

Rehabilitation of a Unilateral Cleft Palate with Endosseous Implants in an Edentulous Elderly Patient

Abstract

The objective was to describe the use of a maxillary obturator supported by dental implants and ball abutments in an adult edentulous unilateral cleft patient. Adult edentulous cleft patients who have had no corrective surgeries or failed attempts at cleft repair in childhood suffer from oronasal communication resulting in hypernasal speech, dysphagia, and compromised masticatory ability. Tissue-supported obturator prostheses in such patients provide for compromised function due to instability and lack of retention. The treatment using fibromucosal-supported obturators is well established in the literature; few articles have also described osseointegrated implants supporting the prosthesis in adult cleft patients supported by bar attachments and magnets; however, reports of implant-supported maxillary obturators retained by ball/stud attachments are scarce. The implants provided retention and stability to the prosthesis, simplifying the laboratory procedure using ball abutments, improving swallowing, speech, and the patient's general quality of life. This article reports the rehabilitation of an adult cleft palate patient with a totally edentulous maxilla using an implant-retained prosthesis.

Keywords: *Adult cleft palate, ball abutments, cleft palate prosthesis, dental implants, implant-supported dental prosthesis*

Introduction

Most of the children born with cleft lip and cleft palate are treated in their early months to early years given the impaired feeding abilities and facial malformation. In the developing countries, however, because of the lack of awareness and access to corrective surgical facilities, it is not rare to find adults in their 30s or 40s suffering from unattended clefts of the lip or the palate. A multidisciplinary and holistic approach is required to treat such adult patients. It is, however, very rare to find completely edentulous geriatric patients suffering from the clefts of the palate, and such cases pose unique challenges and require rehabilitation that demands changes in the approach, technique, and philosophy.

The growth and deformities of the facial bones in a cleft lip and palate patient are uniquely affected by failure of fusion of bones and matrix due to cleft starting from embryonic phase to complete growth. As expected, the facial bones have a normal potential to grow, though malpositioned

in cleft patients. Growth disturbances, especially midface retrusion, in cleft lip and palate patients following surgical treatment are a common finding.^[1,2] Many details have been written in literature about the growth of the facial skeleton in unoperated cleft lip and palate patients. Studies on unoperated adult cleft patients showed that majority of them have normal growth potential without any maxillary retrusion and actual protrusion of the maxilla on the noncleft side. The protrusion of the maxilla on the noncleft side in unilateral cleft lip and premaxilla in bilateral cleft lip is mainly because of the absence of normal lip musculature and their forces. In addition, tongue positioning itself into cleft rotates the alveolus with teeth into a more anterior, superior, and lateral position. It has shown normal SNA, SNB, and ANB angles in an unoperated cleft individual as compared to normal control group.^[3]

Rehabilitative techniques in adult cases include placement of a prosthetic obturator, restoration by local and regional flaps, and restoration by microvascular free flaps.^[4] Edentulous patients requiring prosthetic rehabilitation pose particular

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

**Sudhir
Narayanraopeta,
Hari Kumar
Vemisetty¹,
Taruna Marri²,
Priyanka Konda²**

*Department of Prosthodontics,
Division of Implantology,
Kamineni Institute of Dental
Sciences, ¹Department of
Conservative Dentistry
and Endodontics and
²Prosthodontics, Kamineni
Institute of Dental Sciences,
Nalgonda, Telangana, India*

Submitted : 15-Mar-2019

Revised : 04-Jun-2020

Accepted : 26-Jun-2020

Published : 26-Nov-2020

Address for correspondence:

*Dr. Sudhir Narayanraopeta,
Department of Prosthodontics,
Kamineni Institute
of Dental Sciences,
Sreepuram, Narketpally,
Nalgonda - 508 254, Telangana,
India.*

*E-mail: dr_sudheer_aiims@
yahoo.com*

Access this article online

Website:

www.contempclindent.org

DOI: 10.4103/ccd.ccd_193_19

Quick Response Code:



How to cite this article: Narayanraopeta S, Vemisetty HK, Marri T, Konda P. Rehabilitation of a unilateral cleft palate with endosseous implants in an edentulous elderly patient. *Contemp Clin Dent* 2020;11:285-9.



