

RADIATION THERAPY PATIENT: SPECIAL CONSIDERATIONS IN PROSTHODONTIC MANAGEMENT

¹ Gupta Basant¹ Senior Lecturer, Department of Prosthodontics² Rayannavar Sounyala² Senior Lecturer, Department of Prosthodontics¹ Department of Prosthodontics, NIMS Dental College, Jaipur. ² K.L.E. Institute of Dental Sciences, Belgaum.

ABSTRACT

The use of radiation therapy in the treatment of patients with head and neck cancer has increased in the past few years. The effects of radiation therapy on the soft tissues and bone present the clinician with new challenges regarding the dental care. The prosthodontic rehabilitation of the patient requires special care and treatment protocol to overcome the problems of mucositis, xerostomia and osteoradionecrosis. This paper emphasizes special consideration during the prosthetic rehabilitation of the patient with insight into both the pre-radiation and the post-radiation care of such patient.

KEYWORDS: Oncology, radiation, rehabilitation, denture.

INTRODUCTION

Discussions of treatment modalities presently utilized in the medical management of the cancer patient frequently include the importance of the role of the dentist in patient care. The prosthodontic treatment of head and neck cancer patients, and its role in improving quality of life, is well recognized.¹

With the increased use of radiation in the 1960s, dentistry was challenged with the task of developing treatment regimens for the oral complications associated with this form of therapy. Special considerations are required in the prosthodontic rehabilitation of radiation therapy patients which includes both pre and post radiation care.²

Pre-radiation Prosthodontic Care

Full-mouth or panoramic radiographs are necessary, as is a comprehensive clinical examination of the periodontium and oral soft tissues. An assessment of the patient's oral hygiene is an important element in the initial examination. A dental prophylaxis and review of oral hygiene procedures should be accomplished as quickly as possible. Definitive restorations should be placed, and teeth considered non restorable or non salvageable with endodontic therapy should be extracted.

Periodontally involved teeth exhibiting moderate to severe mobility should also be considered for removal. In questionable situations, it is perhaps more prudent to err on the side of aggressive tooth removal, since extractions following radiation treatment will present an increased risk of osteoradionecrosis.³ It must also be remembered that wound healing will be compromised, and extensive periodontal surgery following radiation will be contraindicated.

It is advisable to consider maintaining strategically positioned, periodontally sound teeth to be used as abutments for removable partial dentures or complete overdentures.⁴ Because irradiated bone loses the ability to remodel, radical alveolectomies must be considered for those patients who are candidates for removable prostheses. Removal of tori and exostoses will help reduce soft tissue problems and improve the opportunity for prosthodontic success.⁵

A number of patients wear removable complete or partial dentures, and although in the opinion of the patient the prostheses are serviceable, they may or may not conform to acceptable prosthodontic standards. Regardless of the condition of the dentures, little definitive prosthodontic care is necessary prior to radiation. The severity of resulting mucositis will limit the patient's ability to tolerate the prosthesis during therapy, whether or not retention or occlusion is adequate. Since patients may experience a substantial weight loss over the treatment course, sufficient change will have occurred in the soft tissues to warrant the fabrication of new dentures once radiation is complete. There is little advantage to relining ill-fitting dentures since the procedure can be moderately expensive and will not be a factor in patient comfort during various stages of mucositis. Soft, temporary relined materials, because of their surface porosity and abrasiveness, make hygiene procedures difficult, serve as a potential reservoir for fungal growth, and may be a source of additional mucosal discomfort.⁶

Patients are advised that they will, in most instances, be better served by not wearing dentures during therapy. The patient must be cautioned that continuing to wear the dentures may be the source of significant additional mucosal irritation and lead to delayed healing following

the completion of radiation therapy.⁷ In most instances the patient will object to being without dentures during therapy for the usual cosmetic and functional reasons.

