



## Case Report

# Prosthodontic management of velopharyngeal incompetence with palatal lift prosthesis: A case series

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### ABSTRACT

Velopharyngeal dysfunction is a palatal defect that occurs when the soft palate or the velum fails to close an opening called the velopharyngeal port or lift adequately to posterior pharyngeal wall. It primarily affects the articulation and resonance of speech and often leads to nasal intonation due to escape of air through the nose. This article presents a series of such cases that have been treated by prosthodontic rehabilitation.

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## 1. Introduction

Speech is the expression of or the ability to express thoughts and feelings by articulate sounds. Alterations in normal speech leads to nasal and unintelligible speech resulting in huge impact on the psychological well-being of a person as it hampers social interactions. Speech was divided into five components namely; respiration, phonation, resonance, articulation and neural integration by Kantner and West.<sup>1</sup> Audition was added as a sixth component by Chierici and Lawson.<sup>2</sup>

Velopharynx is a muscular sphincter located between the nasopharynx and the oropharynx that regulates passage of air during speech.<sup>3</sup> The complete closure of this muscular valve is required for normal physiologic activities like speaking, swallowing, whistling, blowing and sucking. The closure of the sphincter usually involves the movement of soft palate, lateral and posterior pharyngeal wall.

Any abnormality in/of these structures may lead to velopharyngeal defects. Soft palate abnormalities can be grouped into three categories– congenital, acquired and developmental.<sup>3,4</sup> In congenital cleft lip and palate the

development of the soft palate is hampered. In neoplastic involvement surgical resection may involve hard and soft palate affecting the continuity and resulting in acquired defect. Apart from etiological classification, defects may also be classified based on anatomical and physiological involvement of structures. Palatal insufficiency and palatal incompetency are two forms of velopharyngeal deficits.<sup>5</sup> When some or all of the structure of soft palate is absent or has been surgically resected, deficiency of the tissues creates palatal insufficiency. When soft palatal tissues are of adequate dimension but lack movement due to trauma, disease affecting muscular or neurologic activity is called as palatal incompetence.

This clinical report describes the treatment of palatopharyngeal disorders using prosthetic rehabilitation.

## 2. Case Report 1

A 26 year female reported for replacement of missing maxillary teeth 21 and 22. Patient was a known case of congenital submucous cleft of the soft palate. The surgical closure for cleft was performed at the age of 20 following which she complained of altered speech. Extra-orally no gross facial asymmetry was seen (Figure 1).

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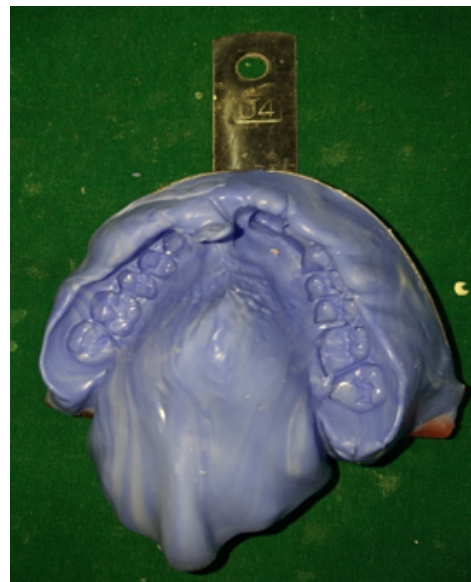
Other findings include depressed nasal bridge, deviation of the lip upwards on the left side and unequal display of teeth. Intraoral findings included missing 21, 22 and Siebert's class 3 defect with the associated edentulous ridge along with the acquired velopharyngeal incompetency (Figures 2 and 3). The resonance was altered with hyper nasal voice. A preoperative speech and auditory assessment revealed defects in articular and velar sounds. The patient had undergone treatment for velopharyngeal incompetence to dissatisfaction and reported with fractured prosthesis. Hence, a new palatal lift prosthesis was planned for the patient for improvement in resonance and articulation.



**Fig. 1:** Extraoral View



**Fig. 3:** Intra oral occlusal view



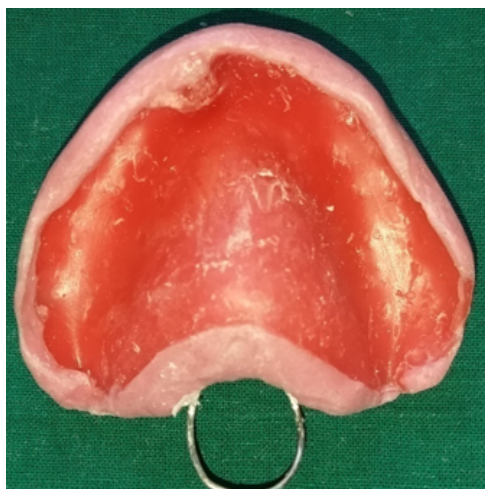
**Fig. 4:** Preliminary Impression with VPS material.



