Oral Care for Patients Undergoing Cancer Therapy

Dentistry Today

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July 1, 2002

More than 1,250,000 Americans are newly diagnosed with cancer every year. Approximately 500,000 of these individuals (40% annually) will develop oral complications from the therapy used to treat their cancer. Nearly one third of cancer patients undergoing radiation and/or chemotherapy treatment are susceptible to oral complications that may interrupt or even cancel their cancer therapy. Bone marrow and stem cell transplant patients are also at high risk for oral complications. Almost all patients who receive radiation for head and neck malignancies suffer from oral complications. Approximately 40% of patients receiving chemotherapy present with oral sequelae, and more than 75% of bone marrow transplant patients develop oral complications.[1]

Some patients experience oral complications only during the active treatment phase. Other problems resulting from cancer treatment, such as xerostomia, can persist for years. Unfortunately, many patients don't receive oral care until serious, even life-threatening, complications develop.

The oral sequelae of cancer therapy can be so severe, so debilitating, that patients may not be able to tolerate the cancer therapy. Scheduled treatment may have to be postponed or therapy discontinued entirely. Oral complications from radiation to the head and neck, or chemotherapy for any malignancy, are cited as the single most common cause of the interruption and premature termination of treatment regimens for cancer patients. Therefore, the oral complications of cancer therapy have the potential to adversely affect treatment outcomes, cancer prognosis, and quality of life for millions of men, women, children, and the families who love them.

The general dentist holds a critical position on the healthcare team for cancer treatment, however, neither patients nor their cancer care physicians typically include the patient's dentist in the line of communication when cancer is diagnosed. This must change in order to improve cancer therapy outcomes for the thousands of people treated for cancer annually. Dental professionals must develop innovative approaches to serve the special needs of cancer patients so these patients can continue to receive their potentially life-saving treatment. Diligent oral care prior to, during, and following cancer treatment can prevent or reduce the severity of oral complications, enhancing both patient survival and the patient's quality of life.

COMMON ORAL COMPLICATIONS

Oral complications common to both chemotherapy and radiation treatment include:

- Mucositis/stomatitis: inflammation and ulceration of the mucous membranes; can increase the risk for pain, oral and systemic infection, and nutritional compromise. Mucositis is the number one reason patients have to stop chemotherapy. If we can prevent or control mucositis, we can positively affect the cure rate of cancer by enabling continuation of cancer treatment.
- Infection: viral, bacterial, and fungal; results from myelosuppression, xerostomia, and/or damage to the mucosa from chemotherapy or radiotherapy.
- Xerostomia/salivary gland dysfunction: dryness of the mouth because of thickened, reduced, or absent salivary flow; increases risk for infection and compromises speaking, chewing, and swallowing. Persistent dry mouth also increases the risk for dental caries.
- Rampant dental decay and demineralization: rapid decay or erosion of the tooth's surface as a result of changes in both the quality and quantity of saliva following cancer treatment.
- Functional disabilities: impaired ability to eat, speak, or swallow because of mucositis, dry mouth, trismus (restriction of normal ability to open mouth), and infection.

- Taste alterations: changes in taste perception of foods, ranging from unpleasant to tasteless (hypogeusia).
- Nutritional compromise: poor nutrition from eating difficulties caused by mucositis, dry mouth, and taste loss.
- Abnormal dental development: altered tooth development and/or craniofacial growth in children secondary to radiotherapy and/or high doses of chemotherapy prior to age 9 years.
  Additional complications of chemotherapy include:
- Neurotoxicity: persistent, deep aching and burning pain that mimics a toothache, but for which no dental or mucosal source can be found.
- Bleeding: oral bleeding from the decreased platelets and clotting factors associated with the effects of therapy on bone marrow.

Additional complications of radiation treatment include:

- Radiation caries: lifelong risk of rampant dental decay that may begin within 3 months of completing radiation treatment.
- Trismus/tissue fibrosis: loss of elasticity of masticatory muscles that restricts normal ability to open the mouth.
- Osteoradionecrosis: blood vessel compromise and necrosis of bone exposed to high-dose radiation therapy; results in decreased ability to heal if traumatized, and in extreme susceptibility to infection.

DENTAL CARE FOR ORAL COMPLICATIONS OF CANCER THERAPY

The following protocols have been developed for use in the general dental practice by the National Cancer Institute, CDC, and the National Institute of Dental and Craniofacial Research.

Mucositis/Stomatitis
Culture lesions to identify secondary infection. Prescribe topical anesthetics and systemic analgesics. Consult oncologist about prescribing antimicrobials for known infections. Advise the patient to avoid rough-textured foods and report oral problems early.

Xerostomia/Salivary Gland Dysfunction
Advise patient to soften or thin foods with liquid, chew sugarless gum, or suck ice chips or sugar-free hard candies. Suggest using commercial saliva substitutes and oral moisturizers or prescribe saliva stimulant drug.

