SHORT COMMUNICATION

Impact of delayed prosthetic treatment of velopharyngeal insufficiency on quality of life

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ABSTRACT

Palatopharyngeal dysfunction may take place when palatopharyngeal valve is unable to perform its own closing due to a lack of tissue (palatopharyngeal insufficiency) or lack of proper movement (palatopharyngeal incompetence). Palatopharyngeal insufficiency induces nasal regurgitation of liquids, hypernasal speech, nasal escape, disarticulations and impaired speech intelligibility. Prosthetic management of palatopharyngeal insufficiency requires a close co-operation between an otolaryngologist and a speech pathologist. As a result, the patient can be socially and physically rehabilitated with the improved speech quality as well as prevention of leakage of liquids.

Key words: Fricatives, hypernasality, obturator, palatopharyngeal insufficiency, syllables

In a maxillofacial prosthesis reestablishment, palato-pharyngeal integrity and providing the potential for acceptable speech are challenging for a clinician. Partial or complete loss of soft palate by means of trauma or birth defect results in insufficient structure or altered function of the remaining structure to provide closure with the pharynx. In such a situation, pharyngeal obturator prosthesis is designed to close the opening between the residual hard palate and/or soft palate and the pharynx.

This case report describes the clinical and laboratory procedures used for fabrication of palatopharyngeal obturator prosthesis for soft palate insufficiency in order to prevent food and liquid leakage into the nose and to improve speech integrity.

CASE REPORT

A 19-year-old male patient, requiring a prosthesis for closure of soft palate defect and anterior palatal fistula, was referred to The Department of Prosthodontics from The Department of Plastic Surgery. Patient history involved surgical closure of cleft palate in 1990s and right lateral superiorly based pharyngeal flap transposition for fistula closure on January 2008.

The patient had nasal regurgitation of liquids and sometimes food. The hypernasal speech was so severe that the patient's personal and professional life was disrupted.

Examination

Examination of the nasal resonance was done by alternating closure of the nose during repeated pronouncing of /i-a/ and /u-i/ during connected speech, and both marked hypernasality and nasal escape were observed. This was performed by perceptual analysis and involved a speech therapist, an otolaryngologist, a prosthodontist and one layperson who had no prior contact with the patient.

On further examination, nasal escape was perceived with speech samples that included sustained fricatives: /s/, /z/, /f/, and /v/. Substitution of /b/ with /m/ and /d/ with /n/ was observed during repetition of syllables /ba/, /bi/, /da/ and /di/, verbalized sentences and conversational speech.[1]

Intraoral examination showed missing maxillary left lateral incisor and rotated left maxillary canine in mesiolingual direction [Figure 1]. Oral endoscopic examination showed the size and shape of a defect present on posterior part of the palate [Figure 2]. During speech, palatal mobility and elevation were normal.

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Technique

After examination, maxillary and mandibular impressions were taken with alginate (Zelgan; Dentsply India Pvt. Ltd., Gurgaon, India) and casts were made. Maxillary record base were fabricated from autopolymerizing acrylic resin (Pyrax; Pyrax Polymer, Roorkee, India) with retentive clasps adopted on premolars and molars. A retentive loop was extended posteriorly from palatal portion of maxillary record base to facilitate placement and retention of impression material into pharynx. This extension was as parallel and as close to the defect as possible. High fusing modeling compound was added into the defect area to the retentive loop posteriorly in order to serve as the tray for subsequent additions of low fusing compound (green stick; DPI, Mumbai, India).

During border molding, the tray was inserted in the patient's mouth with warmed low fusing compound on retentive loop. The patient was instructed to flex the neck fully to achieve contact of the chin to the chest. With this movement, contact of posterior aspect of obturator with the soft tissue covering the anterior tubercle of atlas was established. Lateral aspects of the obturator were formed by rotation and flexion of the neck to achieve chin contact with the right and left shoulder, respectively. When border molding was completed around the entire periphery, there was no escape of liquid from the oral to nasal cavities and the articulation of plosive sounds such as b and p and nasal consonants m, n, and ng was improved.[2]

Low fusing compound was reduced evenly (1–1.5 mm) on all peripheral surfaces of the obturator. A coating of tissue conditioner (Visco-gel; Dentsply, DeTrey GmbH, Germany) was used to take final impression of obturated portion of the prosthesis [Figure 3].

Maxillary record base was reseated over maxillary stone cast. Dental stone was mixed and placed around the obturator impression to include the intaglio side of the denture base. When the stone was initially set, denture base and its extension was removed to obtain the master cast.

