Technique for fabrication of interim closed hollow bulb obturator in a patient with Class II Aramany's defect

David Charles P*,AnushaRajendran,VidyashreeNandini. V+, CholanRamanujam***

*Senior Lecturer, ** Postgraduate student,+ Professor and Head

Department of Prosthodontics and oral Implantology,

SRM Kattankulathur Dental College and Hospital,

Kancheepuram District,

Tamil Nadu, India

Abstract:

Maxillary defects are prosthetically rehabilitated with obturators which prevent the oro-nasal communication, better speech and deglutition possible. Hollow bulb obturator has the advantage of being light weight and also provides resonance for speech. This article describes a technique for fabrication of an interim acrylic hollow bulb obturator for a patient with class II aramany maxillary defect. The prosthesis is entirely made of heat cure acrylic resin and uniform space is maintained in the bulb portion with the help of custom ice used.

Introduction:

Defects of the maxilla can be congenital or acquired. Acquired defects occur due to trauma, from road traffic accident, gun-shot wound or, surgical resection of the maxilla due to carcinoma. Patients with maxillary defects have problems associated with speech, swallowing and eating due to the presence of oro-nasal communication. Prosthodontic treatment mainly involves separation of the oral and nasal cavities by means of an obturator to prevent the communication, speech, deglutition[1,2].

"An obturator is defined as a maxillofacial prosthesis that replaces part or all of the maxilla and associated teeth lostdue to surgery or trauma" (GPT-8)[3]. It is of three types: surgical, intermediate and definitive obturator. The definitive obturator can be made hollow in-order to reduce the weight of the prosthesis. Hollow bulb obturator can be of open or closed type. The closed type is advantageous over the open type which tends to accumulate nasal secretions and needs frequent cleaning. The advantage of hollow bulb obturator is the light weight of the prosthesis, which will prevent the dislodgement of the maxillary prosthesis against gravity, better patient comfort[4,5].

Various techniques have been proposed by authors for fabrication of hollow bulb obturator[6-46]. Schneider used crushed ice to create a matrix inside the bulb to maintain the hollowness during processing[14].Matalon and Parel used sugar whereas Srinivasan et al used lost salt technique for the fabrication of hollow bulb obturator[11,15,41].Other materials were also incorporated to create the

hollowness. Chalianused an acrylic resin shim in the defect area whereas Tanakaet al incorporated polyurethane foam[9,12].

This article describes a techniquefor fabrication of a closed hollow bulbobturator processed using a single flask with double body pour technique and custom freezed ice for fabrication of the bulb portion.

Case report:

A 63 year old male patient reported to the department with the complaint of loose maxillary obturator. History revealed that the patient underwent surgical resection of the maxilla in the right posterior quadrant 6 months before due to oral squamous cell carcinoma. The patient hadAramany'sclass II maxillary defect[47]. Patient was planned for an interim acrylic hollow bulb obturator until the complete healing of the defect. Impression was recorded using irreversible hydrocolloid impression material (Algitex, DPI). Cast was poured with type III dental stone (Fig. 1). Bite registration was done and wax try in was done. Retentive clasps were given in 13, 25, 26 in the trial denture.

Technique:

Flasking and processing was done in two stages but with the same master cast.

1. For the fabrication of the bulb portion, addition silicone Putty (Aquasil, Dentsply) was adapted to the walls of the defect and it was also used to block the tooth portion of the master cast (Fig.2).

BLOCKING OF THE TEETH PORTION WITH PUTTY

2. Flasking of this blocked out master cast was done in the base of the flask with Type II dental plaster and the body pour of the flasking was completed in a routine manner after applying separating medium (Cold mold seal, DPI).
3. Once the plaster was set, the flask was opened and the putty adapted to the walls of the defect was removed.
4. Separating medium was applied on both the halves of the flask and allowed to dry. The flask was packed with heat cure acrylic resin (Heat cure acrylic, DPI) and processing of the bulb portion was done.

5. After processing, the bulb portion was carefully retrieved from the master cast without breaking it from the base pour of the flask(Fig. 3). The bulb portion was filled with water and freezed in a refrigerator.

