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Revamping smiles: Andrew's bridge meets the obturator

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Abstract
Congenital and acquired defects in the oral and maxillofacial region can significantly impact both function and aesthetics, particularly in patients with cleft lip and palate. These patients may experience tooth loss following surgical intervention, leading to substantial hard and soft tissue defects. The primary goal in managing such cases is to rehabilitate form, function, and aesthetics. Traditional treatment options, including dental implants, fixed prostheses, and removable partial dentures, have limitations, particularly in cases of extensive bone loss. An innovative solution, the "Andrews Bridge," offers a fixed-removable prosthesis option that addresses these challenges. Introduced by Dr. James Andrews, this prosthesis features fixed retainers and removable pontics, providing superior aesthetics, ease of maintenance, and comfort. This case report details the rehabilitation of a 22-year-old male patient with a cleft palate and significant anterior maxillary bone loss. Following thorough evaluation and consideration of various treatment options, an Andrews Bridge was fabricated to restore aesthetics, phonetics, and function while minimizing soft tissue impingement and protecting abutment teeth. The patient was satisfied with the outcome, demonstrating the clinical utility of the Andrews Bridge as a viable treatment option for patients with localized alveolar ridge defects.

Keywords: Congenital defects, Andrews bridge, obturator, fixed removable prosthesis

Introduction
In the oral and maxillofacial region, the congenital or acquired defects affects the function and esthetics of the patient. Patients with cleft lip or palate might loss the tooth during surgical intervention. This might lead to huge hard and soft tissue defect. The main goal in such patients is to rehabilitate the form function and esthetics. [1]
Such patients may be treated with implantfollowing bone graft, Conventional fixed dental prosthesis, conventional removable partial denture. [1] Implant placement will be difficult and unpredictable due to extensive bone loss in the defect region and requirement of Autogenous graft. Fixed dental prosthesis might not be an ideal treatment option since it restores the function but esthetics only to certain limit. [2] Removable partial denture is a temporary treatment which will affect the psychological impact of the patient [3].
To overcome all these fixed removable prostheses was identified. It is known as "Andrews Bridge." It was first introduced by Dr James Andrews. [3] The prosthesis had a retainer which is fixed and pontics which is removable. The retainers were made of PFM or full veneer metal. These retainers will be cemented permanently to the abutment. Prefabricated castable bars are used to join the retainers and then cast together, or soldering is done using a prefabricated metal bar to the copings. A clip is placed on the intaglio surface of the removable pontics which accurately attach over the bar attachment. [4]
Indications of Andrews Bridge are [4]

- Patients with Cleft lip & palate
- Patient not satisfied with removable partial denture due to the palatal extension.
- Multiple missing teeth with ridge defect where abutments are capable for supporting an FDP.
- Long edentulous space where FPD is contraindicated.

Contraindications

- Periodontitis
- Gross periodontal disease
- High caries rate

This case report describes prosthetic rehabilitation of cleft palate who underwent surgical intervention by fabrication of a prosthesis using the Andrew's bridge concept. The main goal of this prosthesis is to achieve esthetics, phonetics, comfort, hygiene, and favorable stress distribution to the abutments and soft tissues.

Case Report
A 22 years male patient reported to the hospital with the complaint of uncomfortable appearance as he hadmissing upper front tooth region. A completehistory was obtained. Dental history revealed Patient had cleft palate and underwent surgery in the premaxillary region by correction of bony irregularity along with anterior teeth extraction [11, 12, 13, 14, 21, 22, 23, and 24]
Extra oral examination revealed short lip length and reduced upper lip support. Intra oral examination revealed missing 11, 12, 13, 14, 21, 22, 23, 24. The maxilla and mandible have class 2 relationship. Patient was undergoing orthodontic treatment in mandibular arch. The hard and soft tissue had "V" shaped defect with narrow maxillary knife edge anterior ridge. On measuring the vertical defect was >10 mm and horizontal defect >8 mm. OPG examination revealed complete bone loss in maxillary anterior region According to Sibert's classification there was reduction in boneheight and width (Sibert's class 3).

Treatment plan

Treatment option includes implant placement followed by Autogenous graft, Fixed dental prosthesis, Conventional removable partial denture. Patient refused for any surgical procedure. The vertical bone defect is not favorable for the fixed dental prosthesis because it would restore the function but esthetics to a limited extent. The removable partial denture was not satisfying the patient's need. All possible treatment options were explained to the patient. So, Andrew's bridge was the ideal treatment option in this case. Counselling was given to the patient regarding all treatment options. patient approved for a fixed-removable prosthesis and an informed consent was obtained.

