International Journal Dental and Medical Sciences Research
Volume 5, Issue 3, May - June 2023 pp 681-686 www.ijdmsrjournal.com ISSN: 2582-6018

Maxillary reservoir denture - Prosthetic management of xerostomic patients

Dr. Kritika Pandey, Dr. Pankaj Datta, Dr. Jyoti Gupta, Dr. Mayank Aggarwal

[1,3,4] Post graduate student Department of Prosthodontics, Inderprastha Dental College and Hospital, Sahibabad

[2] Dean, Professor & HOD Department of Prosthodontics, Inderprastha Dental College and Hospital, Sahibabad

Date of Submission: 10-06-2023 Date of Acceptance: 25-06-2023

ABSTRACT
Xerostomia is the subjective sensation of oral dryness, usually, associated with hyposalivation. The difficulties encountered can be troublesome and at times and may lead to complete failure of the prosthesis due to poor tolerance and retention of removable dental prosthesis because of thin dry atrophic mucosa and lack of a salivary film. The present clinical report of xerostomic edentulous patient involves full mouth denture rehabilitation with incorporation of a salivary reservoir in the denture in which a salivary substitute is added which improved the denture retention, comfort, mastication and speech of the patient.

Keywords: Xerostomia, Reservior Denture, dry mouth, lubrication

I. INTRODUCTION

Xerostomia is defined as dryness of the mouth from lack of normal secretions (GPT-5).[1] Xerostomia is not a disease, but can be a symptom of various medical conditions. It is a subjective feeling of oral dryness.[2] Xerostomia is a common complain found often among older adults. It disrupts the normal homeostasis of the oral cavity and produces serious negative effects on the patient's quality of life by affecting dietary habits, nutritional status, speech, taste and tolerance to dental prosthesis and increasing the risk of oral infection, including candidiasis, burning mouth and susceptibility to dental caries, periodontal disease and tooth loss.[3]

Saliva is a viscous, akaline, transparent liquid secreted by cells of the salivary glands. It is composed of 98% water. The rest 2% is composed of mucus, glycoproteins, enzymes, antibacterial and bacterial compounds such as secretory IgA and lyzoenzyme. It plays a critical role in retention of dentures due to its lubricating function.[4]

In the absence of saliva (as a thin film) between the dentures and the oral mucosa, there is decrease retention of the dentures and increases inflammation and ulceration in the oral cavity.[2]

Incorporation of artificial salivary reservoir in dentures has been proposed in patients suffering from Xerostomia which makes denture wearing a successful.[5] In this article, fabrication of a palatal reservoir, was made from routine denture materials which effectively lubricates the oral tissues and improves the overall comfort and function of the denture.

Etiology

Xerostomia is a subjective complaint, often referred to as reduced salivary flow. It may be a result of systemic conditions like Sjogren's syndrome, salivary gland diseases, Systemic illness (e.g.-Diabetes mellitus, Nephritis, Thyroid dysfunction), Parkinson's disease, dysfunction of immune system like HIV/ AIDS, due to head and neck radiation or medication-related side effects Like Anticholinergic agents (eg.atropine) and sympathomimetic agents (eg.tricyclic antidepressants, bronchodilators and antihistamines and Antiemetics).[6,7]

II. CASE REPORT

A 68 year old female patient reported to the Department of Prosthodontics and Crown & Bridge in Inderprastha Dental College and Hospital, Ghaziabad, Uttar Pradesh with the chief complaint of dryness of mouth and discomfort while speaking and eating. Medical history revealed that patient was diabetic and hypertensive and on medication for the same. Past dental history revealed that patient was edentulous past 7 years.

On examination maxillary ride was moderately resorbed while there was severe resorption of mandibular ridge{Figure 1: (a) & (b)} with the inter-ridge distance more than normal. The old denture of the patient was very heavy as well as non-retentive.

International Journal Dental and Medical Sciences Research
Volume 5, Issue 3, May - June 2023 pp 681-686 www.ijdmsrjournal.com ISSN: 2582-6018

