Complete dentures in cancer patients undergoing radiotherapy treatment

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Abstract
Non-communicable diseases including cancer are emerging as major public health problems in India. These diseases are lifestyle related, have a long latent period and need specialized infrastructure and human resource for treatment. Oral malignancy results in dysfunction and disfigurement of the stomatognathic system. This article aims to study the role of dentist to restore and rehabilitate oral cancer patients to near normal appearance and physiologic function.

Keywords
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Introduction
Oral cancer incidence is on the rise because habits such as alcohol and tobacco prevail, also nutritional deficiencies, poor oral hygiene, and exposures to chemicals are the cofactors. The primary goal of treating disabled cancer patients depends on the quality of life which has a physical function, social interaction, psychological function, and treatment of disease as parameters. The goal of cancer treatment should not only be on survival, but rehabilitation, which aims to improve multiple impairments' and quality of life.[1] The main goal of reconstruction is to restore the function, speech, mastication, normal mandibular mobility, restoration of facial, and dental esthetics.[2]

Principal methods of treating malignancies of the head neck are:
• Surgical resection
• Radiotherapy.

Chemotherapy as yet is not that much a favored treatment modality with respect to malignancies of the head and neck. In recent years, radiation therapy has been used with increased frequency in the management of neoplasm of head and neck. The effects of radiation therapy can be classified as: Direct/indirect, immediate/late and most complications can be avoided or minimized by:
• Adequate preventive therapy
• Maintenance of oral hygiene.

Radiation effects on tissues[3,4]
They can manifest as acute changes or chronic changes and the clinical sequelae are specific for each tissue. E.g., Benign paralysis of motor nerves, atrophy of muscles and fibrosis in connective tissues.

Normal tissue complication reaction is dependent on
• Volume of tissue is irradiated
• Dose administered
• Fraction size
• Interval b/w the two fractions
• Individual and genetic factors
• Cofactors (wound infection).

Radiation injury can either be direct or indirect

Direct injury
Destroys or damages susceptible cells are causing a loss or disruption of tissue function. E.g., Salivary glands, mucosa, skin.

Indirect injury
This results from decreased vascularity and the subsequent changes in the tissue. These changes are classified to be based on responses that are:
1. Hypovascular
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2. Hypocellular
3. Hypoxic.

**Prosthetic Management of Edentulous Patients**[^5-8]

Complete denture fabrication in cancer patients undergoing radiotherapy treatment is of considerable importance. Following treatment modality is suggested for the patients undergoing radiotherapy treatment.

**Risk of bone necrosis**

Considering the histopathological changes associated with the mucous membranes and the bone earlier dentures were not advised. However, studies have proven that if the patient was edentulous prior to therapy and the dentures are well constructed then there is no added risk.

**Soft liners**

Silicone liners have been suggested in order to reduce the trauma to the tissues. However, they reduced wettability of tissues thus leading to increased drag, as it does not allow the denture to slide easily over the mucosa when in function. Due to an increase in the fungi population owing to xerostomia there is a more rapid degradation of the silicone liners. Silicone liners have thus been proven to be less effective than acrylic resin in the post radiotherapy denture patient.

**Placement of dentures timing**

Conventional waiting period of 12-18 months is not justified. Studies have proven that edentulous patients have no significant risk of developing complications from well-constructed dentures. 3-12 months waiting period is more than sufficient. Osteoradionecrosis is a phenomenon that is exclusively to the mandible and extreme care should be followed in its construction. It should be ensured that stress is distributed wide over the stress bearing areas.

**Soft tissue necrosis**

Though there are fewer chances of causing soft tissue necrosis with dentures but there are risk areas such as fibroosed and scarred areas. Care should be taken during the development of the peripheral extensions of the denture base.

**Complete Dentures**

**Examination**

- Complete information regarding the therapy is collected
  - Total dose
  - Dates of treatment
  - Radiation fields
  - Tumor response
  - Prognosis of the disease.

**Initial oral examination**

- Note the important clinical manifestation of the radiation treatment
- Appearance of the oral mucous membranes
- Scarring and fibrosis at the tumor site
- Degree of trismus
- Presence and nature of lymphedema
- Status of salivary function.

**Impressions**

Border molding with caution, taking care to note there are no over extensions. A thin coat of vaseline applied on the tissues to compensate for xerostomia. Particular attention paid to the mandibular lingual extensions as over extensions can lead to mucosal perforations. Displacement of the tissues of the floor of the mouth to get a seal should be avoided. Efforts to get the lingual flange should be directed to deriving stability and support and not retention. Cutting away parts of the denture base in the regions of radiation fields may be required.

**Vertical dimension**

A reduction in the vertical dimension may be required. This is done to limit the extent of forces exerted on supporting structures. In-patients with significant trismus the entrance of food bolus is easier by increasing interocclusal space.

**Occlusal forms**

On a theoretical basis only it is been advocated the use of monoplane occlusion to reduce the forces to the underlying bone. Reduction in the number of posterior teeth by using two molars and one premolar only.

**Delivery and post insertion care**

Pressure indicator paste applied to indicate any areas of excessive pressure. Detailed instruction sheet and post insertion recall 24 h, 48 h, and 4 times in the 1st year.

**Implants in Irradiated Tissues**

Long-term function of osseointegrated implants is dependent on the presence of viable bone that is capable of remodeling and turnover as the implant is subjected to the stresses. There is increased the risk of osteoradionecrosis. The success - failure rate is dependent on:
1. Anatomical site
2. Dose to the site
3. Use of hyperbaric oxygen.

Implants already in place tend to add the backscatter thus the tissues around tend to get as much as 15% more than other areas. Osseo-integration is impaired in the bone that has received more than 5000 cGy of treatment. There is always a risk of failure and osteoradionecrosis when placing implants in irradiated bone. Hyperbaric oxygen can help in its success. Abutments and all

[^5-8]: Prosthetic Management of Edentulous Patients. [5-8]
superstructures are to be removed prior to the therapy. Mucosa should be closed over the implant fixtures. They should only be used once therapy is over, and then the prosthesis can be reseated.

**Conclusion**

From the overview, it is deduced that the materials currently available still do not completely meet our needs. Maybe a dream but the possibility of fabricating a high quality life like prosthesis would require no more skills than a prosthodontist already has, if the dental material scientist can help us by providing a perfect material having all the ideal properties to rehabilitate the patient undergoing radiotherapy patient who deserves the best we can offer.

**References**