

Oral Complications of Cancer Treatment: What the Oncology Team Can Do

Radiation to the head and neck and chemotherapy for any malignancy can cause a range of oral side effects. For some patients, these complications may become dose-limiting and slow – or even halt – cancer treatment. Preventing and managing oral complications help support optimal cancer therapy, enhancing both patient survival and quality of life.

Who Has Oral Complications?

Oral side effects occur in virtually all patients receiving radiation for head and neck malignancies, in approximately 80 percent of transplant recipients, and in about 40 percent of patients receiving primary chemotherapy. Risk for oral complications varies with the treatment regimen. Patients administered minimally myelosuppressive or nonmyelosuppressive therapy are at low risk. As chemotherapy becomes more aggressive, the likelihood of oral complications increases. Also at high risk are patients undergoing head and neck radiation for oral and pharyngeal cancer.

Most oral complications resolve when cancer treatment ends and the patient's overall condition improves. Others, such as xerostomia, may persist for years. Unfortunately, patients do not always receive medically necessary dental care that could help avert or minimize oral complications. Ensuring that your patients receive timely oral care helps them maintain the prescribed cancer regimen and complete treatment.

By adding oral care to the pretreatment regimen, you can

- Prevent, eliminate or control oral pain.

Oral Complications of Cancer Treatment

General

- Oral mucositis/stomatitis
- Xerostomia/salivary gland dysfunction
- Pain
- Infection
- Xerostomia-associated cavities
- Taste alterations
- Nutritional compromise
- Functional disabilities
- Abnormal dental development in children

Treatment-specific

Chemotherapy

- Neurotoxicity
- Bleeding

Radiation therapy

- Radiation cavities
- Trismus/tissue fibrosis
- Osteonecrosis

- Prevent oral infections that could lead to serious systemic infections.
- Optimize nutritional support.
- Preserve or improve oral health.
- Prevent or reduce the incidence of bone necrosis in patients receiving radiation therapy to the head and neck.





- Improve the quality of life.
- Decrease the cost of care.
- Improve the likelihood that the patient will successfully complete planned cancer treatment.

Oral Evaluation Before Cancer Treatment Makes a Difference

A pretreatment oral evaluation can identify potential problems and help educate the patient about the importance of good oral care. This evaluation can be conducted by a knowledgeable dentist in the community or by a hospital-based dental team. Ideally, the evaluation should be performed at least 1 month before cancer treatment starts to permit adequate healing from any required invasive procedures. The evaluation includes a thorough examination of hard and soft tissues, as well as radiographs to detect trauma and possible sources of infection. Before cancer treatment begins, the dentist will take the following steps:

- Identify and treat existing infections, problem teeth, and tissue injury or trauma.
- Stabilize or eliminate potential sites of infection.
- Remove orthodontic bands if highly stomatotoxic chemotherapy is planned or if the bands will be in the radiation field.
- Perform oral prophylaxis if indicated.
- Evaluate dentures and appliances for comfort and fit.
- Perform oral surgery at least 2 weeks prior to the initiation of radiation therapy to allow healing, and at least 7 – 10 days before myelosuppressive chemotherapy begins.

- Extract teeth that may pose a future problem to prevent extraction-induced osteonecrosis in adults receiving head and neck radiation.
- Consider extracting highly mobile primary teeth in children, and teeth that are expected to exfoliate during treatment.
- Instruct patients on oral hygiene, use of fluoride gel, nutrition, and the need to avoid tobacco and alcohol.

During the examination, the patient will also learn a home care regimen to protect mouth tissues and minimize oral complications. The dentist or dental hygienist will instruct the patient on special brushing and flossing techniques, mouth rinses, and other approaches to keep the mouth as moist and clean as possible to reduce the risk of infection and pain.

Oral Care During Treatment

Regular oral assessment and care are necessary during cancer therapy. Planning and communication between the oncology and dental teams can minimize the risk of oral complications and maximize the efficacy of dental and supportive care. Specific oral health considerations to remember when treating patients with chemotherapy or radiation include the following:

Radiation Therapy

- **Treat infections and ulcerations.** Ulcerations and dry, friable tissues are prone to trauma and infection. Culture suspected infections and work with the dentist to manage the condition.
- **Provide dietary counseling.** Instruct the patient on the importance of healthy eating to maintain nutritional status, emphasizing the need to avoid foods that irritate sore tissues or cause dental decay.

- **Teach exercises to reduce trismus.** Fibrosis may develop if the chewing muscles are in the direct field of radiation. Work with the dentist to teach patients how to exercise and stretch these muscles properly.

