

Prosthetic Lip with the Retentive Attachment for a Unilateral Cleft Lip Patient: A Clinical Report

Abstract

Patients afflicted with congenital cleft lip defect experience disfigured facial esthetics and lack of oral competency that could reduce the speech intelligibility. Rehabilitation of such cosmetic deformities condition often encountered with dental abnormalities becomes the challenge. When surgical treatment is not desired, prosthetic reconstruction turns out to be an economical option. This clinical treatment describes the fabrication of a maxillary lip prosthesis supported by a cast partial denture retained with magnetic attachment in a cleft lip patient. The use of intraoral magnets placed labially on the cast partial denture and on the counterpart of the prosthesis improved the retention. Moreover, the biomedical-grade silicone prosthesis used to blend closely with the patient's skin shade fulfilled the esthetic needs.

Keywords: Biomedical-grade silicone, cast partial denture, cleft lip, intraoral magnets, lip prosthesis

Introduction

Face perception is fundamental to human social interactions. Patients afflicted with congenital/developmental anomalies reach out to prosthodontists to improve the appearance and quality of life.^[1]

Cleft lip anomaly affects male patients two times more commonly than females.^[2] It occurs unilateral or bilateral, and the ratio of occurrence of the left side is twice as that of the right side.^[3] Because the incidence of cleft lip with or without cleft palate is 1 in 800, it warrants significant management.^[4]

The surgical approach is not always affordable; hence, the prosthetic restoration is considered to be a practical treatment option. The prosthetic management of cleft lip defect in the maxilla poses a crucial task, as it requires retention of the prosthesis through the preservation of the surrounding tissue as well as the remaining dentition. With the introduction of intraoral magnets, the prosthesis stability along with tissue preservation has certainly improved.^[5] For partially missing teeth, most suitable treatment of choice is a removable cast partial denture.

Lips form the boundary of the oral cavity with the constant flow of saliva. Hence,

material preferred was biomedical-grade silicone due to its less cytopathic effect for the prosthesis fabrication. This clinical report describes biocompatible, soft silicone-based prosthesis for the small lip defect retained by cast partial denture with magnetic attachment that satisfied the patient's esthetic and functional needs.

Case Report

A 25-year-old male patient was referred to the Department of Prosthodontics and Crown and Bridge, MCOODS, Manipal, Manipal Academy of Higher Education, for the replacement of maxillary front teeth. A history of uneventful extraction of proclined maxillary central incisors and right lateral incisor occurred 2 months back was reported. On examination, the patient had a right unilateral cleft lip without involvement of alveolus and secondary palate [Figure 1]. There was no contributory family and medical history. Intraoral examination revealed healthy and sound remaining maxillary tooth structure [Figure 2]. The patient's concern for missing anterior teeth was considered and an interim partial denture was delivered. The patient was also explained about various rehabilitative procedures for congenital lip defect. On positive reinforcement, the

**Khushboo Singh,
Nayana Prabhu,
Dhanasekar
Balkrishnan,
Aparna I. Narayana,
S. Pradeep**

*Department of Prosthodontics
and Crown and Bridge, Manipal
College of Dental Sciences,
MAHE, Manipal, Karnataka,
India*

Address for correspondence:
Dr. Nayana Prabhu,
Department of Prosthodontics
and Crown and Bridge, Manipal
College of Dental Sciences,
MAHE, Manipal - 576 104,
Karnataka, India.
E-mail: dr.mpnayana@gmail.
com

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patient recognized the importance of a comprehensive prosthesis and consented for the same. To improve the cosmetic appearance, a magnet-retained silicone lip prosthesis with cast partial denture was designed.

A preliminary impression of the maxillary and mandibular arch was made in irreversible hydrocolloid (Alginate, DPI, New Delhi, India), and facial impression of the lower third of the face that involved the upper lip defect was made with polysulfide impression material (Reposil, Dentsply India Pvt. Ltd.). The preliminary and lower facial impression cast was poured with type III dental stone (Goldstone, Asian Chemicals, Rajkot, India) [Figure 3].

Intraoral maxillary cast was surveyed, and cast partial denture with the retentive elements was designed to achieve more stable and retentive silicone prosthesis. The entire framework was casted using cobalt–chromium alloy (Remanium®, DENTAURUM GmbH and Co. KG, Ispringen, Deutschland) and try-in was performed. Teeth arrangement was done, and the cast partial denture was processed with heat-cured acrylic resin (Trevalon, Dentsply India Pvt. Ltd. Gurgaon) [Figure 4].

Extraoral master cast obtained was sculpted with wax pattern anatomically [Figure 5]. Marginal fit of the contoured wax pattern was then evaluated on the patient's face. The wax trial prosthesis along with the master cast was flaked. The biomedical-grade silicone (SILASTIC MDX4-4210, Dow Corning India Pvt. Ltd.) was shade matched with intrinsic colorants to the adjacent skin [Figure 6]. The colored silicone was packed in the dewaxed mold and processed based on the manufacturer's instructions. After the prosthesis was retrieved, extrinsic coloration was coated to merge it esthetically with the patient's skin color.

