An Alternative Method for Constructing an Obturator Prosthesis for a Patient with a Bilateral Cleft Lip and Palate: A Clinical Report

HASAN ÖNDER GÜMÜŞ, DDS, PHD*
SÜLEYMAN HAKAN TUNA, DDS, PHD†

ABSTRACT

The design of esthetic and effective dental prostheses for bilateral 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 esthetic appearance, and achieving the general satisfaction of the patient. The framework design of the obturator prosthesis is of great strategic importance for patients with a cleft lip and palate. The reduction in the mass of the obturator prosthesis increases stabilization and retention and also contributes to an easier adaptation to the prosthetic restoration. In this report, a 22-year-old woman was successfully treated with a fixed partial denture and a bar-retained obturator with palatal coverage.

CLINICAL SIGNIFICANCE

The design of an obturator prosthesis for cleft lip and palate patients is an important stage in terms of ensuring esthetic restoration and patient comfort. This article describes an esthetic and functional design for such a device using a fixed partial denture and a bar-retained obturator.

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INTRODUCTION

The cleft lip and palate represents the second most frequently occurring congenital deformity, after clubfoot deformity.[1] Although cleft palate patients are not regularly seen in general dental practice, the number of such patients is not negligible. This deformity is associated with many problems, including cosmetic deformities, dental abnormalities, and difficulties in speech and swallowing.[1]

Recently, many patients have benefited from alveolar bone grafting and orthodontic realignment and required little or no prosthodontic treatment.[2] However, prosthetic treatment still plays an important role in cleft treatment.[3] Therefore, patients who have not received grafting and orthodontic realignment present the greatest prosthodontic challenge.[2]

The treatment of patients with a cleft lip and palate presents psychosocial problems as well as technical challenges. It has been observed that patients with congenital craniofacial defects often feel more positive about themselves after prosthetic treatment.[4] Patients with a bilateral cleft lip and palate

*Lecturer, Department of Prosthodontics, University of Erciyes, Kayseri, Turkey
†Research assistant, Department of Prosthodontics, University of Süleyman Demirel, Isparta, Turkey

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Figure 1. Initial clinical situation. Intraoral labial view.

Figure 2. Initial clinical situation. Intraoral palatal view.

(BCLP) have premaxillary displacement in three dimensions. As a result of intrinsic anatomical aberrations, such as the absence of alveolar and palatal hard and soft tissue or contraction resulting from previous surgical repair, orthodontic and facial orthopedic treatment alone sometimes fail to resolve the problem.[5]

After cleft palate surgery, a residual oronasal communication may occur on the palate, in the alveolar ridge or labial vestibule. A palatal obturator covers the opening and contributes to normal speech production, thereby eliminating hypernasality, and assists speech therapy for the correction of compensatory articulations.[3] Complete obturation is required during swallowing and production of all consonants except for nasal ones. The reduction of the mass of the obturator prosthesis increases stability and retention as well as contributes to an easier adaptation process to the prosthetic restoration.

In this clinical report, the issue of esthetics was resolved with a fixed partial denture (FPD). The residual oronasal communication defect was covered with a bar-retained obturator prosthesis encircling only the defect area. Such a treatment approach not only provides good esthetics and prevents food and liquid leakage into the nose but also improves speech intelligibility by ensuring palatal obturation, which is more acceptable for the patient because of less coverage.

CASE PRESENTATION

A 22-year-old woman with a surgically treated BCLP was examined at the Department of Prosthodontics under the Faculty of Dentistry at Hacettepe University. The examination revealed a $16 \times 16 \times 12$-mm triangular palatal defect, through which food filled the nasal cavity during eating. The missing teeth and maxillary deficiency had adverse effects on the patient's chewing abilities, appearance, and ability to speak intelligibly. The maxillary left and right lateral incisors were missing (Figures 1 and 2). Radiographic analysis displayed no bone loss around the abutment teeth.

The technique used for the alignment of the premaxilla and the final impression was one previously described by Tuna and colleagues.[6] A metal framework for the FPD was adjusted between the first premolars (Figure 3). A bar attachment was modulated in the border of the defect and casted. Then, the metal framework and the bar were soldered, and the FPD was completed. A block-out was made for the bar-retained obturator framework (Figure 4). The obturator framework encircling the defect area was waxed (Figure 5) and casted. The areas that could cause mucosal irritation were finished up with

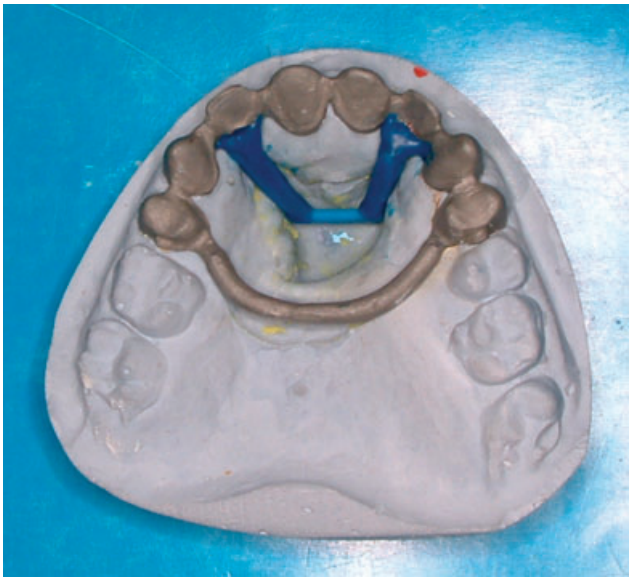

Figure 3. Metal framework for the fixed partial denture.

