ABSTRACT

Saliva plays a vital role in retention of complete denture. Reduced flow of saliva also called as xerostomia is the most common symptom of middle aged and old age group people. Xerostomia can cause serious difficulties to edentulous patients wearing complete denture as it not only affects retention but also makes the oral mucosa more prone to injury. This article gives a simple and cost-effective technique of maxillary salivary reservoir denture to treat the xerostomia and gives patient comfort of wearing a complete denture to improve the patient’s quality of life.

Keywords: Xerostomia, salivary reservoir denture, complete denture.

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**INTRODUCTION**

“Saliva is a clear, tasteless, odourless slightly acidic viscous fluid, consisting of secretions from the parotid, sublingual, submandibular salivary glands and mucous glands of oral cavity”. Saliva plays an important role in maintaining the integrity of oral tissues, it also aids in swallowing, speech and deglutition. In prosthodontic point of view saliva plays a vital role in retention of complete denture. The physical forces of retention in which saliva is involved are adhesion, cohesion, interfacial surface tension, capillarity and atmospheric pressure, which majorly aid in retention of complete denture.¹,²

Dry mouth sensation is subjective and it is known as xerostomia. The victims of xerostomia are middle or old age group people and patients with systemic diseases. It is objectively demonstrated as reduced saliva flow than 0.1 to 0.2 ml non stimulated and 0.7 stimulated i.e., 500 ml saliva secretion per day. Xerostomia can make wearing complete dentures difficult for the edentulous patient as it not only affects retention but also makes the oral mucosa more prone to injury.³

Several treatment options are available to the clinician depending on the aetiology of xerostomia. Symptomatic treatment like changes in dietary pattern, patient counselling, lifestyle modifications, salivary stimulants, and use of salivary substitute are used in most of the xerostomia cases. A salivary reservoir denture is an effective solution in edentulous patients with xerostomia to deliver salivary substitute as it has advantages over a reservoir in the mandibular denture which includes larger reservoir size, provides flow of saliva to the whole mouth unlike mandibular reservoir where flow is restricted to the floor of the mouth, and do not block the outlet holes by fluid and food in the floor of the mouth. This treatment plan was well accepted by the patient. (fig.1,2)

**PROCEDURE**

1. Conventional procedural steps (case history, primary impression, final impression, jaw relation) were followed for fabrication

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**CASE REPORT**

A 78 years old patient reported to Department of Prosthodontics at Late Shri Yashwant Rao Chavan Memorial Medical & Rural Foundation’s Dental College and Hospital, Ahmednagar with chief complaint of missing teeth, dry mouth, bad breath, difficulty in speech and chewing. Patient had not given any relevant medical history. Intraoral examination revealed high, well rounded maxillary and mandibular ridges, thick ropy saliva and age-related changes in the mucosa leeded to dry mouth and halitosis. Considering the clinical scenario, a treatment plan was formulated to construct a salivary reservoir in maxillary complete denture containing salivary substitute as it has advantages over a reservoir in the mandibular denture which includes larger reservoir size, provides flow of saliva to the whole mouth unlike mandibular reservoir where flow is restricted to the floor of the mouth, and do not block the outlet holes by fluid and food in the floor of the mouth. This treatment plan was well accepted by the patient. (fig.1,2)
of complete denture up to the try in stage. (Fig. 3-8).

2. Palatal contours were recorded using a tissue conditioning material at the try in stage by asking the patient to perform the swallowing action repeatedly to determine the appropriate position of the reservoir and also to avoid any interference of tongue. (GC Soft Liner, GC Corporation, Japan) (Fig. 9).

3. Fabrication of reservoir (Fig. 10):
   - In order to fabricate the reservoir, a wax pattern was made with 3mm sprue wax which is circular in configuration and placed at the
anterior portion of contoured soft liner.

- With adequate confinement, it was placed in a such way that it could provide volume of 1.8 to 2 ml.
- Try in of the reservoir wax pattern was done to check the aesthetics and phonetics and then the position of reservoir was fixed.
- For the retention of the lid of the reservoir there is incorporation of grooves on the inner and outer surface of the wax pattern of the reservoir with discoid endof the carver.