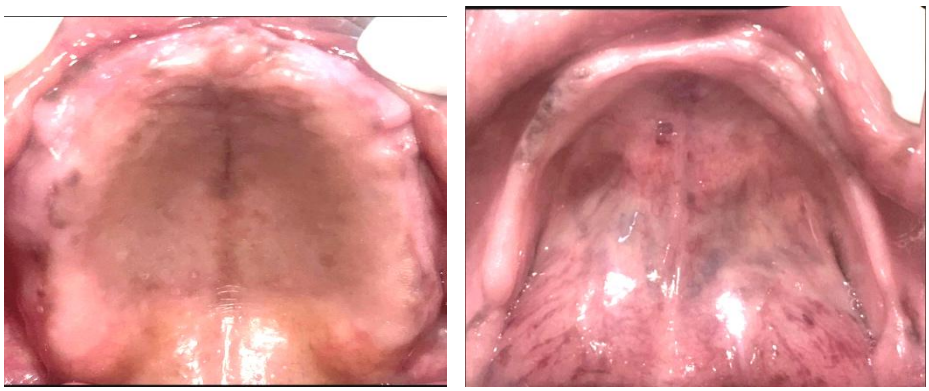

Figure 1: (a) Edentulous maxillary ridge (b) Edentulous mandibular ridge

Procedure

1. The primary impression was made with impression compound. Custom trays were fabricated, border molding was done, and secondary impressions were made in light body elastomeric impression material (Aquasil Ultra LV Dentsply Caulk)
2. Occlusal rims were fabricated and jaw relation was obtained. Teeth were arranged on occlusal rims and try-in was done.
3. 2-mm thickness of modeling wax was adapted over the palatal surface of the maxillary denture base (Figure 2).
4. The reservoir was created by removing the center of the palatal wax (Figure 3). This assembly was processed with heat cured acrylic resin (Figure 4) then cured denture was finished and polished (Figure 5).
5. Extra 2-mm bulk of wax was added over reservoir space (Figure 6) and Separting media was applied over the wax (Figure 7).
6. Another layer of wax was added on the previous layer and lid was made (Figure 8) and the lid was cured separately using heat cure acrylic resin (Trevalon, Dentsply) (Figure 9 and 10).
7. After acrylization, finishing was done. The processed lid was permanently attached to the reservoir area with the help of self-cure resin (Figure 11). The final assembly was polished and the mandibular denture was cured by conventional technique of heat cured acrylic resin (Figure 12).
8. Two 0.8mm release holes were made on the lid with straight fissure bur on palatal aspect of the denture. This permits slow and continuous release of salivary substitute (Figure 13).
9. Betadine solution was added to check for any obstruction and processing errors (Figure 14).
10. Artificial saliva substitute (wet mouth, ICPA Health Products Ltd., MUMBAI, INDIA) was then used for filling the reservoir space (Figure 15).

Figure 2: 2mm thick modeling wax was adapted over the palatal area

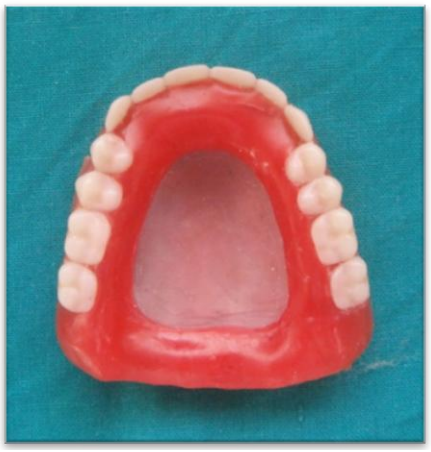

Figure 3: The reservoir was created by removing the center Palatal wax

International Journal Dental and Medical Sciences Research
Volume 5, Issue 3, May - June 2023 pp 681-686 www.ijdmsrjournal.com ISSN: 2582-6018

Figure 4: Assembly was processed with heat cured acrylic resin

Figure 5: Cured denture after finishing and polishing

Figure 6: Wax was poured into the reservoir space of 2mm thickness

Figure 7: Separting media was applied over the wax

Figure 8: Another layer of wax was added on the previous layer and lid was made

Figure 9: Second layer of wax (lid) was processed with heat cure acrylic resin

International Journal Dental and Medical Sciences Research
Volume 5, Issue 3, May - June 2023 pp 681-686 www.ijdmsrjournal.com ISSN: 2582-6018

Figure 9: Second layer of wax (lid) was processed with heat cure acrylic resin

Figure 10: Heat cured maxillary denture and lid

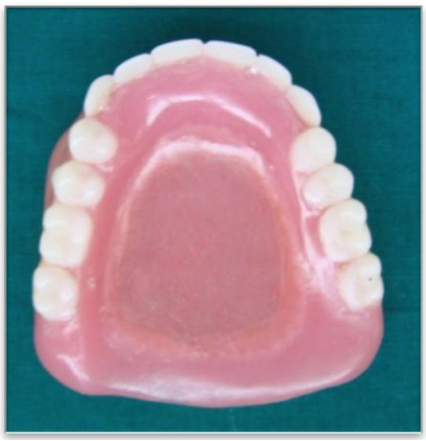

Figure 11: Lid was permanantly attached to the denture with the help of self cure acrylic resin

Figure 12: The complete assembly was smoothed and given a final polish

Figure 13: 0.8mm release holes were made on the lid with straight fissure bur

Figure 14: After injecting betadiene solution in the reservoir space

International Journal Dental and Medical Sciences Research
Volume 5, Issue 3, May - June 2023 pp 681-686 www.ijdmsrjournal.com ISSN: 2582-6018

Figure 15: Intraoral picture with maxillary reservoir denture and mandibular conventional denture

Figure 16: Extraoral picture of patient before and after the removal prosthesis

Instructions to the patient

1. Postinsertion instructions were given to the patient regarding oral and denture care.
2. The patient was instructed about the cleaning of the reservoir and the lid using soft bristled toothbrush and toothpaste.
3. The patient was instructed about refilling the reservoir with salivary substitute with due care.
4. The patient was advised to flush out the reservoir with 1% sodium hypochlorite solution once a week
5. The patient was told to fill the reservoirs 3–4 times a day with artificial saliva
6. The patient was asked to make a conscious effort to consume at least eight glasses of water, lemon juice, or milk.
7. Postinsertion check up was scheduled on the next day and regular recall visits were planned for 3 months.

