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PROSTHETIC REHABILITATION OF A COMPLETELY EDENTULOUS PATIENT WITH A VELOPHARYNGEAL DEFECT: A CASE REPORT

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Abstract:

Rehabilitation of partial soft palate defects following surgical resection of neoplastic tissues poses a prosthodontic challenge. The patient may have difficulties in speech and swallowing and nasal regurgitation of food and fluids, which should be dealt with. This case report describes the prosthetic rehabilitation of a completely edentulous patient with an acquired soft palate defect due to surgical resection of oropharyngeal carcinoma. A velopharyngeal obturator combined with a complete denture using resilient orthodontic wires bent into a crib pattern to join the hard and soft palatal parts of the prosthesis were used in the procedure. For obtaining effective nasopharyngeal obturation, the contours of soft palatal defect were carefully recorded. The prosthesis fabricated following proper evaluation and planning has improved the quality of life of the patient.

Keywords: Velopharyngeal defect, Velopharyngeal insufficiency, Obturator, Soft palate defect, Speech aid prosthesis.

Introduction

A rewarding area of Prosthodontics is the rehabilitation of patients with maxillofacial defects. The Maxillofacial Prosthodontist contributes to all facets of patient care, from diagnosis and treatment planning to rehabilitation[1]. The primary objective in each case is to construct a prosthesis which will restore the defect, improve aesthetics and benefit the morale of the patient[2].

Successful rehabilitation of soft palate defects is a challenging task, especially the restoration of the velopharyngeal mechanism. Soft palate is the movable posterior portion of the palate that marks the beginning of oropharynx. Speech utterance and other oral activities such as swallowing, blowing, sucking and whistling are regulated by the palatopharyngeal or velopharyngeal valving mechanism. Soft palate defects can be grouped into congenital, acquired or developmental defects depending on etiology. Most acquired soft palate defects result from surgical resection of neoplastic tissues. In the past, reconstructive surgery was generally not indicated for patients with acquired defects because tissue loss is often excessive and it is required to monitor the tumor site for recurrent disease. However, the recent advancements in imaging techniques and improved surgical expertise have made excellent functional results for reconstructive surgery in selected patients[1].

In cases with high surgical risks and patients refusing a second surgery, the Prosthetist is called upon for rehabilitation of maxillofacial defects. This case report describes a completely

edentulous patient with a surgical soft palate defect rehabilitated by a velopharyngeal obturator connected to the complete denture by resilient orthodontic wires bent into a crib pattern.

Case report:

A 60 year old completely edentulous male patient reported to the Department of Prosthodontics, Government Dental College, Trivandrum, with a chief complaint of nasal regurgitation of fluids and difficulty in speech. (Fig.1)

On eliciting history, the patient was diagnosed to have oropharyngeal carcinoma for which surgical resection of soft palate tumor had been done. He had also undergone post-surgical radiotherapy which was completed 8 months before reporting to our department.

On examination, the patient was completely edentulous and had a soft palate defect on the left side due to surgical excision of the tumour (Fig.2 & Fig.3). Observation of patient's speech showed hyper nasality of voice. A complete denture with a velopharyngeal obturator extending to the velopharyngeal defect was planned.

The retention, stability and support for the prosthesis were planned to be obtained from the bilateral undercuts in the molar regions of maxillary edentulous ridge and the denture bearing areas of the edentulous maxilla. The procedure was explained to the patient and a written consent was obtained.

Procedure:

1. Primary impression was made with impression

Figure.1:Pre-op profile view

Figure.2: Velopharyngeal defect on left lateral posterior wall of soft palate

Figure.3: Completely edentulous maxillary ridge

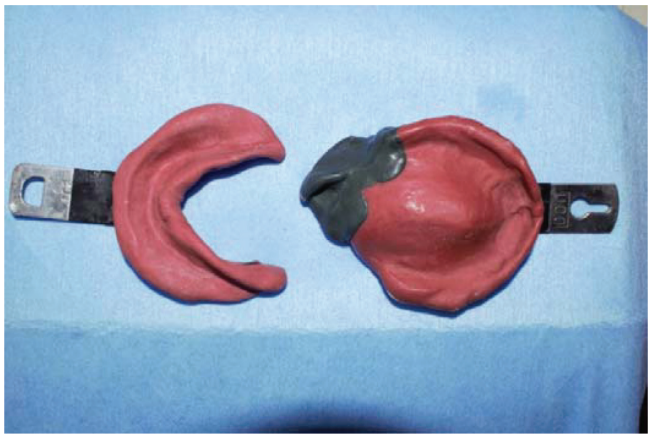

Figure.4: Preliminary Impression

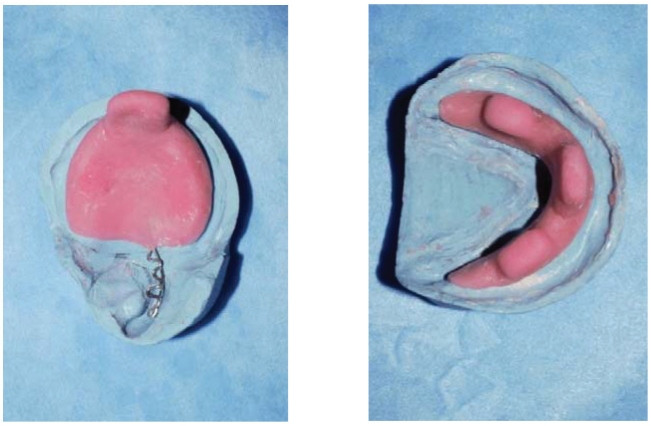

Figure.5: Maxillary and mandibular custom trays

compound (DPI Pinnacle; Bombay Burmah Trading Corp) and the area of the defect was functionally molded onto the maxillary impression using low fusing compound (DPI Pinnacle; Bombay Burmah Trading Corp) (Fig. 4). Impression was poured to obtain a primary cast.

2. A custom tray with an extension of resilient orthodontic wire (21 gauge) bent into a crib pattern was fabricated on maxillary cast using autopolymerising acrylic resin (DPI; Bombay Burmah Trading Corp). Mandibular custom tray was also fabricated (Fig. 5).

3. Border moulding was done and secondary impression was made. The defect was recorded with light body polyvinyl siloxane impression material (3M ESPE Express XT) (Fig.6). The patient was asked to perform functional movements like swallowing, speaking, circular head movements and sidewise head movements. This helped in functional molding of the defect.

4. Beading and boxing were done and impressions were poured with dental stone (Gyprock India, Rajkot) to obtain secondary casts.

5. Permanent record bases were made with the velopharyngeal obturator joined to the maxillary denture using wire components (Fig.7).

6. Jaw relation and try-in were done in a

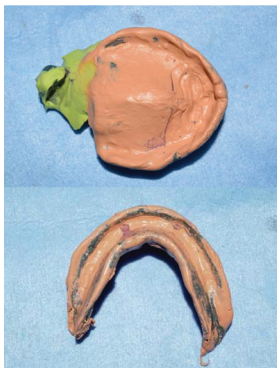

Fig. 6: Maxillary secondary impression (defect lined with light body polyvinyl siloxane) and mandibular secondary impression

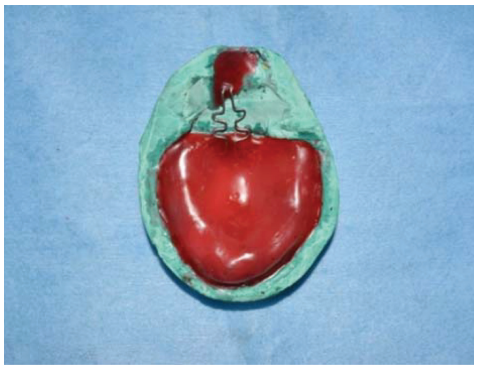

Figure.7 : Fabrication of permanent record base

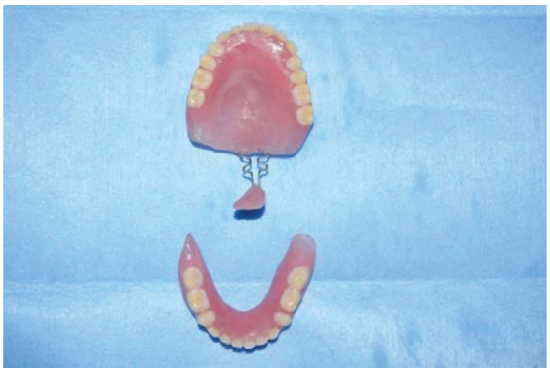

Figure.8: Cameo surface of the velopharyngeal prosthesis

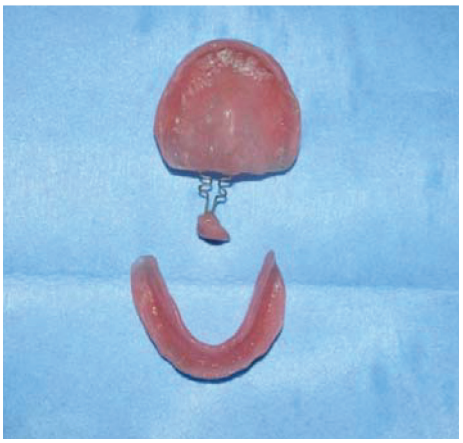

Fig 9: Intaglio surface of the velopharyngeal prosthesis

Fig 10 : Velopharyngeal prosthesis inserted

Fig 11: Post-insertion extraoral view

conventional manner. The fit of the velopharyngeal obturator and its function were checked during this stage to look for hypernasality and regurgitation. The patient was seated in an upright position and made to drink water from a glass to see if swallowing leads to regurgitation. Functional seal was hence verified.

