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Case Report

Prosthodontic Rehabilitation for Edentulous Patients With Palatal Defect: Report of Two Cases

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Cancer resection is the most common cause of acquired palatal defects, whereas cleft palate is the main cause of congenital defects. Palatal defect can be repaired by reconstructive surgery and/or a dental prosthesis. We present prosthodontic rehabilitation of two maxillary edentulous patients, one with a surgically induced palatal defect and the other with congenital cleft palate. In case 1, an 86-year-old man underwent surgical removal of soft-palate squamous cell carcinoma. The acquired palatal defect was repaired by a maxillary complete denture with a posteriorly extended speech bulb. The final prostheses provided good chewing and speech functions. In case 2, a congenital cleft palate in a 65-year-old man was repaired by a maxillary complete denture with superior extension of the obturator, which was designed to improve retention and stability of the upper single denture. He was satisfied with the upper denture after prosthesis placement. Conventional maxillary complete denture with a posteriorly extended speech bulb or modified obturator provides a good chance to restore oral functions in patients with palatal defects. The patients' skill and previous experience of denture wearing might have been important in their successful treatment. However, different patients present with unique problems and need to be treated individually.

Key Words: edentulism, palatal defect, prosthodontic rehabilitation, velopharyngeal defect

The major cause of palatal defect is either acquired or congenital. Tumor resection, especially malignancy, is the most common cause of an acquired palatal defect; whereas cleft palate is the main cause of congenital palatal defect. Palatal defect can be repaired by reconstructive surgery and/or a dental prosthesis. In patients with a tumor, it is accepted that a dental prosthesis is generally preferable to reconstructive surgery because the former provides easier inspection of the residual tissue after surgery. Moreover, recurrent disease can be identified at an early stage.[1,2] In patients with congenital cleft palate, most velopharyngeal defects are managed surgically. Nevertheless, there are two groups of cleft palate patients for whom prosthodontic intervention might be a good option. One group is patients whose clefts are confined to the secondary palate. The other group includes patients with hypernasality and inadequate speech after surgical reconstruction.[2]

Oral functions include chewing, swallowing, respiration and speech. Whenever the patient suffers from a palatal defect, nasal leakage of food and fluid, and hypernasality of speech become

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inevitable. Therefore, swallowing and speech become serious problems in daily activity. In patients with both palatal defect and complete absence of upper teeth, maxillary complete edentulism further complicates the fabrication of an obturator prosthesis. Prosthodontists face a unique challenge to fabricate an obturator prosthesis to restore oral functions in patients with palatal defects. In addition to understanding the fundamentals of fabricating a functional complete denture, prosthodontists also need to understand the physiology of the velopharynx to modify the palatal extension of prostheses. Then, the prostheses can fulfill all the required oral functions.

In this article, two different designs of prosthodontic rehabilitation were carried out for two maxillary edentulous patients; one with a surgically induced palatal defect and the other with a congenital cleft palate. The course of treatment for fabrication of a complete upper denture with an obturator, and its clinical outcome are described. In addition, the reasons why we used two different treatment modalities for the two patients are discussed.

Case Report

Case 1

An 86-year-old man complained of odynophagia for 1 month. He visited the Department of Otolaryngology, National Taiwan University Hospital for treatment. Oral examination found a tumor mass in the soft palate (Figure 1A). A biopsy was performed and the histopathological diagnosis was keratinizing squamous cell carcinoma. Therefore, wide surgical excision of the soft-palatal tumor plus bilateral tonsillectomy was carried out in May 1993. After the operation, adjunctive radiotherapy with 6000 cGy was given to the patient within a period of 44 days. Five months after the operation, he visited our dental clinic for prosthetic restoration of the palatal defect to improve his chewing and speech functions.

