

PALATAL AUGMENTATION PROSTHESIS FOR A PARTIAL GLOSSECTOMY PATIENT – A CASE REPORT

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Abstract

Partial glossectomy can significantly impact speech, swallowing, and overall oral function. Conventional complete dentures often fail to restore these functions due to insufficient tongue–palate contact. Palatal augmentation prosthesis (PAP) is a rehabilitative approach that modifies the palatal contour of the maxillary denture to reduce the distance between the tongue and palate, thereby facilitating improved articulation and bolus control. By enhancing functional contact during speech and the oral phase of swallowing, it plays a crucial role in restoring phonetics and deglutition. Various techniques have been described for its fabrication; however, functional recording methods that capture dynamic tongue movements are considered more effective in achieving optimal outcomes. This case report highlights the importance of individualized prosthetic design in improving oral function and quality of life in patients with compromised tongue mobility.

Keywords: palatal augmentation prosthesis, partial glossectomy, complete denture

Introduction

Complete dentures aim to restore function, form, esthetics, phonetics and maintenance of health in edentulous patients¹. However, in certain conditions such as reduced tongue mobility, neuromuscular disorders, partial glossectomy, or age-related tongue atrophy, patients may experience difficulty in speech articulation and swallowing even after conventional denture rehabilitation.

Palatal augmentation prosthesis is a removable maxillofacial prosthesis that alters the hard and/or soft palate's topographical form adjacent to the tongue; it allows reshaping of the hard palate to improve tongue/palate contact during speech and swallowing to compensate for impaired tongue mobility as a result of surgery, trauma, or neurological or motor deficits². Modification are designed to reshape the palatal contour of the maxillary denture, thereby reducing the distance between the tongue and palate.

After surgery, tongue movement may be reduced due to tissue loss or nerve damage, causing

difficulty in speech and food control. In some cases, the tongue may deviate or have limited movement.³ Swallowing and phonetics can be improved by augmenting the palatal surface of the denture.

Palatal augmentation prostheses can be fabricated using various techniques. Dawis 1987⁴ extended the palatal portion inferiorly using modeling wax, which was subsequently replaced with autopolymerizing acrylic resin and further refined over several weeks until the desired contour was achieved.

This case report describes fabrication of a maxillary complete denture with palatal

augmentation in a partial glossectomy patient to improve phonetics and oral functions.

Case Report

Patient History and Examination

A 62-year-old male patient reported to the Department of Prosthodontics, Rajas dental college and hospital with a chief complaint of missing teeth in upper and lower tooth region for past 3 years. Patient revealed history of carcinoma tongue and partial resection was done 4 years back. Patient was under radiotherapy and completed 3 years back. Post radiation changes led to progressive loss of dentition that resulted in completely edentulous state.



Fig. 1. Intraoral view of the maxillary edentulous arch with bulky bony ridge



Fig. 2. Intraoral view of the mandibular edentulous arch and partial glossectomy defect

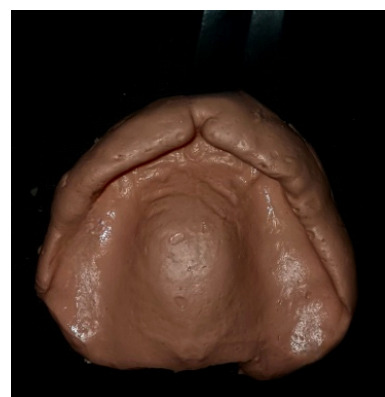


Fig. 3. Primary impression of the maxillary arch made with irreversible hydrocolloid



Fig. 4. Primary impression of the mandibular arch made with irreversible hydrocolloid

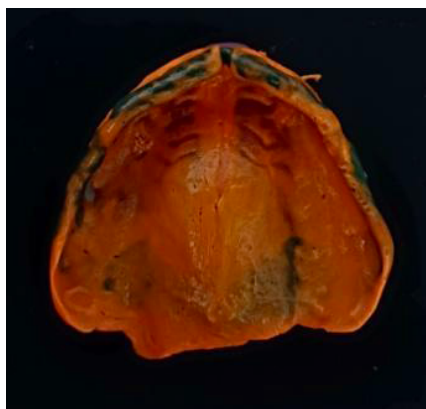


Fig. 5. Final maxillary impression made with light-body silicone impression material



Fig. 6. Final mandibular impression made with light-body silicone impression material

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Intraoral examination revealed completely edentulous maxillary and mandibular arches with bulky and bony ridges (Fig.1,2). Soft tissue examination revealed partial glossectomy along the right side and patient exhibited reduced tongue mobility and difficulty in pronouncing sounds such as /t/, /d/, and /th/.

