

# Dental Management of Oral Complications in Oncology Patients

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## ABSTRACT

Oral complications that follow cancer therapy can occur as a side effect of the treatment therapy itself or an indirect result of the therapy. Cancer patients, who have undergone chemotherapy/radiation therapy, have a lifelong susceptibility to uncontrolled dental disease. Therefore, the counseling of such patients regarding these complications, and the dietary and oral hygiene measures to be adopted to counter the same, is of paramount importance. This article reviews the treatment modalities and preventive measures essential to managing posttreatment complications in oncology patients from a dental perspective.

**Keywords:** Chemotherapy, Dentures, Mucositis, Oral cancer, Osteoradionecrosis, Radiotherapy.

**How to cite this article:** Ramanna PK. Dental Management of Oral Complications in Oncology Patients. *Int J Oral Care Res* 2018;6(1):82-85.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

The prevalence of cancer in India is approximately 2.5 million, with an incidence rate of 7,00,000 new cases and a mortality rate of 5,56,400 each year. Lung, lip-oral, stomach, colorectum, and oropharynx cancers mostly affect men, whereas cervix and breast cancers are most common in women, followed by cancers of the colorectum, ovary, and lip-oral tissues.<sup>1</sup>

The oral complications that result following cancer therapy is either a direct effect or an indirect effect of the treatment.<sup>2,3</sup> These complications can be minimized by advocating meticulous oral hygiene measures and prompt preventive regimen.<sup>4</sup> The patient's quality of life and social adaptation are greatly improved, following cancer therapy, by maintenance of good oral health.<sup>5</sup>

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## Complications resulting from Cancer Therapy

The treatment of cancers includes surgery, radiation therapy, chemotherapy, or a combination.

The oral complications following cancer therapy can be classified as direct stomatotoxicities (direct effect of chemotherapy/radiation therapy) or indirect stomatotoxicities (indirect effect of chemotherapy/radiation therapy).<sup>6</sup>

Direct toxicities include:<sup>6</sup>

- Oral mucositis
  - Salivary gland dysfunction
  - Neurotoxicity: taste dysfunction and dentinal hypersensitivity
  - Temporomandibular dysfunction
- Indirect toxicities include:<sup>6</sup>
- Myelosuppression: neutropenia, immunosuppression, anemia, thrombocytopenia
  - Infections: viral, fungal, or bacterial
  - Graft *vs* host disease after allograft
  - Gastrointestinal mucositis
  - Nausea and vomiting

Based on time of onset, complications of the oral cavity that occur following radiation therapy can be classified as<sup>6,7</sup>

- Acute
  - Oral mucositis
  - Infections: viral, fungal or bacterial
  - Sialadenitis
  - Xerostomia
  - Taste dysfunction
  - Muscular/cutaneous fibrosis
- Chronic
  - Mucosal fibrosis and atrophy
  - Xerostomia
  - Dental caries
  - Soft tissue necrosis
  - Osteoradionecrosis (ORN)
  - Taste dysfunction
  - Dysgeusia
  - Ageusia
  - Infections

The oral complications of chemotherapy include<sup>7,8</sup>

- Oral mucositis
- Infections: viral, fungal, or bacterial
- Xerostomia

- Taste dysfunction
- Neuropathies
- Gastrointestinal mucositis
- Hemorrhage

## DENTAL MANAGEMENT

### Oral Hygiene

Oral hygiene maintenance is imminent to ensure patient comfort, maintain normal function of the oral tissues, and minimize risk of local and systemic infections.<sup>9</sup> A well-structured oral care routine, which consists of brushing, flossing, and rinsing, reduces the incidence of oral complications of cancer therapy.

#### Brushing

A small, soft bristle toothbrush is the best tool for brushing teeth.<sup>10</sup> Brushing with fluoridated toothpastes is recommended. Excessive gingival bleeding may be present if the platelet count is less than  $20 \times 10^9/L$ . Brushing is to be avoided in such cases and a foam swab used instead. Use of electric toothbrushes also increases the potential for gum injury and bleeding.<sup>11</sup> Hence, the use of electric toothbrushes is generally not recommended.

#### Flossing

Using dental floss once a day, preferably before brushing at night, rather than twice a day, is effective and minimizes trauma to the gingiva.<sup>10</sup>

#### Rinsing

Chlorhexidine is an effective antibacterial and is available in concentrations of 0.12 to 0.2% mouthwash. Mouth rinsing with chlorhexidine should be done 30 minutes after toothbrushing. If the 0.2% concentration is used, it may be diluted 1:1 with water to reduce mucosal discomfort.<sup>12</sup>

### Xerostomia

#### Prevention of Xerostomia

- Protecting the contralateral parotid gland during radiation therapy helps maintain the parotid function partially.<sup>13</sup>
- Intensity-modulated radiation therapy or three-dimensional conformal radiotherapy minimizes the radiotherapy dose to the parotid glands.<sup>14-16</sup>

#### Salivary Stimulation

These methods of stimulating salivary secretion are recommended when some salivary function remains:

- Pilocarpine, if there is no medical contraindication, may be administered in a dosage of 5 to 10 mg orally,

three times a day.<sup>14,16,17</sup> The dosage is to be kept to a minimum to avoid side effects. More than 2 months is required for the drug to reach maximum effect.<sup>18</sup>

- Stimulation by chewing gum is also recommended; however, there is limited evidence regarding the efficacy.
- Acupuncture has been shown to have the potential to increase salivary flow with minimum side effects.<sup>16</sup>

