A Case Report

Innovative Management of Xerostomia in Edentulous Patients: A Case Report on the Fabrication of a Maxillary Salivary Reservoir Complete Denture

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Abstract

Background:

Xerostomia, a prevalent condition impacting nutrition, dental health, and psychological well-being, often presents challenges such as glossitis, mucositis, and difficulty in oral functions.

The poor retention and tolerance of removable dental prostheses in xerostomic patients exacerbate these issues. This paper introduces an innovative technique, incorporating a salivary reservoir into the maxillary complete denture which provides effective lubrication of oral tissues and is easily cleansed by the wearer.

By addressing the fundamental issue of inadequate lubrication due to reduced salivary flow, this technique has the potential to revolutionize the management of xerostomia-related complications.

This practical and accessible solution offers promise for prosthodontic practitioners seeking improved outcomes in the care of xerostomia-affected patients.

Keywords: Salivary Reservoir Denture, Xerostomia Management, Edentulous Patient, Maxillary Salivary Reservoir

Introduction

Xerostomia as defined by the glossary of prosthodontic terms 10 is a person's perception and subjective symptom that there is a dryness across the oral cavity; this may occur in the presence or absence of hypo-salivation.[1] It disrupts the normal homeostasis of the oral cavity, leading to changes in the taste, difficulty in speech, difficulty in swallowing, and decreased dietary intake.[2]These changes adversely affect the patient's health and overall quality of life. Moreover, the absence of saliva as a thin film between the dentures and the oral mucosa decreases retention of the dentures and increases inflammation and ulceration in the oral cavity. Hence, complete dentures are often poorly tolerated in patients with xerostomia .[3,4]

Several treatment options are available to the clinician depending on the etiology of xerostomia. Most cases require symptomatic treatment and include changes in dietary pattern, patient counseling, lifestyle modifications, salivary stimulants, and use of salivary substitute. A salivary reservoir denture is an effective solution in edentulous patients with xerostomia to deliver salivary substitute constantly into the patient's mouth without affecting the normal routine.[5]This article describes a simple and innovative technique for fabrication and designing of a functional maxillary salivary reservoir complete denture for a patient with xerostomia.

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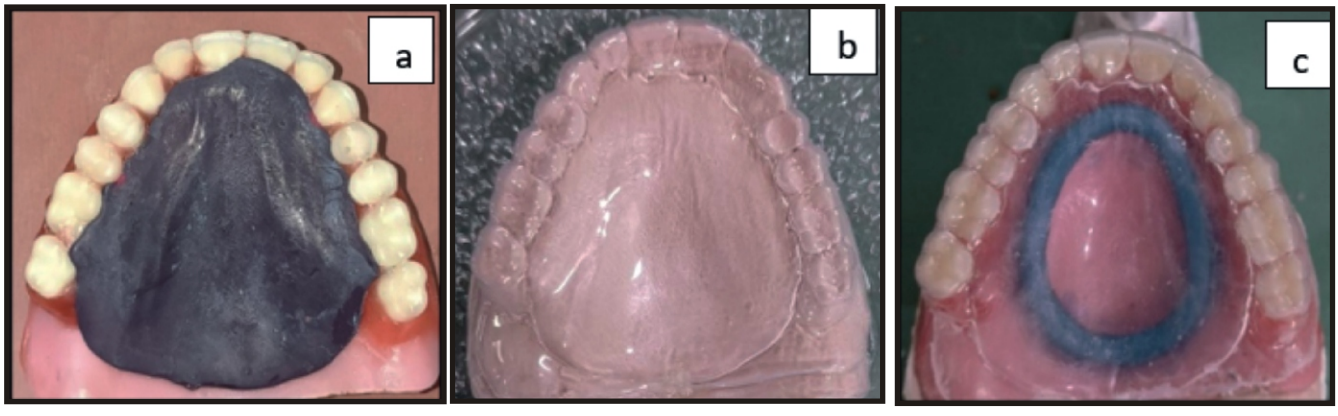
Case Report

A 55 year old male patient reported to the Department of Prosthodontics complaining of dry mouth and difficulty in mastication and swallowing and desired replacement of missing teeth. Patient had been on anti-hypertensive medication since 30 years and was a chronic smoker. Intraoral examination revealed completely edentulous upper and lower arch. It was decided to fabricate a salivary reservoir complete denture in the maxilla containing salivary substitute to relieve xerostomia and aid the patient in the daily activities. Importance of using a modified form of denture was explained to the patient and this was well accepted by the patient.