4. Processing of upper and lower denture using compression moulding technique. (Fig.11).

5. Lab remounting, finishing and polishing of dentures was done. (Fig. 12),

6. Duplication of upper denture (Fig. 13-14):
   - Impression of upper denture was done with
C-silicone putty and light body. (zhermack-zetaplus condensation silicone).

- Then it is poured with diestone (kalrock die stone class IV dental stone) to obtain cast.
- The cast was trimmed up to the reservoir for the fabrication of the lid.

7. Fabrication of flexible lid (Fig.15-17):
- The space was blocked for salivary substitute by means of modelling wax, leaving a periphery of 1-2 mm.
- Material of choice for the fabrication of lid was gingifast due to its flexibility and comfortable to the patient. (zhermack gingifast).
- The material was injected in to the mould space and allowed to set.
- Silicone burs were used for finishing of lid.
- Thickness of the lid was kept 1.5 mm.
- Anendodontic file no. 20 was used to create

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Fig 13. Putty impression of denture

Fig 14. Duplicated cast of denture

Fig 15. Lid fabrication with gingifast

Fig 16. Fabricated lid

Fig 17. Intraoral view
a hole for the escape of salivary substitute in the oral cavity.

8. Denture insertion was done and checked for aesthetics, phonetics and functional efficacy of reservoir (Fig. 18, 21, 22).

**Patient instructions:**
- Patient was advised to take a bottle of salivary substitute (wet mouth) and a syringe to fill the reservoir (Fig. 19).
- Patient was trained to fill the reservoir with syringe (Fig. 20).
- Patient was asked to refill the reservoir every 2 to 3 hrs.
- Patient was trained to clean the reservoir and denture with soft brush and soap water.
- Patient instructed to use the denture for 8 hours a day.
DISCUSSION

Many old age patients suffer from xerostomia. Xerostomia leads to unhealthy oral environment and painful oral condition. The dental practitioners must recognize the seriousness of these complications and continue efforts to alleviate them. Depending on the aetiology of xerostomia, various treatment options are available. However, a combination of methods is often employed to make prosthesis successful. The goal in management of xerostomia is to restore the salivary flow and to help the patient to use the denture and perform normal oral functions comfortably.  

Complete dentures patient’s oral mucosa can get injured and also loss of retention due to diminished salivary flow because of the lack of saliva bonding between the interface of the prosthesis and the oral/gingival tissues. The reservoir denture containing salivary substitute offers clinician an alternative method of treating patients suffering from xerostomia with a slow, sustained, and continuous release of salivary substitute.  

Several authors have recommended many approaches to fabricate reservoir dentures with available space in either the maxillary denture or the mandibular denture. Mendoza and Tomlinson described split-denture technique for artificial saliva reservoir in the mandibular denture, which was split into upper and lower parts. The time required to perform the laboratory steps were more. Burhanpurwala et al. described a method for fabricating mandibular reservoir denture, but still the laboratory steps were complicated. Toljanic and Zucuskie described the use of salivary reservoir in the maxillary denture in patients with xerostomia. Its advantages over a reservoir in the mandibular denture includes larger reservoir size, provides flow of saliva to the whole mouth unlike mandibular reservoir where flow is restricted to the floor of the mouth, and do not block the outlet holes by fluid and food in the floor of the mouth. However, due to incorporation reservoir in the maxillary denture can lead to increase in weight, which ultimately affect its retention and stability. Hirvikingas et al. used a Gerber attachment to operate the release mechanism for the salivary substitute in the maxillary reservoir complete denture. Disadvantage of this technique is that the precision attachment increased the cost of the treatment.

The disadvantages of the techniques mentioned above are improved in our technique. The lid made with gingifast gives patient comfort than acrylic resin lid. Also the lid is flexible and aesthetically superior. Within the clinical limits the disadvantage of this technique is the fabrication of the lid requires precision and also the lid has to be remade every 6 months as the material gets loses its desirable properties which has been observed in recall of patient over a year that in turn increases the clinical visits and maintenance of the denture.

CONCLUSION

This article describes a simple technique for the fabrication of reservoir maxillary denture for xerostomic patients. It helps to improve the oral health of the patient and also the denture wearing experience. Gingifast used here is comfortable and more aesthetic for patients. Further research should be directed towards the development of sensory driven salivary reservoir so that it will detect the dryness of mouth and supply the salivary substitute on constant interval.

Declaration Patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal.

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