

SIALO-OASIS FOR XEROSTOMIA FUNCTIONAL SALIVARY RESERVOIR IN MANDIBULAR COMPLETE DENTURE -A CASE REPORT

Dentistry

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ABSTRACT

Hyposalivation in completely edentulous geriatric population are often encountered in dental practice. As saliva plays major role for retention of denture, hyposalivation in these patients causes extreme discomfort and retention problems. Incorporation of salivary reservoir in dentures is one of the treatment modalities to overcome these problems. Various case reports with reservoir designs were proposed by different authors which requires frequent dental visits and maintenance problems. This paper describes a new novel technique for fabrication of salivary reservoir in mandibular denture which can be easily loaded and also can be maintained by patient.

KEYWORDS

INTRODUCTION

XEROSTOMIA is defined as subjective complaint of dry mouth. Patients who complains of xerostomia do not show any signs clinically their symptoms are usually secondary to changes in composition of saliva qualitatively and quantitatively.¹

Hyposalivation adversely effects the patients' health and overall quality of life, by disrupting normal homeostasis of oral cavity. Thus, altering taste perception, speech and decreased dietary intake. Saliva acts as thin film i.e. interfacial surface tension essential for retention of dentures, acts as anti-inflammatory agent also reduces ulcerations in oral cavity. Thus, hyposalivation creates an environment which cannot be tolerated by patients especially who wear complete dentures.²

Aetiology can be either auto immune disorders, radiation therapy, medication induced or psychiatric issues. Studies have shown that more than 400 pharmaceutical products adversely affect the salivary output.³ Diagnosis can be made by patient's subjective symptoms like burning sensation, difficulty in chewing and swallowing, retention of dentures in edentulous patients, also up on clinical examination objective signs are dry mucosa i.e. cheeks and gums, thick stingy saliva, fissured tongue and carious teeth.³

The clinician has several treatment options at their disposal for addressing xerostomia, depending on its underlying cause. Symptomatic treatment is typically necessary in most cases and can involve making changes to the patient's diet, providing counselling, implementing lifestyle modifications, using salivary stimulants, and utilizing salivary substitutes. For edentulous patients experiencing xerostomia, a salivary reservoir denture can effectively provide a constant supply of salivary substitute without disrupting the patient's normal routine. This article outlines a straightforward and innovative approach to designing and fabricating such a denture.²

Case Report

A 60-year-old female patient reported to Department of Prosthodontics with chief complaint of difficulty in swallowing and chewing also complains of burning sensation in her mouth for 8 months. Dental history revealed that she underwent full mouth extraction 8 months back. Medical history indicated that she was on medication (atenolol 50 mg) for hypertension and diabetes for 1 year. Up on intra oral examination revealed completely edentulous maxillary and mandibular ridges. Mouth mirror test was conducted to check dryness of mucosa which showed positive fig 1; a

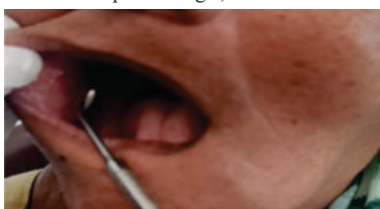


Figure 1: A Mouth Mirror Test Illustrating Dryness Of Mucosa

Sialo metric test was also conducted to check for flow of saliva under stimulated and un stimulated conditions and results were border line i.e. 0.8 ml and 0.15 ml respectively. Thus, provisional diagnosis was made i.e. completely edentulous medication induced hyposalivation. A combination approach was made to over come patient symptoms by substituting medication for hypertension from atenolol to bisoprolol (drugs causing lesser hyposalivation) by communicating with patient's physician, use of salivary substitutes and fabrication of complete dentures with salivary reservoir in mandibular denture.

Procedure

Steps in fabrication were similar to complete denture i.e. from primary impression to try in fig 2 (a-f)

Before mounting of the tentative jaw relation duplication of master cast was made.

Cast were articulated on Hanau semi adjustable articulator after face bow transfer, later duplicated mandibular cast was mounted in the same determined vertical dimension

Mandibular denture is of 2 sections lower section made of clear acrylic with reservoir and upper denture made of pink acrylic with teeth arranged which sits over the lower section

Without compromising the vertical dimension of the patient salivary reservoir was planned in lower denture. The vertical dimension was 35mm.

