A New Membrane Obturator Prosthesis Concept for Soft Palate Defects

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When soft palate defects lead to palatal insufficiency, the patient’s quality of life is affected by difficulties swallowing, hypernasality, and poor intelligibility of speech. If immediate surgical reconstruction is not an option, the patient may benefit from the placement of a rigid obturator prosthesis. Unfortunately, the residual muscle stumps are often unable to adequately move this stiff and inert obturator to properly restore the velopharyngeal valve function. In the present case history report, a new membrane obturator concept is described: Using a dental dam to compensate for the soft palate defect, swallowing and speech were significantly improved. Int J Prosthodont 2018;31:584–586. doi: 10.11607/ijp.5755

The velopharyngeal sphincter seals the oropharynx from the nasopharynx during swallowing and speech. This three-dimensional muscular valve closes through the synergistic behavior of the soft palate and the lateral and posterior walls of the pharynx. A soft palate defect surgically acquired in the context of oral cancer may impede complete closure and lead to a palatopharyngeal insufficiency.1 The resultant airflow escape results in hypernasality, poor speech intelligibility, and swallowing problems (such as leakage of foods and fluids into the nasal airways).2 The best way to rehabilitate and restore chewing and swallowing is one of the top ten research priorities in head and neck cancer.3

When the velopharyngeal function cannot be immediately restored with surgical reconstruction, patients can benefit from an obturator prosthesis. This obturator is a rigid extension of acrylic resin positioned at the level of the hard palate that provides surface contact for the remaining musculature. Often, the residual muscle stumps cannot move adequately around this stiff and inert obturator to properly restore the velopharyngeal valve function. The resulting blockage, or free space between the tissues and obturator, is a main cause of prosthetic failure.4,5 Subsequently, in many cases, oral functions remain impaired, with a negative impact on the patient’s quality of life.1–5

The objective of this case report was to describe the use of a membrane obturator prosthesis that incorporates a dental dam to compensate for the soft palate defect.

Case History Report and Treatment

A 75-year-old male patient with a soft palate defect was referred to the Odontology and Oral Health Department of Bordeaux University Hospital Center (France) for rehabilitation in 2016. The previous month, he had undergone surgical resection of his entire soft palate following a squamous cell carcinoma diagnosis (Fig 1). The compensating treatment consisted of a provisional removable partial denture (RPD) with a membrane obturator. The rigid and central extension, composed of acrylic resin, was attached to (and in the same plane as) the RPD palatal plate (Fig 2). Its borders were trimmed such that they were 5 mm away from pharyngeal walls when contracted. A circular retention groove was made at the distal extremity of the extension, whose thickness was around 4 mm. A linear groove was machined through the RPD at the hard and soft palate junction, and small metal pin extensions were attached to the palatal plate to ensure the fixation and tension of the membrane (Fig 3). The linear groove ensured that the membrane remained flush with the prosthetic palate, thereby minimizing discomfort when swallowing. The membrane consisted of a thick dental dam (450 µm, Dental Hygienic Corporation) shaped with scissors to create a 10-mm...
overlap with the pharyngeal walls that was then perforated with four holes using punch pliers, by which the membrane was secured to the acrylic prosthesis using metal pins. The membrane covered not only the defect, but also the peripheral pharyngeal mucosa. The membrane boundaries were custom trimmed to correct for any hypernasality. The stability of the prosthesis during swallowing relied on an adequate thickness of the membrane, which varies from patient to patient.

After 6 months using the acrylic prototype, a metal frame prosthesis—including the extension—was produced and successfully implemented (Fig 4).

Discussion

Controlled nasal air flow during speech and a pharyngeal obturation during swallowing were achieved in the present patient. The rigid extension acted as a guide for the membrane (similar to a ship mast), but did not interact with the tissue walls of the defect. Furthermore, it prevented the membrane from being forced into the nasopharynx by food. This extension did not seal the opening by itself; however, the peripheral membrane acted as a valve in contact with the residual tissues when pressure or the tongue pushed it backward. The seal was enhanced by oral humidity, which facilitated adherence of the membrane to the tissues during use. Moreover, no gag reflex was reported by the patient, who was even able to suggest some membrane trimming for comfort (due to tickling sensations).

A major issue was the need for dam replacement every week due to loss of elasticity. The practitioners prepared some personalized dams and taught the patient how to replace them.
Conclusions

This new concept of a flexible obturator prosthesis for soft palate defects is promising given its ability to effectively restore speech and swallowing, allowing the patient to maintain a rewarding social and family life. More research is needed to improve fixation of the membrane to limit its aging and to quantify the benefits on quality of life.

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References


Chronic Fatigue Syndrome Patients Have Alterations in Their Oral Microbiome Composition and Function

Host-microbe interactions have been implicated in the pathogenesis of chronic fatigue syndrome (CFS), but whether the oral microbiome is altered in CFS patients is unknown. The authors of this study therefore explored alterations of the oral microbiome in Han Chinese CFS patients using 16S rRNA gene sequencing and alterations in the functional potential of the oral microbiome using PICRUSt. The authors found that the Shannon and Simpson diversity indices were not different in CFS patients compared to healthy controls, but the overall oral microbiome composition was different (multivariate analysis of variance, \( P < .01 \)). CFS patients had a higher relative abundance of Fusobacteria compared to healthy controls. Furthermore, the genera Leptotrichia, Prevotella, and Fusobacterium were enriched while Haemophilus, Veillonella, and Porphyromonas were depleted in CFS patients compared to healthy controls. Functional analysis from inferred metagenomes showed that bacterial genera altered in CFS patients were primarily associated with amino acid and energy metabolism. These findings demonstrate that the oral microbiome in CFS patients is different from healthy controls, and these differences may lead to shifts in functional pathways that have implications for CFS pathogenesis. These findings increase our understanding of the relationship between oral microbiota and CFS, which will advance our understanding of CFS pathogenesis and may contribute to future improvements in treatment and diagnosis.