After a 3 month follow- up, the treatment was found to be satisfactory as the patient has found a great reduction in the symptoms of xerostomia and found it easy to use and clean the denture.

III. DISCUSSION

The average daily production of whole saliva in healthy individual varies between 1 and 1.5 L. The normal flow rate for unstimulated saliva is 0.3 to 0.5 ml/min and for the stimulated saliva it is 1 to 2 ml/min.Values less than 0.1 ml/min are typically considered as xerostomia. [8] The goal in management of the xerostomia is to reduce the suffering from the disease and make wearing of dentures and performing normal oral functions comfortable for the patients. At the same time priority should be given to retention and stability of the dentures. The reservoir denture containing salivary substitute offers an alternative method of treating patients suffering from xerostomia with a slow, sustained, and continuous release of salivary substitute.[9]

The most important factor before considering the maxillary denture for the fabrication of a reservoir is the amount of interarch space. In cases of the shallow palatal vault, the utilization of palatal reservoir is contraindicated. The major problem associated with a palatal reservoir is increased palatal thickness which leads to a constricted oral space. This further leads to difficulty in swallowing and speech alteration.

Several authors have recommended many approaches to fabricate reservoir dentures in either the maxillary denture or mandibular denture. Sinclair et al [10] used cobalt samarium magnets to connect the lower and upper part of the mandibular

reservoir denture. However, the procedure required exhaustive laboratory steps. AR Mendoza et al[11] described a reservoir denture that splits into two sections – a clear acrylic base section which contains the reservoirs and a pink acrylic upper section which contains the denture teeth. It provides constant salivary flow for the patient. Verma et al[12] used a similar method of fabricating a salivary reservoir where the acrylic base and denture teeth were two different parts joined with the help of precision buttons. Hirvikingas et al[13] modified the Vissink method of fabricating salivary reservoir and used a Gerber attachment. However, the precision attachment increased the cost of the treatment. In the current case, a reservoir denture was fabricated that had minimal laboratory procedures, and refilling the salivary substitute into the reservoir did not deem cumbersome for the geriatric patient.

IV. CONCLUSION

This is a simple method of fabricating a salivary reservoir and also an economic option for the management of xerostomia. The patient was satisfied with the results as was noted in the follow-up appointments.

REFERRENCE

[1]. J Prosthet Dent . 2005. The glossary of prosthodontic terms. J. Prosthet. Dent. 94:10–92.
[2]. Sultana, N. , and Sham E. M.. 2011. Xerostomia: an overview. Int. J. Dent. Clin. 3:58–61.
[3]. Guggenheimer J, Moore PA. Xerostomia: etiology, recognition and treatment. J Am Dent Assoc. 2003 Jan;134(1):61-9; quiz 118-9.
[4]. Iorgulescu G. (2009). Saliva between normal and pathological. Important factors in determining systemic and oral health. Journal of medicine and life, 2(3), 303–307.
[5]. Vissink A. , 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.
[6]. Tanasiewicz M, Hildebrandt T, Obersztyn I. Xerostomia of Various Etiologies: A Review of the Literature. Adv Clin Exp Med. 2016 Jan-Feb;25(1):199-206.
[7]. Chambers MS, Rosenthal DI, Weber RS. Radiation-induced xerostomia. Head Neck. 2007 Jan;29(1):58-63.
[8]. Brosky ME. The role of saliva in oral health: Strategies for prevention and management of xerostomia J Support Oncol. 2007;5:215–25
[9]. Villa A, Connell CL, Abati S. Diagnosis and management of xerostomia and hyposalivation. Ther Clin Risk Manag 2015;11:45-51.
[10]. Joseph AM, Joseph S, Mathew N, Koshy AT. Functional salivary reservoir in maxillary complete denture – Technique redefined Clin Case Rep. 2016;4:1082–7
[11]. Eisbruch A, Rhodus N, Rosenthal D, Murphy B, Rasch C, Sonis S, et al The prevention and treatment of radiotherapy – Induced xerostomia Semin Radiat Oncol. 2003;13:302–8
[12]. Vergo TJ Jr. , Kadish SP.Dentures as artificial saliva reservoirs in the irradiated edentulous cancer patient with xerostomia: A pilot study Oral Surg Oral Med Oral Pathol. 1981;51:229–33
[13]. Upadhyay SR, Kumar L, Rao J. Fabrication of a functional palatal saliva reservoir by using a resilient liner during processing of a complete denture J Prosthet Dent. 2012;108:332–5