Figure 1: Facial photograph of the edentulous cleft palate patient with lost vertical dimension



Figure 2: Cleft involving hard and soft palate (Veau's Group 2 classification) with soft-tissue bands extending across the midline

challenges, especially as the anchoring abutments in the form of natural teeth are absent and the soft-tissue support offers only compromised retention and function. In such cases, implant-supported prostheses can provide the necessary denture retention and stability with considerable improvement in their quality of life. The main aim of the maxillofacial prosthodontist is to achieve normal orofacial appearance as well as to restore masticatory function. To retain conventional dentures, two implants can be placed on either side of the jaw. The dental implants must be parallel, otherwise the divergent paths of insertion of the retaining elements will hinder engagement of the prosthesis. This creates difficulties when the cleft runs wide in the maxilla and insufficient bone remains to support a correctly oriented dental implant.^[5] While such cases can be rehabilitated by implant-supported prosthesis retained by magnets or bar and clip attachments, they add to the laboratory procedures and escalate the costs. The magnets are also subject to corrosion in the oral atmosphere. This case report demonstrates the successful fabrication of an implant-retained obturator with ball and socket attachments in a geriatric patient with a cleft palate.

Case Report

A 72-year-old patient reported to our department with the chief complaint of ill-fitting complete dentures and impaired function of speech and mastication [Figure 1]. Clinical examination revealed a complete cleft palate including the soft palate (Veau's Group 2) with signs of attempted repair and soft-tissue bands extending across the midpalatal region [Figure 2]. The patient was completely edentulous with ill-fitting maxillary obturator and mandibular complete denture. The patient was willfully retaining the maxillary obturator by pressing it against the hard palate with his tongue as there was no means of primary retention. Clinical assessment of the prostheses revealed a decrease in the vertical dimension with wearing off of the prosthetic teeth and compromised retention and stability. A detailed dental

history revealed that the patient was born with a cleft lip and cleft palate and had no family history of cleft. Surgical repair of the cleft lip was done at the age of 1½ years, and because of the unavailability of advanced surgical care in his village and also for lack of medical knowledge and motivation from his family, the cleft palate repair was not attempted till he was 26 years old. The cleft palate repair, however, was unsuccessful in the three attempts that followed in the next 2 years. From the age of 40–58 years, he was losing his teeth to caries and periodontal disease and wore Removable Partial Denture (RPDs). At the age of 60 years, he became completely edentulous and was given removable complete dentures. However, he revealed that he always suffered from poor retention of the dentures with nasal regurgitation.

After evaluating the case clinically and radiologically through an Orthopantomogram (OPG) and a cone-beam computed tomography (CBCT) scan, the patient was counseled about the various treatment options available including implant-supported rehabilitation. The patient was averse to any extensive surgery to repair the cleft in the maxilla and requested conservative and cost-effective rehabilitation. The patient was, therefore, assessed for an implant-retained maxillary obturator with ball abutments and a tissue-supported mandibular complete denture. Patient was informed about the treatment plan and consent was taken.

The CBCT scan revealed a wide alveolar defect involving almost the entire premaxillary segment of the maxillae. However, adequate width and height of the alveolar bone was found along the premolar–molar region of the edentulous ridge [Figure 3a and b].