Procedure

Upper and lower diagnostic impressions were made using alginate [irreversible hydrocolloid impression material]. Study model was poured with Type 3 dental stone. [1] Facebow transfer was done and the cast were mounted using a semi adjustable articulator with maximum intercuspation. [1] In the study model a mock tooth preparation was done and a diagnostic wax up was done.

Tooth preparation was done using tapered fissure round end bur in 15, 16 and 25, 26 to receive PFM crowns with bar attachment. Chamfer finish line was given. [1] Gingival retraction was done by placing retraction cords in the prepared tooth. [1] The final impression was made using addition silicone [polyvinyl siloxane impression material] and two stage putty and light body wash technique. The master cast was poured with type 4 gypsum product and mounted on a semi adjustable articulator. [1] Temporary restoration was given for the prepared tooth using tooth moulding powder by direct technique

Wax up was done for PFM coping in 15,16 and 25,26. Prefabricated castable plastic bar attachment was attached palatally between 15, 16 and 25, 16. The bar was positioned parallel to the ridge. Space was created between the alveolar ridge and the bar for ease of maintaince of oral hygiene. The entire assembly [coping and bar attachment] was casted with cobalt chromium alloy. Metal tryin was done and verified intraorally. Shade selection was done for the ceramic restoration. Ceramic builds up was done in relation to 15,16 and 25,26. The retainer along with the bar attachment was cemented intraorally with GIC.

The alginate impression was made for maxillary arch after cementation. Occlusion rim was fabricated and teeth arrangement was done with appropriate size and shade and waxed up. Trial for removable partial denture was done. Plastic clip was placed before placing the resin. The denture was processed using heat cure acrylic resin finished and polished. Esthetics, phonetics, and access for hygiene were evaluated

The patient was trained how to place and remove the prosthesis. Interdental brush was suggested for maintenance of oral hygiene. Periodic recall was doneto asses patient's satisfaction and usage of the prosthesis.

Discussion

Congenital defect might lead to severe hard and soft tissue defect. This is known as "Localized alveolar ridge defect." This is known as limited volumetric insufficiency of hard and soft tissue within the alveolar process [1]

Sibert's classified these ridges defect as class I defect - loss of faciolingual tissue width with normal ridge height. Class II defects—vertical loss of ridge height with normal width; class III defects— both horizontal and vertical loss. [1] Bhapkar, *et al* (2016) stated that class III defect occurs most commonly (56%) followed by class I (33%) and class II (3%) Occurrence of combined vertical and horizontal bone loss or horizontal bone loss is higher compared to vertical bone loss. [2]

Rehabilitation and restoration of this hard and soft tissue is a challenging situation to the Prosthodontist The main goal of this rehabilitation is to restore the form, function, esthetics, phonetics and to satisfy the psychological needs of the patient. Conventional fixed partial denture is not favorable for such clinical situation because it cannot restore the esthetics. Conventional removable partial denture will have poor stability, poor retention & poor comfort for the patient. Implant placement also require pre-prosthetic surgery for bone augmentation. Hence in such clinical cases fixed-removable prosthesis is indicated. [5]

In 1975 Immeleus JE and Aramany M suggested Andrew's bridge might be ideal for cleft palate patients. It restores the lost teeth and their associated structures. [3]

Advantages of Andrew's bridge [2, 4]

- Superior aesthetics,
- Ease of maintenance of hygiene,
- Better adaptability,
- Retention and phonetics.
- Comfortable for the patient
- Economical
- The palatal extension is absent as in case of RPD
- Less soft tissue impingement.
- It protects the abutment teeth by avoiding transfer of unleveraged forces.