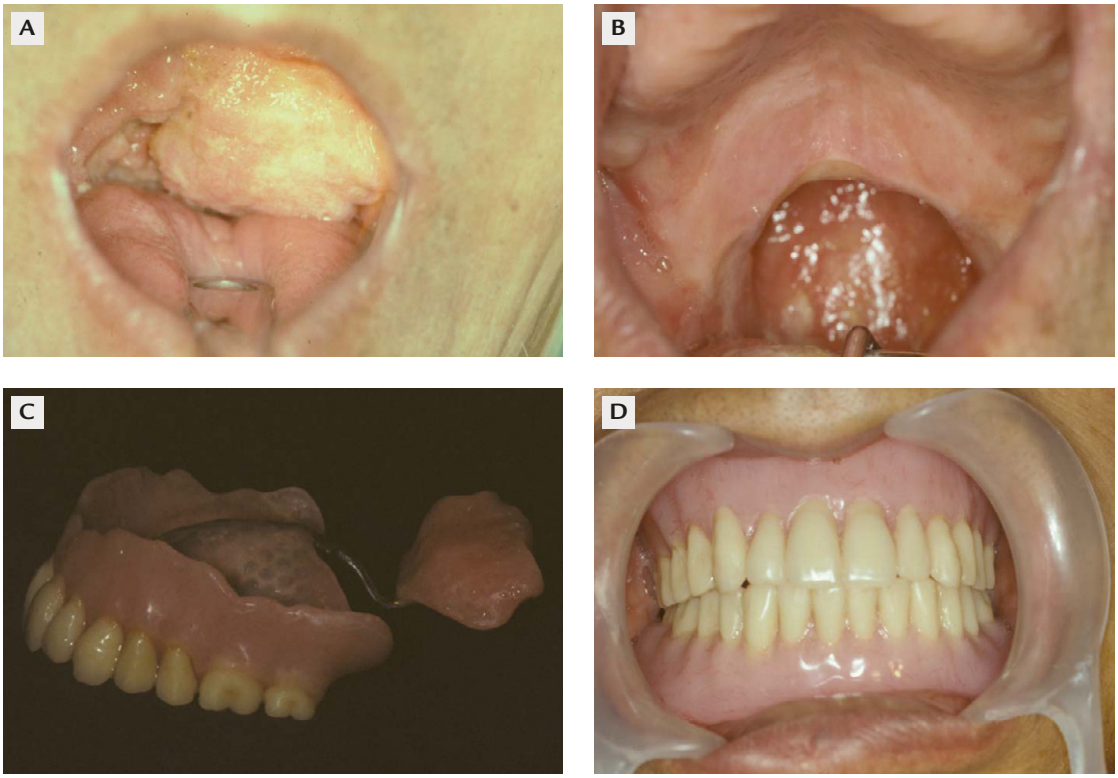

Figure 1. (A) Clinical photograph showing a tumor mass in the soft palate of the patient. (B) Clinical photograph exhibiting a round soft-palate defect after surgery and complete edentulism of the maxillary dental arch. (C) The final upper complete denture with the posteriorly extended speech bulb. (D) Frontal view of the complete upper and lower dentures in position.

Oral examination revealed complete edentulous upper and lower alveolar ridges with a round-shaped soft-palate defect (Figure 1B). In addition, angular cheilitis was found. Antifungal therapy was given to the patient to correct the oral mycosis. The complete denture was fabricated according to the required principles. To restore the palatal defect, a speech bulb was added to the posterior border of the upper denture with functional impression (Figure 1C). The bulb was extended posteriorly to the level of Passavant's pad, which was considered as a guide for proper placement of the soft palate obturator prosthesis. The final prostheses (Figure 1D) provided good chewing and speech functions. The patient had a nearly normal life until he fell into coma due to mecencephalic artery syndrome in March 1996.