Clinical Procedure

Primary impressions of both arches were made using irreversible hydrocolloid impression material (Fig. 3,4) and diagnostic casts were obtained. Custom trays were fabricated on the diagnostic casts. Border molding was performed using low-fusing impression compound to record functional vestibular extensions. Final

impressions were made using light body silicone impression material (Fig.5,6) to obtain accurate master casts. Occlusion rims were fabricated and maxillomandibular jaw relation was recorded. Vertical dimension and centric relation were established. Teeth were arranged following conventional complete denture principles and a try-in was conducted (Fig.7) to evaluate esthetics, phonetics, and occlusion.

During the try-in procedure, silicone putty material was added to the palatal surface of the maxillary denture in the region corresponding to the tongue contact area (Fig.8). The patient was instructed to perform speech movements by pronouncing /t/, /d/, and /th/ and swallowing



Fig. 7. Maxillary and mandibular complete denture try-in for evaluation of esthetics, phonetics, and occlusion



Fig. 8. Silicone putty added to the palatal surface of the maxillary trial denture for functional recording of the tongue-palate contact area



Fig. 9. Duplicated trial denture with the functional palatal record and dental stone cast



Fig. 10. Silicone putty index made over the functional palatal record and covering the artificial teeth

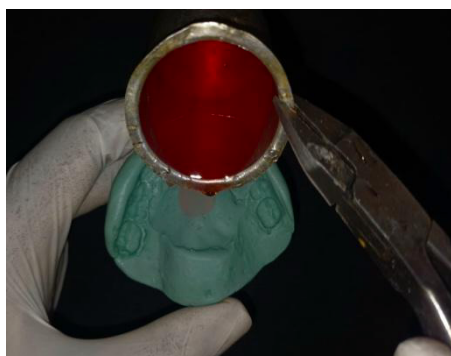


Fig. 11. Molten modelling wax poured into the silicone putty index of the functional palatal record



Fig. 12. Silicone putty index positioned over the trial denture base during fabrication of the wax palatal record

actions. The process was repeated till the patient pronounced them correctly.

After functional recording of the palatal contour the trial denture with palatal record was duplicated by using irreversible hydrocolloid impression material and cast was poured with dental stone (Fig. 9). Then silicone putty index was made over the palatal record covering the artificial teeth (Fig. 10). Modeling wax was placed in wax bath and molten wax was poured into the putty index of the palatal record (Fig. 11). After initial cooling the index was placed over the trial denture base (Fig. 12) and after setting of the wax the index is removed.

The excess wax over the palate and teeth were removed and trial denture with wax palatal record (Fig.13,14) was tried in the patient

mouth for phonetics and swallowing and corrected if necessary. After confirmation of the functional palatal contour, the dentures were processed using heat-activated acrylic resin (Fig.15-17). The palatal contour was preserved during processing. The dentures were inserted (Fig.18,19) and evaluated for retention, stability, occlusion, and phonetic performance. Necessary adjustments were made, and the patient was given instructions for denture maintenance. The patient was recalled after 2 weeks for follow-up evaluation.

Quality of life assessment

During the second week follow up, quality of life assessment was done by using University of Washington Quality of Life Questionnaire (UW-QoL v4). The translated and validated

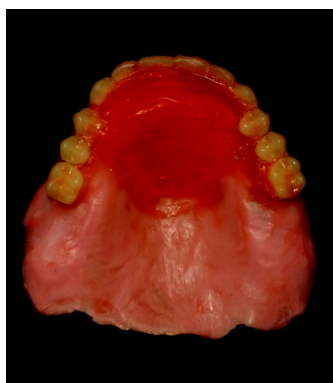


Fig. 13. Trial denture with the fabricated wax palatal record after removal of excess wax



Fig. 14. Intraoral try-in of the wax palatal record for evaluation of phonetics and swallowing



Fig. 15. Processed complete dentures fabricated using heat-activated acrylic resin



Fig. 16. Processed maxillary complete denture showing the augmented palatal contour



Fig. 17. Processed mandibular complete denture



Fig. 18. Intraoral view of the inserted complete dentures

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questionnaire⁵ was given in patients own language (Tamil) and evaluated.

