

Treating Velopharyngeal Inadequacy Using an Interim Palatal Lift Prosthesis – A Case Report

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Abstract : Velopharyngeal incompetence is one of the contributing factors for speech disorders. This condition usually follows certain disorders like cleft palate, soft palate paralysis and neurologic disorders. Cleft palate is one of the major contributing factors for the velopharyngeal incompetence. Various treatment modalities have been proposed including prosthetic management, surgical correction and speech therapy; often better results are obtained by a multidisciplinary approach. This case report describes about a 12 year old female patient presenting with hyper nasal speech pattern and velopharyngeal incompetence secondary to cleft palate which has been corrected ten years ago. The patient was treated by a combination of speech therapy and an interim palatal lift prosthesis.

Keywords: cleft palate, hypernasality, palatal lift prosthesis, velopharyngeal incompetence.

I. Introduction

Velopharyngeal incompetence is the functional inability of the soft palate to create a complete seal with the lateral and/or posterior pharyngeal walls¹. Cleft palate is one of the most common causes of velopharyngeal insufficiency (VPI). It accounts for more than 50% of all cases². Hyper nasal speech is the commonest symptom of patients with VPI which is caused due to reduced mobility or paralysis of soft palate or pharyngeal muscles. Various treatment options include surgical repair, prosthetic management, and speech therapy. Optimal results can be obtained by a multidisciplinary approach correcting both anatomical and physiological defect³. Prosthetic treatment with palatal lift prosthesis was first reported by Gibbons and Bloomer⁴. This prosthesis has an acrylic resin pharyngeal portion over a palatal extension section which projects downward and then upward behind the remaining palate into the pharyngeal cavity. The pharyngeal section is moulded to assist velopharyngeal closure by contact through muscle action of the posterior and lateral pharyngeal wall. Severe VPI will often lead to compromised speech behaviors, resulting in poor speech intelligibility⁵. The advantage of treating patients with palatopharyngeal inadequacy is that space for producing oral sound is increased.

II. Case Report

A 12 year old female patient reported to the Department of Prosthodontics, Govt. Dental College, Trivandrum, with a chief complaint of abnormal speech pattern. Patient had a history of cleft palate which was corrected surgically ten years ago. Presently she had a nasal tone in her speech. On clinical examination it was found out that her uvula was rudimentary and an incompetent soft palate. She had missing lateral incisors on both right and left side in the maxillary arch. (Fig 1) A combination of prosthetic rehabilitation and speech therapy was planned for the patient.



Fig 1: Pre-operative intra oral view

A preliminary impression was obtained with hydrocolloid impression material, alginate (Zelgan, Dentsply, Constance, Germany) using stock trays and diagnostic cast was made. The secondary impression was then made using addition polysilicone (Reposil, Dentsply, Milford, USA) (Fig 2) and master cast was prepared with Type III dental stone (Kalrock, Kalabhai Karson Pvt. Ltd, Mumbai, India) (Fig 3). The secondary impressions were made using custom trays. The custom trays were specifically designed to extent till the posterior soft palate region.



Fig 2: Secondary impression



Fig 3: Master cast

Initially wax was adapted on to the master cast confining to the palatal margins. Two C shaped clasps were fabricated on the first premolar region for the stability of the prosthesis. The palatal lift extension was then waxed up in the master cast as a separate entity confining to the soft palate region in the patient's mouth. The hard palatal and the soft palatal portions were joined using a zig zag wire. This 19 gauge wire holds the palatal lift extension on to the palatal plate region (Fig 4). The wire makes it flexible allowing it to be adjusted to get the desired palatal lift in the patient's mouth. An interim palatal plate with the palatal lift extension was processed by heat cure acrylic resin (DPI Heat Cure, DPI, Mumbai, India) (Fig 5&6) and was given to the patient (Fig 7).



Fig 4: Wax up for the prosthesis



Fig 5: Palatal lift prosthesis – cameo surface



Fig 6: Palatal lift prosthesis – intaglio surface



Fig 7: Post – operative intra oral view

Patient was under regular follow-up with this prosthesis. Simultaneously, the speech therapy was also started at the Department of Audiology, NISH, Trivandrum. The patient showed improvement in phonetics and the hyper nasality in the speech pattern was reduced. Audiometric analysis was periodically performed by a speech pathologist. Further improvement in speech was noticed one month post insertion of the prosthesis and regular sessions of speech therapy. The patient is currently under regular follow-up.

III. Discussion

Velopharyngeal incompetency occurs when the surgically repaired soft palate has limited mobility to elevate to obtain velopharyngeal closure. The velopharynx is a tridimensional muscular valve located between the nasal and oral cavities. It consists of the posterior and lateral pharyngeal walls as well as the soft palate, and regulates the flow of air. The velopharyngeal sphincter consists of six muscles, five intrinsic muscles of soft palate (levator veli palatini, tensor veli palatini, musculus uvulae, palatoglossus, and palatopharyngeus) and the superior constrictor of pharynx². Velopharyngeal dysfunction may take place when this sphincter is unable to close by its own, due to a lack of tissue or proper movement⁶.

Palatal lift prosthesis covers the hard palate and posteriorly extends to engage the soft palate. This prosthesis elevates and readjusts the soft palate to the proper position, to achieve velopharyngeal closure. This prosthesis is more effective when the soft palate has little muscle tone and offers little resistance to elevation⁷. Most of the patients with velopharyngeal inadequacy are treated surgically or with speech therapy, or both, but there are individuals who benefit most from palatal lift prosthesis than from other treatments⁸.

Palatopharyngeal incompetence can result due to various conditions like injuries to the soft palate, and cleft palate, myasthenia gravis, traumatic head injuries, neurologic accidents, cerebral palsies. Velopharyngeal incompetence is associated with wide range of speech disorders including hypernasal phonetics, compromised articulation, and reduced oral pressures. In such cases prosthetic management may be the best possible treatment. Although a cast metal palatal lift prosthesis may provide greater therapeutic advantages, the patient acceptance is usually low. The reason for non-acceptance could be due to the soreness created by high upward force applied by the palatal extension. An interim palatal lift prosthesis processed using polymethyl methacrylate will aid the patient to get habitual to the palatal extension in a gradual mode as the force applied by this this prosthesis is minimum and can be progressively raised by incrementing the palatal extension in subsequent visits⁹.

Pinto et al. mentioned that speech intelligibility was significantly improved after placement of the prosthesis for patients with velopharyngeal incompetence; speech therapy was needed to eliminate any compensatory articulation production that had developed¹⁰. An interim PLP was indicated for patients whose maxillofacial and dental development is incomplete. This necessitates successive prostheses for them during their progressive growth. Other benefits of interim PLP include lesser laboratory time and expense. Moreover, the interim prosthesis can be used in the early stages to assess patient acceptance, motivation, and prosthetic efficacy before proceeding on to a definitive treatment. The evaluation of clinical efficacy of the appliance by audiologist is essential and should include assessing the resonance, nasal flow of air, articulation and intelligibility.

IV. Conclusion

Application of an appliance and speech therapy will provide benefit to the young subjects in improving their glottal articulation, hypernasality and speech intelligibility. To achieve maximum benefit from palatal lift prosthesis, the prosthodontist and the audiologist must co-operate, using the technology of fluoroscopy and nasoendoscopy in the design, location and modification of the prosthesis. The interim palatal lift prosthesis assists the patient to gradually adapt and enhance patient acceptableness and treatment outcome. A team effort consisting of maxillofacial surgeon, prosthodontist, and audiologist is recommended for comprehensive management of patients having VPI.

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