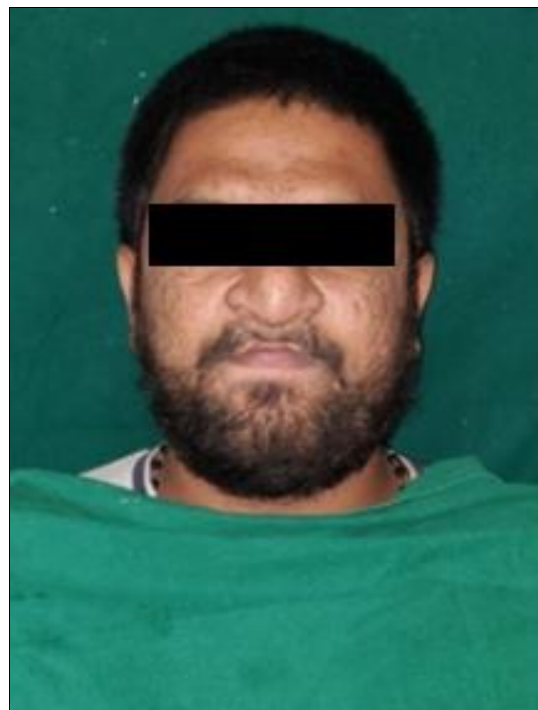

Fig 1: Pre-Operative Extraoral Profile View

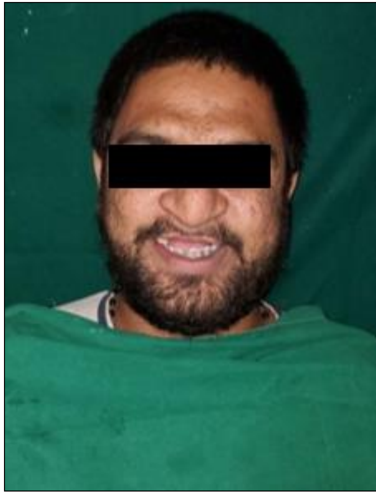

Fig 2: Pre-Operative Extraoral Smile View

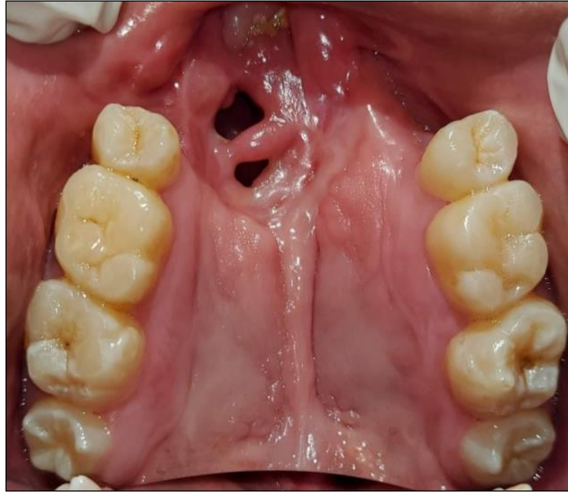

Fig 3: Preoperative – Maxillary Arch

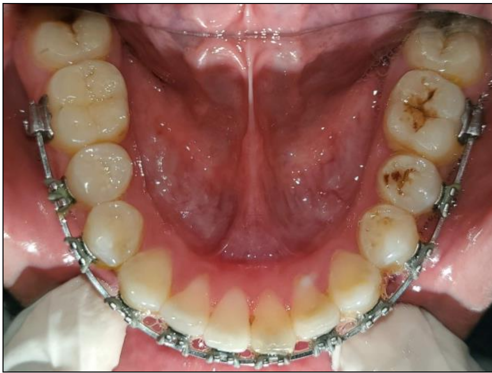

Fig 3: Preoperative – Mandibular Arch

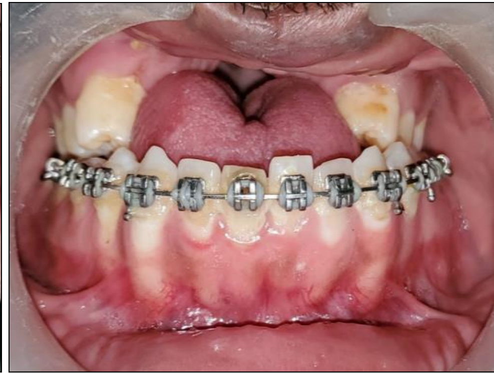

Fig 4: Preoperative – Mandibular Arch

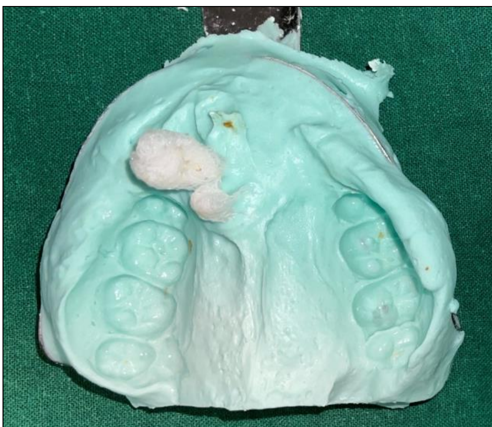

Fig 5: Diagnostic Impression – Maxillary Arch

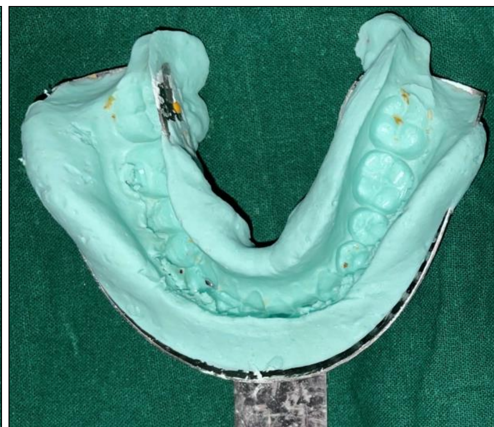

Fig 6: Diagnostic Impression – Mandibular Arch