PROCESSED BULB PORTION

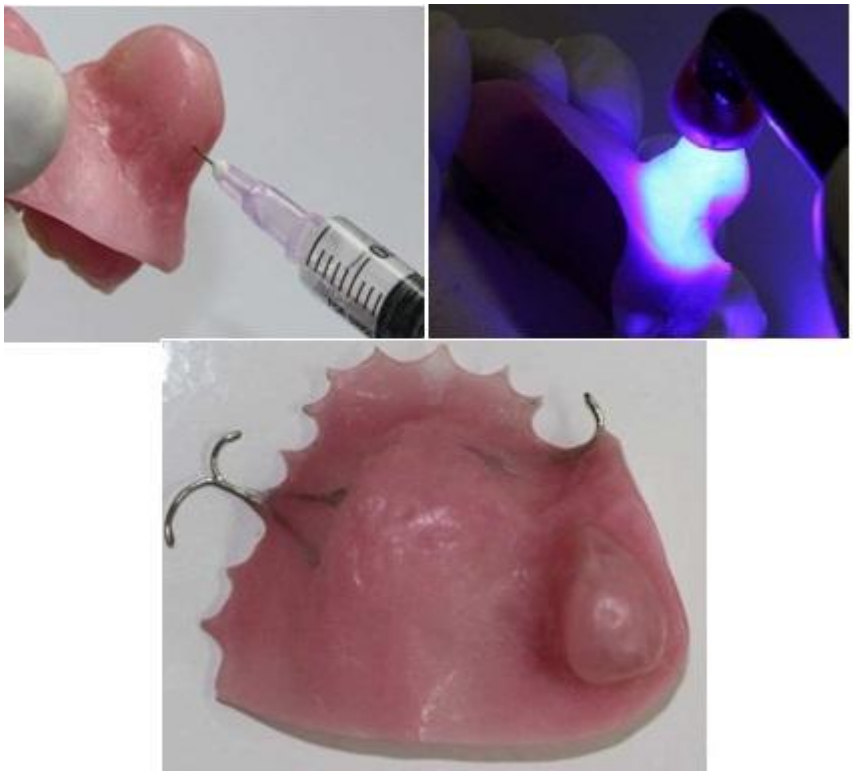
6. The trial denture was placed back on the master cast in the base pour of the flask and fused to the cast (Fig. 4). After applying separating medium to the base pour, the second pour was carried out and flasking was completed.

FLASKING OF TRIAL DENTURE

7. After dewaxing, just before packing of the heat cure resin, the bulb portion with the freezed ice was placed back in the defect (Fig. 5). The prosthesis was processed, finished and polished.

BULB WITH_ICE PLACED BACK IN THE DEFECT

8. The removal of water from the melted ice in the bulb portion was done with the help of a syringe after which the hole was closed with visible light cure resin (Fig. 6).



REMOVAL OF WATER WITH SYRINGE AND THE HOLE SEALED WITH LIGHT CURE ACRYLIC

Discussion:

Acquired defects of the maxilla are prosthetically managed with obturators. Hollow bulb obturators are preferred because of decreased weightand better speech by adding resonance to the voice. Decreasing the weight may result in increased retention, better patient acceptability and comfort. Wu in his study found that hollow bulb obturators have reduced the weight of the prostheses from 6.55% to 33.06% depending on thesize of the defect when compared to solid obturators[48].

The bulb portion can be processed together with the oral portion or separately and later joined together with auto-polymerizing acrylic resin, light cure resin[4,29,31,35]. Numerous techniques have been described to fabricate the obturator in one piece or two piece[6-46]. The advantages of one piece obturator are; it is hygienic and there are no lines of demarcation between heat cure and autopolymerizing resin.

In this case, the bulb portion is fabricated first and used as a receiver for the custom ice which was used for creating the hollowness and joined with oral portion with heat cure resin. Making the obturator completely of heat cure acrylic resin minimizes the stain, reduces leakage and also increases the durability and longevity of the prosthesis. The custom ice space created here allows for uniform space to be maintained in the bulb portion unlike the crushed ice which may collapse and get merged with the resin in previous techniques[14].