Patient's ability to chew and swallow has improved considerably. Previously, he had difficulty with phonetics and now, he has better pronunciation and speech clear enough to be understood. His salivary consistency is within normal limits.

Discussion

Partial glossectomy significantly impairs mastication, swallowing, and speech due to



Fig. 19. Intraoral view demonstrating the palatal augmentation prosthesis and functional tongue–palate relationship

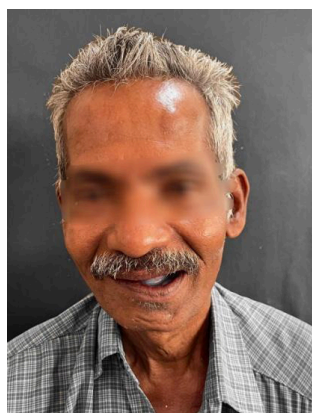


Fig. 20. Extraoral view of the patient before prosthetic rehabilitation



Fig. 21. Extraoral view of the patient after prosthetic rehabilitation with the complete dentures

reduced tongue mass and mobility. The residual tongue's inability to achieve sufficient palatal contact affects bolus control and articulation⁶, which impacts overall oral function and quality of life. A proper swallowing cycle needs adequate pressure against the palate and contact between the tongue and the palate during the oral phase. It is not possible in cases with resected tongue due to its limited mobility. Logemann 1989⁷ found that intra oral reshaping of prosthesis resulted to improve swallow efficiency in patients who had undergone resection.

The articulation of certain parts of the tongue and palate is also necessary for pronouncing various sounds, which is necessary for good intelligible speech. Pound 1950⁸ stated that anterior palatal region has an important role in pronouncing of consonants. He also termed that area 'play ground' of tongue as 90 % of tongue's rapid manipulation while talking was restricted to this area and area lingual to lower anterior teeth.

Palatal augmentation prosthesis (PAP) is a rehabilitative approach that modifies the palatal contour to improve tongue–palate contact. This facilitates efficient bolus propulsion during swallowing and enhances speech intelligibility by restoring articulation points⁹. The effectiveness of PAP depends on recording a palatal contour compatible with the functional movements of the residual tongue.

Abdulhadi 2012¹⁰ in a case report augmented palate by using tissue conditioning material which was added layer by layer performing functional tongue articulatory movements and after 3 days of denture usage the functional record was replaced with heat cured acrylic resin.

Lampe 2016¹¹ in a case report used irreversible hydrocolloid impression material to record functional movement of the resected tongue. Application of this material is easy and the setting

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time is long enough to give adequate time for functional movements of the tongue. However, the process of converting the hydrocolloid record into a wax record was not clearly described.

Considering the shortcomings of these methods a modified approach was framed in this case by using condensation silicone impression material to perform tongue movements recording which was then duplicated with irreversible hydrocolloid impression material and poured with type III gypsum onto which another index was made using condensation silicone and poured with molten modelling wax. Palatal augmentation prosthesis fabricated by this method showed improved swallowing and speech articulation that results in better prosthetic function and also an impact on quality of life. The use of a hollow palatal augmentation prosthesis may improve patient comfort by reducing prosthesis weight without compromising functional efficiency. Bin Li 2025¹² in a case report duplicated existing PAP using scanning and 3D printing and delivered. The oral hypofunction test yielded satisfactory results.

Long-term follow-up is crucial in patients treated for squamous cell carcinoma due to the potential for recurrence and ongoing tissue alterations. Additionally, case reports are limited by their reliance on subjective outcome assessments and the absence of objective, quantitative functional measurements. Overall, palatal augmentation prosthesis constructed using this functional technique can effectively enhance oral functions in patients with resected tongue. The selection of technique may be guided by clinician preference and individual patient factors. Patient participation during functional shaping and an adequate adaptation period also play crucial roles in achieving optimal treatment outcomes.

Conclusion

A palatal augmentation prosthesis is a simple but functionally transformative solution for oral

rehabilitation after partial glossectomy. PAP may significantly improve speech intelligibility, swallowing efficiency and general oral function by restoring effective tongue-palate contact through an individualized palatal contour. Furthermore, functional recording techniques that capture dynamic tongue movements enable accurate prosthetic adaptation to the patient's specific functional limitations. Therefore PAP should be considered not only as a denture modification but also as a functional prosthesis specific for the patient to restore confidence, communication and quality of life in those with impaired tongue mobility.

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