

VELOPHARYNGEAL DEFECT MANAGEMENT: A CASE REPORT

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ABSTRACT

Rehabilitation of a patient with partial resection of soft palate is a prosthodontic challenge. Surgery is the preferred treatment for speech correction in patients affected by velopharyngeal dysfunction which may not be feasible in many clinical situations. Prosthetic treatment combined with speech therapy is the treatment of choice in such patients who cannot be managed with surgical treatment. In velopharyngeal dysfunction, hypernasality and regurgitation of food and liquids is common if defect is not obturated. This case report describes rehabilitation of a patient with soft palate defect and subsequent velopharyngeal insufficiency by a velo-pharyngeal prosthesis

KEYWORDS: Soft palate obturator, speech aid, velopharyngeal obturator, velopharyngeal dysfunction.

INTRODUCTION

The velopharynx is a muscular valve located between the nasal and the oral cavities, consisting of the lateral, posterior pharyngeal walls and soft palate. Defect in this valve can either be due to lack of tissue like velopharyngeal insufficiency or lack of proper movement like velopharyngeal dysfunction.¹ Such patients exhibit impaired speech intelligibility, difficulty in swallowing and hyper nasality. Velopharyngeal defect may result from congenital malformations, acquired neurological deficits, surgical resection of neoplastic disease, etc. The velopharyngeal dysfunction may be corrected through surgery, prosthetic appliances, speech therapy or a combination of them. Prosthetically, the defect can be treated with palatal lift prosthesis or meatus obturator. This case report describes the prosthodontic rehabilitation of a patient with velopharyngeal insufficiency.

CASE REPORT

A 19-year-old male patient reported to the Department of Prosthodontics with chief complaint of difficulty in eating and speech (Fig 1 and 2). Dental history revealed

that cleft lip-palate was present since birth. The patient underwent surgical closure of cleft lip 9 years back, which was satisfactory; whereas the palatal cleft remained leading to communication between oral and nasal cavity.



Figure-1.



Figure-2.

Intra oral examination revealed a cleft involving soft palate; hard palate and alveolar ridge (Veau’s classification -3). Tooth number 11 was missing. The treatment objective was to provide prosthesis to obturate the defect to improve speech, deglutition and replace the lost tooth. Maxillary obturator with closed hollow palatal bulb extension was planned for the patient.

Rehabilitation Procedure

1. Maxillary and mandibular preliminary impressions were made using alginate impression material. Undercuts in the maxillary defect area were blocked. Primary cast was poured in type 3 stone as shown in (Fig 3).



Figure 3: Primary cast poured in Type-3 stone.

2. Once the primary cast was studied a stock metal tray was modified using impression compound and greenstick compound (Fig 4) and over this tray, tray adhesive was applied, and a final impression was made using putty and light body viscosity addition silicone material. (Fig 5).



Figure 4: Stock metal tray was modified using impression compound, greenstick compound and over this tray.



Figure 5: Final impression made using putty, light body viscosity addition silicone material.

3. The final cast was poured and studied.
4. To refine the defect region, an acrylic plate was constructed over the final cast with a palatal extension. (Fig 6).



Figure 6: Acrylic plate construction over Final Cast with palatal extension.

5. This plate was tried intraorally, adhesive was applied, and a ball of putty was loaded around this extension. The tray was then placed intraorally, and the patient was asked to move his head up and down and move his head sideways touching the chin on either shoulder. This gave us a functionally molded registration of the soft palatal defect. (Fig 7).



Figure 7: Molded registration of the soft palatal defect.

6. The final cast was then altered to get the altered cast. (Fig 8:a and 8:b)



Figure 8(a): Altered Cast.



Figure 8(b): Altered Cast.

7. This cast was duplicated and another cast for processing was made.
8. On this cast a temporary base plate was fabricated, and teeth arrangement was done. Since there was no space for one tooth and keeping the midline into consideration; two small teeth were arranged in the missing tooth region.
9. This was then tried in the mouth.
10. The duplicated cast was then waxed up to full contour involving the bulb region. C clasps were made on the molars using wrought wire (20 gauges) for retention. (Fig 9).



Figure 9: Clasps made on molars with wrought wire.

11. Conventional flasking and dewaxing steps were done.
12. The hollow bulb was to be made using shim – stock technique.
13. A shim was made in self curing acrylic and was embedded into heat cure resin and the flask was packed. (Fig 10.a and 10.b).



