ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 08, pp.56447-56450, August, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

CASE STUDY

PROSTHODONTIC REHABILITATION OF PATIENT WITH CLEFT PALATE (CP) WITH REMOVABLE PARTIAL DENTURE

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ARTICLE INFO

Article History:
Received 08th May, 2017
Received in revised form
02nd June, 2017
Accepted 29th July, 2017
Published online 31st August, 2017

Key words:

Denture, Partial, Removable,
Cleft Lip, Cleft Palate.

ABSTRACT

This clinical report described the oral rehabilitation of a cleft palate patient with removable partial denture. Although implantsupported fixed treatment was presented as part of the optimum treatment plan to achieve the best result, the patient declined this option due to the significant financial burden. Persons with a congenital or craniofacial defect are unique, and oral problems must be evaluated individually to the most ideal treatment. The changes in appearance, function, and psychological wellbeing have an enormous impact on patients' personal lives and are rewarding for the maxillofacial prosthodontist providing this care.

Citation: Dr. Gattu Anusha, Dr. Veena S Prakash and Dr. N. Chandana, 2017. "Prosthodontic rehabilitation of patient with cleft palate (CP) with removable partial denture", *International Journal of Current Research*, 9, (08), 56447-56450.

INTRODUCTION

Prosthodontic treatment has a long and rich history in the care of patients with cleft lip and palate. Because of increased knowledge of craniofacial growth and development and improved surgical and orthodontic treatment, today's cleft patients receive better care and in less time and have remarkably reduced the functional and cosmetic handicap in CP patients. This requires less prosthetic intervention. Still, prosthetics retains an important place in cleft care, and the prosthodontist remains an integral member of the cleft/craniofacial rehabilitation team. Prosthetic treatment requires cooperation with the surgeon, orthodontist, pedodontist, speech and language pathologist, and medical artist and dental laboratory technician. Therefore, patients who have not received grafting and orthodontic realignment present the greatest prosthodontic challenge. (Reisberg *et al*., 2001) Typically, bony defects can be primarily closed in infancy, resulting in small residual oro-nasal fistulae, if any, thus improving the quality of speech and avoiding rhinolalia. Early surgical corrections of the upper lip create a more harmonic facial appearance, while malposition of the alveolar segments and maxillary retrognathia can be corrected later by orthognathic surgery. Among elderly patients, however, large surgically unrepaired defects are not uncommon. Functional disturbances are remarkable, especially if the patient is nearly or completely edentulous. The clinical problems are similar to those of patients who have undergone ablative tumour surgery in the maxilla. Dysphagia, in controlling the leakage of oral fluids, hyper nasal speech, compromised chewing ability, and aesthetic disturbances are the typical findings in adult edentulous CP patients. (Free, 2002) Rehabilitating patients with such maxillofacial defects is one of the most difficult therapies of the stomatognathic system. Factors that affect the management of maxillary defects are the presence of teeth, amount of remaining support area and defect characteristics. When these factors are not favourable and negatively impact the treatment outcome, then successful prosthetic management of the defect becomes more challenging. (Jain *et al*., 2014) The design of aesthetic and effective dental prostheses for cleft lip and palate patients is a challenge for prosthodontists because the prostheses must serve more than one purpose. The goals to be attained by prosthetic intervention are preventing food and liquid leakage into the nose, improving speech intelligibility, a more aesthetic appearance, and achieving the general satisfaction of the patient. (GÜMÜŞ and Tuna, 2009) This article presents case of a cleft palate Maxillary defect patient, where rehabilitation is carried out with a Cast partial denture with obturator in the maxillary arch, and complete denture in the mandibular arch.