#### Saliva Substitutes

These are artificial substitutes with physical properties similar to saliva but without the antibacterial and immunological properties.<sup>19</sup> Mucin-based artificial salivas are reported to be better tolerated, because mucin is a natural component of saliva.<sup>20</sup>

### Fungal Infections

Chemotherapy and/or radiotherapy increases the risk of oral fungal infection in patients. Topical antifungal drugs have a lower risk of side effects than systemic agents. However, the efficacy of topical antifungal agents has been inconsistent.<sup>21</sup> The following are systemic antifungal regimens that are recommended as follows:

- Nystatin 100,000 units per mL oral suspension, four times daily, for minimum 7 days and continued for 2 days after symptoms subside.<sup>21</sup>
- Miconazole 24 mg/mL oral gel, 10 mL four times daily, continued till 2 days after symptoms subside.
- For moderate or severe oropharyngeal candidiasis: 50 mg capsules or suspension of fluconazole daily for 1 to 2 weeks.<sup>22</sup> Miconazole and fluconazole should be avoided in patients taking anticoagulants like warfarin or statins.<sup>23</sup>

### Osteoradionecrosis

Osteoradionecrosis is a major complication of surgery or trauma in previously irradiated maxilla or more commonly mandible, due to radiation-induced vascular insufficiency. The management of ORN involves<sup>24-28</sup>

- Avoidance of extractions, especially in the mandible, wherever possible
- Prescribing a soft diet to reduce oral trauma
- Correction or discontinuance of dentures traumatizing oral tissues
- Antioxidant agent, pentoxifylline 800 mg/day and (tocopherol) vitamin E 1000 IU/day (5 days a week) seem to aid in the management of ORN by their synergistic action
- High-dose antibiotic regimes with broad-spectrum antibiotics

- Administering antibiotics prophylactically prior to any extraction or sequestrectomy procedure and continuing the same until mucosal integrity is established
- Removal of sequestra and other debris from intraoral defects in addition to antibiotic therapy
- Hyperbaric oxygen therapy
- Ultrasound at frequencies of 3 MHz pulsed one in four at an intensity of 1 W/cm<sup>2</sup> applied to the mandible for 10 minutes daily for 50 days has been found effective

### Protocols for Dental Treatment

Precautionary measures necessary in cancer therapy patients undergoing dental treatment, to minimize the risk of systemic infection, include:

- Exodontia: Patients who have undergone radiation therapy are at a risk of developing ORN following dental extractions. A recent study estimated that the total incidence of ORN after dental extraction, in irradiated patients, is 7%. However, extractions along with antibiotic therapy reduced the incidence to 6%. Hyperbaric oxygen therapy used prophylactically reduced the incidence to 4%.<sup>29</sup> Bisphosphonate therapy also increases the risk of developing osteonecrosis after dental extractions in cancer patients.<sup>30</sup>
- Implant therapy: Implant placement in patients undergoing bisphosphonate therapy is not recommended due to the increased risk of osteonecrosis and increased damage to the bony structures.<sup>30</sup> Hyperbaric oxygen therapy has not been found to have significant clinical benefits with respect to implant success.<sup>31</sup>
- Restorative therapy: It is preferable to delay routine restorative therapy till the patient is in remission. Restorations fabricated must be functional with adequate esthetics, and simple in design for easy maintenance. Xerostomia resulting from radiation therapy leads to a prevalence of cervical caries. It is favorable to use as a restorative material with fluoride release wherever conducive.
  - Full/partial coverage crowns should be provided only when the patient can demonstrate good oral hygiene. Should a full coverage restoration be warranted, the margins should be subgingival.<sup>32</sup>
- Orthodontic therapy: There should be a year delay, postcancer treatment, before orthodontic treatment is commenced.<sup>33</sup>

### Care of Dentures and Other Oral Appliances

- Obturators and dentures should be reviewed regularly. They must be discontinued if there is pain or trauma to the tissues.
- Appliances should be cleaned thoroughly and removed at night daily. Obturators should not be left out at night for 6 months following treatment.

- For those edentulous patients who have xerostomia, a saliva substitute can be applied to the intaglio surface of their prosthesis prior to reinsertion.<sup>34</sup> Artificial saliva reservoirs, incorporated into complete or partial prostheses, have been shown to relieve xerostomia symptoms temporarily.<sup>35,36</sup>
- In case of oral candidal infections, antifungal drugs should be prescribed for a minimum of 2 weeks consecutively.

Denture wearers undergoing cancer therapy are prone to fungal infections. Methods to manage them include:

- Miconazole varnish or gel applied to intaglio denture surface. However, miconazole enhances the anticoagulant action of warfarin and should be avoided in these patients.<sup>22</sup>
- Denture soft lining material reinforced with nystatin powder 500,000 to 1,000,000 units per application used as a soft liner. The fungicidal activity of such modified lining materials reduces with time and requires to be changed regularly every 7 to 14 days.<sup>37</sup>
- Tea tree oil (*Melaleuca alternifolia*) incorporated into tissue conditioner has an antifungal effect and could be used as an alternative therapy in case of resistance to traditional therapies.<sup>38</sup>
- Disinfection of maxillary complete denture studies has found microwave disinfection effective.<sup>39</sup>

### CONCLUSION

Susceptibility of cancer patients, treated with chemotherapy/radiation therapy, to uncontrolled dental disease is a frequent occurrence. This can prove to be a lifelong battle for the patient. Therefore, it is of paramount importance to counsel patients regarding the oral complications of cancer therapy, the oral hygiene measures to help prevent them, and also the necessity for prompt management of these conditions.

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