Figure 90(a): Shim made in self curing acrylic & embedded into heat cure resin.



Figure 10(b): Closer look of Figure-10(a).

14. Conventional processing techniques were followed, and the prosthesis was retrieved and trimmed and finished.

15. On the day of insertion of the prosthesis, the patient was uncomfortable with the palatal extension. He felt a gag; hence the bulb was thinned, and patient was asked to slowly use it till he got used to it. (Fig 11).



Figure 10: Insertion of prosthesis.

16. Once this was done, the patient was referred to a speech pathologist for speech training.
17. Once the patient gets fully adjusted to this prosthesis, definitive cast framework supported obturator prosthesis has been planned.

DISCUSSION

Patients suffering from VP deficits are prosthetically rehabilitated with obturator prosthesis and prosthetic rehabilitation varies according to the location and nature of the defect or deficiency. Normally palatopharyngeal closure occurs when the soft palate elevates and contacts the lateral and posterior pharyngeal walls of the nasopharynx whereas acquired defects of soft palate results in insufficient tissues or altered function of the remaining structures to provide palatopharyngeal closure.^[2] Obturator prosthesis constructed for those patients with developmental or congenital malformation of soft palate varies from those obturators constructed for patients with acquired defects.

In the literature, several types of prosthesis have been described to improve speech ability which includes meatus obturator, speech bulb prosthesis and pharyngeal obturator prosthesis and palatal lift prosthesis. Prosthesis which aid in correcting palatopharyngeal insufficiency can be accomplished by providing pharyngeal obturator/speech bulb prosthesis. A portion of obturator extends into the pharynx to separate oropharynx and nasopharynx, restores the soft palate defect and allows adequate closure of palatopharyngeal sphincter (Abrew, et.al., 2007, Saunders, 1993, Beumer, et.al., 1996 as cited by Tuna, et al. 2010).

A meatus obturator is designed to close the posterior nasal chonchae through a vertical extension from the distant aspect of the maxillary prosthesis. (Eckert, et.al. 2000). This obturator design may be indicated when the entire soft palate has been lost in an edentulous patient.

Palatal lift prosthesis is provided for patients with speech disorders due to palatopharyngeal incompetency normally caused by closed head injuries. The purpose is to elevate the soft palate to the level of the palatine plane, enabling velopharyngeal closure by the actions of pharyngeal walls thus improving the quality of speech and reducing the effort required to speak (Gonzalez, 1970, Gibbons, et al., 1958).

However, the objectives of obturator are to prevent the leakage of material into the nasal passage during deglutition, prevent inappropriate nasal resonance during speech and to provide control of nasal emission.^[3,4] An accurate prognosis is extremely essential to achieve normal speech with a prosthesis for the patients exhibiting considerable movement of the residual VP complex during function. This is because for the control of nasal emission, the movement of the lateral pharyngeal wall is essential, at the same time it is very difficult to achieve normal speech with either surgical reconstruction or prosthetic therapy with little or no movement of VP mechanism.

In this case, patient was suffering from cleft lip-palate since birth and he underwent surgical closure of cleft lip 9 years ago, which was satisfactory. But, the palatal cleft remained, leading to communication between oral and nasal cavity resulting to hypernasality and/or nasal emission associated with VP Inadequacies. This can be prevented by fabricating pharyngeal obturator prosthesis, to obtain adequate VP closure during speech and swallowing, a posterior extension is added to prosthesis.

This extension was positioned at the level of the hard palate during the most active movement of the pharyngeal sphincter and this movement was achieved by asking the patient to say 'ahh' and by touching to the posterior wall of the pharynx with an instrument to initiate gag reflex in the patient. An acrylic resin extension was formed functionally, this extension was ensured to be in static contact with the soft tissues and also care was taken to not affect the stability of the prosthesis. The impression was also examined for contact with the pharynx bilaterally and posteriorly.

The success of the prosthesis depends on the functional adaptation of the impression material.^[5] In current case, putty and light body viscosity addition silicone material was used in functional contouring of the palatal defect and VP portion. Impression wax may also be added to the compound surface to make final impression. Recently, elastomeric impression materials such as polyvinylsiloxane and polyether have also been considered appropriate for border molding procedures.

