

Fabrication of Temporary Speech Bulb Prosthesis: A Clinical Report

K. Kasim Mohamed, V. Anand Kumar, N. Devi, T. V. Padmanaban

© Indian Prosthodontic Society

Maxillofacial prosthesis is an art and science which not only replaces the lost structure sometimes it restores the functions also. Pharyngeal obturator is a prosthesis which closes the palatal and pharyngeal defects and improving the speech and other function. The following case report discusses palatopharyngeal insufficiency, impression procedures, fabrication of prosthesis and improvements in speech.

Keywords: Temporary pharyngeal obturator, Speech bulb prosthesis

Introduction

Palatopharyngeal insufficiency is a condition where there is lack of effective closure between the soft palate and one or more of the pharyngeal walls during swallowing or speech sounds that require high intraoral pressure. This lack of closure may be due to four etiologic categories, namely, anatomic deficiency, myoneural deficiency, anatomic and myoneural deficiency, and neither anatomic nor myoneural deficiency [1]. It is a congenital or acquired anatomical defect of the soft palate that makes the palatopharyngeal sphincter incomplete. Excessive nasal air flow, inadequate pressure affect the speech and nasal regurgitation also common during feeding. The muscles which are Levator veli palatini and superior constrictor play an important role during palatopharyngeal closure [2]. Speech bulb prosthesis is a ideal choice for these defects. It is a removable prosthesis to restore an acquired or congenital defect of the soft palate with a portion extending into the pharynx to separate the oropharynx and nasopharynx during phonation and deglutition, thereby completing the palatopharyngeal sphincter [3].

Case report

A 53-year-old male patient referred to department of prosthodontics from ENT department with the chief complaint of loss of portion of throat due to surgery, Which leads to difficulty in eating food, drinking water because of aspiration and problem with phonetics. Patient was more concerned about his speech because of poor communication. According to past medical history patient had non-painful swelling below the right ear 6 months back and it gradually increased in size. On examination it was found that soft palate was fibrosed and a 3 × 3 cm hard mass was noted in the deep lobe of the right parotid gland without infiltrating the facial nerve. It was diagnosed as carcinoma of right parotid gland (mucoepidermoid carcinoma according to histopathological report) and velopharyngeal incompetence. Patient underwent parotidectomy with facial nerve preservation and soft palate resection. Patient was instructed to undergo pharyngeal flap surgery with reconstruction of soft palate after 1 year [4].

On examination a portion of soft palate and pharynx were missing in the anatomical midline. It extended from posterior one-third of the soft palate to middle one-third of the pharyngeal wall measuring 6 cm in length and 2.5 cm in width. The surrounding area appeared to be normal no evidence of infection (Fig. 1). All the teeth were present except maxillary second molar. After clinical evaluation of the defect it was concluded that the surgical lesion was acceptable for prosthetic rehabilitation. All the treatment

K. Kasim Mohamed ✉ • V. Anand Kumar • N. Devi • T. V. Padmanaban
Department of Prosthodontics,
Sri Ramachandra Dental College,
Sri Ramachandra University, Chennai, India

e-mail: mohamedkasim9@yahoo.com

procedures and time consumption was explained to the patient before start the treatment.



Fig. 1 Palatopharyngeal insufficiency (pre-operative)

Clinical procedure

Preliminary impression

Dentulous impression tray size -3 was selected. Posteriorly tray extended approximately 3–4 cm with help of self-cure acrylic resin. Impression was made with help of silicon impression material (putty consistency). Cast fabricated with die stone (Fig. 2).



Fig. 2 Primary cast

Fabrication of oral section of prosthesis

Four wrought wire clasps (19 gauge) were fabricated and positioned two were on first premolars, another two were on molars (right side second molar and left side first