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Case report

A 26-year-old women born with cleft lip and palate with congenitally multiple missing teeth reported to the Department

of Prosthodontics, College of Dental Sciences, Davangere. She underwent cheiloplasty at 7 months of age. Patients clinical examination revealed poor oral hygiene with multiple missing teeth in the upper arch and completely edentulous lower arch. Patient presented with inadequately repaired cleft lip and cleft palate and severe related psychosocial problems. The speech of the patient was compromised and not clear due to escape of air through the cleft region. The facial profile showed collapsed upper lip giving a prognathic appearance to the patient. Intraoral examination showed presence of the following teeth: 13, 14, 16, 23, 26, 27 with palatal cleft measuring about 4*4*10mm.The radiographic examination showed adequate periodontal support of all the teeth. Tooth 26 showed peri-apical radiolucency and appropriate endodontic treatment has been done. Following a dental prophylaxis and oral hygiene instructions, the patient was placed on a 0.12% chlorhexidine gluconate oral rinse (Periogard Oral Rinse; Colgate Oral Pharmaceuticals, Canton, MA, U.S.A.) with twice daily recommended use. To satisfy the patient's primary concerns, and considering the clinical situation, maxillary CPD and mandibular CD was determined to be the treatment of choice. Maxillary and mandibular complete arch impressions were made using irreversible hydrocolloid impression material (Jeltrate, Alginate, Fast Set; Dentsply Intl, York, PA, U.S.A.). Diagnostic casts were fabricated from Type IV dental stone (Silky- Rock; Whip Mix Corp, Louisville, KY, U.S.A.).

Fig 1, 2, 3. Pre-operative facial view, left lateral view and right lateral view

Fig 4, 5. Pre-operative intra oral view of maxilla and mandible

Teeth 13 14 and 23 were prepared to receive post core restorations to support an overlay denture above. Teeth 26 and 27 were prepared with chamfer finish lines to receive cast metallic crowns. Laboratory processed metallic posts with metallic coping and metal crowns (splinted) were fabricated and cemented with Glass Ionomer cement. After which, mouth preparation has been done to receive cast partial denture which included disto-occlusal rest seat preparation over 16 and embrasure clasp rest seat preparation over 26 and 27. Definitive impression of the prepared teeth of the upper arch was obtained using hydrophilic addition silicone material (Elite HD+, Zhermack, Rovigo, Italy). Impression made was inspected to make sure all the sulcus extensions, prepared teeth details and cleft region were well recorded.

Fig. 6. Preparation of 13, 14, 23, 26, 27

Also Custom trays were fabricated on the preliminary mandibular cast using self-cure acrylic resin (Rapid Repair, Dentsply, Gurgaon, India) tray material. Border extensions of the trays were adjusted to be at least 2mm short of the vestibules on the preliminary cast. Mandibular border moulding was done using low fusing impression compound (green stick) (DPI Pinnacle Tracing Sticks, the Bombay Burmah Trading Corporation, Mumbai, India) and final impression was made using Zinc Oxide Eugenol impression material (DPI Impression Paste, the Bombay Burmah Trading Corporation, Mumbai) The upper and lower master casts were poured in type IV stone (Silky- Rock; Whip Mix Corp, Louisville, KY, U.S.A). The block out of the maxillary master cast is done using wax and duplicated in agar medium to form a refractory cast. Cast partial denture design of the prosthesis was fabricated using inlay waxes and finalized. Mesh framework was adapted on the labial surface of the maxillary cast so that it provides adequate support to acrylic material as to improve profile fullness. Also mesh was adapted on the inner surface of the palatal cleft borders to support acrylic.

Fig 7. Maxillary definitive impression with extension in to the cleft region

Fig 8. Wax pattern design of the final prosthesis framework

The wax pattern was invested and casted with Ni – Cr alloy ((Degussa AG, PalliagM, Frankfurt, Germany) and the framework was fabricated. Then the framework was tried in patients mouth to check for the fit. At this stage denture bases were prepared on upper framework and lower cast, wax rims prepared and the jaw relations were recorded.

Fig 9 and 10. Framework casted and try in the mouth

After jaw relation records have been made, casts are mounted on a semi adjustable articulator (Hanau H2) using a face bow transfer (Spring Bow) and a centric relation record was made. The articulator was programmed using protrusive and lateral records (Imprint, 3m ESPE dental products, Conway Avenue, USA). The artificial teeth were arranged in wax for trial evaluation. The occlusion and position of the prosthetic teeth were evaluated intraorally, and the necessary corrections were made before processing the dentures.