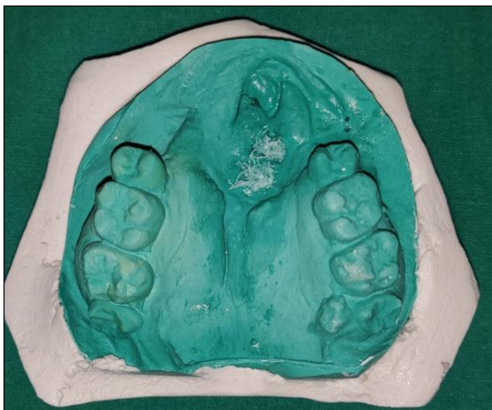

Fig 7: Diagnostic Cast – Maxillary Arch

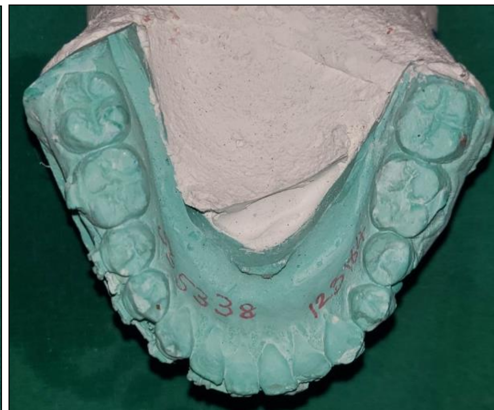

Fig 8: Diagnostic Cast – Mandibular Arch

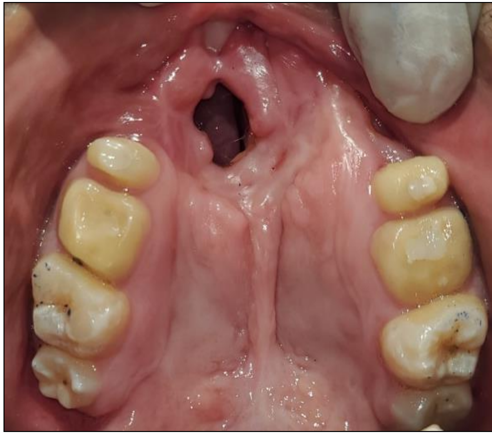

Fig 9: Tooth Preparation in Relation To 15,16,25,26

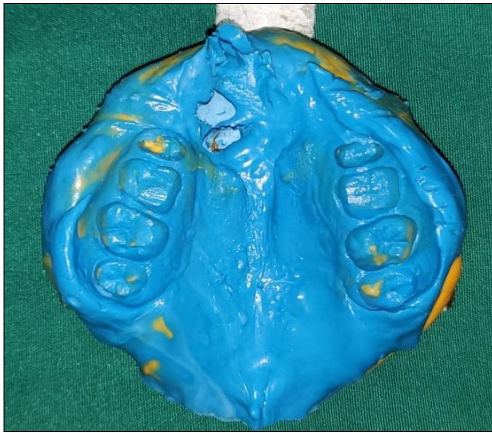

Fig 10: Final Impression

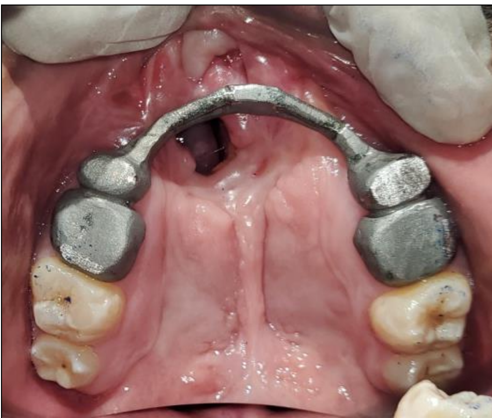

Fig 11: Metal try in

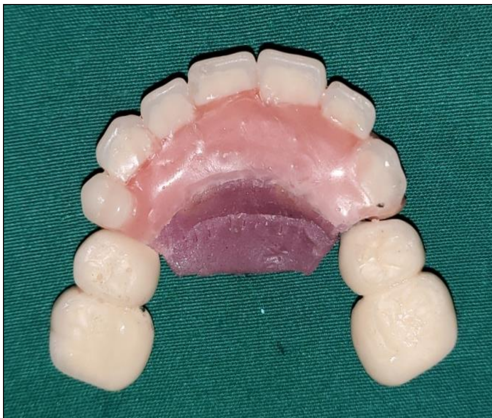

Fig 12: Andrew's Bridge

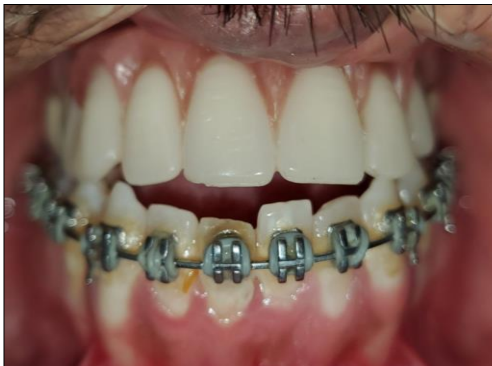

Fig 13: Wax Try in

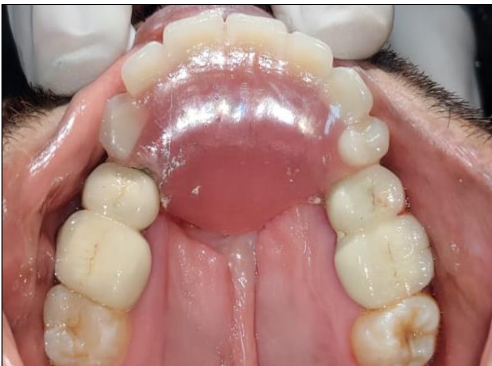

Fig 14: Maxillary Arch – Post Insertion

