Case Report

Fabrication of palatal salivary reservoir denture for a patient suffering from radiation-induced xerostomia

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ABSTRACT

Xerostomia is a debilitating condition, especially in the presence of complete dentures. Radiation is known to be one of the etiologies of xerostomia, and radiation-induced xerostomia may be irreversible. In such cases, it is necessary to provide symptomatic treatment. For completely edentulous patients wearing dentures, the presence of saliva is vital because it is required for the retention and normal functioning of a denture. In the absence of saliva, the oral mucous membranes may develop erythema and sore spots, and the patient may feel discomfort when dentures are in function. Hence, salivary substitutes are prescribed for symptomatic treatment. One efficient way to ensure slow and continuous release of salivary substitute is to incorporate a salivary reservoir in the denture. This will facilitate the lubrication of the oral environment, and aid in success of the prosthesis. This case report describes a method of fabricating salivary reservoir in maxillary denture in a patient suffering from radiation-induced xerostomia.

Keywords- Xerostomia, Salivary reservoir, maxillary complete denture

INTRODUCTION

Xerostomia is defined as a subjective complaint of dry mouth that may result from a decrease in the production of saliva[1]. Saliva enhances taste, speech and swallowing and facilitates irrigation, lubrication and protection of the mucous membranes in the upper digestive tract. Xerostomia can occur due to side effects of drugs, Sjogren's Syndrome, anxiety, depression. Radiation therapy is considered one of the major causes of xerostomia in patients undergoing treatment.[2] The degree of xerostomia is directly proportional to the radiation dose administered and volume of salivary gland exposed to radiation[3,4]. The presence of saliva as a thin film between the dentures and the oral mucosa aids in retention of the dentures, and a decrease in saliva can cause inflammation and ulceration in the oral cavity. Hence, complete dentures are often poorly tolerated in patients with xerostomia[5] Several symptomatic treatment options are available. Changes in dietary pattern, patient counselling, lifestyle modifications, salivary stimulants, and use of salivary substitutes are some of the common treatment modalities. From a prosthodontic aspect, a salivary reservoir denture is an effective solution in edentulous patients with xerostomia to deliver salivary substitute consistently into the patient's mouth[5]

This article describes a simple technique for fabrication and designing of a

maxillary salivary reservoir complete denture for a patient with xerostomia secondary to radiation therapy.

CASE REPORT

An 80-year-old patient reported to the Department of Prosthodontics at Mahatma Gandhi Dental College and Hospital, Jaipur with a chief complaint of inability to eat. The patient also complained of difficulty in swallowing and experienced dryness in mouth. The patient gave history of radiation therapy done two months ago for Hodgkin's lymphoma. Prior to the radiation therapy, he had undergone total extraction of teeth. He had a history of diabetes, and was under medication for the same. Intraoral examination revealed high well rounded completely edentulous maxillary and mandibular ridges, dryness of mouth and diffuse erythematous spots. The patient was diagnosed as a case of radiation-induced xerostomia, with completely edentulous arches. It was decided to construct a complete denture with salivary reservoir in the maxilla containing salivary substitute to relieve xerostomia and aid the patient in mastication.

Procedure

1) Steps in fabrication of conventional complete denture were similar up to the try-in stage (Fig 1A).

2) After trial insertion was done, the reservoir walls and lid rim were built on the palatal surface of denture base with sprue wax (Fig 1B), the lid was fabricated tentatively with modelling wax, and trial denture was inserted again. The patient was asked to pronounce linguodental and linguoalveolar (alveolar and sibilant) sounds, and it was verified that the reservoir didn't cause any interference with phonetics. A groove was made on the external surface of the lid rim using a Lecron carver which facilitated attachment for the flexible lid of the reservoir.

3) The trial denture was waxed-up, invested, and processed (Fig. 1C), and finished and polished (Fig. 1D) in the conventional manner.

4) The palatal surface of the denture was duplicated using alginate to obtain a second working cast made of Type III Dental stone, and the reservoir space was blocked out with the help of dental plaster (Fig 1E)

5) A thermoplastic sheet (3A Medes, easy-vac gasket) was adapted on the duplicated cast with the help of a vacuum former, the excess sheet was trimmed until it only adapted around the region of the rim to form the lid of the reservoir (Fig 1F)

6) A release hole was made on the most dependent portion of the thermoplastic sheet using a straight fissure bur. This facilitated the slow and continuous release of the salivary substitute.

7) To ensure salivary substitute doesn't leak around the edges of the lid, the lid was sealed around the reservoir with self-cure acrylic, and was finished and polished. The reservoir was filled with salivary substitute (Wet mouth, ICPA) using a calibrated syringe through the release hole.

8) The salivary substitute would be released when tongue creates pressure in the anterior portion of the palate. The functional maxillary salivary reservoir

complete denture was then inserted (Fig. 1G and H).

9) Postinsertion instructions were given to the patient for maintenance and hygiene. The patient was instructed on how to refill the reservoir with salivary substitute, and was asked to make a conscious effort to consume at least eight glasses of water, and lemon juice and milk. Follow up was scheduled on the next day, and regular recall visits were planned every month.

Discussion

The prevalence of xerostomia with patients receiving radiotherapy for head and neck cancer was 100% and studies show that the prevalence increases with age[6]. Several authors have recommended many approaches to fabricate reservoir dentures in either the maxillary denture or mandibular denture. Sinclair et al[7] used cobalt samarium magnets to connect the lower and upper part of the mandibular reservoir denture. However, the procedure required exhaustive laboratory steps. AR Mendoza et al[8] described a reservoir denture that splits into two sections – a clear acrylic base section which contains the reservoirs and a pink acrylic upper section which contains the denture teeth. It provides constant salivary flow for the patient. Verma et al[9] used a similar method of fabricating a salivary reservoir where the acrylic base and denture teeth were two different parts joined with the help of precision buttons. Hirvikingas et al[10] modified the Vissink method of fabricating salivary reservoir and used a Gerber attachment. However, the precision attachment increased the cost of the treatment. In the current case, a reservoir denture was fabricated that had minimal laboratory procedures, and refilling the salivary substitute into the reservoir did not deem cumbersome for the geriatric patient.

LIMITATIONS AND DISADVANTAGES

1) Required additional laboratory procedures
2) Patient has to manually refill the reservoir at regular intervals
3) A physiologic method to stimulate saliva needs to be devised

Conclusion

This is a simple method of fabricating a salivary reservoir and also an economic option for the management of xerostomia. The patient was satisfied with the results as was noted in the follow-up appointments.

Figure1- A) Try-in, B) Reservoir walls built with sprue wax, C) Processing of denture, D) Finished denture, E) Denture duplicated and reservoir space blocked with plaster, F) Reservoir lid built with thermoplastic sheet, G)Salivary reservoir H) Post insertion

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