Interim velopharyngeal obturator: a case report

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ABSTRACT

Rehabilitation of velopharyngeal defect requires multidisciplinary approach, in order to achieve optimum results. Traditionally, patients with velopharyngeal defect suffer from nasal regurgitation of oral fluids and recurrent nasal infection, hyper nasality in speech, and difficulty in swallowing food. Patients with large velopharyngeal anatomical defect with the requirement of aesthetic surgical correction of deviated nose are usually treated by interim velopharyngeal obturator to protect the surgical site from nasal regurgitation of oral fluids and to accustom the patient with intra oral obturator treatment. This article describes a case report of a young male patient with velopharyngeal anatomical defect treated with interim velopharyngeal obturator for the purpose of rhinoplasty of his deviated nose.

Key words: Velopharyngeal defect; Hypernasality; Nasal regurgitation; Interim obturator; Rhinoplasty.

1. INTRODUCTION

Traditionally large congenital velopharyngeal defects are more amenable to prosthetic rehabilitation. Velopharynx, is a muscular valve located between the oral and nasal cavity consists of the soft palate and the lateral and posterior pharyngeal wall. Velopharynx is associated with the control of passage of air during speech, blowing, sucking, and swallowing (Curtis et al.1979). Velopharyngeal insufficiency is an acquired or congenital anatomical defect of the soft palate that makes the palatopharyngeal sphincter incomplete. The Glossary of Prosthodontic Terms defines velopharyngeal insufficiency as a condition where there is lack of effective closure between the soft palate and one or more of the pharyngeal walls during swallowing or speech sounds that require high intraoral pressure (GPT-8). Examples of velopharyngeal insufficiency are patients with inadequate length of soft palate, congenital cleft palate, short soft palate (due to congenital or postsurgical scarring of the soft palate) and acquired palatal clefts (Subtelny et al. 1966). Patients with velopharyngeal defect suffer from nasal regurgitation of oral fluid and recurrent nasal infection, hyper nasality in speech, and difficulty in swallowing food (Rieger et al.2003; Bohle et al. 2005). Surgical closure of the defect or prosthetic rehabilitation with velopharyngeal obturator is the treatment of choice for the patients with velopharyngeal insufficiency. The term obturator is derived from the latin word "obturare" means close or shut off. According to the glossary of prosthodontic terms obturator is defined as a prosthesis used to close a congenital or an acquired tissue opening, primarily of hard palate and or associated alveolar structures (GPT-8). This article presents a case report of a 22-year old male with velopharyngeal anatomical defect treated with interim velopharyngeal obturator prosthesis.

2. CASE REPORT

A 22-year old male patient with congenital large soft palatal defect was referred from the Department of Ear Nose and Throat to the Department of Prosthodontics for fabrication of an interim velopharyngeal obturator. Extra oral examination of the patient revealed gross asymmetry of nose, with deviation towards the right side and presence of surgical scar on the upper lip (Figure 1). Intra oral examination showed the presence of mid soft palatal anatomical defect extending anterior to the junction of hard and soft palate (Figure 2). The patient had a chief complaint of gross deviation of nose and wants to surgically correct it. Therefore rhinoplasty procedure was planned by the ENT surgeon and asked for a presurgical interim velopharyngeal obturator to reduce the nasal regurgititation oral fluids. The purpose of the obturator, is to protect the surgical site from the contamination of oral bacterial flora. History revealed that the patient had left sided unilateral cleft lip and mid palatal cleft since birth and the surgical correction of cleft lip was done successfully at childhood. But the surgical closure of the cleft palate failed leading to wide mid palatal anatomical defect. So an Interim Closed hollow bulb velopharyngeal obturator was planned for the patient to prosthetically close the defect and to reduce the weight of the prosthesis. The treatment procedure was as follows:
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A stainless steel stock tray was selected according to the size of upper arch. Posterior end of the tray was extended into the defect with autopolymerizing resin (Figure 3).

The defect area was recorded with low-fusing modelling compound (Pinnacle Tracing Sticks, DPI, and India). Irreversible hydrocolloid (Hydrogum, Zhermach, Italy) wash preliminary impression of the maxillary arch including the defect site was recorded using the same tray.

Primary cast was poured with dental stone. Custom tray was made with clear acrylic resin extending into the defect site (Figure 4) and the extension of the tray was adjusted intra-orally.