Chemotherapy

- **Consider oral causes of fever.** Fever of unknown origin may be related to an oral infection; dental consultation may be appropriate.
- **Schedule dental appointments carefully.** Have the patient schedule appointments for times when blood counts will be at safe levels. If oral surgery is required, it should be performed at least 7 – 10 days before the patient receives myelosuppressive chemotherapy.
- **Determine hematologic status.** Conduct blood work 24 hours before dental treatment to determine whether the patient's platelet count, clotting

factors, and absolute neutrophil count are sufficient to prevent hemorrhage and infection.

- **Evaluate need for prophylactic antibiotic treatment.** If the patient has a central venous catheter, determine if antibiotic prophylaxis (www.americanheart.org) is needed before dental treatment.

Follow-up Oral Care

Once all complications of chemotherapy have resolved and blood counts have recovered, most patients may resume their normal dental care schedule. It is essential that the dentist know the patient's hematologic status before initiating any dental treatment or surgery. Advise the dentist if a patient has received intravenous bisphosphonate therapy due its association with osteonecrosis of the jaw.

Once radiation therapy has been completed and acute oral complications have abated, the patient should be evaluated by a dentist every 4 to 8 weeks for the first 6 months. Thereafter, the dentist can determine a schedule based on the needs of the individual patient.

Minimizing Oral Complications of Cancer Therapy

- Consider use of palifermin for patients with hematologic malignancies receiving chemotherapy/radiation and autologous stem cell transplantation.
- Utilize salivary gland-sparing radiation techniques.
- Administer a radioprotectant, such as amifostine, to reduce risk of xerostomia in head and neck cancer patients.
- Encourage patients to maintain the oral hygiene regimen recommended by the dentist.
- Work with the dentist to prevent and control infections with appropriate treatment before, during, and after cancer therapy.
- Emphasize the importance of maintaining good nutrition.

Long-term Problems Following Head and Neck Radiation Therapy

Radiation therapy to the head and neck can cause oral complications that continue or emerge long after treatment has ended. Although patients may no longer be under an oncologist's care at that time, what they learn about oral health during their treatment will affect how they deal with subsequent complications. Patients receiving radiation therapy need to know about its risks:

- Radiation treatment carries a lifelong risk of osteonecrosis, xerostomia, and dental cavities.

- Because of the risk of osteonecrosis, people who have received radiation should avoid invasive surgical procedures (including extractions) that involve irradiated bone.
- Radiation to the head and neck may permanently reduce the quantity and quality of normal saliva, so ongoing oral care is crucial to optimize oral health. Daily fluoride tray application, good nutrition, and oral hygiene are especially important.
- Radiation may alter oral tissues, so dentures may need to be reconstructed after treatment is completed and the tissues have stabilized. Some people may not be able to wear dentures again.
- Craniofacial and dental structure may develop abnormally in younger children who receive high-dose radiation to those areas.

Helping Patients with Xerostomia

- Encourage patients to sip water often.
- Suggest using liquids to soften or thin foods.
- Recommend using sugarless gum or sugar-free hard candies to help stimulate saliva flow.
- Suggest using a commercial saliva substitute.
- Consider prescribing a saliva stimulant.

Helping Patients with Mouth Pain

- Prescribe topical anesthetics and systemic analgesics.
- Detect and treat oral infections early.
- Encourage patients to avoid eating irritating or rough-textured foods.

Hematopoietic Stem Cell Transplantation

Because of the pronounced immunosuppression that accompanies hematopoietic stem cell transplant procedures, patients have a high risk of developing acute oral complications, particularly mucositis, ulcerations, hemorrhage, infection, and xerostomia. Although these problems begin to resolve when hematologic status improves, immunosuppression may last for up to a year after the transplant, so the risk of complications continues. The oral cavity and salivary glands are also commonly involved in graft-versus-host disease in allograft recipients. Careful attention to oral care in the post-transplant period is important to the overall health of these patients.

Oral Complications: Glossary of Terms

Abnormal dental development: Altered tooth development, craniofacial growth, or skeletal development in children secondary to radiotherapy and/or high doses of chemotherapy before age 9.

Functional disabilities: Impaired ability to eat, taste, swallow, or speak because of mucositis, xerostomia, trismus, or infection.

Neurotoxicity: Persistent, deep aching and burning pain that mimics a toothache, but for which no dental or mucosal source can be found. This complication is a side effect of certain classes of drugs, such as the vinca alkaloids.

Oral mucositis/stomatitis: Inflammation and ulceration of the mucous membranes; can increase the risk for pain, oral and systemic infection, and nutritional compromise.