A quadrilateral distribution for the implant placement was decided after evaluating the CBCT data of the patient. This served for better biomechanics in the distribution of stress from the prosthetic superstructure and an even distribution

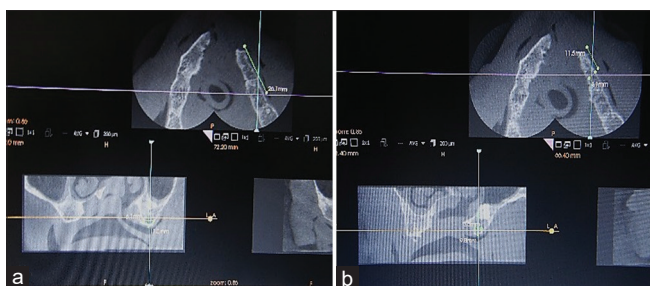


Figure 3: (a and b) Cone-beam computed tomography scan showing a wide alveolar defect involving almost the entire premaxillary segment of the maxillae

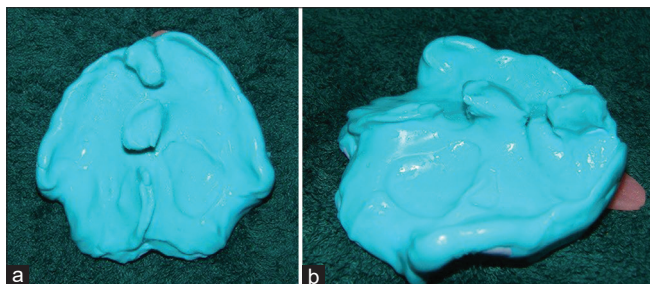


Figure 4: (a and b) Impression of the maxillary defect made in polyvinyl siloxane, 4 weeks after the soft tissue healed

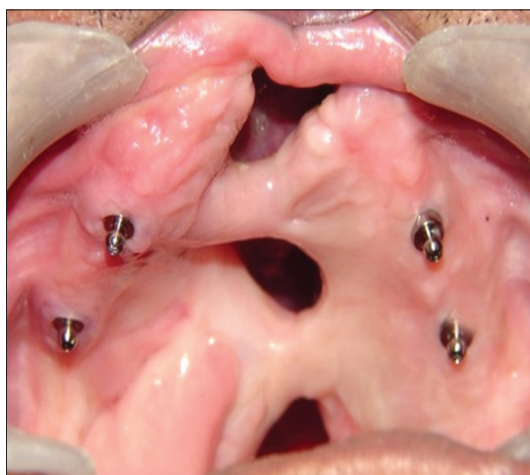


Figure 5: Six months from the implant placement, ball abutments were placed after exposure

of support both from the implants and the tissue for the obturator.^[6] Four implants, two on each side, were planned. Anteriorly along the second premolar region, on each side, a 4.2 mm × 11.5 mm implant (Touareg-S, ADIN, Israel) was placed, and posteriorly along the second-third molar region, on each side, a 5.0 mm × 10 mm (Touareg-S, ADIN, Israel) implant was placed. Care was taken to surgically place the implants relatively parallel to each other.

Four weeks later, after the soft tissue healed, impressions of the maxilla and the mandible were made in polyvinyl siloxane [Figure 4a and b], jaw relations were recorded, and the maxillary obturator and a mandibular complete denture were fabricated after a try-in inside the patient's

mouth. Six months from the implant placement, osseointegration was confirmed using a radio frequency analyzing device (Penguin Radio Frequency Analysis (RFA) [Aseptico, USA]). The Implant Stability Quotient (ISQ) values recorded were >75. Ball abutments were placed on the implants after the exposure [Figure 5]. Metal housings with the resilient nylon retainers were inserted onto the ball ends. Marking paste was used on the housings to locate the areas which had to be relieved on the maxillary obturator/complete denture to accommodate the housings. A chairside pickup of the housings was then made with autopolymerizing resin (DPI, Mumbai, India) to incorporate the housings within the intaglio surface of the maxillary obturator [Figure 6]. After confirming the setting of the autopolymerizing resin, the obturator along with the incorporated metal housings was retrieved, finished, and polished. The patient was given instructions and trained to place and remove the prosthesis over the ball abutments and was maintained on a recall schedule [Figure 7].