Taste Changes
Refer to dietician or nutritionist.

Infections
Bacterial. It is least likely to see this easily controlled type of infection in your cancer patients. Bacterial infections occur less frequently than fungal and viral infections among people with cancer. Use tetracycline after consultation with the oncologist. Typically, patients with bacterial infections do not have accompanying pain.

Viral. This is common among cancer patients. Viral infections are highly influenced by stress. Simply the diagnosis of cancer alone can trigger an outbreak. Viruses often travel the path of the fifth cranial nerve. Sores may be evident on the face and head. Mouth sores are extremely painful and present with red, rolled, raised borders. Patients with oral viral infections are often in too much pain to eat, drink, or talk. Prescribe antiviral medications in conjunction with the oncologist

Fungal. This is the most common oral infection in cancer patients. Patients with fungal infections are in a great deal of pain. They describe it as feeling like their mouth is on fire. A heavy white buildup surrounds the teeth, fuzzy exudates are present, and the gingival tissues are bright red. Do not scrape off the fungal substrate without anesthetic. Underneath, the tissues are extremely ulcerated. Do not scrape off the fungal substrate if the platelet count is below 50,000/ mm^3 because you could precipitate a bleeding episode. Do not prescribe Nystatin if the patient has his own teeth because it contains too much sugar. Consult the oncologist and prescribe a newer antifungal drug. Often a combination of systemic and topical antifungal medications is prescribed. For angular cheilitis, a topical antifungal cream or ointment works well.

Etched Enamel
To protect enamel, advise the patient to rinse his mouth with water and baking soda

following vomiting. Use of fluoride gel or highly concentrated fluoride toothpaste, such as Prevident 5000 (Colgate Oral Pharmaceuticals), can be helpful.

Demineralization and Radiation Caries
Prescribe daily application of fluoride gel in fluoride tray and/or use of highly concentrated toothpaste, such as Prevident 5000. Fluoride varnish can be applied in office at each 3-month maintenance appointment. Continue fluoride use throughout the patient's lifetime.

Neurotoxicity
Provide analgesics or systemic pain relief.

Bleeding
Advise patient to clean teeth thoroughly with a toothbrush softened in warm water, or toothettes. Instruct patient to floss all teeth gently. Most oncologists recommend that patients do not floss at all, but dental professionals know that leaving bacteria interproximally will result in increased bleeding due to infection. Therefore, we recommend that patients continue to floss very gently, and we spend time instructing them on proper technique. Gentle use of stimudents or proxy brushes is helpful in reducing bleeding. Antimicrobial mouth rinses can be very helpful in reducing bacterial load and bleeding. Chlorhexidine and Kamillasan are very good anti-inflammatory agents, and are often used in combination.

Trismus/Tissue Fibrosis
Instruct patient on stretching exercises for the jaw to prevent or reduce severity of fibrosis. If patient doesn't retain ability to open normally, difficulty in eating, speaking, and maintaining oral hygiene may result.

Osteoradionecrosis
Avoid invasive surgical procedures involving irradiated bone, including extractions. If an invasive procedure is required, use of antibiotics and hyperbaric oxygen therapy prior to and following treatment should be considered.

CANCER PRETREATMENT ORAL HEALTH EXAMINATION

This is the most important dental visit for the cancer patient. Unfortunately, once a diagnosis of cancer is given to a person, the last thing on his mind is preventive dental care. That's why is it critical to develop a good working relationship with local oncologists. It is crucial that they understand the importance of their patients being seen by a dental professional prior to beginning any cancer therapy. It is vitally important that dental professionals develop protocols to address the very specific needs of cancer patients, and that they establish an office policy of always seeing cancer patients immediately. The patient's course of treatment and ultimate outcome of that treatment may be affected negatively by the patient having to wait for an opening in the dentist's schedule. You may save a person's life by committing to see these patients immediately. When his blood count is high enough to get his teeth cleaned or to allow for treatment, the patient should always be worked into the schedule. It can be a matter of life or death.

Prior to examination of a cancer patient, the dental professional must obtain the patient's cancer diagnosis and treatment plan, medical history, and dental history. It is essential to communicate with the oncologist in order to obtain and share essential information. At the pretreatment oral examination, the dental team can identify and treat problems that could contribute to oral complications when cancer therapy begins. The evaluation also establishes baseline data for comparing the patient's status in subsequent examinations.

Goals of Pretreatment Examination

- Reduce the risk and severity of oral complications.
- Allow for prompt identification and treatment of existing infections or other problems.
- Improve likelihood that the patient will tolerate optimal schedule and doses of cancer treatment.
- Prevent, eliminate, or reduce oral pain.