Other advantage of this technique is the same base pour of the flask with the master cast was utilised again to fabricate the other part of the obturator. The water in the bulb was aspirated out with a syringe and closed with visible light cure resin avoiding significant damage to the bulb portion.

Summary:

This technique helps in fabricating a lightweight, durable obturator prosthesis made of heat cure acrylic resin using custom ice for creating the hollow bulb portion.

References:

1. Kornblith AB, Zlotolow IM, Gooen J, Huryn JM, Lerner T, Strong EW, Shah JP, Spiro RH, Holland JC. Quality of life of maxillectomy patients using an obturator prosthesis. Head Neck 1996;18:323-34.
2. Beumer J, Curtis T, Marunick M. Maxillofacial rehabilitation: prosthodontic and surgical considerations. St Louis: IshiyakuEuroAmerica, Inc.; 1996:240–285.
3. Glossary of Prosthodontic Terms. J Prosthet Dent 2005;94:10-92
4. Brown KE. Clinical considerations improving obturator treatment.J Prosthet Dent 1970;24:461-6
5. Desjardins RP. Obturator prosthesis design for acquired maxillary defects. J Prosthet Dent 1978;39:424-35.
6. Nidiffer TJ, Shipmon TH. The hollow bulb obturator for acquired palatal openings. J Prosthet Dent 1957;7:126-34.
7. Payne AG, Welton WG. An inflatable obturator for use following maxillectomy. J Prosthet Dent 1965:759.
8. El Mahdy AS. Processing a hollow obturator. J Prosthet Dent 1969;22:682-6.
9. Chalian VA, Barnett MO. A new technique for constructing a one-piece hollow obturator after partial maxillectomy. J Prosthet Dent 1972;28:448-53.
10. Buckner H. Construction of a denture with hollow obturator lid and soft acrylic lining. J Prosthet Dent 1974;31:95-9.
11. Matalon V, LaFuente H. A simplified method for making a hollow obturator. J Prosthet Dent 1976;36:580-2.
12. Tanaka Y, Gold HO, Pruzansky S. A simplified technique for fabricating a lightweight obturator. J Prosthet Dent 1977;38:638-42
13. Beder OE, Todo J. Rapid technique for constructing a hollow-bulb provisional obturator. J Prosthet Dent 1978;39:237-9.
14. Schneider A. Method of fabricating a hollow obturator. J Prosthet Dent 1978;40:351.
15. Parel SM, LaFuente H. Single-visit hollow obturators for edentulous patients. J Prosthet Dent 1978;40:426-9.
16. Worley JL, Kniejski ME. A method for controlling the thickness of hollow obturator prostheses. J Prosthet Dent 1983;50:227-9.
17. Taicher S, Rosen AG, Arbree NS, Bergen SF, Levy M, Lepley JB. A technique for fabrication of polydimethylsiloxane-acrylic resin obturators. J Prosthet Dent 1983;50:65-8.
18. Browning JD, Kinderknecht J. Fabrication of a hollow obturator with fluid resin. J Prosthet Dent 1984;52:891-5.
19. Palmer B, Coffey KW. Fabrication of the hollow bulb obturator. J Prosthet Dent 1985;53:595-6.
20. Phankosol P, Martin JW. Hollow obturator with removable lid. J Prosthet Dent 1985;54:98-100.
21. Minsley GE, Nelson DR, Rothenberger SL. An alternative method for fabrication of a closed hollow obturator. J Prosthet Dent 1986;55:485-90.
22. Benington IC. Light-cured hollow obturators. J Prosthet Dent1989;62:322-5.