Discussion

In children with cleft palate, the rehabilitation is directed toward providing acceptable speech/phonetics, appearance, and proper occlusion with satisfactory masticatory function. Such rehabilitation requires a highly specialized multidisciplinary approach with phased and synchronized treatment procedures. The management of cleft palate patients is initiated in early infancy and continues until the late teens or early adulthood.^[7,8] Dental specialists such as oral and maxillofacial surgeons and orthodontists start contributing to the treatment of cleft palate patients at an early age. In most cases, prosthetic rehabilitation is required at various stages to restore the missing teeth. The timing and success of early surgical procedures eventually determine the quantum of prosthodontic treatment that may be required later. There are few reports in the literature concerning the treatment of unrepaired cleft palate in adults, particularly in recent years due to early intervention and proper management.^[9,10]

Prosthetic rehabilitation of adult patients suffering from unrepaired cleft palate poses a formidable challenge to the restorative dentist, especially when the patient reports with complete loss of the teeth. In such cases, removable obturator dentures are a relatively easy treatment option. However, relying on the tissue undercuts and the irregular border seal along the oronasal defect for retention and stability compromises the function of the prosthesis given its massive contours and weight.

The introduction of dental implants improved prosthesis retention, stability, and occlusal function in many patients, such as those with acquired and/or congenital defects (trauma, malignant tumors, and cleft palate).^[11-13] The nature and extent of the defect and therefore the quantity and quality of the remaining maxillary alveolar bone in cleft palate patients dictates the number of



Figure 6: Chairside pickup of the housings with autopolymerizing resin to incorporate the housings within the intaglio surface of the maxillary obturator

implants that can be placed and also the design and planning of the superstructure. Most standard protocols in implant dentistry suggest a healing period of 3 months for the mandible and 6 months for the maxilla.^[14] In few cases, surgical repair of the cleft palate along with bone grafting and bone augmentation improves the available bone for the implant recipient site. In other cases where this is not possible, an overdenture supported by fewer implants is indicated. In cases where the posterior maxilla provides better bone support compared with the anterior region, as in this cleft palate defect case, parallel placement of two separate bars supported by dental implants could be used to the left and right posterior maxillary regions.^[15] Harrison^[16] reported the placement of four implants (two per side) into the posterior maxillae to stabilize and retain a complete maxillary overdenture. The healthy segments of the maxillae were preferred to place the implants, which provided better stability for prosthetic loading. This way, the definitive prosthesis could also gain additional support, retention, and stability from the residual soft and hard tissues.^[17]

Few cases have been reported where first, surgical repair of the cleft palate was made, and subsequently, implant-retained fixed dentures or overdentures have been given in adult cleft palate patients between the age of 60 and 70 years.^[18] These reported cases have used either bar attachments or magnets supported by the implants to retain the definitive obturator. The present case is relatively unique for two reasons. One, the 72-year-old patient with a cleft palate was unwilling for any surgical corrective measures, and two, he demanded a simple and cost-effective solution with implants. The bar and clip attachments and the magnets, like in the earlier reported cases, require elaborate laboratory planning, design and fabrication of the supporting metal framework, and extended costs therein. Ball end attachments with a chairside pickup of the housings,



Figure 7: The patient with the obturator *in situ* and the restored vertical dimension

as in the present case, offer a relatively easier and economical means of an implant-supported obturator. This is, however, possible only in cases where relative parallelism between the implants can be achieved during surgical placement.

Conclusions

With increase in awareness about the cleft lip and palate and the availability of medical and surgical care, suffering from the clefts into the late adulthood is almost rare today. Obturators or removable dentures provide for a prosthetic solution for adults who suffer from cleft palate. They provide good esthetics, phonetics, and mastication but also suffer from compromised retention and stability. With the inclusion of endosseous dental implants, the vista of care for such adult patients has improved and made rehabilitation more predictable and comfortable. This provides the patients' greater self-confidence and improves their quality of life. In the present case, a geriatric patient with a cleft palate was rehabilitated with an implant-supported overdenture retained by ball abutments with a chairside pickup of the housings. This offers a relatively easier and economical means of an implant-supported obturator.

