Novel treatment (new drug/intervention; established drug/procedure in new situation)

Prosthodontic management of radiation induced xerostomic patient using flexible dentures

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Summary

Xerostomia causes discomfort for complete denture wearers as the tissues become dry and friable due to lack of lubricating properties of saliva. Common problems faced by such patients are glossitis, mucositis, angular cheilitis, dysgeusia and difficulty in chewing and swallowing. This case report describes a new method in addressing such issues by using flexible complete denture construction in radiation induced xerostomic patient with minimal tissue damage during and after denture construction procedures.

BACKGROUND

Xerostomia can be caused as a result of systemic conditions like rheumatic disease, Sjogren's syndrome, salivary gland diseases, diabetes mellitus, Parkinson's disease, dysfunction of immune system like HIV/AIDS, radiation of head and neck and side effects of medications.¹⁻² The diminished flow of saliva causes discomfort of oral tissues³⁻⁴ due to lack of lubrication, decrease of bactericidal action and self cleansing properties of saliva. It also interferes with eating, speaking, swallowing and sometimes causes infection.⁵⁻⁶ Also the decreased flow of saliva interferes with denture retention.⁷ Cho *et al* conducted a study and concluded that xerostomic patients display varying degrees of discomfort related to the quality of life depending on the aetiology of xerostomia.⁸ Therefore a need exists to modify the techniques for prosthodontic procedures involved in construction of complete dentures to enhance denture wearing comfort.

This article describes a case of a patient with radiation induced xerostomia managed with biocompatible and atraumatic materials for impression making and denture construction. Flexible dentures have many advantages over the traditional rigid denture bases. Translucency of the material matches with the tissue underneath making it almost impossible to detect in the mouth. The material is free of monomer and metal thereby making it free from allergic reactions unlike conventional denture materials.⁹ Areas of the ridge that would not be possible to be covered with conventional denture techniques can be used. Also these dentures will not cause sore spots due to negative reaction to acrylic resins and will absorb small amounts of water to make the denture more soft tissue compatible.¹⁰ These dentures are nearly unbreakable, can be fabricated quite thin, and can form the denture base, and the clasps as well. Since the clasps are built to curl around the necks of the teeth, they are practically indistinguishable from the gums that normally surround the teeth.¹¹ Because of the

above advantages usage of flexible dentures was contemplated in this case.

CASE PRESENTATION

A 65-year-old patient reported to the department of prosthodontics with the complaint of difficulty in wearing dentures associated with dryness of mouth, frequent occurrence of oral ulcers and pain while swallowing. The patient was a denture wearer for the past 1 year. On taking medical history it was found that the patient had suffered from carcinoma of right tonsillar region (figure 1) about 3 years back. He was successfully operated for the same and he underwent postoperative radiation therapy. Systemic examination revealed, dry mouth, cracking of corners of mouth and lack of appetite. On clinical examination, completely edentulous upper and lower residual ridges with dry, thin and friable mucosa with erythema and inflammation, dry tongue and minimal frothy saliva in the floor of

Figure 1 Intraoral view of the carcinoma site.

Figure 2 Primary impression with alginate.

Figure 3 Final impression.

the mouth were observed. The history and examination pointed towards a radiation induced xerostomia.

DIFFERENTIAL DIAGNOSIS

Sjogren syndrome, infective/inflammatory sialoadenitis and rheumatoid arthritis.

TREATMENT

After a number of unsatisfactory adjustments of the existing dentures, it was decided to fabricate a new set of maxillary and mandibular flexible dentures. Primary impressions were made with alginate impression material (figure 2) while final impressions were made with non-eugenol impression paste (figure 3) since zinc oxide eugenol paste may cause burning sensation to the patient. Denture base was made on the final cast using shellac base plate. Occlusal wax rims were made and jaw relation was recorded using conventional method and centric relation was recorded by nick and notch method. The casts were mounted on semiadjustable articulator (figure 4).

Teeth arrangement was done and tried in patient's mouth to check for retention, stability, esthetics, phonetics and comfort.

Dentures were processed in injection molding system. Finally dentures were finished and polished (figure 5). During denture insertion (figure 6) occlusion was evaluated and adjusted and postoperative instructions were given. During postinsertion appointments minor adjustment were done and the patient was placed on a 6 month recall.

OUTCOME AND FOLLOW-UP

This technique resulted in a complete denture that provides better cooperation from patient during impression making subsequently resulting in better retention and comfort.

DISCUSSION

The various modalities for treatment of xerostomia are salivary substitutes or salivary stimulants,^{12 13} soft liners, intraoral lubricating device,¹⁴ split dentures with salivary

reservoirs¹⁵⁻¹⁷ and flexible dentures.⁷ Salivary substitutes are useful in the presence of inadequate salivary gland function¹⁸ but they are contraindicated in conditions like asthma, iritis and glaucoma as they cause tachycardia, bradycardia, sweating and increased smooth muscle tone.¹⁹ The limitations of the split dentures are that they

Figure 4 Teeth arrangement mounted on semiadjustable articulator.

require adequate vertical dimension for accommodating the reservoir in the denture which weakens its structure. Also repair and relining are difficult in such dentures and are often reported to be too bulky and interfere with speech.¹⁸

Though the flexible resins are more expensive, they are also longer-lasting than the traditional resins. Acrylic dentures shrink if not kept in water and dropping them onto a hard surface can cause them to crack whereas flexible dentures do not warp or become brittle. As the flexible dentures are fabricated using the injection molded technique, they exhibit better accuracy compared to conventional techniques.²⁰

Some common problems associated with xerostomia include a constant sore throat, difficulty in speaking and swallowing, hoarseness in voice.^{21 22} Therefore xerostomics with hard acrylic denture complain of denture movement resulting into sore spots in the mouth. In contrast the flexible denture uses a softer material which locks into the undercuts of the ridges thereby adapting to the constant movement and flexibility in the mouth and provides the stability to eat tough foods. Also these dentures can retain a small percentage of water to help interface with adjacent tissues and also to make the denture more soft and tissue compatible¹⁰ as compared with acrylic dentures.

Complete biocompatibility is also achieved because the material is free of monomer and metal, which are the principle causes of allergic reactions in conventional denture materials.⁹ Flexible dentures are more hygienic as the material used is non-porous, so bacteria build up does not occur within it unlike acrylic dentures where more colonisation has been found on the tissue surface of maxillary denture. Another advantage of a flexible denture is that the trial fitting can be used as part of the final denture that is the overall construction time of a flexible denture is lesser than that of a hard acrylic denture.

Figure 5 Finished dentures.

Figure 6 Postoperative view.

Learning points

- ▶ Flexible dentures offer a good option for management of xerostomia patients as they are soft and adapt well to the gums thus comfortable for wearing.
- ▶ Flexible dentures retain moisture with them and give better lubrications than acrylic dentures thus apt for xerostomic patients.
- ▶ Flexible dentures are biocompatible thereby safe for patients with carcinoma. They are lighter in weight, are not brittle, do not warp unlike acrylic dentures and are suitable in conditions of inadequate vertical dimension unlike split dentures.

Competing interests None.

Patient consent Obtained.

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