

Prosthetic Rehabilitation of a Velopharyngeal Defect: 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

I. Introduction

The soft palate is the movable posterior portion of the palate that marks the beginning of the oropharynx. The speech utterance and other oral activities such as swallowing, blowing, sucking, and whistling are regulated by the palatopharyngeal or velopharyngeal (VP) valving mechanism.^{1,2} The terms velopharyngeal dysfunction (VPD), velopharyngeal incompetence, velopharyngeal insufficiency (VPI), and velopharyngeal inadequacy are frequently used to denote an improperly functioning velopharynx. Obturation of a velopharyngeal dysfunction attempts to re-establish velopharyngeal closure, control nasal emission during speech, and assist in preventing nasal regurgitation of food and fluids during swallowing. A partial soft palate defect may result from the surgical resection of the posterior border from the medial or lateral posterior portion of the soft palate. With such defects, the velopharyngeal apparatus is compromised, and prosthetic obturation is the treatment of choice.³ Microvascular flaps may be used to reconstruct these areas. But in many cases, complete obturation of the defect becomes unsuccessful and such a patient is usually referred to the prosthodontist for fabrication of an obturator prosthesis. A pharyngeal obturator is a removable maxillary prosthesis which has a posterior extension to separate oropharynx and nasopharynx. Prosthetic management of VP insufficiency is done by means of speech-aid prostheses (SAPs), whereas VP incompetence is treated with palatal lift prostheses (PLPs). The functional component of the SAP is a nasopharyngeal section ("speech bulb") that is shaped to conform to the activity of the VP during speech and swallowing, whereas PLP reduces hypernasality by approximating the incompetent soft palate to the posterior pharyngeal wall.⁴ This is a case report of a patient with a surgical soft palate defect rehabilitated by a velopharyngeal obturator made using resilient orthodontic wires joining the hard and soft palatal parts of the prosthesis.

II. Case Report

A 42 year old female patient reported to the Department of Prosthodontics, Government Dental College, Trivandrum with a chief complaint of nasal regurgitation of fluids. On examination she had a soft palatal defect due to surgical excision of tumor (Fig. 1). Hypernasality of speech was present. On eliciting the history, the patient had undergone radiotherapy 5 months before. A speech aid prosthesis with speech bulb was planned for the patient since she exhibited symptoms of velopharyngeal dysfunction. Entire procedure was explained to the patient and her consent was obtained.

Procedure: The soft palatal defect was blocked with gauze piece and primary impression of the maxillary arch was made using irreversible hydrocolloid impression material. Impression was poured using dental plaster to obtain a primary cast. After blocking out the area of teeth with wax, a custom tray extending to the defect was fabricated using autopolymerizing acrylic resin. The area of the defect was functionally molded using low fusing green stick compound. Wax used for blocking the teeth was then removed and final impression of the

defect was obtained using medium body elastomeric impression material (Fig. 2). Final impression was checked for adequate extensions and poured using type III dental stone.

On the master cast, Adams clasps were fabricated using 19 gauge stainless steel orthodontic wire for retention of the prosthesis. Two lines, 2 cm in length were drawn parallel to each other on the definitive cast using marking pencil extending from the posterior part of the hard palate to the anterior part of the soft palate defect. Two orthodontic wires of 19 gauge thickness were bent in a zig-zag manner and was aligned parallel to these lines (Fig. 3). The zig zag configuration provided the required flexure to allow the movement of the soft palate. A stable denture base that extends to the defective area was fabricated in heat cure acrylic resin (Fig. 4). The extension of the prosthesis was made just posterior to the intact residual soft palate parallel to the soft tissue in the nasopharynx and a few millimeters short of the adjacent tissues at the maximum level of contraction. The patient was asked to wear it for two days so that she could get accustomed to the new prosthesis and a functional impression be made without gagging.

The functional impression of the contours of the defect was made at the next appointment (Fig. 5). The patient was made to turn her head to the right and left sides, swallow, speak and make circular head movements while the contours of the defect were recorded. Functional record of the defect was lined with medium body elastomeric impression material. The denture base with functional impression was invested. Molloplast-B denture relining material was placed in the posterior defect of the cast in the mold chamber in such a manner that the defect was slightly underfilled. Over this, heat cure acrylic resin was packed in the dough stage. A long curing cycle was followed for acrylization. After the curing process, prosthesis was carefully removed from the cast, finished and polished (Fig. 6). The prosthesis was placed in patient's mouth and evaluated for proper extension using a pressure indicating paste (Fig. 7). The patient was trained for insertion and removal of the prosthesis. Post insertion instructions were given and a regular follow up was advised. Patient was satisfied with the prosthesis since there was marked improvement in her speech and pronunciation.

III. Figures



Figure 1: Soft palatal defect.



Figure 2: Final impression.



Figure 3: Wax up for denture base.



Figure 4: Finished denture base.



Figure 5: Functional record of the defect.



Figure 6: Intaglio surface of definitive prosthesis.



Figure 7: Definitive prosthesis intraorally.

IV. Discussion

Velopharyngeal function is required for normal oronasal respiration control.⁵ It also aids in other activities such as swallowing, blowing, sucking, whistling, and sneezing.⁶ Surgical correction in cases of VP insufficiency may be contraindicated due to local or systemic reasons. Patients for whom surgical intervention is contraindicated are referred for prosthetic treatment. A multidisciplinary approach to the treatment of VP insufficiency is often required. A speech pathologist should examine these cases to test articulation errors and inappropriate oro-nasal resonance balance.⁷ Traditionally, various types of speech-aid prostheses have been used: hinge type,⁸ meatus-type obturator,⁸ palatal lift prosthesis devices,^{9,10} palatal stimulators¹⁰, and fixed-type obturator known as a speech bulb.¹⁰ Prosthetic management using speech bulb is an effective, physiologic, and versatile treatment modality. The objectives of obturation are to provide the capability for the control of nasal emission and inappropriate nasal resonance during speech and to prevent the leakage of material into the nasal passage during deglutition.^{11,12} The degree of the defect can affect the functioning of the prosthesis. If the defect includes both soft and hard palate resections, the discomfort in the usage of obturator increases. Individuals with a history of radiation therapy have less satisfaction with obturator function due to salivary gland dysfunction.¹³ But if constructed properly, a speech-aid prostheses will allow an acceptable pharyngeal and oral comfort without any interference with oral articulation. Also, most of the patients have a concern over gag reflex. The various causes of the reflex and ways to control it should be carefully explained to the patient. Due to increased muscular activity in this region, periodic adjustments of the size of the bulb would also be required.

V. Conclusion

Prosthetic treatment in combination with speech therapy is the treatment of choice in patients having partial soft palate defects who cannot be managed with surgical treatment. For obtaining an effective nasopharyngeal obturation, the contours of soft palatal defect should be carefully recorded. Fabrication of the prosthesis following proper evaluation will definitely improve the quality of life of the patient.

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