Case 2

A 65-year-old man had congenital cleft lip and palate when he was born. The cleft lip was repaired in his early months of life. However, he never had his cleft palate repaired (Figure 2A). He lost all his maxillary teeth and wore a single upper denture which was fabricated 3 years ago. Unfortunately, he was unable to use his upper denture for chewing or speaking because of its poor retention. For the mandibular dentition, there were a fixed partial denture on the six anterior teeth (Figure 2B) and a couple of posterior retained roots that were covered by a removable partial denture. He visited our dental clinic to seek a solution for his oral problems. All the remaining teeth except the two mandibular canines were removed. The mandible was in the form of a Kenney class III modification 1 partially edentulous arch. After endodontic treatment, surveyed crowns were fabricated on the two mandibular canines. An upper complete denture and a lower removable partial denture with two C clasps on the two mandibular canines were made (Figure 2C). During the course of treatment, a speech bulb was designed. However, several clinical trials ruled out the feasibility of

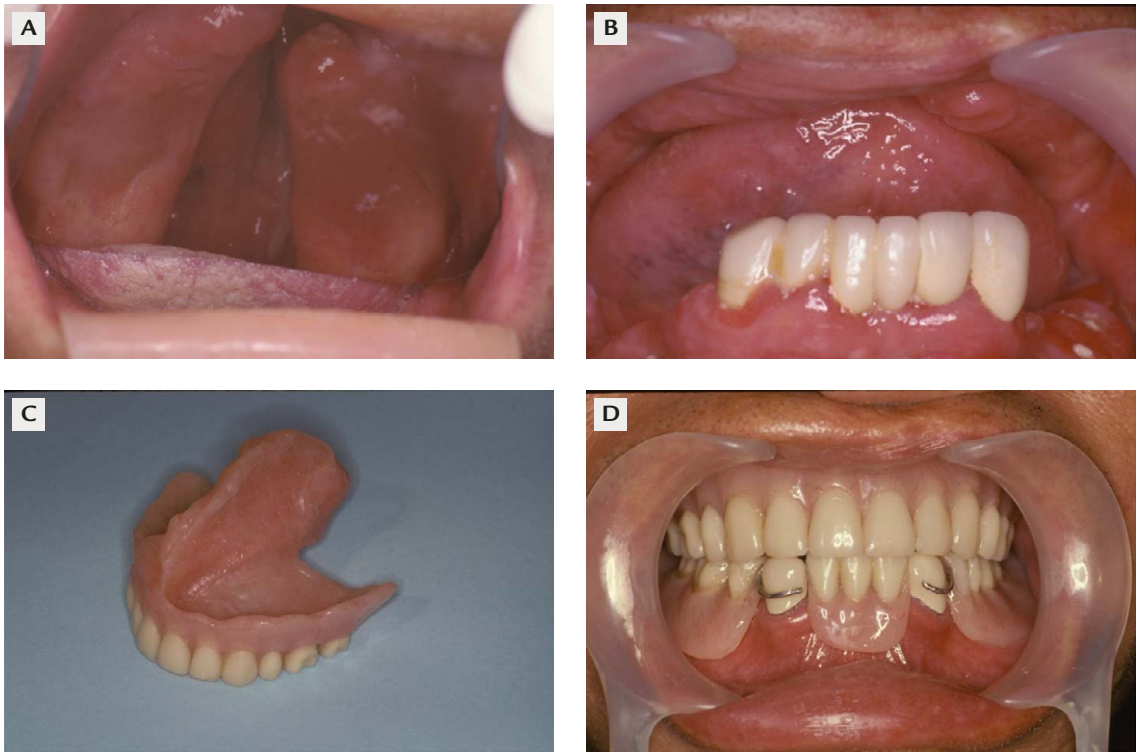

Figure 2. (A) Clinical photograph showing the large palatal cleft of the patient. (B) Clinical photograph demonstrating the remaining six mandibular anterior teeth and absence of the lower posterior teeth. (C) The in-place final prostheses including porcelain fused to metal crowns on teeth #33 and #43, bilateral mandibular removable partial denture, and maxillary compete denture with the obturator. (D) The maxillary complete denture with the superior extension of the obturator.

this design. The patient complained of swallowing pain and did not obtain any improvement in his speech function when the bulb was extended to the level of Passavant's pad. He had no intention to undergo speech therapy in the future. Therefore, the speech bulb design was abandoned. Instead, the maxillary complete denture with superior extension of an obturator was made to improve the retention and stability of the upper single denture (Figure 2D). The patient was satisfied with the upper and lower dentures after placement of the prostheses.