Figure 4. Block-out for the obturator framework.

Figure 5. Waxing for the obturator framework on a refractory model.

Figure 6. Final fixed partial denture and completed obturator prosthesis with heat-cured acrylic resin.

heat-cured acrylic resin (Paladent, Heraeus Kulzer GmbH, Hanau, Germany) (Figure 6), and the obturator was lightened. After the cementation of the FPD (Figure 7), the obturator was adjusted and delivered (Figures 8 and 9). The importance of adequate oral health and hygiene was emphasized to the patient. The patient was also taught about the correct use of an interdental brush, dental floss, and single tufted brush. In our case, the patient was invited for controls every 6 months over 3 years, and it was observed that there was no loss in retention in neither the FPD nor the obturator.

DISCUSSION

Surgical repair in early life and subsequent orthodontic treatment are regarded as powerful determinants of the type and extent of

Figure 7. Luted fixed partial denture with bar attachment. Intraoral view.

Figure 8. Intraoral palatal view showing the obturator.

Figure 9. Intraoral frontal view of the prosthesis.

prosthodontic treatment that will be required.[7] The bone graft restores the contours of the alveolar process, facilitates the closure of oronasal fistulae, and stabilizes the premaxilla segments. In this manner, a continuous arch is achieved. When timed properly (i.e., prior to canine eruption) a secondary osteoplasty facilitates the eruption of teeth adjacent to the cleft through the transplant.[1] The indications and timing of premaxillary surgery in patients with BCLP are crucial for success.[5,8] The orthodontic movement of the maxillary segments were found to contribute to late postoperative fistula formation.[9] In adulthood, the task of a prosthodontist is to restore lost teeth and parts of the alveolar ridge to achieve full function and esthetics as well as alleviate any deformities as much as possible.[10]

A removable dental prosthesis is most often used as a temporary form of tooth replacement. Although it certainly helps appearance, a portion of the prosthesis must rest on soft tissue and may cause irritation. The prosthesis may also move during use. Moreover, the fact that it is removable accentuates its artificial character, to the displeasure of patients. It is used only as a definitive means of tooth replacement in which multiple teeth are missing and the edentulous space is too large to be spanned by a fixed restoration.[3]

Replacing anterior teeth with a nonremovable appliance is traditionally done by means of a conventional or adhesive bridge. The FPD is attached to the teeth on either side of the edentulous space to provide a more natural tooth replacement. If the abutment teeth need no other restoration, then a resin-bonded FPD will suffice. This is a conservative restoration that requires very little tooth preparation, yielding excellent appearance and function. As the metal tabs may loosen over extended periods of time, this type of restoration is not recommended as a definitive

treatment for adults. Micromovement in the former premaxilla segments or the hypermobility of abutment teeth may cause loosening and compromise the endurance of an adhesive bridge.[1] If the patient has not undergone any bone grafting, an FPD can still be fabricated, but this may call for at least two abutments in each of the cleft segments. These extensive FPDs are not recommended, especially for young patients, as any movement of the cleft segments will lead to the disruption of the cement seal around the abutments of the FPD. This could lead to an increase in the propensity of recurrent caries under the FPD and the potential failure of the FPD.[11]

The impression procedure is an important and challenging step in treating adult BCLP patients with FPDs. With these patients, if the mobility of the anterior segment is neglected, the final esthetic success may be compromised.[6] Therefore, the premaxilla must be positioned in as esthetically pleasing a position as possible within physiological limitations. In this study, this was achieved by fixing the plastic bars between provisional acrylic restorations.

The formulation of a design for a removable partial denture framework must be approached in a logical, organized fashion, whether the framework is conventional or designed to support an obturator.[12] By decreasing the weight of the prosthesis, the retention and stability may be optimized to allow the obturator to function comfortably during mastication, phonation, and deglutition.[13] When constructing the major connectors, the patient's comfort must be taken into consideration.[14] If the size of the major connector decreases during speech, mastication, and in the resting position, the patient's comfort will increase.[15,16] Also, less soft tissue covered means that the soft tissue will be healthier with better hygiene.[17]

A well-planned prosthetic treatment will result in satisfactory function and esthetics, alleviating deformities. However, it is essential that patients take responsibility for maintaining their own oral health.

DISCLOSURE

The authors do not have any financial interest in the companies whose materials are included in this article.

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Reprint requests: Hasan Önder Gümüş, Erciyes Üniversitesi, Diş Hekimliği Fakültesi, Protetik Diş Tedavisi AD, Melikgazi, Kayseri, Turkey. Tel.: +9003524374937; Fax: +9003524380657; e-mail: ondergumus@yahoo.com