

Salivary Reservoir Denture – A Simple Technique to Battle Xerostomia

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Abstract

Individuals usually detect they have a “dry mouth” when the flow of saliva decreases to approximately half the normal unstimulated rate of around 0.3 ml/min.¹ Causes of xerostomia are anxiety, Sjogren's syndrome, salivary gland diseases, drug induced side effects, sequelae to head and neck radiation and general medical conditions such as diabetes mellitus. Depending upon the cause, a variety of treatment options are available. In cases where all treatment modalities have proven unsuccessful, the incorporation of reservoirs containing salivary substitutes into dentures has been proposed. The present paper discusses a case report of a salivary reservoir denture which successfully rehabilitated a xerostomic completely edentulous patient.

Keywords: reservoir, dentures, artificial saliva, wet mouth, xerostomia

Introduction

Xerostomia is the subjective feeling of dryness in the mouth, often referred to as reduced salivary flow. It is a symptom, not a diagnosis or disease. The term is used to encompass the spectrum of oral complaints voiced by patients with dry mouth. Xerostomia is a possible side effect associated with more than 400 drugs including anti-hypertensives, antidepressants, anti-histamines, bronchodilators, anti-parkinsonians, antispasmodics, anti-cholinergics and sedatives. Mouthwashes, alcohol, tobacco and caffeine may alter salivary flow or cause dryness of the oral mucosa. Saliva plays a key role in the maintenance of healthy oral hard and soft tissues and provides essential lubrication during essential oral functions including speech and mastication. The lubricating and chemical buffering effect of saliva is central to the comfort and function of the mouth.

Xerostomia is a chronic condition that affects many adults. Autoimmune diseases such as Sjogren's syndrome and rheumatoid arthritis and iatrogenic conditions including drug-related side-effects and radiotherapy for head and neck cancer are common causes of xerostomia.

Case Report

A 65 years old female reported with a chief complaint of missing all upper and lower teeth and oral dryness. Medical history revealed that the patient had been operated for carcinoma throat followed by radiation therapy 1 year back resulting in decreased saliva.

Intra Oral Examination

It revealed edentulous maxillary and mandibular arches & minimal saliva in oral cavity.

Clinical Steps

Primary impressions were made with irreversible hydrocolloid impression material (Plastogen, India) and definitive impressions were made by using special trays in non-eugenol metallic oxide paste. Maxillo-mandibular relationships were recorded and models were articulated. A clear acrylic resin base was fabricated with a beaded peripheral finish line as first component of reservoir denture. Then the bite rim was fabricated followed with teeth arrangement & try-in. Shorter teeth were used in the upper rim to allow a deeper area for the future placement of reservoir².

Now dewaxing was done and definitive acrylic record base with a ledge was replaced on the master cast. The whole assembly was duplicated using addition silicone material (Elite Double 32,

Zhermack) and a plaster cast was retrieved. Heat cure acrylic resin was mixed and packed in dough stage in the mould with teeth and this duplicated assembly was compressed in clamp. After following proper long curing cycle, maxillary denture component having teeth was retrieved as second component of reservoir denture. Now it was placed over the previously fabricated Heat cured definitive fitting plate, joined & fit was verified.

Now male portion of two snap button attachments were attached using self cure acrylic resin in thickest portion of definitive maxillary plate. Female portion were placed over it with a separator and again the second component with teeth was placed over the first component using self cure resin. After setting, the two components were reopened. Inlet holes were made using 8 no. round bur on Buccal flange of the denture into the reservoirs on both sides. Reservoir space was made by selectively trimming adjacent resin material to the attachments maintaining sufficient thickness of the denture walls for strength³. The two sections must 'click' into place at this point. Polishing was done with the segments together to ensure a flush, smooth finish and no damage to the edges.

Instructions were given to the patient

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about how to separate and clean the two halves of the denture. The patient was instructed to flush out the reservoirs weekly with 1% sodium hypochlorite solution and clean the reservoirs daily with either a small toothbrush or bottlebrush. Fine orthodontic wire was provided to clean the drainage holes if they became blocked. The patient needed to refill the reservoirs twice per day with artificial saliva (Wet Mouth, ICPA)⁴. The patient found a great reduction in his symptoms of Xerostomia and was comfortable in her recall visits.

Discussion

Upon review of the literature two main approaches to radiation-induced xerostomia surfaced, prevention and treatment. In mild xerostomic cases, gustatory stimulation of the salivary glands by mastication of sugar-free chewing gums or lozenges is helpful.⁵ In severe cases, saliva substitutes may be utilized. The advantage of this split denture technique lies in the ready access to the reservoirs. The use of clear acrylic for the base section permits the clinician to determine the best size and position for placement of the reservoirs. Additionally, it also enables the patient to clearly visualize the levels of salivary substitute within the chamber.

Case selection is also extremely important. Cutting reservoirs into the denture weakens its structure, so only cases with no bony undercuts and sufficient vertical dimension, and thickness are suitable⁶. Additionally, patients must have the manual dexterity to separate and rejoin the two segments of the split denture. Poor

maintenance of denture by patient leads to fungal growth specially Candida biofilms⁷. Evaluation of study showed that the metal base surface exhibited significantly less growth of Candida as compared to resin⁸. From a clinician's perspective, little additional chair-side time is required. However, laboratory stages are time consuming and precision is essential. Additionally, repairs and relines of a split denture become more complex and collection of foods and fluids might clog the holes of reservoir. Many other materials like magnets, precision attachments are also used in the literature.

Previous studies suggest that reservoirs in the palatal aspect of maxillary dentures may also be useful in treating xerostomia⁹.

Conclusion

This case report presents a novel technique for the fabrication of a maxillary denture incorporating a salivary reservoir. Before fabrication of a removable prosthesis is started, oral tissues should be ascertained that the denture bearing tissues will accept and support the prosthesis in comfort. Hence a successful treatment depends both on knowledge of material science along with recognition of problems, their prevention & also clinical expertise^{10,11}. The current reservoir denture is a novel design as it requires no extra laboratory steps & also has a wide range of usage with a number of products. Further clinical trials are necessary, but the prototype was a success.

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Figures of legend

- 1a Preoperative Frontal View.
- 1b Preoperative Profile View.
2. Definitive Impressions.
3. First Component of Salivary Reservoir.
4. Acrylized first Component.
5. Facebow Transfer.
6. Teeth Arrangement.
7. Duplication of first Component with Cast.
8. Acrylized Components of Split Reservoir.
9. Post Placement.
10. Artificial Saliva.
- 11a. Post Placement Frontal View.
- 11b. Post Placement Profile View.