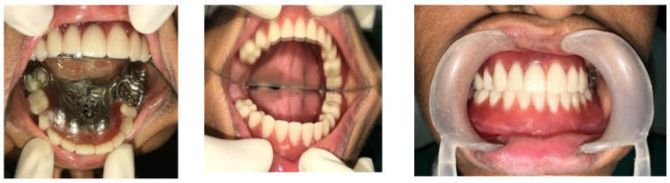

Fig 11, 12, 13. Try in in patient's mouth

Final dentures were processed, trimmed, polished and inserted. Instructions were given to the patient and she maintained a soft diet for the first few days to facilitate accommodation; the necessity of regular cleaning and maintenance was also explained. The patient was instructed to remove the dentures at night and to present the following day and once a week for a period of two months for inspection and possible corrections and adjustment. In addition to oral hygiene instructions, the patient was prescribed a topical 1.1% neutral sodium fluoride (PreviDent; Colgate Oral Pharmaceuticals) with recommended daily use.

Fig 14 Final dentures.

Fig 15, 16, 17 Final dentures insertion

The patient's functional and aesthetic expectations were also satisfied. Patient had improved speech sounds with good resonance. The facial profile was also well improved. At follow-up sessions after completion of treatment, the patient reported her great satisfaction with the outcome, and her family described her resultant more extroverted character.

Fig 18, 19 Post-operative final profile view of the patient.

DISCUSSION

The RPD treatment selected, albeit invasive, is more conservative than the considered alternatives. Other treatment methods involving implant-supported fixed dentures are considerably more radical and have greater incidence of clinical complications than conventional removable prosthodontics. (Goodacre *et al*., 2003; Fukuda *et al*., 2000) Furthermore, this patient's limited financial resources precluded the selection of a costly treatment. Therefore, RPDs were used, the patient's oral hygiene was maintained to an acceptable level, and both the aesthetic and functional results of the restorations were satisfactory. When evaluating a patient with congenital abnormalities, the initial steps involve inspection of appropriate occlusal vertical dimension (OVD). Insufficient OVD may be secondary to lack of teeth, abraded and worn teeth, altered anatomy intraorally and extraorally, or inadequate arch development. Maxillary and mandibular RPDs are used to restore OVD, function, and aesthetics. Many variables determine the appropriate OVD to restore functional occlusion and facial support in each patient. These processes include an evaluation of speaking space, interocclusal distance, facial contours, lip contours, speech, condition of remaining teeth, and occlusion. A thorough assessment evaluates the need for periodontal care, endodontic treatment, orthodontic treatment, oral and maxillofacial surgery, or plastic surgery either prior to or during the maxillofacial prosthetic treatment. Other factors, such as work and/or family commitment, may contribute to the course of the prosthetic and other treatments selected. Treatment such as orthognathic surgery, bone grafts, and orthodontics, which would require more treatment time, may not be possible options. (Hickey and Salter, 2006) For some patients, it may be better to consider a more expedient treatment that obtains a high degree of success versus a long-term complicated treatment involving multiple procedures and increased expense during the critical development phase of adolescence or young adulthood. The more expedient treatment can give an individual more immediate aesthetic, functional, and psychological support. The treatment of patients with congenital craniofacial defects presents psychosocial as well as technical challenges. In the general population, physical attractiveness contributes to a positive self-concept and social wellbeing. (Diener *et al*., 1995) The research of social psychologists describes the self-fulfilling nature of social

stereotypes: appearance forms the basis for responses and impressions by others, which then influence individual behaviour. (Harter, 1999) Research has shown that global self-esteem is highly determined by assessment of one's own physical presentation, as well as by comparisons with the attractiveness, ability, intellectual skills, and social acceptance of other people. (Harter, 1993)

Unusual facial features exacerbate the social challenges of meeting new people and getting along with others. (MacGregor, 1990) Lowered self-esteem, speech defects, decreased academic performance, and social isolation may result from merely "looking different" from one's peers. These factors can contribute to inappropriate acting out and impaired social interactions. (Pope and Ward, 1997) A combination of fixed, implant-supported and removable prostheses in conjunction with other dental and medical treatment is often necessary to obtain the maximum and ideal outcome for the patient. Maxillofacial prosthetic treatment allows these patients to feel more normal, and to have better self-esteem, greater opportunity to fulfil their potential socially, and improved employment possibilities. (Wiens *et al*., 2000)

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