Discussion

The ideal protocols for prosthetic treatment of patients with a palatal defect after surgery can be divided into three stages: surgical or immediate obturator, interim obturator, and definitive obturator. Each type of obturator can fulfill the patient's needs at different stages. In case 1, neither surgical nor interim obturator was given to the patient for several reasons. First, the patient had his complete dentures made more than a decade ago. The retention, stability, or occlusal relationships of this set of dentures were all in compromised condition. However, the patient had outstanding skill to use them very well. Thus, it was not necessary to modify the old upper denture into a surgical obturator. Second, the remaining palatal tissue did not provide any undercut for the auxiliary retention of the obturator because the defect was limited to the soft palate. Third, the patient needed adjunctive radiotherapy for his palatal cancer immediately after surgery. It was difficult to let the patient go through the adaptation period for a new set of dentures. Instead, the complete denture with the posteriorly extended speech bulb was made at a later stage to restore the velopharyngeal functions of the patient.[3] The final weight of the upper denture with the speech bulb was 29.3 g, which is far heavier than the average weight of the ordinary upper complete denture.

In case 2, only two mandibular canines were worthy of being retained. The treatment options for the lower dental arch could be either an over-denture or a fixed partial denture combined with a removable partial denture. The mandibular over-denture was not the treatment of choice because the diagnostic work-up revealed both space inadequacy and severe tissue undercut in the mandibular canine regions. Finally, the patient's financial condition fitted the choice of fabrication of two surveyed crowns over a bi-canine bridge. For the maxillary single denture, it was difficult to construct a post-dam at the posterior palatal margin for the patient after several clinical trials. This resulted in an unsatisfactory posterior palatal seal for this single upper denture. However, upward extension of the obturator more or less provided a certain degree of compensation in terms of the posterior palatal seal. The final weight of the upper denture with the obturator was 31.1 g, which is even heavier than the weight of the upper denture with the speech bulb in case 1.

The retention of complete dentures predominantly comes from the proper border seal and intimate fit of the denture base. There was a concern that the extra weight due to the denture modification to improve speech function might break the border seal and cause loss of retention. Most prosthodontists agree that, except for well-designed prostheses, the patient's skill to wear complete dentures plays an important role in the stability of the dentures.[4,5] Our two patients were long-term denture users; therefore, they probably had acquired sufficient skill to use the modified dentures in terms of chewing and swallowing. However, there was no significant improvement in speech quality in case 2 after placement of the obturator prosthesis. In general, patients with a congenital palatal cleft need speech therapy, with or without cleft repair. The long-term un-repaired cleft palate deprived this patient of normal speech. To improve speech quality, the patient was strongly advised to accept a speech therapy program after placement of the prostheses.[2]

Passavant's pad is a good indicator for the proper placement of the soft palate obturator. It is a forward bulge on the posterior pharyngeal

wall, which corresponds to the level of the atlas. Although this pad is more likely to be observed in patients with velopharyngeal incompetence or insufficiency, many individuals with this deficiency do not show a prominent pad. It is not clear whether the presence of a prominent pad is a compensatory phenomenon due to long-term velopharyngeal incompetence. However, both our patients demonstrated a significant bulge on the posterior pharyngeal wall. This offered a certain degree of convenience for us to determine the posterior extension of the obturator prosthesis. If the conventional obturator prosthesis does not fulfill patients' needs, then treatment with dental implants becomes mandatory.[6,7] Both of our patients could operate the obturator prosthesis well and there was no need for them to receive further treatment with dental implants.

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