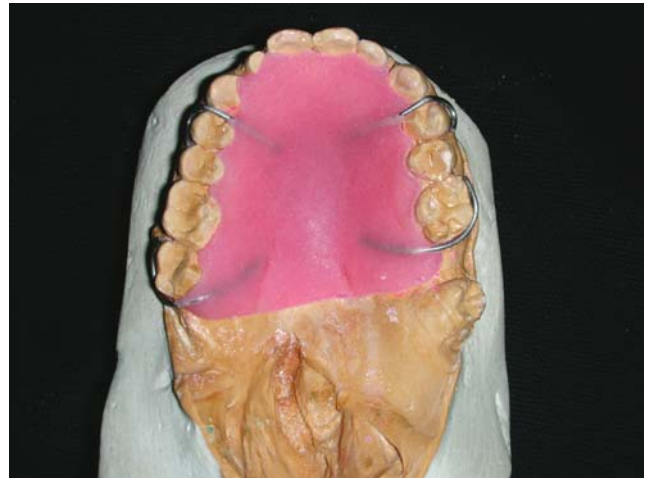


Fig. 3 Oral section of pharyngeal obturator

molar) and oral section was fabricated with self-cure acrylic resin. Its thickness was 2 mm (Fig. 3).

Recording a impression for pharyngeal section

Retentive loop was fabricated with 21 gauge wire to support impression material. It was stabilized with self-cure acrylic resin. It extend from posterior part of oral section of prosthesis to till the defect area without compressing soft tissue. Impression compound was softened, kneaded and placed over the wire loop inserted in the patient mouth, patient was instructed to bend his head upward, downward, turn the head right and left side and touch his shoulder with help of the chin then prosthesis removed and inspected for over extensions, excess compound removed from the superior aspect until patient was able to breath comfortably, peripheries of the impression compound were trimmed, low fusing compound was added prosthesis inserted and patient was instructed to do the head movements again as mentioned above, prosthesis removed from the mouth and inspected for continuous smooth margin all over the peripheries, this procedures was repeated until continuous margins obtained. If patient had difficulty in breathing, lateral surfaces of the compound was trimmed and tissues were recorded without pressure (Fig. 4). The impression compound records the entire length of the soft palate and makes contact with the posterior pharyngeal wall [5].

Altered cast technique

Pharyngeal section of the primary cast was removed by using frit saw blade, two retentive aid were created in the posterior part of remaining cast, prosthesis with pharyngeal impression was seated firmly on the cast, boxing done with modeling wax and new cast was prepared (Fig. 5).



Fig. 4 Recording pharyngeal section with impression compound



Fig. 6 Pharyngeal obturator

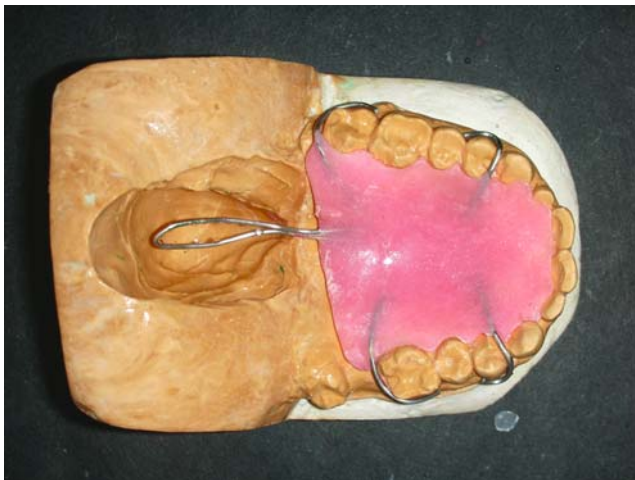


Fig. 5 Master cast with oral section of obturator



Fig. 7 Pharyngeal obturator in patient (post operative)

Fabrication of pharyngeal section of prosthesis

Impression compound was removed and wire loop was cut, only few millimeter length of wire was extending into the defect area to support pharyngeal section of the prosthesis. Peripheries of defect areas marked with pencil, then self-cure acrylic mixed and pharyngeal defect was filled up to the marked line, prosthesis was removed from the cast. Trimming, finishing and polishing was done (Fig. 6). Prosthesis was kept in water for 3 days to remove some unreacted monomers.

