



## Case Report

# Veau's group IV Cleft: A case report

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### ABSTRACT

The case report demonstrates treatment of Group 4 cleft under Veau's Classification of cleft lip and palate. The patient had complete cleft palate, displaced premaxilla, bilateral cleft alveolus, repaired bilateral cleft lip, bilateral posterior crossbite and severe crowding in maxillary arch. A 18 year old male reported with forwardly placed premaxilla, severe crowding in maxillary arch. Therefore treatment was planned to make a 3D printed model of the maxillary arch for proper treatment plan. To relieve severe crowding with modified Transpalatal Arch, followed by expansion of maxillary arch and to achieve proper occlusion with fixed orthodontic treatment. After achievement of proper leveling and alignment fixed prosthesis was planned to achieve desired aesthetics.

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## 1. Introduction

There can be complete or incomplete bilateral cleft lip and palate on both the sides. The size and shape of premaxilla is dependent on the number of tooth buds and their distribution in both incomplete and complete bilateral clefts of the lip and alveolus, which makes it symmetrical or asymmetrical. Since development of cleft of lip /alveolus, hard and soft palate are from different embryological sites, the cleft may occur in lip and alveolus with or without occurring in the hard and soft palate.<sup>1</sup>

The combined effect of tension and resulting bony overgrowth causes premaxillary protrusion. It is produced at premaxillary vomerine suture by displacement of bone due to abnormal muscular forces of the detached outer muscles combined with pushing force of the tongue within it.<sup>2</sup>

Diagnosis is an integral part for different successful treatment modalities of cleft lip and palate. Advancement in technology has made things easier for the operator. 3D printed model is one of them. 3D printed model is a virtual

replica of the patient's problem. Along with radiographs 3D printed models makes the diagnosis and its execution more accurate. 3D printed models manifesting different examples of the cleft palate defect helps in visual and physical representation of the defect for better understanding the physical nature of the condition for parents and other family members.<sup>3</sup> It also helps surgeon and orthodontist to plan the treatment accordingly.

This case report represents the use of 3D printed model in treatment of Group 4 cleft.

## 2. Case Discussion

### 2.1. Case introduction

An 18 year of age male patient reported with cleft palate which was operated previously and was non - syndromic. His chief complain was severe crowding and forwardly placed front teeth. When he was 1 year old he underwent primary repair of cleft palate and lip.

His extraoral examination revealed bilateral repaired cleft lip. displaced premaxilla, incisor visibility on rest.

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His Intraoral examination revealed patient was having Group 4 cleft of Veau’s Classification. Complete cleft of hard and soft palate, displaced premaxilla, bilateral cleft of alveolus and bilateral cleft of lip.(Figure 1) Class III canine relationship on left and right side was present. The overjet was 0mm, Bilateral posterior crossbite with collapsed maxillary arch, and severe crowding in maxillary arch. He had retained maxillary deciduous second molar on right and left side.

3D printed virtual models (Figure 3) along with CBCT scan (Figure 2) was planned for proper diagnosis of the cleft.

Treatment objective planned was to start fixed orthodontic treatment with modified Transpalatal Arch (TPA) to relieve severe crowding and to bring premolars into alignment. To maintain normal overbite and overjet, correction of bilateral posterior crossbite, expansion of the collapsed maxillary arch, and to attain Class I molar and Class I canine relationship. Followed by surgical alveolar bone graft and lip repair. Fixed prosthetic rehabilitation was planned for aesthetic correction.

