

Fig 3.8 Pre-glaze Trial

Fig 3.9 Post operative intraoral views

## III. DISCUSSION

The restoration of large vertical defect by fixed prosthodontic modality is a challenge as it is unable to achieve the basic goals of prosthodontic treatment i.e restoring function, mastication and aesthetics of the dental arches. Such clinical conditions are not successfully treated by conventional fixed or removable prosthesis.

Seibert classified alveolar crestal defects as Class I, Class II and Class III: (6)

Class I: Buccolingual loss with crestal height maintained.

Class II: Vertical loss with buccolingual width maintained.

Class III: Combination of buccolingual and vertical loss.

The most commonly seen defects are the Class III defects (56% of cases), followed by horizontal defects Class I (33% of the cases) (2). Techniques which can be used for the restoration of the defects include: (8-12)

1) Soft Tissue Procedures include various options like the Interproximal Graft Technique
2) Free Gingival Graft.
3) Graft for augmentation of ridge width and height.
4) Distraction osteogenesis.
5) Combination of a ridge augmentation using bone grafts followed by implant supported prosthesis.
6) Prosthodontic modalities like cast partial denture, fixed partial dentures or Andrews' bridge.

The drawback of prosthodontic modalities without augmentation procedures is that,they result is excessively large pontics which give an unaesthetic appearance to the prosthesis especially in the anterior region.

In the case series discussed in this article, the patients presented with different forms of large vertical defects and were unwilling to undergo an augmentation, grafting or dental implant procedure. The following discussion elaborates on the history of the patient and the treatment planned.

There aetiologies of the vertical defect for the three cases in the case series included cleft lip and palate and periodontal causes. The fabrication methodology for the three cases varied.

In case 1, the defect was post-surgical closure of cleft lip and palate. Post-surgery, the defect in the anterior region was a large vertical defect and could not be restored completely by surgical and orthodontic treatment modalities. The advantages of Andrews' bride in such cases are adequately reported in literature (16-17). It provides better aesthetics, hygiene, phonetics along with good adaptability and phonetics.

In case 2, the young woman had lost multiple teeth due to periodontal issues. It was ensured that her remaining natural teeth are preserved well and a cost-effective comprehensive treatment is provided for her. The maxillary posterior region and mandibular arch were restored with acrylic removable partial denture and complete denture respectively. This provided better aesthetic and function to the patient.

In case 3, the patient was not convinced for rehabilitation of posterior teeth and wanted to get only the mandibular anterior rehabilitated. Considering the compromised periodontal condition and recession present, Andrews' bridge was planned as a fixed-removable treatment option to ensure better hygiene and aesthetics.

The drawback of treatment with Andrews' bridge is that; over a period of time, there is loss of retention of the removable acrylic component. This can be rectified by changing the silicone housing on the intaglio surface of the acrylic component.

## IV. CONCLUSION

Andrews' bridge is an efficacious fixed-removable treatment modality for edentulous areas with large vertical defects. It can restore aesthetics, speech and function successfully along with complete closure of the defect.

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