

“Dentures As Artificial Saliva Reservoirs In The Irradiated Edentulous Cancer Patient With Xerostomia”

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Introduction:

Xerostomia, a clinical condition caused by a decrease in the production of saliva may present itself as a local symptom, as part of a systemic disease such as Sjogren’s syndrome, diabetes, alcoholism or as side effects of medications or following therapeutic radiation to the head and neck regions. Edentulous patients suffering from xerostomia may complain of not only dry mouth, but also of difficulty in normal functions like eating, speaking, swallowing, etc. Extreme discomfort in wearing dentures is a common complaint.¹

Depending upon the cause, several treatment options are available to the clinician. If xerostomia is drug induced, the drug needs to be

substituted. In most cases symptomatic treatment is required and this includes the change in dietary pattern, frequent sipping of water, use of artificial salivary substitutes, etc. However the main problem is how to deliver this substitute constantly into the patient’s mouth without his normal routine being affected. Here comes the role of an artificial saliva reservoir denture which delivers the artificial salivary substitute continuously into the patient’s mouth.^{2,3,4,5}

Various saliva substitutes are available to ameliorate xerostomia and many ingenious methods have been devised to incorporate reservoirs in the dentures from which these substitutes may be dispensed. Some designers

have concentrated on modifying maxillary dentures^{3,6,7}, whereas others have created chambers in the dentures^{5,8}. However they recognized two aspects requiring further development: the prevention of food particles from entering the reservoir and the need for increasing the time over which the wetting agent has released. This technique resulted in a reservoir denture that provided good lubrication to oral tissues and was made from routine denture base material.

Case Report :

A 62 year old male patient reported to the Department of Prosthodontics, Rural Dental College, Loni with the chief complaint of difficulty in mastication, dry feeling of the mouth and frequent need for sipping water.

The patient had a history of poorly differentiated squamous cell carcinoma of posterior pharyngeal wall. Patient was treated radically with curative intent , external beam teletherapy in combination with brachytherapy. Teletherapy was accomplished with a Theatron 780 (Cobalt) unit at at Department of Radiation Oncology, P.M.T. Hospital Loni.

Extraoral examination revealed reduced 'vertical dimension of the face, hollow cheeks, unsupported lips, and mild distortion of speech articulation on sibilant sounds, general physical examination was normal. Intraoral examination revealed maxillary and mandibular edentulous residual ridges, dry cracked tongue and minimal frothy saliva in the floor of the mouth.

Treatment plan :

Treatment plan included either conventional

complete denture along with salivary substitute to be applied in the oral cavity or making complete dentures with artificial saliva reservoir in it.

It was decided that the patient should be given maxillary and mandibular complete dentures so as to accommodate an artificial saliva reservoir in it. This was so decided because the conventional complete denture along with saliva substitute does not provide a continuous flow of saliva affecting retention. An artificial saliva substitute (Wet Mouth, ICPA), was used.

Also the patient was given multivitamin supplements. He was instructed to avoid dry foodstuffs like biscuits, avoid smoking of cigarettes as tobacco increases oral dryness and use a salivary substitute till the final dentures were ready.

Procedure:

1. Primary impressions were made in impression compound while final impressions was made in light body elastomeric impression material since zinc oxide eugenol paste may cause burning sensation to the patient. Jaw relation was recorded keeping in mind that vertical dimension of occlusion be kept 2 mm less that normal. This was done to compensate for the slight increase in vertical dimension of occlusion that takes place when the two parts of the reservoir denture are attached to each other. Teeth arrangement was done and the trial bases were tried in the patient's mouth.
2. Now extra bulk of wax was added to the maxillary

and mandibular trial dentures so as to make the denture approximately 6 mm thick. The trial dentures were finished and retried in the patient's mouth to check for retention, stability, esthetics and comfort.

3. A 26 gauge needle and a 19 gauge needle were used, respectively for outlet and inlet for saliva substitute for maxillary and mandibular denture. Six 26 gauge outlet needles were placed, just near the palatal regions of the maxillary premolars and molars.[Fig. 1]

An inlet hole of diameter similar to 19 gauge needle was made in the teeth bearing plate labially between central incisors.

Similarly for mandibular wax try-in six 26 gauge needles were placed in the mylohyoid region, 3 mm above the lingual surface border on both the sides. Also an inlet hole of diameter similar to a 19 gauge needle was made in the waxed trial denture base, labially just below the central incisors.

4. FLASKING PROCEDURE:

Four separate flasks were selected, two for upper and two for lower (U-1, U-2, L-1, L-2). The flasks were identical and the base portion and the counter part were interchangeable. [Fig.2]

Flasking followed by dewaxing of the maxillary and mandibular trial dentures were done to obtain a base portion containing the cast and the counter portion containing the teeth.[Fig. 3]

5. PREPARATION OF TISSUE BEARING PLATE :

2mm of wax is adapted onto the maxillary and mandibular cast and a bevel was carved at the entire periphery [Fig.4]. The counter part of the separate flask was selected (U-2 counterpart, L-2 counterpart) and fitted into the base of the first flask. Counter flasks were again poured, flasks were dewaxed, packed in clear heat-cure acrylic resin and processed to obtain the tissue bearing plate of the two piece reservoir dentures.

