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Case Report

Prosthetic rehabilitation of velopharyngeal insufficiency: A case report

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Abstract

The prosthodontic management of palatal defects has been practiced for many years. Obturators play a crucial role not only in restoring function and aesthetics but also in aiding patient reintegration into society. They facilitate physical and social rehabilitation by improving speech quality and preventing the leakage of liquids. For an edentulous patient, the absence of mechanical retention makes the stability of the obturator prosthesis even more essential. This case report outlines the treatment of a partial soft palate defect and the associated velopharyngeal insufficiency using a velopharyngeal prosthesis.

Keywords: Soft palate defect, Velopharyngeal insufficiency, Pharyngeal obturator

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1. Introduction

The velopharynx is a three-dimensional muscular valve situated between the oral and nasal cavities. It primarily comprises the lateral and posterior pharyngeal walls and the soft palate, functioning to regulate airflow.[1] The palatopharyngeal or velopharyngeal valve mechanism controls activities such as speech production, swallowing, blowing, sucking, and whistling.[2,3] Velopharyngeal dysfunction occurs when this valve fails to close properly, either due to insufficient tissue (velopharyngeal insufficiency) or inadequate movement (velopharyngeal incompetence).[2]

Velopharyngeal insufficiency is associated with speech and nasal resonance abnormalities caused by soft palate defects, which can be congenital, such as in cleft lip and palate, or acquired, such as after palatal tumor resection.[4,5,6] In contrast, velopharyngeal incompetence involves the dysfunction of an anatomically intact velopharyngeal mechanism, often linked to neuromuscular disorders.[7] Diagnosis of velopharyngeal insufficiency involves perceptual speech evaluation, multiview video fluoroscopy, and nasendoscopy.[8]

Beumer[9] highlighted that reconstructive surgery for acquired soft palate defects is often not recommended due to significant tissue loss and the need for ongoing tumor site monitoring. Additionally, surgical reconstruction may result in a dysfunctional velopharyngeal mechanism. In cases where surgery is not feasible, prosthetic management is the preferred approach. Velopharyngeal insufficiency is typically addressed using a pharyngeal obturator, while velopharyngeal incompetence is managed with a palatal lift prosthesis.[4,6,10]

The pharyngeal obturator aims to close the communication between the oral and nasal cavities caused by tumor resection, enhancing speech intelligibility and swallowing. This prosthetic option remains a preferred rehabilitation method due to its efficiency, affordability, and adaptability to individual patient needs.[11]

However, it is more difficult to treat the acquired palatal defects in edentulous patients, as no natural teeth are present

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to take support from. In fully edentulous patients where the support is taken only from the remaining bone, it is always mandatory to take care of what is remaining, while keeping in mind what is lost.

The rarity of the case reported in the prosthetic rehabilitation of velopharyngeal insufficiency (VPI) highlights its significance in advancing clinical understanding and practice. VPI, a condition where the soft palate fails to close adequately against the posterior pharyngeal wall during speech and swallowing, poses multifaceted challenges for patients and clinicians. Its etiology can range from congenital anomalies, such as cleft palate, to acquired defects caused by surgical resection or trauma, making each case unique. The reported case sheds light on innovative approaches to address the functional and aesthetic concerns associated with this condition, emphasizing the importance of interdisciplinary care involving prosthodontists, speech therapists, and maxillofacial surgeons. Due to its uncommon occurrence and the lack of standardized treatment protocols, documenting such cases is invaluable for expanding the clinical knowledge base. It provides insights into customized prosthetic solutions, such as obturators or palatal lift devices, tailored to the patient's specific anatomical and functional needs. This case report not only underscores the ingenuity required in managing rare presentations but also serves as a benchmark for future research and clinical endeavors, ensuring improved quality of life for individuals with VPI. Through detailed documentation, it enriches the literature and inspires innovation in prosthetic rehabilitation techniques.

2. Case Report

A 55-year-old male patient visited the clinic with a primary concern of fluid regurgitating through his nose. His medical history revealed that he had previously undergone surgery on the soft palate before being referred to the clinic (**Figure 1**). The patient exhibited a noticeable nasal tone in his voice and faced challenges with both speech and swallowing. An intraoral examination revealed a fully edentulous maxillary arch, while the mandibular arch retained natural anterior teeth. The maxillary alveolar ridges, vestibular sulci, and palate shape were deemed appropriate for a conventional complete denture.