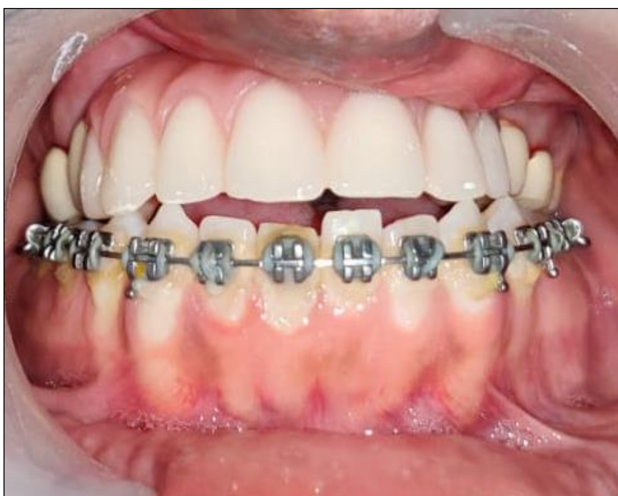

Fig 15: Post Insertion – Intraoral View

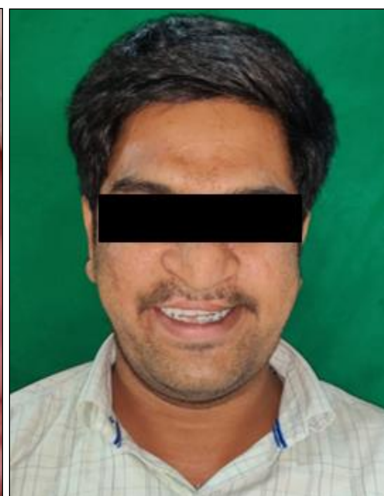

Fig 16: Post Insertion Extraoral View

Conclusion

Inenormous hard and soft tissue defect Andrews Bridge provides better aesthetics and most appropriate phonetics. It can be easily removed and oral hygiene can be maintained by the patient. It also avoids the unwanted forces delivered to the abutment teeth. Hence Andrews Bridge might be better option for patient with localized alveolar jaw defect.

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