The tissue surface of the silicone prosthesis was affixed with (1.5 mm width) an autopolymerizing clear acrylic resin substructure (Rapid Repair Powder, Dentsply India Pvt. Ltd.). This substructure served as a base to house the retentive magnets (cobalt–samarium, Ambica Co., New Delhi, India). Perforations measuring approximately 2 mm were created on the substructure to serve the purpose of retaining overlaying silicone material [Figure 7]. The counterpart magnet was guided and centered on the cast partial denture labially and bonded with autopolymerizing acrylic resin (Rapid Repair Powder, Dentsply India Pvt.



Figure 1: Frontal facial view



Figure 2: Pretreatment intraoral view



Figure 3: Master cast of the face



Figure 4: Cast partial denture insertion

Ltd.) [Figure 8]. The whole assembly of extraoral and intraoral prosthesis was then positioned at the cleft lip defect [Figure 9]. By means of retentive magnet, lip prosthesis supported by the cast partial denture was delivered to the patient [Figure 10]. A skin biomedical-grade adhesive (MG 7-1010, Dow Corning®, India Pvt. Ltd.) was applied to form a better seal of the thin margin of the silicone with the adjacent skin.

At the delivery appointment, postoperative instructions with the removal and wear of the prosthesis were explained. The prosthesis marginal fit was enhanced after application of silicone skin adhesive. The patient experienced better magnetic retention, but reduced smile as the maxillary lip defect was small; hence, the prosthesis coverage provided limited movements on the skin. The patient was made well aware of the initial discomfort and maintenance and hence recalled for routine follow-up at 1 week, 1 month, and 6 months.

Discussion

Facial malformation can cause a profound impact on the psyche of an individual. The patient showed unwillingness

for conventional surgical reconstruction due to financial constraints and favored prosthodontic restoration. Among various maxillofacial materials available, biomedical-grade silicone prosthesis was the choice. Long term usability of this material has shown safe, repairable, absence of cytotoxic effects and satisfactory result in the past. However, it requires frequent replacement because coloring agents undergo changes.^[6]

Lips are in constant range of motion, and the movement of adjacent tissue bed creates discrepancy in the marginal fit of the prosthesis above the defect.^[7] Various methods of retention include tissue undercuts, adhesives, mechanical devices, and osseointegrated implants. Retentive elements beyond what conventional adhesives offer are often required.^[4]

Several methods of retention for the lip prosthesis have been reported in the literature. Birnbach and Herman explained intraoral and extraoral devices to restore functionally orofacial cancer patients.^[8] Cheng *et al.* restored a defect of mandibular lip with retentive components attached to anterior mandibular teeth.^[9] Oki



Figure 5: Sculpting of the wax pattern



Figure 6: Silicone shade matching



Figure 7: Substructure with magnet

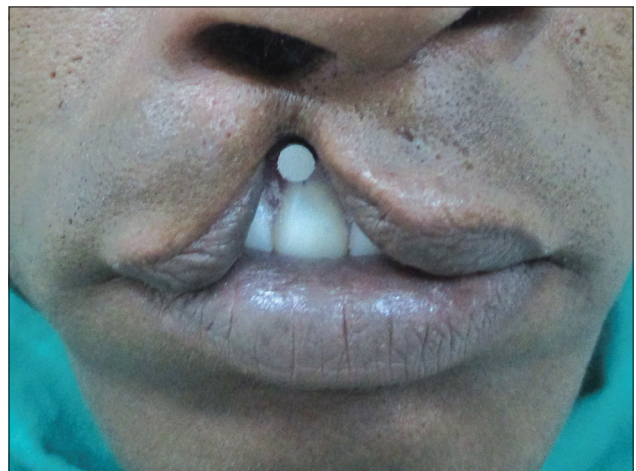


Figure 8: Counterpart magnet embedded labially



Figure 9: Extraoral view of the prosthesis

et al. described a case report, where mechanical retention for the obturator prosthesis was obtained through ball attachments.^[7] Zeno *et al.* described combination mandibular lip prosthesis retained by two Micro-ERA attachments as an intraoral component.^[10] Rao *et al.* designed a magnet-retained lip prosthesis with maxillary removable partial denture.^[11]

Technique of retention in combined extraoral and intraoral defects depends on the connection between the extraoral and intraoral prosthesis. Cast partial denture fabricated served the purpose of successful retention for the missing teeth and the cobalt–samarium magnets incorporated to it had provided additional mechanical retention for the silicone prosthesis. Advantages of magnets include ease of cleaning, ease of placement, automatic reseating, and constant retention of the prosthesis.^[12] Magnets have the disadvantages of low corrosion resistance and possible cytotoxic effects, which may limit their use in the oral cavity, but studies have revealed that no such tissue-damaging effects have been observed clinically for cobalt–samarium magnets.^[5]

Skin adhesive silicone majorly enhanced adhesion for extended periods. Because the defect was small, the patient was overall comfortable with the use of biomedical-grade silicone prosthesis because of its lifelike effect, soft texture, lightweight, and biocompatibility. With this treatment, the patient perception of comfort and esthetics was also appreciated. Thus, customized retention was obtained with the magnets which resolved the functional demand of the prosthesis whereas the silicone material fulfilled the esthetic needs of the patient.

Conclusion

Cosmetic disfigurement poses inherent challenges in planning the prosthesis for maxillofacial defect. The prosthetic rehabilitation of congenital cleft lip with a magnet-retained lip prosthesis supported by a cast partial



Figure 10: Insertion of cast partial denture-retained lip prosthesis

denture has been described. The goal accomplished was, along with the restoration of esthetics, the lips were competent with adequate magnetic retention offered to the prosthesis.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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