Procedure

1. Till try-in stage, steps were similar as that for conventional denture fabrication i.e.Primary impression followed by secondary impression (in this case with Detaseal function, addition silicone for border molding), and then jaw relation were recorded.
2. Palatal contours (palatogram) were recorded in trial denture using impression compound mixed with green stick at the try-in appointment.Palatolingual consonant sounds were used with vowel "O",eg: SO, SHO, CHO, NO, KO, TO, DO etc. Vowel "O" was combined with other consonants to avoid multiple recordings of tongue to palate as tongue does not make any contact with palate during its pronunciation (Allen's protocol).[6](Fig. 1.a)
3. The trial denture with its modified palatal contours was duplicated in alginate and a working cast was poured in Type IV Dental Stone.
4. A template of 1-mm thick thermoplastic material (BIOPLAST®, India) was fabricated on this working cast which served as a guide for salivary reservoir designing. (Fig. 1.b)
5. The palatogram on the palatal surface of the trial denture was removed. The reservoir walls and lid rim were built with sprue wax. (Fig. 1.c) A slight undercut was made on the external surface of the lid rim using a carver to facilitate attachment for the flexible lid of the reservoir. The reservoir was filled with liquid and then aspirated with a syringe at this stageto assess the available volume for salivary substitute which was 4 ml in this case.
6. The trial denture with reservoir wall in sprue wax was processed in heat cure acrylic resin(DPI heat cure, Dental Products of India, Mumbai, India). (Fig. 1.d)
7. Putty impression was made of reservoir wall after refinement of undercut to obtain a second working cast made of Type IV Die stone. (Fig. 1.e,f)
8. The reservoir space was blocked out with the help of putty.The reservoir lid was fabricated with a 1.5-mm flexible thermoplastic sheet (BIOPLAST®) on the second working cast of the reservoir wall. (Fig. 1.g)
9. A 0.8- mm release hole was made on the most dependent portion using a straight fissure bur. This permitted slow and continuous release of the salivary substitute.
10. The reservoir was filled with salivary substitute (methyl cellulose – wet mouth, ICPA) using a calibrated 2ml syringe and was covered with reservoir lid. (Fig. 1.h) The salivary substitute was released when the tongue creates pressure in the anterior portion of the palate.
11. The functional maxillary salivary reservoir complete denture was inserted and post insertion instructions were explained to the patient. (Fig 2)