6. PREPARATION OF TOOTH BEARING PLATE :

The counter parts of maxillary and mandibular salivary reservoir dentures were fitted with two extra base portions of the flasks (U-1 counterpart fitted with U-2 base part, L-2 counterpart fitted with L-2 base part). Heat cure acrylic resin was then packed between these new base flasks (U-2 base part, L-2 base part) and the teeth bearing counter portions of the first flasks, to obtain the teeth bearing plate of the reservoir denture.

The labial and buccal areas of teeth bearing counter portions of the flasks were packed in pink coloured heat cured acrylic resin and rest in clear heat cured acrylic resin. [Fig.5] The tooth bearing acrylic plate was finished and polished and it now rests on the bevel created on the tissue bearing plate. Now little amount of clear self

cured acrylic was used to seal the tooth and tissue bearing plate. The dentures were remounted , adjusted and finishing and polishing was done . Inlet and outlet needles were removed . Dentures were inserted and the patient was instructed as for routine denture and oral hygiene maintainance.[Fig.6.] He was taught how to feel the artificial salivary substitute through the inlet hole. [Fig.7]

Discussion:

Many patients who undergo treatment for carcinoma of the head and neck region receive a course of radiation therapy . The resultant degeneration of bony and vascular elements create an unhealthy oral environment⁹.A decrease in quantity and quality of saliva can also cause or exacerbate a painful oral condition.The medical profession must recognize the seriousness of the complications and continue efforts toward their alleviation.³

The reservoir denture offers clinician an alternative method of treating patients suffering from xerostomia.^{2,3,4,5} Dentures which would ordinarily rehabilitate the edentulous patient with normal salivary flow, are often poorly tolerated in the patient who has a diminished salivary flow because of the lack of saliva bonding between the interface of the prosthesis and the oral/gingival tissues.^{10,11,12,13,14,15} In an attempt to reverse these changes , and particularly to permit the wearing of dentures, artificial saliva preparations have been described.²⁴ The major drawback of artificial saliva

is that it must be mechanically introduced in the oral cavity by the patient at regular intervals. Patients object to carrying a bottle of artificial saliva and would prefer a more convenient saliva delivery system.¹⁶

Patient motivation and cooperation are an important part of successful oral rehabilitation.The dentures and the reservoir require meticulous cleaning, and patients were instructed in the use of a disposable syringe for flushing and refilling the chamber.They must be willing to have the dentures readjusted frequently to accommodate the continuing postirradiation changes of shrinkages and retraction taking place in the oral/gingival tissues.⁴

Conclusion:

This paper provides a novel approach in the management of a xerostomia patient by fabricating an artificial saliva reservoir denture made from routine denture base material. The technique of fabrication is simple and it provides good lubrication of the oral tissues. Further research in more physiologic salivary substitutes and in a better release and delivery mechanism appears warranted. Reservoir chambers that allow for a more even controlled release of the artificial saliva may make this treatment more acceptable to more patients.

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Legends:

1. Figure 1: Use of needles for inlet and outlet
2. Figure 2: Flasking of waxed trial dentures
3. Figure 3: Dewaxed flasks: Base portion containing the cast and the Counter portion containing the teeth
4. Figure 4: 2 mm. of wax adapted on the cast to obtain tissue bearing plate
5. Figure 5: Tooth bearing and Tissue bearing plate
6. Figure 6: Post-treatment intraoral view
7. Figure 7: Filling of salivary substitute with needle and syringe.

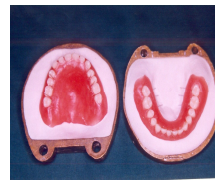


Fig.2



Fig.3

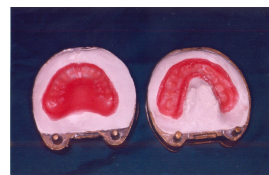


Fig.4



Fig. 5

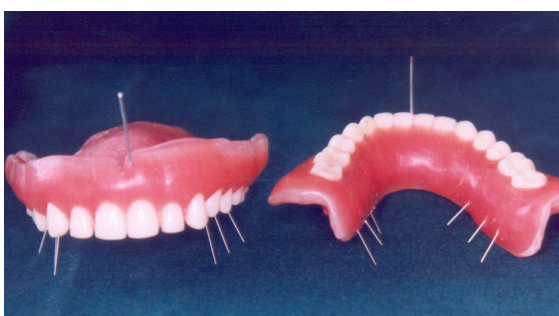


Fig 6



Fig. 7

Fig.1



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