Functional impression of the defect area was recorded with low-fusing modelling impression compound adding incrementally. During the impression procedure, the patient was engaged in function by voluntary swallowing of saliva or sipping juice with a straw.

As pharyngeal shape varies with head position and movement of the cervical spine, the patient was asked to turn his head towards his right and left side and drop his chin to the chest during the impression procedure.

Further moulding was undertaken by engaging the patient with conversation until the impression was moulded as dull smooth with the functional movement of the palatopharyngeal musculatures.

The final moulding was evaluated by the absence of oral fluid escapement on forceful nasal expiration.

0.5 to 1mm thickness of low fusing modelling impression compound was scraped off from the impression surface and final wash impression was recorded with PVS impression material (Reprosil regular body, Dentsply).

Overlying anatomical impression of the teeth was recorded with irreversible hydrocolloid (Figure 5) impression material.

A definitive cast was made with dental stone (Kalstone, Kalabhai Dental, India) and the cast was sectioned into two pieces with a laboratory saw.

Plaster index was made to reassemble the two sectioned part into the original position (Figure 6).

The minor undercuts in the defect wall was blocked out with plaster of paris (Kaldent, Kalabhai India) and a shellac base plate (Base plate, Deepti, India) was adapted on the defect wall.

The shellac base plate was removed from the cast and flasked in plaster mold. The shellac pattern was replaced by heat cured acrylic resin (Heat cure, DPI, India).

Three notches were made on acrylic hollow bulb and coated with petroleum jelly (Figure 7). The hollow bulb was filled with salt and placed back on the cast. The overlying lid was made with auto polymerizing resin (Cold cure, DPI, India).

Wrought wire circumferential clasp were adapted on the premolar and molar region on both the sides and anteriorly in the right central incisor and acrylic palatal plate was made with heat cured resin and attached to the acrylic hollow bulb (Figure 8).

The single piece obturator was polished and final adjustments were done intra-orally (Figure 9).

Softened radio opaque gutta-percha was added on the external surface of hollow bulb, and the posterior extension of the prosthesis was verified with lateral cephalometric radiograph (Figure 10).

The patient was advised to regularly clean the prosthesis with mild cleansing solutions and referred to the Department of ENT for the surgical procedure.

Patient reported after 4 month postoperatively with the corrected nose and was convinced for a definitive obturator (Figure 11).
Rehabilitation of cleft lip and palate involves essentially a multidisciplinary approach. The size and location of the defect and the age of the patient are important factors to be considered in choosing the correct method of treatment. Small defects are usually closed surgically in the growing stage of the patient, whereas larger defects involving the hard or soft palate require multiple surgical appointments and are more amenable for prosthetic rehabilitation. Naso-alveolar moulding is usually advocated for cleft involving lip and alveolar region, during the active growth period of the child. It induces the growth of the proximal tissues towards the defect site, thus reducing the size of the defect and enhances the success rate of the surgical repair (Singh et al. 2007). To alleviate the chief complaint of the patient of deviated nose, rhinoplasty along with interim velopharyngeal obturator prosthesis was planned for the patient by the ENT surgeons. The obturator acts as a barrier between the oral cavity and nasal cavity and protects the nasal tissue from oral microbial flora during the healing phase. The obturator was made hollow to reduce the weight of the prosthesis and to improve patients comfort in speech and swallowing. Interim obturator rather than definitive obturator was planned for the patient as it requires less time for fabrication and it gives an opportunity to the clinician to re-correct the prosthesis according to the adaptability of oro-pharyngeal musculature in definitive obturator. In fluoroscopic and naso-endoscopic studies it was found that there should be a gap of 5 mm between the speech bulb and posterior pharyngeal wall at rest, the angle of the bulb relative to the palatal plane should be approximately 20° (Kelley et al. 1996; Spratley et al. 1988). McKerns and Bzoch showed that in men the typical relation of the soft palate to the posterior pharyngeal wall is at a point above the palatal plane (McKerns et al. 1970).

SUMMARY OF REPORT
Before surgical correction of the deviated nose, interim velopharyngeal obturator was used to close the congenital anatomical defect of the soft palate and adjacent tissue. The obturator reduced nasal regurgitation of oral fluids into the nasal cavity and protected the postsurgical nasal tissues from oral microbial flora. The prosthesis reduced hyper nasal voice and improved the self confidence level of the patient.

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