

PROSTHETIC REHABILITATION OF A XEROSTOMIA PATIENT WITH A MANDIBULAR SPLIT SALIVARY RESERVOIR DENTURE

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ABSTRACT

For a patient with xerostomia, wearing dentures can be an extremely uncomfortable experience. To relieve patient's complaints from xerostomia, mucin-containing artificial saliva has been developed long back. Different techniques have been proposed for incorporating reservoirs in the dentures, containing salivary substitutes, in the dentures. A new design for a split- reservoir denture is described in this article that maximizes capacity and is easy to clean by the wearer and was produced from routine denture materials.

KEYWORDS: xerostomia, split- reservoir denture

INTRODUCTION

Xerostomia is defined as dryness of the mouth due to lack of normal secretions of saliva.¹ Xerostomia is a common patient complaint that could be a result of systemic conditions like rheumatic, Sjogren's Syndrome, salivary gland diseases, Diabetes mellitus, Parkinson's disease, dysfunction of immune system like HIV/ AIDS, due to head and neck radiation, medication-related side effects.^{2,3} Patients suffering from xerostomia may complain of not only a dry mouth, but also of difficulty in normal oral and oropharyngeal functions including eating, speaking and swallowing. Increase susceptibility to infection is also seen^{4,5}. Extreme discomfort is a common complaint in a denture wearer^{6,7}. It can also add to the problem of retaining and eating with dentures. Salivary mucins possess rheological properties that include elasticity and adhesiveness, which aid in retention of dentures⁸⁻¹¹. So in xerostomia, dentures invariably become loose. Depending upon the cause, variety of treatment options is available. In medication induced xerostomia, dosage, timing, or a change in medication may reduce the severity of the problem. In such cases, measurement of a patient's non-stimulated salivary flow rates before and after altering their medication may be useful in gauging the success of treatment. Gustatory stimulation of the salivary glands by mastication of sugar free chewing gums or lozenges is also helpful^{12,13}. In severe xerostomic cases, saliva substitutes or salivary

stimulants may be used^{14,15}. To minimize patient discomfort, soft denture liners can also be used. Often, a combination of treatments may be required.

Saliva substitutes containing thickening agents for longer relief and increased moistening and lubrication of the oral surfaces have been developed. These are available as solutions, sprays or gels and have multiple contents such as carboxymethylcellulose, electrolytes and flavoring agents eg wet mouth (ICPA Health Products Ltd), aqwet (Cipla Ltd) However, the main problem is to deliver this substitute constantly into patient's mouth without affecting his normal routine. Where all treatment modalities have proven unsuccessful, the incorporation of artificial salivary reservoir in dentures, has been proposed in such cases^[16-18]. This paper presents a case where a method for fabricating mandibular split- reservoir complete dentures is discussed, which utilizes routine materials and follows routine clinical stages during fabrication.

Case report:

A 65-year-old edentulous male patient reported having complained of dryness of mouth and severe discomfort when wearing lower denture. Intraoral examination revealed maxillary and mandibular edentulous residual ridges, areas of irritation associated with the lower denture, dry tongue, and minimal frothy saliva in the floor of the mouth. His



Fig.1.primary impression with putty rubber base

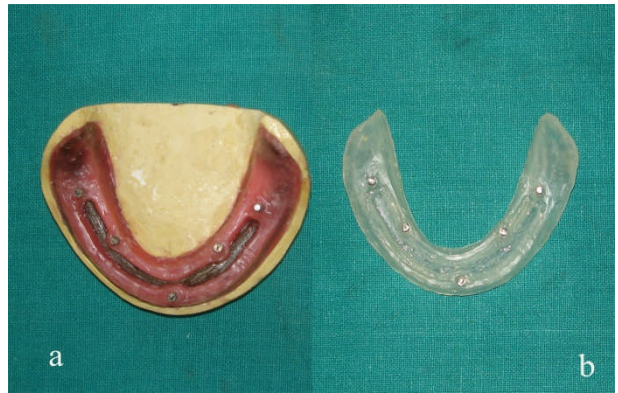


Fig 2. Placement of metal rods with groove



Fig.3. Flasking and dewaxing of lower denture basal portion



Fig.4. preparation of reservoir



Fig.5.Lower denture with a clear acrylic base and a removable, pink acrylic upper section



g.6. Dentures in the patient's mouth

medical history revealed that he was on medications for hypertension and non-insulin dependent diabetes mellitus. The patient's general practitioner was also contacted and the medications were reduced or altered to reduce the xerostomia. The patient was given multivitamin supplements. He had been advised to use salivary substitute (methyl cellulose) regularly and frequently drink water to overcome the dryness and discomfort. After that, the patient still suffered from dryness of mouth and discomfort from his lower denture. At this stage, fabricating lower complete denture with salivary reservoir was planned. The procedure is outlined below.