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.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Ortiz-Monasterio F, Olmedo A, Trigos I, Yudovich M, Velazquez M, Fuente-del-Campo A. Final results from the delayed treatment of patients with cleft of the lip and palate. *Scan J Plast Reconstr Surg* 1974;8:109-15.
2. Ortiz-Monasterio F, Serrano R, Barrera GP, Rodriguez-Hoffman H, Vinageras E. A study of untreated adult cleft patients. *Plas Recon Surg* 1966;38:37-41.
3. Shetye PR. Facial growth of adults with unoperated clefts. *Clin Plast Surg* 2004;31:361-71.
4. Schmidt BL, Pogrel MA, Young CW, Sharma A. Reconstruction of extensive maxillary defects using zygomatic implants. *J Oral Maxillofac Surg* 2004;62:82-9.
5. Shor A, Brudvik JS, Rubenstein J. Design and technical aspects in the construction of an implant-supported cleft palate obturator. *Quintessence Dent Technol* 2004;27:202-12.
6. ELSyad MA, Elsaadawy MG, Abdou AM, Habib AA. Effect of different implant positions on strain developed around four implants supporting a mandibular overdenture with rigid telescopic copings. *Quintessence Int* 2013;44:679-86.
7. Berkowitz S. Team management: Concern for the whole child. In: *Cleft Lip and Palate. Perspectives and Management*. Vol. 1. San Diego, CA: Logopedics Phoniatrics Vocology; 1996. p. 1-5.
8. Strauss RP. The treatment of children with major craniofacial deformities: Ethical and health policy issues. In: Berkowitz S, editor. *Cleft Lip and Palate. Perspectives and Management*. Vol. 2. San Diego, CA: Logopedics Phoniatrics Vocology; 1996. p. 299-05.
9. Ronchi P, Chiapasco M, Frattini D. Endosseous implants for prosthetic rehabilitation in bone grafted alveolar clefts. *J Craniomaxillofac Surg* 1995;23:382-6.
10. Pham AV, Abarca M, De Mey A, Malevez C. Rehabilitation of a patient with cleft lip and palate with an extremely edentulous atrophied posterior maxilla using zygomatic implants: Case report. *Cleft Palate Craniofac J* 2004;41:571-4.
11. Lefkove MD, Matheny B, Silverstein L. Implant prosthodontic procedures for a completely edentulous patient with cleft palate. *J Oral Implantol* 1994;20:82-7.
12. Trakas T, Michalakis K, Kang K, Hirayama H. Attachment systems for implant retained overdentures: A literature review. *Implant Dent* 2006;15:24-34.
13. Mericske-Stern R, Perren R, Raveh J. Life table analysis and clinical evaluation of oral implants supporting prostheses after resection of malignant tumors. *Int J Oral Maxillofac Implants* 1999;14:673-80.
14. Turkyilmaz I, Avci M, Kuran S, Ozbek EN. A 4-year prospective clinical and radiological study of maxillary dental implants supporting single-tooth crowns using early and delayed loading protocols. *Clin Implant Dent Relat Res* 2007;9:222-7.
15. Mericske-Stern RD, Taylor TD, Belser U. Management of the edentulous patient. *Clin Oral Implants Res* 2000;11 Suppl 1:108-25.
16. Harrison JW. Dental implants to rehabilitate a patient with an unrepaired complete cleft of the hard and soft palate: A clinical report. *Cleft Palate Craniofac J* 1992;29:485-8.
17. Eckert SE, Carr AB. Implant-retained maxillary overdentures. *Dent Clin North Am* 2004;48:585-601, v.
18. Güven O, Gürbüz A, Baltali E, Yilmaz B, Hatipoğlu M. Surgical and prosthetic rehabilitation of edentulous adult cleft palate patients by dental implants. *J Craniofac Surg* 2010;21:1538-41.