- Minimize oral infections that could lead to potentially fatal systemic infections. Of all infections in cancer patients, 54% originate in the mouth.
- Prevent or minimize complications that compromise nutrition.
- Prevent or reduce later incidence of bone necrosis.
- Preserve or improve oral health.
- Provide an opportunity for patient education about oral hygiene during cancer therapy.
- Improve quality of life.

Objectives of the Precancer Treatment Examination

1. Establish a schedule for dental treatment. Begin at least 14 days prior to cancer therapy to allow for adequate healing. Postpone elective oral surgical procedures until cancer treatment is completed. Perform necessary oral surgery at least 2 weeks prior to the initiation of radiation therapy. For patients receiving radiation, this may be the only appropriate time to consider surgical procedures. For patients receiving chemotherapy, oral surgery should be performed 7 to 10 days before the patient becomes myelosuppressed.

2. Identify and treat sites of low-grade and acute oral infections:

- Caries
- Periodontal disease
- Endodontic disease
- Mucosal lesions.

(*Note:* Ask all patients who are about to begin cancer treatment if they get recurrent oral ulcers or cold sores. If so, prescribe a prophylactic systemic antiviral regimen which they will continue throughout their cancer treatment.)

3. In adults, extract teeth that may pose a future problem or are nonrestorable to prevent later extraction-induced osteoradionecrosis.

4. In children, extract loose primary teeth and teeth that are expected to exfoliate during later treatment.

5. Identify and eliminate sources of oral trauma and irritation such as ill-fitting dentures, orthodontic bands, and other appliances. Orthodontic bands and brackets should be removed if highly stomatotoxic chemotherapy is planned or if the appliances will be in the field of radiation.

6. Before radiation treatment, identify and treat potential oral problems within proposed field of radiation.

7. Instruct patients about necessity to maintain impeccable oral hygiene.

8. Educate patients on preventing demineralization and dental caries.

9. Advise patients to report oral complications to you immediately so they can get relief before symptoms become acute and possibly interfere with or interrupt their cancer treatment.

GENERAL GUIDELINES FOR ORAL CARE DURING CANCER TREATMENT

Careful monitoring of oral health is critically important during cancer therapy to prevent, detect, and treat complications as soon as possible. Always consult with the patient's oncologist prior to any dental procedures, including prophylaxis. The patient's blood count will determine when and if a patient will be able to tolerate dental treatment. At various times during the course of chemotherapy, there are windows of opportunity that we can take advantage of, and there are other times when a patient's health is too fragile to risk dental treatment. Open communication and a good working partnership with the cancer treatment team is vital in order to provide the best care for your patient.
The following guidelines should be followed for every patient undergoing therapy for cancer:

- See patient frequently to monitor the soft tissues for signs of inflammation, check patient's plaque control, and monitor the development of caries or other complications.
- Review patient's home care routine, including ways to keep mouth moist. Continue to reinforce importance of optimal oral hygiene. Provide specific instructions. Advise patients to avoid alcohol and tobacco during cancer treatment. Patients must understand that good oral care during cancer treatment contributes to the success of the cancer treatment.
- Provide analgesics for oral pain as needed, in consultation with oncologist.
- Schedule dental work carefully, in consultation with oncology team.
- Request that oncology team do blood work 24 hours prior to dental treatment to determine if patient's platelet count and clotting factors are sufficient to allow oral treatment.
- Consider possible oral causes of fever. Fever of unknown origin may be related to an oral infection. (Remember, 54% of infections originate in the mouth.) Normal signs of infection may be affected by immunosuppression related to chemotherapy.
- Consult with oncologist about the necessity of prophylactic antibiotic coverage prior to dental treatment if the patient has a central venous catheter. The American Heart Association endocarditis prophylactic antibiotic regimen is considered appropriate coverage for patients with a central venous catheter.
- Continually monitor pediatric cancer patients for abnormal growth and development of craniofacial and dental structures.

PROTOCOL FOR CARE OF CHEMOTHERAPY PATIENTS

Before Chemotherapy

- Conduct pretreatment oral health evaluation.
- Schedule dental treatment in consultation with oncologist.
- Schedule oral surgery 7 to 10 days before patient becomes myelosuppressed.
- In patients with hematologic cancers, consult the oncologist before conducting any oral procedures; do not perform any treatment on patients who are immunosuppressed or have thrombocytopenia.

During Chemotherapy

- Consult oncologist prior to any dental procedures, including prophylaxis.
- Ask oncologist to order blood work 24 hours before oral surgery or any invasive dental procedures. Postpone treatment when platelet count is less than 50,000/mm^3 or abnormal clotting factors are present. Also postpone when neutrophil count is less than 1,000/mm^3.
- In patients with fever of unknown origin, check for oral source of viral, bacterial, or fungal infection.
- Encourage consistent oral hygiene measures.
- Consult oncologist about implementing the American Heart Association endocarditis prophylactic antibiotic
  regimen in patients with indwelling central venous catheters before any invasive or prophylactic dental procedures.

