



## **CASE REPORT**

### ***Prosthetic Management of a patient with xerostomia: A novel technique for salivary reservoir fabrication with a removable lid***

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#### ABSTRACT

**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, Diabetes mellitus, Parkinson's disease, dysfunction of immune system like HIV/ AIDS, due to head and neck radiation or medication-related side effects. 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.**

**This article describes a new technique of incorporating a salivary reservoir in the maxillary complete denture. The salivary reservoir fabricated by this technique provided good lubrication of the oral tissues was easily cleansed by the wearer and was fabricated from routine denture materials.**

## **INTRODUCTION:**

Xerostomia is defined as dryness of mouth from the lack of normal secretions (GPT8) [1]. It is a common complaint affecting 30% of the population aged 65 years and above. Individuals with xerostomia complain of dryness of mouth, difficulty with eating, speaking and swallowing affecting their nutrition as well as psychological health [2, 3].

Salivary hypofunction is more common in elderly age because of the daily usage of drugs such as antihistaminics, antidepressants, antihypertensives, anti-anxiety agents, diuretics, antiparkinsonian drugs, antiemetics and bronchodilators. Therapeutic radiation to head and neck, systemic diseases (diabetes mellitus, HIV, emotional stress) and diseases involving the salivary gland [4] are the other possible causes.

The oral symptoms of xerostomia are:

- Difficulty in normal oral and oropharyngeal functions including eating, speaking and swallowing.
- Reduced dilution of plaque acids and antimicrobial protection predisposing to gingivitis and rapidly progressing caries.
- A negative effect on masticatory ability and efficiency, contributing to protein energy malnutrition among elderly denture wearers.
- Extreme discomfort in wearing dentures.
- Poor retention is compounded by the reduction in surface tension, rendering the denture loose and potentially more traumatic.
- The buccal mucosa, tongue and lips tend to stick to the denture predisposing to mucosal abrasion and ulcerations.
- Increased susceptibility to candidiasis and angular stomatitis.

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Conventional complete denture can be damaging to the dry mucosa. Hence special attention to clinical and laboratory procedures should be given while fabricating the prosthesis. The main aim should be to optimize denture retention, stability and provide continuous lubrication of the mucosal tissues.

### **CASE REPORT**

A 61 year old female patient was referred to Dept of Prosthodontics, Goa Dental College and Hospital, with a chief complaint of missing teeth. The patient also complained of difficulty in eating and swallowing of food. The patient was a known case of carcinoma of oropharynx and was treated for the same with combined radiotherapy and chemotherapy two years back. Since then the patient had experienced difficulty in eating and swallowing food due to dryness of oral cavity.

On clinical examination, the patient had completely edentulous maxillary and mandibular arches. Intraoral examination revealed decreased salivary flow due to hypofunction of the salivary gland; dryness of the mucosa; smooth, glossy tongue and mucosal surfaces. Extra oral examination revealed decreased vertical dimension and hoarseness of the voice. Sialometric analysis proved that the patient was xerostomic.

Treatment plan included fabrication of upper and lower complete dentures and a salivary reservoir with a removable lid in the maxillary prosthesis.

Maxillary and mandibular final casts were obtained following conventional procedures of impression making. The recording of jaw relations, teeth arrangement and try-in of the waxed denture was carried out in the conventional manner. At the denture try-in appointment, the palatal contours were recorded using tissue conditioner to assess the space available for building a reservoir into the palatal surface of the upper denture. It was confirmed with a "Palatogram Analysis" [5]. The patient was told to pronounce sound stimulus statements in DEVNAGARI script. The patient's tongue was coated with the contrasting coloring medium and she was asked to repeat the sentences. Contact of the tongue to the palatal surface during speech was noted and area not contacted by the tongue was marked as the reservoir space.

The tissue conditioning material served as an index to locate the reservoir space. The tissue conditioning material was removed from the palatal surface of the trial denture. The reservoir walls were built up with modelling wax (Prodent Modelling wax, Ratnagiri: Maharashtra-India) using a one inch diameter Poly Vinyl Chloride (PVC) pipe to achieve circular shape of the reservoir (fig 1). A 19 gauge stainless steel wire was bent in the shape of a loop to be incorporated into the walls of the waxed up reservoir (fig 2). The stainless steel wire was used because it would provide a smooth gliding surface for the acrylic lid. It is also seen that the rate of wear of stainless steel as compared to acrylic is considerably less. The denture was invested and processed in the conventional manner. After acrylization the loop was seen to be positioned into the walls of the reservoir cavity.

The next step was to fabricate a self cure acrylic removable lid for the reservoir, hence an elastomeric impression material of putty consistency (Aquasil) (fig 4) was made of the reservoir cavity and a stone cast was poured with type III dental stone. Putty was mixed and made in the shape of a cylinder of 21 mm. Modelling wax was used to secure this putty block to the record base. The putty block was centered

of the reservoir cavity ensuring 2 mm space all around to provide sufficient thickness to the lid. The putty block was kept 2 mm short to provide sufficient thickness for the top surface of the reservoir lid. A removable autopolymerizing resin lid was fabricated by adapting the resin onto the sides as well as the top surface of putty block out (fig 5).

The lid could be threaded into the reservoir to provide perfect seal for the reservoir. The lid also had a friction fit due to the undercuts of the stainless steel loop. This property could be used if the patient's manual dexterity was compromised. A rubber stopper was placed in the centre of the lid to provide an outlet for the saliva substitute (fig 6). An endodontic file was modified by trimming off the working end, to be used to lift the lid (fig 7). The same instrument could be used to clean the outlet opening of the rubber stopper, in case if the opening was clogged. The capacity of the reservoir was found to be ten cc.

The lower denture was fabricated in the conventional manner. Both the dentures were finished, polished and delivered to the patient (fig 8). The patient was recalled after twenty four hours, one week, one month and three months. Minimal adjustments were needed after twenty four hour recall, and the patient was very comfortable with the dentures.

### **DISCUSSION**

The salivary reservoir was constructed in maxillary arch because:

- 1) construction of mandibular saliva reservoir is technique sensitive procedure
- 2) food and fluid collection occurs mostly in the floor of the mouth that clogs the outlet in mandibular reservoir.

Other maxillary reservoirs described in the literature had the lid of the reservoir firmly fixed with cold cure acrylic resin with the denture base [5]. So once the reservoir has been fitted in the denture, further cleaning measures were nearly impossible.

The denture fabricated using this novel technique not only provided perfect seal for the artificial saliva, but also provided an opportunity for the patient to maintain a clean reservoir. The reservoir had an advantage that it was fabricated from the routine dental materials and was an inexpensive technique.

### **CONCLUSION**

Xerostomic patients form a unique group in whom prosthodontic treatment is challenging. Apart from preventive measures, interventional measures like fabrication of a reservoir denture definitely helps in improving the patient's quality of life. Successful treatment depends on knowledge and recognition of their particular problems and methods of prevention combined with skilful prosthodontics.

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**FIGURES**



**FIG. 1**



**FIG. 2**



**FIG. 3**



**FIG. 4**



**FIG. 5**



**FIG. 6**



**FIG. 7**



**FIG. 8**