Retention of pharyngeal obturator can be obtained by direct and indirect retainers for patients with complete maxillary dentition. Although removable partial denture designs for patients with VP deficiencies are like removable partial denture designs for nonsurgical

patients, the long lever arm created by the extension for the obturator must be considered. The weight and length of obturator portion increases the effect of gravitational forces and the potential for rotation around the fulcrum line. The effect of extension will be most significant for patients requiring a Kennedy Class I or Class II removable partial denture and minimal for patients with Class III or Class IV removable partial denture for which proper guiding planes, direct and indirect retainers serve the purpose.^[6]

The retention of prosthesis can be obtained by the alveolar ridge and deep vestibular sulcus. The degree of defect affects the functions of the obturator. If the defect includes both soft and hard palate resections, the discomfort in the usage of obturator increases. Most individuals with a history of radiation therapy have poorer satisfaction with obturator function due to their dry mouth.

The treatment of VP insufficiency requires a multidisciplinary approach. The involvement of a speech pathologist is necessary in treatment of these cases to test articulation errors and inappropriate oro-nasal resonance balance.^[7] Perceptual and instrumental measures of hypernasality and nasal escape along with a profile of the patient's articulation provides information about the frequency and consistency of VP insufficiency.

These measures, however, provide only limited information about the functioning of the VP mechanism. The use of MVF and/or NE may contribute to the diagnostic confirmation of the assessment of velar mobility, pattern of velar elevation, size of residual VP gap and lateral pharyngeal wall displacement while the patient is producing a standardized sample of connected speech. It may also contribute to the assessment of treated patients with VP insufficiency.^[8] While neither NE nor MVF can substitute for perceptual speech assessment in the diagnosis of VPI, they are complementary tools in the assessment of velopharyngeal function.

In present cases, no nasopharyngoscopic evaluations were made. However, perceptual speech evaluations demonstrated significant improvements in speech ability and VP function. In the long run, patients using definitive obturator shows increased level of dissatisfaction. It is observed that adjustment to an obturator might be a lengthy and changing process that requires close clinical monitoring.

REFERENCES

1. Suleyman Hakan Tuna, Gurel Pekkan, Hasan Onder Gumus, Alper Aktas. Prosthetic Rehabilitation of Velopharyngeal Insufficiency: Pharyngeal Obturator Prostheses with Different Retention Mechanisms. *European Journal of Dentistry*, January 2010; 4
2. Pratik Agarwal, Pankaj Dhawan, Pankaj Madhukar, Piyush Tandan. Prosthetic Rehabilitation of

- Velopharyngeal Incompetence. *IJOPRD*, 10.5005/jp-journals-10019-1180.
3. Neha Sikka, Reeta Jain, Ashutosh Kaushik, Reena Rani. Prosthetic rehabilitation of a child with velopharyngeal dysfunction e A case report. *Journal of oral biology and craniofacial research*, 2014; 4: 140-143.
 4. Dr. Teny Fernandez, Dr. K. Harshakumar, Dr. R. Ravichandran, Dr. S. Lylajam. Prosthetic Rehabilitation of a Velopharyngeal Defect: A Case Report. *IOSR Journal of Dental and Medical Sciences*. e-ISSN: 2279-0853, p-ISSN: 2279-0861. Apr. 2015; 14(4): (Ver. X) 01-05.
 5. Dr. Ranganatha Rao K Jingade, Dr. Subhabrata Maiti, Dr. Ponnanna AA, Dr. Nitesh Rai, Dr. Raghu and Dr. Vini Panjwani. Velopharyngeal prosthesis: A case report. *International Journal of Applied Dental Sciences*, 2017; 3(3): 20-22.
 6. Dr Hardik K Ram, Dr Rupal J Shah. A novel approach for Velopharyngeal prosthetic rehabilitation: Case series. *International J. of Healthcare & Biomedical Research*, January 2013; 1(2): 70-76.
 7. Dr. Ashwin Kumar, Dr. K. Harshakumar, Dr. R. Ravichandran, Dr. Prasanth.V. Treating Velopharyngeal Inadequacy Using an Interim Palatal Lift Prosthesis – A Case Report. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, e-ISSN: 2279-0853, p-ISSN: 2279-0861., May. 2016; 15(5): (Ver. VI) 37-39.
 8. Jurel Sunit K, Aeran Himanshu. Prosthetic Rehabilitation of Velopharyngeal Insufficiency: A case of Pharyngeal Obturator with palatal lift prosthesis. *JPFA*, June, 2012; 26: 57.