After Chemotherapy

Place patient on dental health maintenance schedule when chemotherapy is completed and all side effects, including immunosuppression, have resolved. Patients who comply with impeccable oral hygiene home care may eventually be seen on a 6-month schedule.

PROTOCOL FOR CARE OF PATIENTS RECEIVING RADIATION TREATMENT

Before Radiation

- Conduct pretreatment oral health examination and prophylaxis.
- Schedule dental treatment in consultation with radiation oncologist.
- Extract teeth in the proposed radiation field that may be a problem in the future.
- Prevent tooth demineralization and radiation caries:

1. Fabricate custom gel-applicator trays for patient; be sure trays cover all tooth structures without irritating gingival or mucosal tissues.
2. Prescribe a 1.1% neutral pH sodium fluoride gel or 0.4% standard, nonflavored fluoride gel (not rinses).

3. Have patients with porcelain crowns use a neutral pH fluoride.

4. Instruct patients in home application of fluoride gel. Patient should start a daily

5-minute application several days prior to the onset of radiation therapy.

- Allow at least 14 days of healing for any oral surgical procedures.
- Conduct all prosthetic surgery before treatment since surgical procedures are contraindicated on irradiated bone.

During Radiation

- Monitor patient's oral hygiene.
- Monitor patient for trismus: check for pain or weakness in muscles of mastication in the field of radiation. Instruct patient to exercise three times a day, opening and closing mouth as much as possible without pain, repeating 20 times. Also, exert pressure on midline of mandible, then open mouth.

After Radiation Therapy

- For the first 6 months following radiation treatment, recall the patient for prophylaxis and home care evaluation every 4 to 8 weeks, or as needed.

Gradually lengthen time between appointments until you level off at a 3-month interval.

- Reinforce the importance of optimal oral hygiene.
- After mucositis subsides, consult with the oncology team about the use of dentures and other appliances. Patients with friable tissues and xerostomia may never be able to use them again.
- Watch for trismus, demineralization, and caries. Lifelong daily applications of fluoride gel are needed for xerostomic individuals.
- Advise against oral surgery on irradiated bone because of osteoradionecrosis risk. Tooth extraction,if unavoidable, should be conservative, using antibiotic coverage and possibly hyperbaric oxygen therapy.

PROTOCOL FOR PATIENTS RECEIVING BONE MARROW AND STEM CELL TRANSPLANTS

Before Transplant

- Conduct a pretreatment oral health examination.
- Consult oncologist about scheduling dental treatment.
- Schedule surgery at least 7 to 10 days before expected date of myelosuppression (absolute neutrophil count of less than 1,000/mm^3 and/or platelet count of less than 50,000/mm^3).
- Prevent tooth demineralization and radiation caries:

1. Instruct patient in home application of fluoride gel (not rinses).

2. Instruct patient in oral hygiene regimen.

After Transplant

- Watch for infections on the tongue and oral mucosa. *Herpes simplex* and *Candida albicans* are common oral infections.

- Monitor the patient's oral health for plaque control, tooth demineralization, dental caries, and infection.
- Consult oncologist prior to any dental procedures, including prophylaxis.
- Delay elective procedures for 1 year.
- Follow patients for long-term oral complications. Such problems are strong indicators of chronic graft-versus-host disease.
- Follow bone marrow transplant patients carefully for second malignancies in oral region.

Conclusion

There are many outstanding cancer treatment facilities in the United States. In Houston, we are fortunate to have M. D. Anderson Hospital, which employs dental oncologists who meet with every patient who undergoes radiation to the head and neck, and with all oral cancer patients. All patients undergoing cancer treatment at M. D. Anderson are well educated in the possible dental ramifications of their treatment. By the time these patients come to our offices for initial dental therapy prior to cancer treatment, they understand their responsibility for compliance with the impeccable home care required to maintain their oral health.

Unfortunately, not all oncologists and cancer treatment centers are as thorough and as focused on total patient care as M. D. Anderson. While the general dentist holds a critical position on the healthcare team for cancer treatment, neither the patients nor their physicians typically include the patient's dentist in the line of communication when cancer is diagnosed. Many dental offices will find that they will have to educate the oncologists in their area about the necessity of sending their newly diagnosed patients for an initial dental evaluation prior to beginning chemotherapy or radiation therapy. As dental professionals it is our obligation to inform the medical professionals with which we share patients of the importance of maintaining oral health. They may not know that oral complications can directly affect the outcome of the cancer therapy. It is up to us to increase awareness in our dental and medical communities in order to enhance the life expectancy and quality of life of our cancer patients.

References

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