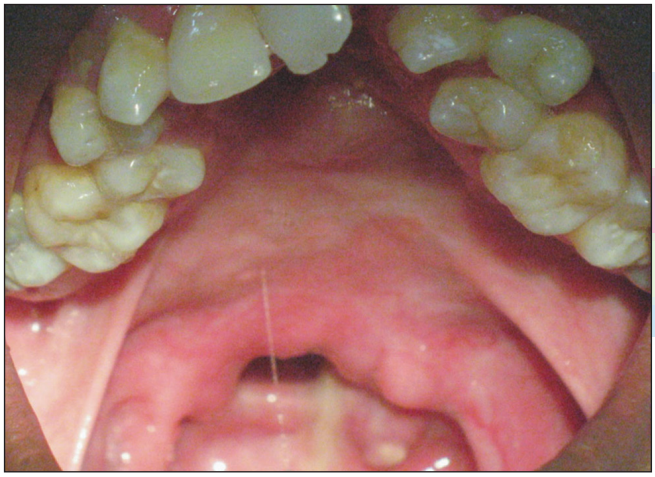

Figure 1: Defect on posterior part of soft palate

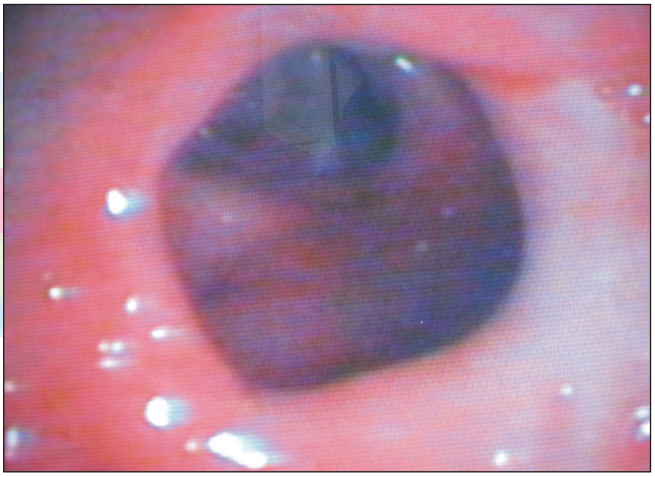

Figure 2: Oral endoscopic examination showing size and shape of the defect on posterior part of the soft palate

Figure 3: Maxillary record base with recorded soft palate defect with tissue conditioner

Figure 4: Intraoral view of palatopharyngeal prosthesis

Maxillary denture base was re-fabricated from autopolymerizing resin onto the master cast which was treated with a separating medium. Left maxillary central and lateral incisor teeth were arranged in modeling wax on maxillary denture base and try-in was done.

Retentive clasps were adopted on premolars and molars and maxillary denture base was trimmed at the location of placement of retentive arms of clasps. Retentive arms were fixed in denture base by modeling wax. Retentive loop was placed over the pharyngeal defect along with its extension toward denture base. Maxillary denture base was waxed up along with retentive loop up to the level of superior border of recorded obturation defect. After these steps, prosthesis was processed in a customary manner with heat-activated methyl methacrylate.

After finishing and polishing, the final position and contour of obturator was determined with prosthesis positioned into the mouth [Figure 4]. Pressure indicator paste was used to determine the area of overextension. Oral endoscopic examination was performed with prosthesis inserted in the patient's mouth to determine level of closure of soft palate defect.

Post-insertion instructions, which were similar to the instructions given to any removable partial denture patient, were given to the patient.[2]

Post-prosthetic evaluation

Speech evaluation of the patient was performed with and without the palatopharyngeal prosthesis in the mouth. Patient was then referred to a speech therapist for speech-language therapy and re-examined after treatment. There was a mean duration of 3 weeks between fitting of the prosthesis and the final post-prosthesis evaluation of the patient. The initial and subsequent improvement in speech, including both hypernasality and intelligibility, were noted.

Remarkable changes were noted in nasal regurgitation of food and liquids.

DISCUSSION

The palatopharyngeal valving mechanism regulates resonation and speech utterance and partakes in non-speech oral activities such as swallowing, blowing, sucking, and whistling.[3,4] Palatopharyngeal insufficiency implies the presence of hypernasality, inappropriate nasal escape and decreased air pressure during the production of oral speech sounds (weak pressure consonants).

Orthodontic treatment needed expansion of the maxillary arch and then extraction of few teeth. Expansion of the arch will lead to increase in the size of fistula which must be followed by surgery. Fixed orthodontic treatment is then needed for proper alignment of teeth. This treatment plan does not improve defect size, needs additional surgery, and is expensive and time consuming. These were the reasons for opting to fabricate this prosthesis.

Surgical intervention in cases of velopharyngeal insufficiency may be contraindicated for local or systemic reasons. Patients for whom surgical intervention is contraindicated are candidates for prosthetic treatment.[5] In our patient, prosthetic treatment was designed to effectively treat the palatopharyngeal insufficiency both in speech and in deglutition when awake.

CONCLUSION

Palatopharyngeal prostheses seem to be an effective treatment approach for patients suffering from palatopharyngeal insufficiency and cannot be treated surgically. Remarkable changes were noted in hypernasality in phonetics and nasal regurgitation of food and liquid. Multidisciplinary approach of prosthodontics from an otolaryngologist and a speech therapist helped the patient to regain his personality physically, psychologically and socially.

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