The treatment plan involved fabricating an upper complete denture with a pharyngeal obturator and an interim removable partial denture for the lower arch. Although dental implants were suggested to enhance prosthesis stability and retention, the patient declined this option. He was counseled and prepared psychologically for the obturator fabrication process.

A primary impression of the maxilla was taken using addition silicone impression material (Affinis Perfect Impressions, Putty Super Soft, Coltene, Switzerland) and cast with Type III dental stone (Kalstone, Kalabhai, Mumbai) to create a primary cast. A custom tray extending into the defect was constructed on this primary cast using auto-polymerizing acrylic resin (Trevalon, Dentsply, Gurgaon). Border molding of the edentulous upper arch was completed using green stick compound (DPI Pinnacle Tracing Stick, Mumbai).

The functional impression of the defect contours was captured by instructing the patient to flex their neck until their chin touched their chest. Lateral aspects of the obturator were shaped through neck rotation and flexion. Additionally, the patient was asked to drink water during the functional impression procedure. A wash impression was then performed using light-body addition silicone material (Affinis Precious, Coltene, Switzerland) (**Figure 2**). The final impression was inspected for accuracy and poured with Type III dental stone to produce the final cast. After verifying the try-in, the prosthesis was processed using heat-cure acrylic resin (Trevalon, Dentsply, Gurgaon). (**Figure 3**) The interim removable partial denture for the lower arch was fabricated conventionally.

The definitive prosthesis was delivered to the patient following necessary adjustments. (**Figure 4**) Examination revealed adequate velopharyngeal closure, as no nasal reflux occurred when the patient drank water with their head tilted upwards.

The patient received thorough instructions on maintaining oral hygiene and caring for the prosthesis. Regular follow-up visits were scheduled to monitor the prosthesis's performance and address any concerns.

Figure 1: Intraoral view of the patient with acquired soft palate defect.

Figure 2: Functional border molding and impression

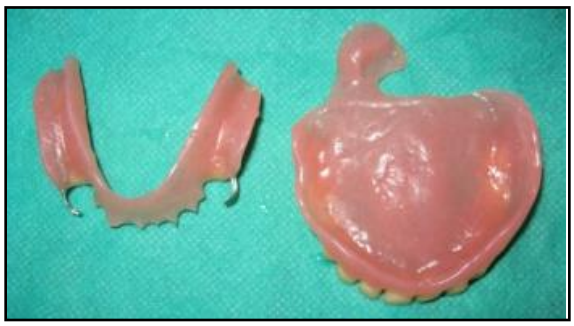

Figure 3: Final prosthesis

Figure 4: Prosthesis in the patient's mouth

Table 1: Degree of nasalance and suggested treatment options for velopharyngeal deficiency (Shin's criteria)

Nasalance		Recommended treatment options
Below 20%	No nasality	
20-35%	Mild nasality	Speech therapy
35-45%	Moderate nasality	Speech aid appliance with speech therapy
45-60%	High nasality	Surgery or speech aid
Over 60%	Severe nasality	Surgery

3. Discussion

Oral cancer is a major health care concern in elderly patients.[12] Among elderly patients, it is particularly important not only to detect and treat this condition early but also to rehabilitate postoperative patients.[13]

Obturator prosthesis play an important role in the recovery of oral function and attempts to re-establish velopharyngeal closure, control nasal emission during speech, and assist in preventing nasal regurgitation of food and fluids during swallowing.[9,14] A partial soft palate defect may result from the surgical resection of a part of soft palate. Such patients experience a range of defects, all presenting with a portion of the soft palate remaining. With such defects, the velopharyngeal apparatus is compromised, and prosthetic obturation is the treatment of choice.[14] Compared with a soft palate that has been partially resected and is dysfunctional complete soft palate defect is easier to trace and obturate.[15]

In order to obtain adequate velopharyngeal closure during speech and swallowing a posterior extension is added to prosthesis.[14] The extension must be positioned at the level of the hard palate during the most active movement of the pharyngeal sphincter. This movement can be achieved by asking the patient to say 'ahh' or stimulating the posterior pharyngeal wall to initiate gag reflex.[9,14] Functionally molded acrylic resin extensions ensure contact with the soft tissues without compromising prosthesis stability.[9] Proper impressions are vital to confirm bilateral and posterior contact with the pharyngeal walls.[16] For functional assessment, patients may drink water to verify complete closure of the anatomical defect, ensuring no nasal reflux occurs when upright.[9]