7. After curing the prosthesis, it was carefully removed from the cast, finished and polished (Figure. 8 & 9). The prosthesis was placed in patient's mouth (Fig. 10) and evaluated for proper extension using a pressure indicating paste. The patient was trained for insertion and removal of the prosthesis.

Post-insertion instructions were given and a regular follow-up was advised. The patient was satisfied with the prosthesis (Fig.11) since there was marked improvement in swallowing and speech.

Discussion

Velopharyngeal deficiencies may be classified on the basis of physiology and structural integrity. Palatal insufficiency occurs when the hard or soft palate is of inadequate length (to affect velopharyngeal closure) but the movement of remaining tissues is within normal physiological limits. Palatal incompetence occurs when velopharyngeal structures are essentially normal, but the intact mechanism is unable to effect velopharyngeal closure[1]. The soft palate should be properly prepared following tumor ablation by retaining the movements of the residual velopharyngeal mechanism so that the defect can successfully be managed by an obturator or speech aid prosthesis. Velopharyngeal incompetence due to neurologic disease or trauma resulting in impaired motor control can prosthodontically be managed bypalatal lift prosthesis. The functional component of the speech aid prosthesis is a nasopharyngeal extension ("speech bulbs") that is shaped to conform to the activity of velopharynx during speech and swallowing whereas the palatal lift prosthesis reduces hypernasality by approximating the incompetent soft palate to the posterior pharyngeal wall[3].

In this case report, surgical resection of the left lateral posterior portion of the soft palate had been done following the diagnosis of oropharyngeal carcinoma resulting in a soft palate defect. Reconstructive surgery was not done and the patient had been referred to the Department of Prosthodontics for fabrication of an obturator prosthesis. An interdisciplinary approach was used for the treatment of velopharyngeal insufficiency in this case. A speech pathologist was consulted and the patient was examined for articulation errors and inappropriate oronasal resonance balance[4]. Traditionally, various types of speech aid prostheses have been used namely, the hinge type[5], the meatus type obturators[5], the palatal lift prostheses[6,7], the palatal stimulators[7] and the fixed-type obturators known as a speech bulbs[7]. The general objectives of obturation were to provide the capability for the control of nasal emission and inappropriate nasal resonance during speech and to prevent the leakage of material into the nasal passage during deglutition[8,9]. The size and extent of the defect can affect the functioning of the prosthesis. Larger the defect, greater is the difficulty to get adapted to the prosthesis and lesser the improvement in speech. The case discussed here involves only soft palate defect. Retention of the prosthesis is by resilient orthodontic wire of 21 gauge bent into crib pattern extending from the maxillary denture base. Bilateral undercuts in the maxillary edentulous ridge were utilised here to achieve retention. In case of edentulous patients with both hard and soft palatal defect, achieving effective retention is very difficult.

To obtain an adequate velopharyngeal closure during speech and swallowing, functional moulding of the defect had been done. After moulding, the final impression was examined for contact with the pharynx bilaterally and posteriorly. The functional seal was verified by

asking the patient to drink water. The water should not regurgitate into the nasal cavity when patient was seated in an upright position. Individuals with a history of radiation therapy had discomfort wearing obturator prosthesis due to salivary gland dysfunction and dry mouth[10]. Mostly patients had initial difficulty wearing the obturator due to gag reflex and choking sensation. Careful explanation of the causes of reflex and how to control it should be explained to the patient. Periodic check-up and adjustments were advised because it is necessary to monitor the tumor site for recurrent disease and to accommodate tissue changes in the prosthesis.

Conclusion

Prosthetic treatment along with speech therapy and counselling are necessary for complete rehabilitation of patients having partial soft palatal defects. For such patients who cannot be treated by surgical reconstruction alone, obturator prosthesis helps to improve the quality of life. Thus, an interdisciplinary approach with proper care in the fabrication of the obturator and training of the patient demonstrate commendable results.

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