

## Palatal Reservoir Denture- Hope for Xerostomia Patient- A Case Report

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### Abstract

Xerostomia is the subjective sensation of oral dryness, usually, associated with hyposalivation. The difficulties encountered can be troublesome and at times may lead to complete failure of the prosthesis. Poor tolerance and retention of removable dental prostheses because of thin dry atrophic mucosa and lack of a salivary film are the major problems encountered in such cases. The present clinical report of xerostomic edentulous patient involves full mouth denture rehabilitation with incorporation of a salivary reservoir in the denture in which a salivary substitute is added.

**Keywords :** Xerostomia, Reservoir Denture, Molloplast –B.

### Introduction

Xerostomia is defined as the dry mouth resulting from reduced or absent salivary flow<sup>1</sup>. It is a common patient discomfort reported to the dentist in their day to day practice that could be manifestation of systemic conditions like Sjogren's Syndrome, salivary gland diseases, Diabetes mellitus, Parkinson's disease, dysfunction of immune system like HIV/ AIDS, head and neck irradiation, medication related side effects.<sup>2,3</sup>

Saliva functions to cleanse and moisten the oral cavity besides regulation of water balance, antimicrobial and buffering actions. Decreased salivation could lead to difficulty in mastication and deglutition of bolus in xerostomia patient. This subjective discomfort in conjunction with loss of taste acuity increase the risk of anorexia.<sup>4</sup> Xerostomia patients complain of dry mouth and difficulty in eating, speaking and swallowing. However, in denture wearers

there is reduced amount in retention and extreme discomfort<sup>5</sup>.

Salivary mucins possess rheological properties that include elasticity and adhesiveness to aid in retention of dentures and xerostomia, dentures invariably become loose.<sup>6,7</sup> Prosthodontist pose a challenge to combat discomfort and poor retention of denture prosthesis among these patients.

This case report of xerostomia patient oral rehabilitation with reservoir denture fabrication elaborates both clinical and laboratory procedures.

### Case Report

#### *History and Examination*

A 65 year old male patient reported to the Department of Prosthodontics ITS-CDSR, with the chief complaint of difficulty in chewing food and denture discomfort. Patient was relatively asymptomatic after complete denture rehabilitation seven years before. The

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patient underwent surgery and radiotherapy for cancer of vocal cord four years back with subsequent difficulty in chewing food and discomfort in wearing dentures that progressed over time leading to avoidance of wearing denture till date. A palatal reservoir denture with artificial salivary substitutes was planned for the patient.

**Procedure**

01. Preliminary impressions of the maxillary and mandibular arches were made with impression compound and final impressions using light body elastomeric impression material.
02. Maxillomandibular relations were recorded and teeth arrangement completed by conventional method<sup>8</sup>.
03. Trial dentures were evaluated in the patient's mouth.
04. Extra bulk of modelling wax was added to the palatal side of maxillary denture base approx. 2mm for providing space for the reservoir. Palatal contours were adjusted and evaluated for speech variables.
05. An index of the palatal surface was made (Type III dental stone, Kalabhai Karson Pvt Ltd, Mumbai, India) to serve as a guide for fabrication of the floor of the reservoir.
06. Excess modelling wax was then removed and denture was processed (Fig 1).



**Figure 1 :** Invested palatal index

07. A sheet of modelling wax was adapted on the surface of the stone index then invested and processed in clear heat-polymerized acrylic resin (Trevalon; DENTSPLY India Pvt Ltd, Gurgaon, India) to form the floor of the reservoir.
08. Adaptation of the floor of the reservoir with the denture base was evaluated (Fig 2).



**Figure 2 :** Floor of the reservoir with the denture

09. A bulb shaped hole was made with roughened borders in the anterior part of the floor and relined with a permanent soft liner thus achieving functional in the oral cavity. (Molloplast-B, Buffalo Dental Manufacturing Co., Inc.) (Fig 3).



**Figure 3 :** Permanent soft liner to form the floor of reservoir

10. Two cuts were made of 1 mm in width in the central part of plate one in the anterior and other in the posterior part.

11. Floor of the reservoir was attached to the palatal surface of denture with autopolymerising acrylic resin (Trevalon, DENTSPLY India Pvt Ltd) (Fig 4).



**Figure 4 :** Reservoir denture in situ

12. Salivary substitute (Wet Mouth; ICPA Health Product) injected into the reservoir through the cuts by syringe. Patient is instructed to practice this procedure until they are able to inject the saliva substitute easily.
13. Treatment record card was given to the patient to note the time when the reservoir is filled, the quantity of substitute, and the time till the reservoir was empty. One week recall appointment was made.
14. After 1 week, the average duration of flow was evaluated and recorded. The duration of flow provided by artificial saliva reservoirs should range from 2 to 5 hours. Size of the cuts is adjusted to manipulate the flow rate.<sup>6,7</sup>
15. *Post Denture instructions:*
  - a) Explained that this is an adjunct to the other therapy and has to continue his medicines.
  - b) To consume at least eight glasses of water per day.
  - c) Instructed about the filling of the reservoir with artificial saliva and the due care.
  - d) A post-insertion check-up was done in regular recall visits.

**Discussion**

The purpose of the technique is to fabricate a prosthesis that makes swallowing a control mechanism for the flow of saliva substitute. As the patient swallows, the tongue creates pressure on the anterior part of the hard palate, which, in turn, releases the substitute. On releasing pressure, the liner reverts to its position because of its resiliency and creates negative pressure inside the reservoir space that sucks air inside. The air collects at the top of the reservoir.

The thickness of the palate was increased primarily in the palatal vault area with minimum increase at the periphery of the palate. Increased palatal thickness in the regions of contact areas of the tongue while pronouncing /ch/ and /j/ (tongue contacts anteriorly), /s/ and /sh/ (tongue contacts laterally) and /k/ (tongue contacts posteriorly) affects speech significantly<sup>9</sup>.

The volume of the reservoir was 5 ml and its working duration was 2 to 2.5 hours. As the mean number of swallowing cycles is approximately 600 cycles per day or approximately 25 cycles per hour, the amount of substitute released per functional cycle of the reservoir was approximately calculated to be about 0.25 ml<sup>10</sup>.

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 flavouring agents. e.g. Wet

Mouth (ICPA Health Products Ltd). However, the main problem is to deliver this substitute constantly into patient's mouth without affecting his normal routine.

The permanent soft liner Molloplast-B is heat processed silicone material that stays soft permanently and features decades of documented success in denture relines cases. The material bonds firmly to new or existing acrylic dentures, and stays elastic and bacteria free for years.

This method utilizes routine clinical stages during fabrication of prosthesis. So, this is an easy and less time consuming procedure for xerostomia patients.

### **Summary**

A palatal reservoir denture offers the clinician an alternative method of treating patients suffering from xerostomia. The advantage of this palatal reservoir denture technique over previous reservoir dentures mentioned in the literatures lies in the ready access to the reservoirs, both by the patient and for professional attention, it is easy to fabricate without tedious laboratory procedures.

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