Procedure:

1. Primary impressions were made in putty rubber base impression material while final impressions was made in light body polysiloxane (condensation-type) impression material (Speedex, Coltène, Whaledent AG, Alstätten, Switzerland,) since zinc oxide eugenol paste may cause burning sensation to the patient (Fig.1).
2. Waxed-up for permanent denture base was done on the final cast by using shellac denture base and modeling wax (Modeling wax, DPI, Mumbai, India). Step was created at the periphery and wax was removed from the center. Six metal rods, 3mm in length, 2 mm in diameter having groove at one end were made in Ni-Cr metal alloy (Bellabond Plus, Bego, Bremen, Germany) were placed at a distance in a such a way that all should remain parallel to each other. The end with groove was inserted in the wax, so that it would get locked in the denture base after processing (Fig 2a). Then flasking and dewaxing was carried out as a routine procedure. Clear heat cure polymerized resin was used for packing the mold space (Trevalon HI, Dentsply India Ltd, Guargaon, Haryana,India) (Fig 2b).
3. Wax rims were made over denture base and jaw relation was recorded.
4. Teeth arrangement was done and tried in patient's mouth to check for retention, stability, esthetics, phonetics and comfort.
5. Flasking followed by dewaxing of the lower trial denture was done to obtain a base portion containing permanent denture base and a counter portion containing the teeth (Fig 3). Petrolatum gel was applied on the lower

permanent denture base along with the metal rods. Clay was placed in the prepared trough. Aluminum foil was adopted on the periphery of the denture base, for easy separation of two halves of the mandibular denture. The molds was packed with pink heat cure acrylic resin (Trevalon HI, Dentsply India Ltd, Guargaon, Haryana,India) and processed. The upper denture was fabricated in the conventional manner.

6. After careful deflasking, the upper segment of the mandibular denture was attached to the lower segment for finishing and polishing. All finishing and polishing was done with the segments together to ensure a flush, smooth finish and no damage to the edges. Hollow space was created in centre of the two halves of the split lower denture with the help of acrylic trimming burs. The reservoir was made as large as possible while maintaining sufficient thickness (minimum 2mm thickness) of the denture walls for strength (Fig 4). Finally, a full lower denture with a clear acrylic base and a removable, pink acrylic upper section were obtained. (Fig.5)

The extent of the reservoirs could be clearly visualized, as a clear acrylic was used for the base section. Thin straight fissure #8 bur (DFS, Germany) was used to drill a drainage hole from the inferior aspect of the lingual flange of the denture into the reservoirs (Fig.6). One was placed in each posterior segment. Details instructions were given to the patient about how to separate and clean the two halves of the denture. To clean the reservoirs, the patient was instructed to flush out the reservoirs weekly with 1 per cent sodium hypochlorite solution and clean the reservoirs daily with either a small toothbrush or bottlebrush. Fine orthodontic wire was provided to dean the drainage holes if they became blocked. Numbers of follow-up appointments were required to adjust the diameter of the drainage holes to achieve the optimum flow levels. After a number of visits, the patient was able to wear the denture comfortably throughout the day and only needed to refill the reservoirs twice per day. The patient has found a great reduction in his symptoms of xerostomia and finds it easy to use and clean. (Fig.7)

Discussion

The advantage of this split denture technique over previous reservoir dentures lies in the ready

access to the reservoirs, both by the patient and for professional attention. It allows easy cleaning and adjustment of the reservoirs as needed. The use of clear acrylic for the base section permits the clinician to determine the best size and position for placement of the reservoirs. It also enables the patient to clearly visualize the levels of saliva substitute within the chamber. This method utilizes routine materials during construction. Both the pieces were retained because of parallelism of the Ni-Cr rods which were attached to the permanent denture base, and holes in the counter part with the teeth. From a clinician's perspective, the clinical stages during construction are routine and require less chair-side time. However, laboratory stages are time consuming and precision is essential to ensure accurate and smoothly fitting segments. Additionally, repairs and relines of a split denture become more complex. Case selection is also extremely important. Cutting reservoirs into the denture weakens its structure, so only cases with sufficient vertical dimension and thickness are suitable for this technique.

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