Insertion of prosthesis

Prosthesis was inserted and checked for over extensions (Fig. 7). Patient was given a news paper and instructed to read 10 lines loudly with and without prosthesis. Patient was able to read very clearly with prosthesis. According to

clinical evaluation his hypernasal speech reduced and speech intelligibility improved [6]. Patient was reviewed after 24 hours, a small sore spot was found in right lateral pharyngeal wall, prosthesis was adjusted, polished and inserted. There are several methods of speech evaluation such as acoustic spectrogram [7], pressure flow technique [8] and acoustic and aerodynamic techniques [9]. As this prosthesis was for temporary purposes and unlike palatal lift prosthesis, showed marked improvement in speech intelligibility immediately after insertion, perceptual analysis was recommended by speech pathologists [10].

Perceptual analysis rating scale

Articulation

- 0 Normal
- 1 Mild misarticulation
- 2 Moderate misarticulation

3 Severe misarticulation

Resonance

- 0 Hyponasal resonance
- 1 Normal
- 2 Mild hypernasal resonance
- 3 Moderate hypernasal resonance
- 4 Severe hypernasal resonance

Nasal air emission

- 0 No nasal emission
- 1 Mild nasal air emission
- 2 Moderate nasal air emission
- 3 Severe nasal air emission

Speech intelligibility

- 1 Intelligible
- 2 Listeners attention needed
- 3 Occasional repetition of words required
- 4 Repetition
- 5 Isolated words understood
- 6 Occasionally understood by others
- 7 Unintelligible

Patient reviewed after 1 week and after 1 month, he does not have any problem with prosthesis. Patient was once again sent to speech pathologist to evaluate articulation, resonance, nasal air emission and speech intelligibility.

Results

Speech outcome- pre and post treatment		
	After 24 hours	After 1 month
Articulation	Score – 3	Score – 1
Resonance	Score – 4	Score – 2
Nasal air emission	Score – 3	Score – 1
Speech intelligibility	Score – 5	Score – 1

Discussion

Defects of the soft palate may present as perplexing problems to the clinician. When some or all of the anatomical structures of the soft palate are absent, the term palatopharyngeal insufficiency applies. Absence or loss of some or all of the soft palate results in insufficient structure or altered function of the remaining structure to provide closure with

the pharynx. In this situation the obturator prosthesis is designed to close the opening between the residual hard and/or soft palate and pharynx. Unlike a meatus obturator it is more functional. Several investigations like nasovideo endoscopy, fluoroscopy and naso metric analysis are available but, according to speech pathologists, perceptual analysis is best. Unlike palatopharyngeal incompetence, speech intelligibility improves immediately after insertion of pharyngeal obturator.

Summary and conclusion

Improvements in speech function were observed after treatment with prosthesis. Velvo- pharyngeal insufficiency patients should be carefully tailored for prosthetic treatment because of contingent noncompliance. Our patient tolerated the appliance well and was referred to a speech therapist for speech articulation.

References

1. Marsh JL (2003) Management of velopharyngeal dysfunction. *J Craniofac Surg* 14:621–628
2. Tachimura T et al. (2002) Change in levator veli palatine muscle activity for patients with cleft palate in association with placement of a speech aid prosthesis. *Cleft Palate Craniofac J* 39:503–508
3. Dosumu OO, Ogunrinde TJ, Ogundipe OT (2006) Prosthetic management of soft palate cleft. *Afr J Med Med Sci* 35:391–393
4. Yoshida H, Michi K, Yamashita Y, Ohno K (1993) A comparison of surgical and prosthetic treatment for speech disorders attributable to surgically acquired soft palate defects. *J Oral Maxillofac Surg* 51:361–365
5. Birnbach S (1978) Physiologic recording of soft palate for fabrication of obturator speech prostheses. *J Prosthet Dent* 39:539–545
6. Yoshida H et al. (1990) “Prosthetic treatment for speech disorders due to surgically acquired maxillary defects.” *J Oral Rehabil* 17:565–571
7. Paul G, Harlan B (1958) A supportive type prosthetic speech aid. *J Prosthet Dent* 8:362–369
8. Warren D (1965) A physiologic approach to cleft palate prosthesis” *J Prosthet Dent*. 15:770–778
9. Wood MT, Warren DW (1971) Effect of cleft palate prostheses on respiratory effort. *J Prosthet Dent* 26:213–218
10. Marshall RC, Jones RN (1971) Effects of palatal lift prosthesis upon speech intelligibility of dysarthric patients. *J Prosthet Dent* 25:327–333