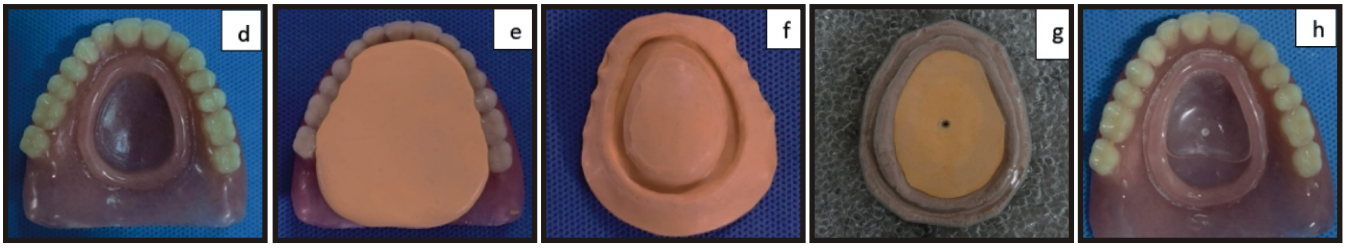


Figure 1. Steps in fabrication of maxillary salivary reservoir complete denture (a) Palatal contours recorded in trial denture (b) Template of 1- mm thick thermoplastic material fabricated on working cast as index © Wax-up of reservoir walls and lid rim with sprue wax. (d) Finished and polished maxillary denture with reservoir walls on the palatal aspect of the denture. (e) and (f) putty impression of reservoir wall after refinement of undercut for fabrication of reservoir lid (g) Reservoir lid fabricated with 1.5mm flexible thermoplastic sheet on duplicated cast of the denture. (h) Polished surface of maxillary salivary reservoir complete denture with salivary substitute and reservoir lid

Instructions to the Patient

- To clean the reservoir and the lid using soft bristled toothbrush and toothpaste daily.
- Refilling the reservoir with salivary substitute using 2ml syringe with due care.
- To make a conscious effort to consume at least eight glasses of water, lemon juice, or milk.
- Post insertionfollow up was scheduled on the next day and regular recall visits were planned every month.

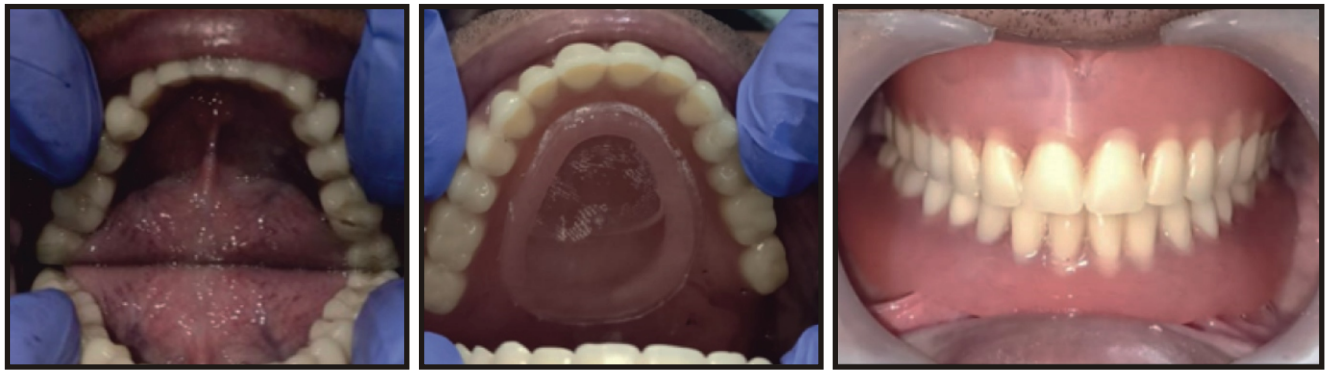


Figure 2. Intraoral view of maxillary salivary reservoir complete denture with salivary substitute and intraoral view of complete dentures in occlusion.

Discussion

Xerostomia can create an unhealthy oral environment and may contribute to or worsen painful oral conditions.[4]. The primary objective in managing xerostomia is to minimize the patient's discomfort and facilitate the comfortable use of dentures in performing regular oral functions.[5]

A reservoir denture with a salivary substitute provides an alternative method for treating xerostomia, ensuring a slow, sustained, and continuous release of the substitute.[7]Salivary substitutes can be categorized into carboxymethyl cellulose-based and mucin-based options, with the former being more commonly used due to cost-effectiveness and availability.[8] Examples of commercially available substitutes include Wet Mouth, Saliveze, Salivart, Moi-Stir, and Salix.

Several authors have proposed methods for integrating a reservoir into dentures using attachments like Lego blocks[9], magnets[10], or precision attachments[11]. While these approaches have proven successful, they come with drawbacks such as elevated costs, heightened complexity, and sensitivity to technique.

