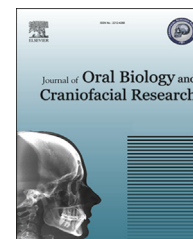


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## Case Report

# Prosthetic rehabilitation of a child with velopharyngeal dysfunction – A case report



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## ABSTRACT

The speech of person is a unique mode of expression for an individual. Alterations or deviation from normal speech leading to nasal and unintelligible speech have enormous effects on the psychological well being of a person as it hampers social interactions. The anatomic or functional anomalies occurring as a result of congenital or traumatic defects leading to velopharyngeal dysfunctions influence the speech by making it completely atypical. The cleft palate patients may have residual velopharyngeal inadequacy even after surgical repair. A removable palatal lift appliance in conjunction with speech therapy is a viable treatment option for such patients as it is economical, easy to fabricate and easy to use.

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## 1. Introduction

Speech being the oldest media of communication and expression of thoughts has a great effect on the on the psychological status and social interactions. Faulty unintelligible speech is never desirable even for short period. Velopharynx, a muscular sphincter located between the nasopharynx and the oropharynx regulates passage of air during speech.<sup>1</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.<sup>2</sup> Velopharyngeal dysfunction due to non closure of sphincter can either be the result of (i) anatomic deficiency, known as velopharyngeal insufficiency, or (ii) inadequate movement called as velopharyngeal incompetence.<sup>3</sup> Velopharyngeal dysfunctions make the speech completely atypical. The constant failure to separate the nasal and oral cavities produces hypernasality in speech, compensatory articulation and nasal air leakage.<sup>1</sup>

The major causes of velopharyngeal dysfunction include patients with Cleft palate, Cerebrovascular accidents, brain stem tumors and traumatic injuries to neuromotor system. It can be treated by surgery or prosthetic rehabilitation.

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Pharyngeal flap surgery has been a standard treatment approach for years. After surgical correction 20–34% of patients do not acquire desirable amount of velopharyngeal competence due to limited mobility of the pharyngeal flap. An adjunctive prosthodontic therapy by palatal lift appliance is necessary in such cases.<sup>4</sup> The mechanism of action of the Palatal lift appliances is through elevation of the soft palate in upward and backward direction thereby creating a pressure on the lateral portion of the elevated soft palate, producing a proper velopharyngeal closure.<sup>2–6</sup>

The present case describes the fabrication of a palatal lift appliance for the correcting the nasality of speech in a child with cleft palate.

## 2. Case report

A 5-year-old female patient referred to us by a plastic surgeon, reported with the chief complaint of nasality in voice. The history of the patient revealed that she has been operated for cleft palate two weeks back. The sutures in the soft palatal area could be seen, there was complete closure of the defect and the wound was healing uneventfully [Fig. 1a]. The fabrication of a removable tooth supported Palatal lift appliance was chosen to alleviate her problems in speech. The treatment plan with its advantages and disadvantages was explained to the patient's parents and consent was taken.

Step by step procedure for fabrication of palatal lift appliance:

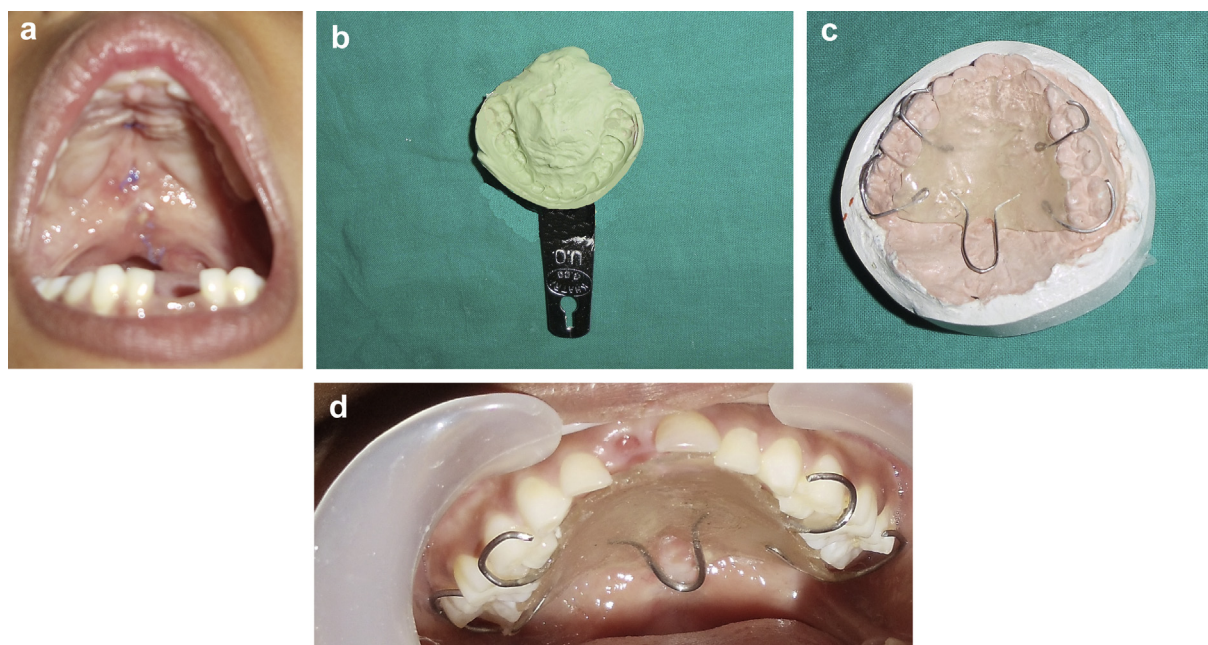
After thorough clinical examination, impression was made in a modified stock tray [Fig. 1b] using irreversible hydrocolloid (Zelgan Plus, Dentsply, USA) and cast prepared.

Stainless steel wire clasps and loop were constructed to be embedded in appliance fabricated [Fig. 1c] using self cure clear acrylic (RR Cold Cure, DPI, India).

The appliance with wire loops was tried in [Fig. 1d]. Necessary adjustments were made to ensure complete seating. For the generation of palatal lift, low fusing impression compound (Green Sticks, DPI, India) was applied to the loop in the posterior part of the appliance in the desired shape and cooled immediately [Fig. 2a].

The hardened green stick displaces the soft palate upwards to produce the lift. Following this green stick wax was added incrementally and patient was asked to perform some physiologic movements including certain phonetic syllables like B and P, blowing through nose against resistance and bending head from side to side. The addition of increments of green stick was terminated at the point where there was improvement in nasality of voice and nasal air leakage [Fig. 2b].

After the generation of sufficient soft palatal lift, the area of appliance consisting of green stick was replaced by clear acrylic resin (RR Cold Cure, DPI, India). The insertion of appliance was done after finishing and polishing [Fig. 2c]. The appliance was checked for nasal air leak by placing a finger near the nose when the patient blows out through mouth after pursing her lips. A lateral cephalogram was taken with appliance in position for determination of generation of lift. The technique of insertion and removal and maintenance was explained to patient and her parents. As the child may not wear the appliance, the parents were advised to ensure the usage during waking hours. Patient was referred to a speech therapist. The speech therapy involved 2 phases, each for a duration of 3 weeks. In the first phase, elimination of the compensatory articulations/inadequate sounds was done by modulating oral and nasal air pressure.<sup>4,7</sup> The second phase



**Fig. 1** – a. Intraoral view showing recent surgical closure for cleft palate. b. Preliminary impression made using irreversible hydrocolloid. c. Acrylic framework with wire extension fabricated. d. Acrylic framework with wire extension placed intraorally.

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