Mandibular denture (18mm) with reservoir was planned in such a way that 5mm was utilized for teeth and rest 13mm for fabrication of mandibular denture lower section with reservoir. fig:2 g



Figure 1 a) primary impression using impression compound. b) border molding and secondary impression c) tentative jaw relation d) try in frontal e) try in left lateral view f) try in right lateral view

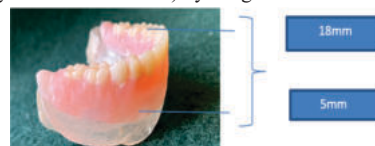


Fig:2 g 18mm of mandibular denture with 5mm of teeth rest 13mm for lower section reservoir construction

- For fabrication of mandibular salivary reservoir wax pattern for future salivary reservoir was made on the duplicated master cast Pouring of the cast was made followed by dewaxing. (Fig 3 a-c)
- NOTE: putty index adapted to the wax pattern are the future chambers into which the salivary substitutes will be injected has capacity of 1.5ml in each chamber.
- The lower was made of clear acrylic to visualize the levels of salivary substitutes in the chambers
- Denture base was fabricated, upon which occlusal rims was made maintaining same determined vertical dimension of 35mm teeth were arranged and try in was done figure 3; e
- Upper section was acrylized separately.



Figure 3 a) duplicated master cast with adapted wax pattern and putty adapted which will be occupied by reservoir in future b) flasking of duplicated master casts c) dewaxing of cast d) acrylized (clear acrylic), finished and polished lower section of mandibular denture reservoir



Figure 3 e) try of split mandibular denture with teeth arranged f) final prosthesis in oral cavity

- To have easy access to these chambers an opening was made with a lid upon it which can be refilled with a dropper whenever necessary.
- The upper section sits on the lower section with a snug fit by means of a retention pin attached to the upper sections and retention holes made in the lower section as shown in the figure. fig:4 (a-c)
- The reservoir has the capacity of 3ml in total and an emptying time of 4 hrs.
- Salivary substitute drips and wets the oral cavity from the vent holes made in the posterior lingual flanges as shown in figure. Fig:4; d
- The salivary substitute used here was wet mouth.
- COMPOSITION OF WET MOUTH (key ingredients):
- Sodium carboxy methyl cellulose (0.5% w/v)
- Glycerine 30% w/v
- Cetylpyridium chloride
- Propylene glycol
- Instructions were given to the patient for the usage of dentures and for their maintenance flushing with 1% hypo chloride was advised.
- To take a sufficient amount of water to keep her body hydrated.



Figure 4 a) left; pink acrylic denture showing inner surface with dowel pins and sleeves attached. Right; showing clear acrylic lower section with lids 3 holes seen in the anterior region will be occupied by dowel sleeves after conforming fit of the prosthesis in the oral cavity b) upper section with dowel pin and sleeves c) figure showing upper section placed on lower section as one-unit d) lower section demonstrating the drip of salivary substitute from the posterior lingual flanges

DISCUSSION

- Elderly patients with hyposalivation often experience challenges with their dental health, such as recurring caries leading to failed dental restorations, tooth wear, early tooth loss, and difficulty tolerating dentures. Providing prosthodontic therapy for this group can be challenging due to the limited choice of abutments, loss of vertical dimension, and poor occlusion.
- Therefore, it is essential for dentists to consider the unique needs and limitations of elderly patients with reduced salivary flow when planning and implementing prosthodontic therapy. By doing so, we can improve their oral health and quality of life.⁵
- Lower dentures were fabricated in 2 sections lower made of clear acrylic for easy access and visualization of salivary substitute levels. Upper section made of pink acrylic with teeth arranged to simulate oral mucosa.
- Reservoir with lids were provided to prevent spilling of liquid. These lids can be opened and refilled with the help of dropper easily by the patient.
- Various authors have proposed different designs for salivary reservoirs, including split denture designs. In 2003, Mendoza et al described a method for fabricating a split denture in the mandible⁶, while Halikerimath et al in 2011 described a split denture design using Lego blocks⁷. Pattanaik Bikash in year 2011 described another method for reservoir in mandibular denture.⁴ Arijita Dutta et al in 2021 also described a method for fabricating a maxillary salivary reservoir, although this prosthesis may affect speech due to increased bulk.⁷
- The technique described in this case report offers an effective treatment for hyposalivation in completely edentulous patients. Additionally, the design provides an efficient way to maintain the denture.

Pros And Cons Of The Salivary Reservoir:

Pros:

- Simplified technique.
- Cost-effective.
- No additional clinical steps.
- Physiologic mechanism of salivary release.
- Easy to use, clean, and refill the reservoir.
- Sustained and slow release of salivary substitute.
- Does not interfere with normal oral functions.
- Easy visibility of salivary substitute in the chamber.
- Easy accessibility to the reservoir by the dentist and patient
- Reservoir is less bulky compared to the conventional techniques
- Can be refilled by patient whenever necessary.

CONS

- Additional laboratory steps

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