23. Birnbach S, Barnhard B. Direct conversion of a solid obturatorto a hollow obturator prosthesis. J Prosthet Dent 1989;62:58-60.
24. Hayashi J, Nishiyama M, Miyake M, Kudo I, Nakazawa K. Construction of a maxillary prosthesis with a hollow obturator by the balloon technique and a case report. J Nihon UnivSch Dent 1989;31:585-96.
25. Gardner LK, Parr GR, Rahn AO. Combination nasal support breathing flange with hollow obturator prosthesis. A clinical report. J Prosthet Dent 1990;63:497-501.
26. Jhanji A, Stevens ST. Fabrication of one-piece hollow obturators. J Prosthet Dent. 1991;66:136–8.
27. Polyzois GL. Light-cured combination obturator prosthesis. J Prosthet Dent 1992;68:345-7
28. Blair FM, Hunter NR. The hollow box maxillary obturator. Br Dent J 1998;184:484-7.
29. McAndrew KS, Rothenberger S, Minsley GE. An innovative investment method for the fabrication of a closed hollow obturator prosthesis. J Prosthet Dent 1998;80:129-32
30. Shaker KT. A Simplified technique for construction of an interim obturator for bilateral total maxillectomy defect. Int J Prosthodont 2000;13:166-8.
31. Asher ES, Psillakis JJ, Piro JD, Wright RF. Technique forquick conversion of an obturator into a hollow bulb. J ProsthetDent 2001;85:419-20.
32. Habib BH, Driscoll CF. Fabrication of a closed hollow obturator.J Prosthet Dent 2004;91:383-5.
33. Cheng AC, Somerville DA, Wee AG. Altered Prosthodontics treatment approach for bilateral complete maxillectomy: a clinical report. J Prosthet Dent 2004;92:120-4
34. Iramaneerat W, Seki F, Watanabe A, Mukohyama H, Iwasaki Y, Akiyoshi K, Taniguchi H. Innovative gas injection technique for closed-hollow obturator. Int J Prosthodont. 2004;17:345-9.
35. Rilo B, Dasilva JL, Ferros I, Mora MJ, Santana U. A hollow-bulb interim obturator for maxillary resection. A case report. J Oral Rehab 2005;32(3):234–6.
36. Kocacikli M, Yalug S, Yazicioglu H, Yilmaz C. Fabricating ahollow obturator with visible light-cured resin system. JProsthodont 2008;17:596-8.
37. Shimizu H, Yoshida K, Mori N, Takahashi Y. An alternative procedurefor fabricating a hollow interim obturator for a partial maxillectomypatient. J Prosthodont 2009;18:276-8.
38. Padmanabhan TV, Kumar VA, Mohamed KK, Unnikrishnan N. Prosthetic rehabilitation of a maxillectomy with a two-piece hollow bulb obturator. A clinical report. J Prosthodont 2011;20(5):397–401.
39. Elangovan S, Loibi E. Two-piece hollow bulb obturator. IndianJ Dent Res 2011;22:486-8.
40. Dable R. A Hollow Bulb Obturator for maxillary resection in a completely edentulous patient. J ClinDiag Res. 2011;5(1):157-62
41. Srinivasan J, BabuRajan K, Suresh V. Fabrication of interim hollow bulb obturator using lost salt technique – A Case report. Journal of Scientific Dentistry 2011;1(1):37-40
42. Patil PG, Patil SP. Fabrication of a hollow obturator as a singleunit for management of bilateral subtotal maxillectomy. JProsthodont 2012;21:194-9.
43. Patil PG, Patil SP. A hollow definitive obturator fabrication technique for management of partial maxillectomy. J AdvProsthodont 2012;4:248-53
44. Kumar VJ, anilkumar S, Lylajam S. Hollow partial denture with hollow bulb obturator, a novel technique for rehabilitation of post-maxillectomy defect. Health Sciences 2013;2(1):JS006
45. Buzayan MM, Ariffin YT, Yunus N. Closed Hollow Bulb Obturator—One-Step Fabrication: A Clinical Report. J Prosthodont. 2013;22(7):591-5.

46. Sridevi JR, Kalavathy N, Jayanthi N, Manjula N. Techniques for fabricating hollow obturator: Two case reports. SRM J Res Dent Sci 2014;5:143-6
47. Aramany MA. Basic principles ofobturator design for partially edentulouspatients. Part I: Classification. J Prosthet Dent 1978;40:554-557
48. Wu YL, Schaaf NG. Comparison of weight reduction indifferent designs of solid and hollow obturator prostheses. J Prosthet Dent 1989;62:214-7