Dentate patients with metallic crowns or fixed partial dentures in the treatment field may suffer significant irritation to adjacent soft tissue as a result of backscatter.⁸ This problem can be minimized with the use of a custom-made, soft plastic stent. The stent should be of sufficient thickness to displace the soft tissue in buccal and lingual directions. In some cases, the patient's fluoride carrier may be used for this purpose.

Post-radiation Prosthodontic Care

Patients treated with radiation suffer substantial changes to the oral mucosa and are often candidates for new complete or partial dentures.⁹ The oral soft tissue must be adequately healed before necessary prosthodontic procedures can be initiated. Since trauma caused by dentures may increase the potential risk of mucosal irritation and subsequent bone exposure, some have suggested waiting at least 6 months to a year before dentures are contemplated.⁴

However, the insult to oral tissue as a result of radiation is dependent on a number of factors, and the severity of this insult is not the same for each individual.¹⁰ Patients who abuse alcohol or tobacco may need a substantially longer healing period than a nondrinker or nonsmoker. Delivered dosages, type of radiation employed, and size of areas radiated also play roles in soft tissue morbidity.¹¹

Dentures should be carefully fabricated using conventional prosthodontic techniques. A wide variety of materials can be used when making impressions. The dentist may be well served by using a familiar technique, thereby avoiding the need for multiple remakes and an unpredictable result. It has been reported that plaster or zinc oxide may cause some discomfort related to tissue friability and the lack of saliva.⁴ Denture border extensions are developed with modeling plastic. This material must be properly tempered prior to placement in the mouth to prevent soft tissue irritation. Soft tissues are manipulated as gently as possible during the impression process. It should be re-emphasized to the patient that denture retention may be compromised as a result of xerostomia. Use of Salivary substitutes may be of some help in such conditions.¹²

Accurate temporary denture bases are fabricated and interocclusal records made in centric-relation at a slightly closed vertical dimension. A closed vertical dimension is believed to place less stress on the alveolar ridges during function and parafunction and may also be an advantage in positioning the denture should trismus or fibrosis develop.¹³ Casts are mounted on an articulator, and

artificial teeth are set. There does not appear to be any contraindication to the use of either plastic or porcelain monoplanes or anatomic teeth. The plastic, monoplanes teeth are frequently the teeth of choice. A well-balanced, non-interfering occlusion is an absolute necessity regardless of the tooth form used.¹³

An appointment to evaluate the waxed denture allows verification of interocclusal records and provides the patient an opportunity to satisfy esthetic considerations. The prostheses are flaked and processed using heat-cured poly-methyl methacrylate. Soft materials have been suggested for use as denture bases.¹⁴ In the past, these materials have offered little advantage over hard base materials because of their coarse surface and propensity for support of fungal growth.⁶

Delivery procedures must be meticulously performed. Indicating paste is used to identify the areas of excessive pressure. Denture borders should be carefully evaluated for areas of overextension, paying special attention to the retromylohyoid area. Remounting the dentures provides an opportunity for verifying the accuracy of interocclusal records and developing a non-interfering occlusion.¹³ Upon completion of these procedures, the dentures are highly polished. Some clinicians advocate that the tissue-bearing surface of the denture also be polished to eliminate any surface roughness in an effort to minimize tissue irritation.⁴ The patient should be advised regarding the effect of xerostomia and compromised mucosa have on the potential for prosthodontic success and should be cautioned to remove the dentures if any soreness or irritation develop and to see the dentist as quickly as possible.¹² The benefits of removing the dentures while asleep and maintaining appropriate oral hygiene procedures must be explained.¹⁵ Additionally, the patient must be seen at frequent intervals during the first few weeks allowing delivery of the dentures. Two appointments a week provide ample opportunity to intercept any problems that may develop.

