Cast partial prosthetic rehabilitation of a patient with unilateral cleft lip and palate

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**ABSTRACT**

The oral rehabilitation of individuals with cleft lip and palate is directly related to severity of anatomical and functional alterations determined by malformations and at treatment. The ideal treatment of cleft area is closure by bone grafts and orthodontics when this is not feasible, many cases are solved with prosthetic rehabilitation. The prosthetic rehabilitation contributes directly and positively to the psychological aspects of the individual. Cast partial denture is chosen as the treatment of option in this case as removable partial dentures (RPDs) are especially indicated in patients with tissue deficiency. Planning of RPD should be combined to clinical and radiographic examination, dental cast analysis and occlusal analysis, and determination of retainer, connector, and dental bar.

**KEY WORDS:** Esthetics, Cast partial denture, Cleft lip, Cleft palate, Full mouth rehabilitation

**INTRODUCTION**

Cleft palate occurs resulting from the failure of closure of primary palate in 4th-8th week of intrauterine life.[1] Cleft lip is the one which occurs anterior to incisive foramen, due to the failure of penetration of mesenchymal cells into nasolacrimal grooves.[3] These are considered as the congenital abnormal gaps in the upper lip, alveolus, and palate. The epidemiological studies by Burdi et al. (1972) and Cooper and Poinar[4] had stated that the occurrence of cleft lip is more in males and cleft palate is found to be more in females. The etiology was not confined to one or two, but many factors had their role such as growth hormone defects, genetical, environmental (Vitamin B6 deficiency), alcohol, smoking, antiepileptic medications, cortisol, steroids, antiasthmatic, and frequent exposure to X-rays.[5-7] Depending on the severity of the defects, it will also get associated with anomalies of heart, skull, nervous system, and extremities.[8] There are various classifications given by various authors for cleft lip and palate such as:

1. Davis and Ritchie (1922)
2. Veau (1931)[9]
3. Kernahan and Stark (1958)[10]
6. Pruzansky
7. Ross and Johnston
8. Iowa system
9. ICPR.

The treatment goals for any kind of orofacial defects are normalized facial esthetics, integrity of the primary and secondary palate, normal speech and hearing, airway patency, Class I occlusion with normal masticatory function, good dental and periodontal health, and normal psychological development.[12] For this to achieve, there should be a multidisciplinary approach for managing and correcting cleft abnormalities. This multidisciplinary team includes a plastic/craniofacial surgeon, pediatrician, orthodontist, pediatric dentist, speech and language specialist, otolaryngologist (ear-nose-throat specialist), audiologist (hearing specialist), genetic counselor, nurse team coordinator, and a social worker.[13,14] Maxillofacial prosthetic treatments offer improvement in appearance, function, and health of patients with congenital and craniofacial defects. It is important to determine the occlusal vertical dimension of the patients with cleft lip and palate before planning for an appropriate prosthetic rehabilitation. Various options are available in prosthetic treatment...
modalities depending on the extent of the defect such as conventional multiunit fixed partial denture (FPD), resin composite veneers, fiber-reinforced composite resin-bonded prosthesis, conventional removable partial dentures (RPDs), and attachments in combination with FPD/RPD.[15,16] The role of prosthodontist is to make a decision either to give a fixed prosthesis or a removable prosthesis depending on the defect such as soft tissue dysfunction, fistulae, nasopharyngeal defects which results in hyper-nasal speech.

Soft-tissue dysfunction, fistulae, nasopharyngeal defects which results in hypernasal speech.[17] The metal framework gives the retention of the prosthesis, and the acrylic extensions of the prosthesis cover the soft-tissue defects which will also improve the speech efficiency of the patient.[18]  

CASE REPORT

A 32-year-old male patient has come to the department with a chief complaint of missing teeth in maxillary and mandibular anterior teeth region of jaw since a long duration. The patient has also been treated with his cleft lip and palate and underwent through many surgeries. Although to an extent the lip got it contour and shape, the alveolus and palate have its defect in contour. The challenging part is to sleeve the defect that aids in fulfilling the basic needs of the patient, i.e., function and esthetics. Hereby, we are going to report the step-by-step procedure which brings the teeth in function.

Procedure
1. As the patient enters, the department a detailed case history was taken along with diagnostic impressions and radiographs.
2. Case was properly discussed and planned. It was planned for a tooth-supported fixed prosthesis in the mandibular arch and a cast partial prosthesis in the maxillary arch to seal the defect.
3. In the second appointment, jaw relation and facebow transfer were done, and then, the casts were articulated in Stratos 300 articulator which helps in doing a wax mock-up.
4. After getting the wax mock-up done, the teeth preparation was done followed by temporization (tooth-supported fixed prosthesis was planned in the entire mandibular arch and left and right back teeth regions of maxillary arch) [Figures 1 and 2].
5. Double cord packing was done, and master impression was taken with putty and light body impression material.
6. The impressions were sent to laboratory to proceed with metal copings, and then, the metal trial was done and checked for fit and clearance for ceramic layering.
7. Proper shade matching was done under natural light, and the metal copings were send back to laboratory.
8. Bisque trial was done once the ceramic layering was finished. During this step, the crowns were checked for fit, occlusal contacts and morphology, high points, and esthetics.
9. Then, the crowns were glazed, polished, and cemented [Figures 3-5].
10. Now, at this stage, the cast partial prosthesis was planned for the maxillary arch. Here, 24 (first premolar in the second quadrant) was preserved as a sleeping abutment, and occlusal support was taken by preparing rest on the mesial aspect of 25 and 16 and distal aspect of 15. Guide planes were prepared on the mesial aspects of 11 and 25 [Figure 6].
11. Clasps were given on 25, 11, 15, and 16. A mesh type minor connector was connected to a major

Figure 1: Maxillary teeth preparation

Figure 2: Mandibular teeth preparation and cord packing

Figure 3: Tooth-supported prosthesis in the mandibular arch and right and left posterior region of maxillary arch
connector. Then, casting was done, trimmed, and polished [Figure 8].

12. The metal framework try in was done in the patient's mouth and checked for its fit and retention [Figure 7].

13. Then, the wax bite was taken followed by teeth arrangement, and wax try in was done [Figure 9].

14. Then, the prosthesis was cured and inserted in the patient’s mouth. High points were trimmed and polished. Prosthesis was checked for high points, esthetics, and its function [Figures 10-12].

15. The case was documented, and 2-year follow-up was done.

**DISCUSSION**

Treatment planning plays a major role in the success of any kind of oral rehabilitation. In this case, a cast partial prosthesis was chosen to sleeve the defect in anterior alveolar and palatal region of maxilla. A patient with oral and maxilla-facial defect represents a significant challenge in terms of treatment. Retention is usually compromised in such patients and complain of difficulties in speech and eating. A number of denture making systems that make use of direct and indirect techniques have been reported by many authors previously. Cast partial dentures was chosen as a treatment of option in many complicated clinical situations.

Leupold and Kratochvil had stated that a RPD with altered cast technique provides better service to patients in compromised clinical conditions.\[19\]
by machining the framework with the spark erosion method using electro-discharge machining.[21-23] However, this type was not used in the reported case, as the casting requires highly trained technicians and also due to economic reasons.[24,25]

**SUMMARY**

With the advancements in surgical, orthodontic, and prosthodontic treatments, the cleft lip and cleft palate patients will no longer be treated as a complex prosthodontics patient but rather can be treated with an implant, FPD, or a cast partial denture. The treatment should ultimately provide an excellent support to dental rehabilitation, functionally, esthetically, and psychologically as well in particular for this kind of cleft patients.

**REFERENCES**


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