The technique presented here, however, is straightforward making it easy to implement and exclusion of attachments enhances its simplicity and renders it a cost-effective technique. This case report validates the fabrication technique for a maxillary denture with a salivary reservoir, offering significant benefits for xerostomicpatients.[12]The reservoir chamber allowed for a controlled flow of artificial saliva, with a volume of 4 mL and a working duration of 2 hours. Compared to a mandibular reservoir, a maxillary reservoir has advantages such as a larger size and saliva flow throughout the entire mouth rather than being restricted to the floor of the mouth. [13]

However, it's essential to note that incorporating a reservoir in the maxillary denture may increase its weight, potentially affecting retention and stability.[14]Another limitation is that Itmakes dentures bulky, and the patient must regularly introduce artificial saliva into the dentures. Additionally, extra laboratory steps are necessary, and both the dentures and reservoir demands meticulous cleaning.[14, 15]

Conclusion

This article reports a simple and innovative technique for the construction of functional salivary reservoir in maxillary denture. Xerostomic patients wearing prosthesis can benefit immensely from this as it will enhance the oral health and quality of life of such patients.

References

1. The glossary of prosthodontic terms 10 2023 edition. J. Prosthet. Dent. VOLUME 130, ISSUE 4, SUPPLEMENT 1, E1-E3, OCTOBER 2023
2. Greenberg, M. S. , and Glick M.. 2003. Burket's oral medicine diagnosis & treatment. 10th ed. Pp. 236–237. BC Decker Inc, New York.
3. Zarb, G. A. , Bolender C. L., Eckert S. E., Fenton A. H., Jacob R. F., and Mericske- Stern R.. 2004. Prosthodontic treatment for edentulous patients. 12th ed. Pp. 27, 57–58. Mosby, St. Louis.
4. Arslan, A. ,Orhan K., Canpolat C., Delilbasi C., and Dural S.. 2009. Impact of xerostomia on oral complaints in a group of elderly Turkish removable denture wearers. Arch. Gerontontol. Geriatr. 49:263–267.
5. S. Winkler, Essentials of Complete Denture Prosthodontics, Saunders Elsevier, Philadelphia, Pa, USA, 2nd edition, 2012
6. Allen LR. Improved phonetics in denture construction. J Prosthet Dent. 1958;8:753–63.
7. Vissink, A. , 's- Gravenmade E. J., Panders A. K., Olthof A., Vermey A., Huisman M. C., et al. 1984. Artificial saliva reservoirs. J. Prosthet. Dent. 52:710–715.
8. Covington, J. S. , Slagle W. F., and Disney A. L.. 1985. Complete denture salivary fluid reservoirs: a novel approach to xerostomia relief. J. Dent. Res. 64(Special issue):242.
9. Mendosa AR, Tomlinson MJ: The split denture: a new technique for artificial saliva reservoirs in mandibular dentures. Aust Dent J 2003;48:190-194
10. Sinclair GF, Frost PM, Walter JD: New design for an artificial saliva reservoir for the mandibular complete denture. J Prosthet Dent 1996;75:276-280
11. Modgi CM, Aras MA: An innovative design of 2-piece saliva reservoir using precision attachment: a case report. J Indian ProsthodontSoc 2012;12:260-263
12. Joseph AM, Joseph S, Mathew N, Koshy AT. Functional salivary reservoir in maxillary complete denture - technique redefined. Clin Case Rep. 2016 Oct 11;4(12):1082-1087. doi: 10.1002/ccr3.640. PMID: 27980737; PMCID: PMC5134153.
13. Toljanic, J. A. , and Zucuskie T. G.. 1984. Use of a palatal reservoir in denture patients with xerostomia. J. Prosthet. Dent. 52:540–544.
14. Gurkar H, Venkatesh OY, Somashekar JM, Gowda MH, Dwivedi M, Ningthoujam I. Prosthodontic Management of Xerostomic Patient: A Technical Modification. Case Rep Dent. 2016;2016:8905891. doi: 10.1155/2016/8905891. Epub 2016 Feb 10. PMID: 26977325; PMCID: PMC4764727.
15. Shah, R. M. , Ajay Aras M., andChitre V. 2015. An innovative and simple approach to functional salivary reservoir fabrication. J. Prosthodont. 24:339–342. [PubMed] [Google Scholar]