The success of prostheses for soft palate defects depends significantly on the functional adaptation of impression materials.[9,16] In current cases, modeling plastic impression compounds were used to contour the palatal defect and velopharyngeal area, followed by elastomeric polyvinyl siloxane for the final impression. Zinc oxide eugenol was avoided due to its potential to irritate soft tissues and pose risks if fragments are aspirated.[16,17]

For edentulous patients, achieving effective retention of conventional prostheses can be challenging due to factors like prosthesis weight, lack of border seal, or anatomical irregularities such as shallow vestibular sulci or lower muscle attachments.[18] Therefore, dental implants have great importance for these patients. Accordingly, the retention provided by the implants will be enhanced if the implants can be positioned to maximize the anterior-posterior spread. They improve prosthesis retention, stability, and occlusal function when they are used in selected cases.[19] However, in some cases implant treatment may be complicated such as for the irradiated tissues.[20] Furthermore, implant treatment may be rejected by the patients because of psychological reasons as presented. The retention of prosthesis can be obtained by the alveolar ridge and deep vestibular sulcus as in this report. Most individuals with the history of radiation therapy have poorer satisfaction with obturator function due to their dry mouth.[21]

Most patients have initial concern over whether they will experience a gag response or choke on the prosthesis. Careful

explanation of the causes of the reflex and how to control it should be given. Apprehension can be reduced by constant reassurance by the clinician.

An objective method by Shin[22] to determine the treatment option, either surgery or conservative intervention for velopharyngeal dysfunction was given.[23] (**Table 1**)

Assessment of the obturator is important. Speech bulb or pharyngeal obturator may correct the nasal emission and food regurgitation but articulatory errors may persist. This is the reason why a speech evaluation after prosthetic rehabilitation is necessary. Articulation errors and nasal resonance during speech is evaluated by a speech pathologist and it is of utmost importance for optimizing result.[24] These prosthesis results in a decrease in nasal air emissions and hypernasality, thus improving the patient's communication skills and overall quality of life.[25]

4. Conclusion

In this report, a patient with a soft palate defect was successfully rehabilitated using a pharyngeal obturator. The success of such treatment depends significantly on the patient's motivation, cooperation, and adaptability to the prosthesis. This prosthetic device played a vital role in restoring essential oral functions, such as speech and swallowing, while also addressing the patient's psychosocial needs.

By improving functional abilities, the obturator allowed the patient to regain confidence and engage more comfortably in social interactions. This aligns with findings from other cases involving maxillofacial prosthodontic appliances, which have been shown to enhance oral health-related quality of life. Such improvements extend beyond physical functionality, positively influencing emotional well-being and social integration.

Additionally, the prosthesis not only restored normal physiological functions but also helped mitigate the psychological impact of living with a soft palate defect. This case underscores the importance of a multidisciplinary approach, including the involvement of speech pathologists and prosthodontists, to ensure comprehensive rehabilitation and optimal patient outcomes.

5. Source of Funding

None.

6. Conflict of Interest

None.