**Fig. 2:** Intraoral Frontal view



**Fig. 5:** Primary cast.



**Fig. 6:** Special tray for palatal moulding.



**Fig. 7:** Final impression with palatal moulding.



**Fig. 8:** Palatal lift Appliance (Ex-situ)



**Fig. 9:** Palatal Lift Appliance (In-situ)

Preliminary impression of maxillary arch was made using extended palatal impression recording the soft palate using vinyl polysiloxane material [Silagaum, DMG] (Figure 4). The impression was poured in type III gypsum product [Kalabhai, India] (Figure 5). A custom acrylic tray with a 'U' loop extending distally from the soft palate section was fabricated (Figure 6). The U loop was fabricated and embedded in the tray with the idea of adapting it with orthodontic plier according to hard palate. Palatal moulding was done with low fusing impression compound (Figure 7). Patency of the breathing was monitored with comfort of the patient. Articulations made by the patient was assessed with the help of speech therapist. Final impression was made with moulded palatal lift section. Cast was poured. First an interim palatal lift prosthesis was given to the patient. Auditory and speech assessment was made, patient satisfaction was achieved; a definitive improvement in the speech with the help of speech bulb was observed. A definitive palatal lift appliance was then planned for long term correction (Figures 8 and 9). An improvement in speech was observed during the recall visits (at an interval of one week, followed by a month and a year).

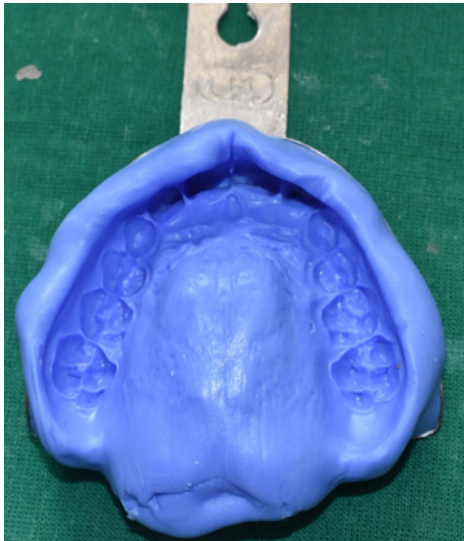
### 3. Case Report 2

An 11 year old girl reported with chief complaint of altered and unintelligible speech. The patient was a known case of submucous cleft palate of soft palate and velopharyngeal incompetence was observed with hyper nasal speech (Figure 10). Reduced mobility of soft palate was seen. A provisional palatal lift appliance was planned for the patient (RR Cold Cure, DPI). Pre prosthetic speech and auditory assessment was made. Prosthetic phase was initiated with extended palatal impression with vinyl polysiloxane [Silagum, DMG] (Figure 11). Type III gypsum was used to pour the casts [Kalabhai, India]. A clear acrylic plate was fabricated with a 19 gauge round wire extending on the soft palate portion of the cast. The wire component was used to support the palatal mould portion. The moulded section was relined on the cast with self-cure clear acrylic resin. Patency

was assessed for breathing with appliance in situ. Definitive improvement in speech was seen and a final palatal lift prosthesis was then given to the patient (Figure 12 a-b). A great improvement in speech was observed during the recall visits (at an interval of one week, followed by a month and a year).



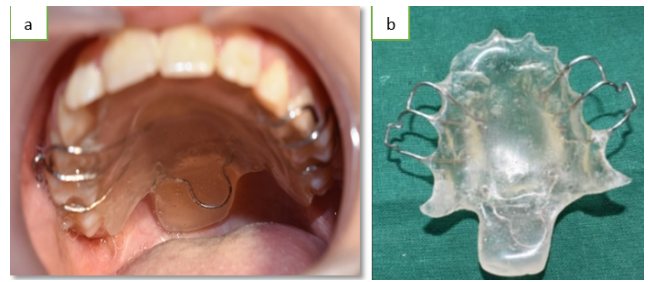
**Fig. 10:** Extraoral view



**Fig. 11:** Preliminary extended Palatal Impression

#### 4. Discussion

Patients with palatopharyngeal disorders exhibit multiple problems such as changes in the resonance of voice (hypernasality or hyponasality), impaired speech, articulation disturbances (distortions, substitutions and



**Fig. 12:** a: Palatal Lift appliance in-situ; b: Palatal lift prosthesis ex-situ

omissions), air-flow escape, seepage of nasal secretions into the oral cavity and difficulty in sucking, deglutition etc. This may often lead to psychological problems along with physical difficulties. These problems can usually be observed in childhood and may continue lifelong. Palatopharyngeal disorders are commonly treated by surgery in combination with speech therapy.<sup>5-8</sup> However, the surgical procedures are more invasive and have their own shortcomings. On the other hand, treatment with prosthetic appliances are relatively simple, versatile and non-invasive. The soft palate can be elevated and stimulated by means of a palatal lift prosthesis to treat palatal incompetence. Resonance and articulation are two characteristics which can be improved with palatal lift prosthesis.<sup>2</sup>

The interim palatal lift prosthesis was given to our patients with the sole purpose of gradually adapting the patients to the feel and load of the final appliance and in order to improve patient acceptability and desired treatment outcome. The definitive palatal lift prosthesis improves the intelligibility of speech by reducing or eliminating the hypernasality, does not interfere with growth and development of palatal tissues and simultaneously aids to improve the patient's self-esteem. The prosthetic appliances aids to restore the vital functions of speech, deglutition and mastication in the patients with velopharyngeal defects and simultaneously established the importance of prosthodontist in the management of such cases.

#### 5. Conclusion

Defects of soft palate or velum presents with perplexing problem to the clinicians. A multidisciplinary approach involving an oral surgeon, prosthodontist, speech and language therapist is recommended for comprehensive management of patients having velopharyngeal defects as described in the case series to achieve satisfactory results and to improve the quality of life of such patients.

#### 6. Conflict of Interest

The authors declare that there is no conflict of interest.

## 7. Source of Funding

None.

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