CONCLUSION

The cancer patient who is to receive curative doses of radiation to the head and neck presents an interesting challenge for the dentist. Prosthodontic management of the irradiated patient is a serious undertaking since the standard of care certainly has an effect on the patient's quality of life. Dentists assuming the responsibility for treating this group must be willing to make a long-term commitment to each individual patient's care. They must also have an understanding of basic radiation and dental oncology techniques and their own limitations. An attempt has been made to review the rationale for the prosthodontic procedures important in the dental management of the irradiated patient.

References:

1. Schoen PJ, Reintsema H, Bouma J, Roodenburg JL, Vissink A, Raghoobar GM. Quality of life related to oral function in edentulous head and neck cancer patients posttreatment. *Int J Prosthodont.* 2007;20(5):469-77. PMID:17944334
2. Morton M, Roberts H. Oral cancer and precancer: after-care and terminal care. *Br Dent J.* 1990;168(7):283-7. doi:10.1038/sj.bdj.4807168 PMID:2159314
3. Brennan MT, Woo SB, Lockhart PB. Dental treatment planning and management in the patient who has cancer. *Dent Clin North Am.* 2008;52(1):19-37, vii. PMID:18154863 doi:10.1016/j.cden.2007.10.003
4. Rahman RA, Ngeow WC, Chai WL, Ramli R. Managing complications of radiation therapy in head and neck cancer patients: Part III. Provision of dentures. *Singapore Dent J.* 2006;28(1):7-10. PMID:17378335
5. Shaw MJ, Kumar ND, Duggal M, Fiske J, Lewis DA, Kinsella T, Nisbet T. Oral management of patients following oncology treatment: literature review. *Br J Oral Maxillofac Surg.* 2000;38(5):519-24. PMID:11010786 doi:10.1054/bjom.2000.0468
6. Gedik H, Ozkan YK. The effect of surface roughness of silicone-based resilient liner materials on the adherence of *Candida albicans* and inhibition of *Candida albicans* with different disinfectants. *Oral Health Prev Dent.* 2009;7(4):347-53. PMID:20011752
7. Toljanic JA, Saunders VW Jr. Radiation therapy and management of the irradiated patient. *J Prosthet Dent.* 1984;52(6):852-8. doi:10.1016/S0022-3913(84)80019-0
8. Farman AG, Sharma S, George DI, Wilson D, Dodd D, Figa R, Haskell B. Backscattering from dental restorations and splint materials during therapeutic radiation. *Radiology.* 1985 Aug;156(2):523-6. PMID:4011918
9. Esposito SJ, Matheis MJ. Sequelae and dental management of the head and neck radiation patient. *Ohio Dent J.* 1987;61(10):17-9, 21-4. PMID:2966328
10. Chung EM, Sung EC. Dental management of chemoradiation patients. *J Calif Dent Assoc.* 2006;34(9):735-42. PMID:17022298
11. Huber MA, Terezhalmay GT. The head and neck radiation oncology patient. *Quintessence Int.* 2003;34(9):693-717. PMID:14982224
12. Haveman CW. Xerostomia management in the head and neck radiation patient. *Tex Dent J.* 2004;121(6):483-97. PMID:15354667
13. McCord JF. Contemporary techniques for denture fabrication. *J Prosthodont.* 2009;18(2):106-11. PMID:19254299 doi:10.1111/j.1532-849X.2009.00439.x
14. Hayakawa I, Keh ES, Morizawa M, Muraoka G, Hirano S. A new polyisoprene-based light-curing denture soft lining material. *J Dent.* 2003;31(4):269-74. doi:10.1016/S0300-5712(03)00031-9
15. De Souza RF, de Freitas Oliveira Paranhos H, Lovato da Silva CH, Abu-Naba'a L, Fedorowicz Z, Gurgan CA. Interventions for cleaning dentures in adults. *Cochrane Database Syst Rev.* 2009 Oct. 7;(4):CD007395. PMID:19821412

Corresponding Author

Dr. Gupta Basant

Senior Lecturer

NIMS Dental College, Jaipur

Mobile: +91-9928366118

E-mail: gupta_basant@hotmail.com