Oral prophylaxis: Thorough dental cleaning.

Osteonecrosis: Blood vessel compromise and necrosis of bone exposed to high-dose radiation therapy, resulting in decreased ability to heal if traumatized and extreme susceptibility to infection.

Radiation caries: Lifelong risk of rampant dental decay that may begin within 3 months of completing radiation treatment if changes in either the quality or quantity of saliva persist.

Trismus/tissue fibrosis: Loss of elasticity of masticatory muscles that restricts normal ability to open the mouth.

Xerostomia/salivary gland dysfunction: Dryness of the mouth because of thickened, reduced, or absent salivary flow; increases the risk for infection and compromises speaking, chewing, and swallowing. Medications other than chemotherapy agents, such as psychotropic and some antihypertensive drugs, can also cause salivary gland dysfunction. Persistent dry mouth increases the risk of dental cavities.

Additional Readings

Elting LS, Cooksley C, Chambers MS, Garden AS. Risk, outcomes, and costs of radiation-induced oral mucositis among patients with head-and-neck malignancies. *Int J Radiat Oncol Biol Phys* 2007; 68:1110-1120.

Elting L, Cooksley C, Chambers M, Cantor S, Manzullo E, Rubenstein, E. The burdens of cancer therapy: clinical and economic outcomes of chemotherapy-induced mucositis. *Cancer* 2003; 98:1531-1539.

Jellema AP, Slotman BJ, Doornaert P, et al.: Impact of radiation-induced xerostomia on quality of life after primary radiotherapy among patients with head and neck cancer. *Int J Radiat Oncol Biol Phys* 2007; 69(3): 751-60.

Keefe DM, Schubert MM, Elting LS, et al. Updated clinical practice guidelines for the prevention and treatment of mucositis. *Cancer* 2007; 109(5):820-31. Online at <http://www.mascc.org/content/125.html> (Accessed September 2008)

National Cancer Institute. Mucosal Injury in Cancer Patients: New Strategies for Research and Treatment. JNCI Monographs, No. 29, 2001.

National Cancer Institute. PDQ® Cancer Information Summaries. Oral Complications of Chemotherapy and Head/Neck Radiation. Online at <http://www.cancer.gov/cancertopics/pdq/supportivecare/oralcomplications/healthprofessional> (Accessed September 2008) or from the Cancer Information Service at 1-800-4-CANCER.

Schubert MM, Appelbaum FR, Peterson DE, Lloid ME: Oral complications. In: Blume KG, Forman SJ, eds.: *Thomas' Hematopoietic Cell Transplantation*. 3rd ed. Malden, Mass: Blackwell Science Inc., 2004, pp 911-28.

Shiboski CH, Hodgson TA, Ship JA, Schiødt M. Management of salivary hypofunction during and after radiotherapy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007; 103(suppl 1):S66.e1-S66.e19.

Sonis ST, Elting LS, Keefe D, et al. Perspectives on cancer therapy-induced mucosal injury: pathogenesis, measurement, epidemiology, and consequences for patients. *Cancer* 2004; 100(9 Suppl):1995-2025.

Spielberger R, Stiff P, Bensinger W, et al. Palifermin for oral mucositis after intensive therapy for hematologic cancers. *N Engl J Med* 2004; 351:2590-2598.

Oral Health, Cancer Care, and You

This fact sheet is part of a series on managing and preventing oral complications of cancer treatment sponsored by the National Institute of Dental and Craniofacial Research. The series was developed in partnership with the National Cancer Institute, the National Institute of Nursing Research, and the Centers for Disease Control and Prevention. Other publications in this series include:

For Health Professionals

Dental Provider's Oncology Pocket Guide

Oral Complications of Cancer Treatment:
What the Dental Team Can Do

Oncology Pocket Guide to Oral Health

For free copies of these publications contact:

National Institute of Dental and Craniofacial Research
National Oral Health Information Clearinghouse
1 NOHIC Way
Bethesda, MD 20892-3500
301-402-7364
www.nidcr.nih.gov

For Patients

Chemotherapy and Your Mouth
Quimioterapia y la Boca

Head and Neck Radiation Treatment and
Your Mouth

*Su Boca y el Tratamiento de Radiación en la
Cabeza y el Cuello*

Three Good Reasons to See a Dentist BEFORE
Cancer Treatment

*Tres buenas razones para ver a un dentista ANTES
de comenzar el tratamiento contra el cáncer*

Three Good Reasons to See a Dentist Before
Cancer Treatment (Illustrated booklet for adults
with limited reading skills)



U.S. Department of Health
and Human Services
National Institutes of Health