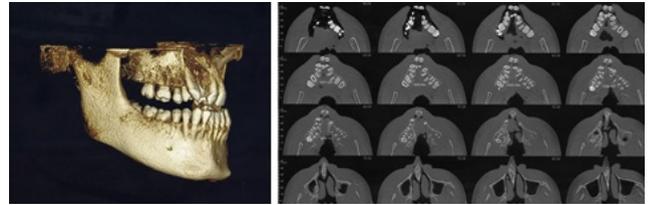


Fig. 2: Pretreatment CBCT images

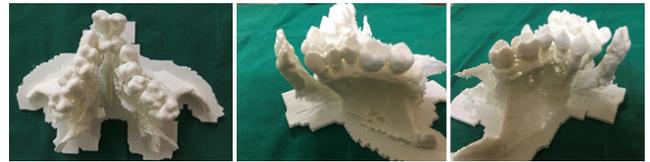


Fig. 3: 3D printed models images



Fig. 4: After achievement of expansion & levelling and alignment images



Fig. 1: Treatment photographs

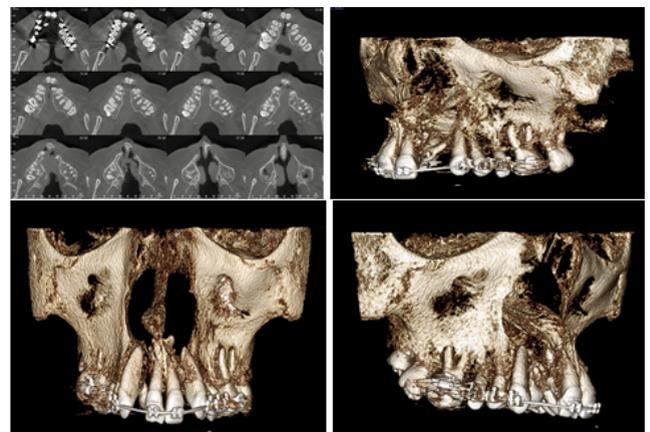
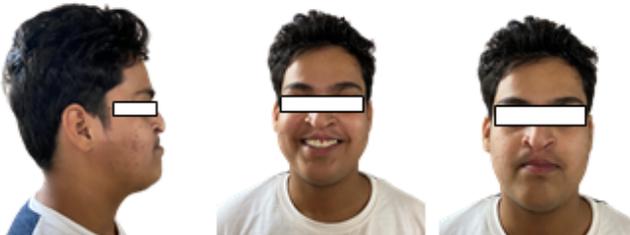


Fig. 5: Postlevelling & alignment CBCT images



**Fig. 6:** Face bow transfer for prosthetic rehabilitation



**Fig. 7:** Post treatment photographs

## 2.2. Treatment progress

The treatment was started with modified TPA with buccal extension from the maxillary molars. Extraction of maxillary bilateral deciduous molars was done MBT 022 was bonded on maxillary first premolars and Begg's bracket was bonded on second premolars for derotation. After derotation of second premolars MBT 022 brackets were bonded for further correction.

Elastic chains were engaged on first and second premolars and on buccal extension of TPA to pull them into alignment. After alignment of teeth Quad Helix was delivered for expansion of the maxillary arch. After achievement of desired expansion MBT 022 brackets were bonded on remaining teeth.

First wire to be inserted was 0.014 Nickel Titanium arch wire. Followed by 0.016 NITI wire was inserted to achieve proper leveling and alignment. After achievement of leveling and alignment 16x22 NITI was inserted followed by 17x25 NITI. 19x25 stainless steel was the final wire to be inserted to achieve proper torque. After achievement of desired orthodontic result (Figures 4 and 5) Left side of the Alveolar Cleft was grafted with Secondary Alveolar Bone. Particulate cancellous bone from the anterior iliac crest was used. Oro Nasal communication absence was checked and bone packing was done in the defect. Secondary residual deformity of the primary cheiloplasty procedure corrected by lip revision.

But unfortunately bony graft failed and patient was not willing for second surgery. So, Complete fixed prosthesis was planned to restore missing teeth and stability of the maxillary arch to prevent its future collapse. Proper jaw records were taken with facebow (Figure 6) and prosthetic rehabilitation was done on anatomical articulator so that proper functional occlusion can be achieved. (Figure 7)

## 3. Treatment Result

Duration of the treatment was for two and half years. Treatment objectives were achieved at the end of the treatment. There was improvement in patient's profile appearance. Bilateral posterior crossbite was eliminated by maxillary arch expansion. Premaxilla was aligned with its bilateral shelves. Class I Canine and Class I molar relationship was achieved on both sides, a good occlusal interdigitation and positive overjet and overbite was achieved.

Patient was satisfied with the esthetic and occlusal result. Proper chewing function was been achieved.

The speech was unchanged.

## 4. Discussion

The human cranial morphogenesis is purely the pinnacle of very complex series of diverse and overlapping development

events, Four fundamental processes can categorize all these events into which span mammalian development are apparent in the beginning of development of palate and face. 1) cell differentiation, 2) morphogenesis, 3) growth, 4) dymorphogenesis and abnormal growth.<sup>4</sup>

Diagnosis is important part for cleft treatment planning and 3D printed model plays a pivotal role not only in making proper diagnosis both for surgeon and orthodontist but also help in making parents understand the problem and to make them understand future treatment planning.

This case report presents successful treatment outcome of Group 4 type of cleft with multidisciplinary approach. Stepwise planned orthodontic treatment was executed to get the desired result. Followed by secondary alveolar bone grafting and lip repair. Then fixed prosthesis was planned to rehabilitate missing teeth. Unfortunately surgery failed and patient was not ready for second surgery, so complete prosthesis was planned to prevent future relapse.

Hawley plate was preferred for retention purpose.

## 5. Conclusion

To achieve good functional and aesthetics, treatment planning and interdisciplinary treatment approach is an integral part. 3D printed models make understanding of the problem easier for both clinician and parents. And it also helps in successful execution of treatment for orthodontist and surgeon.

## 6. Patient Consent Declaration

It is certified that all appropriate consent from the patient for his images has been undertaken.

## 7. Sponsorship and Financial Support

None.

## 8. Conflict of Interest

There is no conflict of interest.

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