References

1. Pinto JHN, Pegoraro-Krook MI. Evaluation of Palatal Prosthesis for the Treatment of Velopharyngeal Dysfunction. *J Appl Oral Sci.* 2003;11(3):192–7.
2. Knowles JC, Chalian VA, Shanks JC. A Functional Speech Impression Used to Fabricate a Maxillary Speech Prosthesis for a Partial Glossectomy Patient. *J Prosthet Dent*. 1984 Feb;51(2):232–7.
3. Davis JW, Lazarus C, Logemann J, Hurst PS. Effect of Maxillary Glossectomy Prosthesis on Articulation and Swallowing. *J Prosthet Dent.* 1987;57(6):715–9.
4. Saunders TR, Oliver NA. A Speech-Aid Prosthesis for Anterior Maxillary Implant-Supported Prostheses. *J Prosthet Dent*. 1993;70(6):546–7.
5. Ragab A. Cerclage Sphincter Pharyngoplasty: A New Technique for Velopharyngeal Insufficiency. *Int J Pediatr Otorhinolaryngol*. 2007;71(5):793–800.
6. Abreu A, Levy D, Rodriguez E, Rivera I. Oral Rehabilitation of a Patient with Complete Unilateral Cleft Lip and Palate Using an Implant-Retained Speech-Aid Prosthesis: Clinical Report. *Cleft Palate Craniofac J.* 2007 Nov;44(6):673–7.
7. Johns DF, Rohrich RJ, Awada M. Velopharyngeal Incompetence: A Guide for Clinical Evaluation. *Plast Reconstr Surg J*. 2003;112(6):1890–7.
8. Seagle MB, Mazaheri MK, Dixon–Wood VL, Williams WN. Evaluation and Treatment of Velopharyngeal Insufficiency: The University of Florida Experience. *Ann Plast Surg*. 2002;48(5):464–70.
9. Beumer J, Curtis TA, Firtell DN. Maxillofacial Rehabilitation: Prosthodontic and Surgical Consideration; The C.V. Mosby Co.: St. Louis, 1979:133–56.
10. Shifman A, Finkelstein Y, Nachmani A, Ophir D. Speech-Aid Prostheses for Neurogenic Velopharyngeal Incompetence. *J Prosthet Dent.* 2000;83(1):99–106.
11. Cholan R, Dilip Kumar M, Vidyashree NV. Evaluation of Speech for a Patient with an Extensive Soft Palate Defect, Before and After Fabrication of Obturator. *J Sci Dent.* 2014;4(2):34–9.
12. Reynolds MW. Education for Geriatric Oral Health Promotion. Spec. *Care Dent*. 1997;17(2):33–6.
13. Curtis TA, Cantour R. The Forgotten Patient in Maxillofacial Prosthetics. *J Prosthet Dent*.1974;31(6):662–70.
14. Chambers MS, Lemon JC, Martin JW. Obturation of Partial Soft Palate Defect. *J Prosthet Dent*. 2004;91(1):75–9.
15. Ramya R, Balasubramanya KV. Speech Aid Prosthesis: Case Report of Obturation of Partial Soft Palate. *J Dent Sci Res.* 2011;2(2):67–70.
16. Keyf F, Sahin N, Aslan Y. Alternative Impression Technique for a Speech-Aid Prosthesis. *Cleft Palate Craniofac J*. 2003;40(6):566–68.
17. Cholan R, Dilip Kumar M, Vidyashree NV. Evaluation of Speech for a Patient with an Extensive Soft Palate Defect, Before and After Fabrication of Obturator. *J Sci Dent.* 2014;4(2):34–9.
18. Brånemark PI, Higuchi KW, de Oliveira MF. Rehabilitation of Complex Cleft Palate and Craniomaxillofacial Defects: The Challenge of Bauru; Quintessence: Illinois, 1999; p.17–30.
19. Tuna SH, Pekkan G, Buyukgural B. Rehabilitation of an Edentulous Cleft Lip and Palate Patient with a Soft Palate Defect Using a Bar-Retained, Implant-Supported Speech-Aid Prosthesis: A Clinical Report. *Cleft Palate Craniofac J*. 2009;46(1):97–102.
20. Harrison JS, Stratemann S, Redding SW. Dental Implants for Patients Who Have Had Radiation Treatment for Head and Neck Cancer. *Spec Care Dent*. 2003;23(5):223–9.
21. Rieger JM, Wolfaardt JF, Jha N, Seikaly H. Maxillary Obturators: The Relationship Between Patient Satisfaction and Speech Outcome. *Head Neck* 2003;25(10):895–903.
22. Yoon BK, Ko SO, Shin HK. A Clinical Study of Palatal Lift for Treatment of Velopharyngeal Incompetency. *J Korean Assoc Oral Maxillofac Surg*. 2001;27:92–6.
23. Paul N, Augustine C, Sharma UA, Nishant K, Jyotsna S. Intensive Speech Therapy Programme Combined with a Speech Bulb Prosthesis in the Prosthodontic Rehabilitation of Velopharyngeal Dysfunction. *Cureus*. 2020;12(2):e6951.

24. Ahmed B. Rehabilitation of Surgically Resected Soft Palate with Interim Velopharyngeal Obturator. *Int J Oral Craniofac Sci*. 2015;1(2):31–3.
25. Sarmalkar SD, Aras M, Nagarsekar A, Rajagopal P. Hollow Complete Denture with a Speech Bulb Prosthesis: A Case Report. *Cureus* 2024;16(3):e55671.

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