26 Dental Oncology

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Core Messages

- Surgery, radiation therapy, and chemotherapy are common modalities used in the treatment of head and neck cancer. Combination therapy is required with advanced disease.
- Each treatment modality has adverse side effects on normal oral tissues.
- These side effects should be minimized for patient comfort, function, and overall health and quality of life.
- Pretreatment oral evaluation is critical to manage acute oral conditions and to minimize acute and chronic side effects.
- Management of oral side effects is important during and after treatment.
- Management of oral conditions and prevention of oral complications is best provided by integrated multidisciplinary health care teams.

Surgery, radiation therapy, and chemotherapy are common modalities used to treat head and neck cancer (HNC). Depending on the type, size, stage, and location of the tumor, it may be treated with single or multimodality therapy. The intensity of the side effects is usually less if these modalities are used concomitantly.

Each type of treatment strives for a selective effect where there is a maximum therapeutic dose delivered to the tumor with minimal side effects to normal tissues. As these therapies have advanced, there have been more tumor-specific techniques and agents developed towards this end. However, unfavorable side effects still do occur and new side effects are being identified with new therapies. By minimizing and managing these effects, therapy may be made more effective and patient comfort, level of function, and overall quality of life will be improved and cost of care reduced.[1]

Radiation Effects and Management

Radiation therapy may affect the oral mucosa (epithelial and connective tissues), salivary glands, muscles, blood vessels, lymphatics, nerves, teeth, and bones. Side effects include mucositis, hyposalivation, dental caries, changes in oral flora, infection, loss of taste, neuropathy, muscle fibrosis and trismus, and soft tissue and bone necrosis. Severity is not uniform or consistent but depends upon the surgery performed, radiation therapy (fields, fractionation, total dose), and individual patient variability. The introduction of intensity-modulated radiation therapy (IMRT) has decreased the severity of some side effects, but not eliminated them.

Proper management dictates that all patients receive a comprehensive oral evaluation before commencement of cancer treatment, be monitored during therapy, and then be periodically followed for oral management once therapy has been completed. Oral management is best accomplished by experienced dental providers working as part of an oncology team. Some undesirable side effects of radiation and chemotherapy may improve once cancer treatment is complete while others linger on indefinitely and new, late complications may arise.

Mucositis

Mucositis appears early and intensifies as treatment progresses. Within the first 2 weeks, erythema is noted followed by desquamation and ulceration as treatment proceeds (**Fig. 26.1**). Changes are caused by a direct effect of radiation on epithelial and connective components of the mucosa as well as a change in the oral flora that may result in a shift in oral bacterial and fungal colonization. In patients who continue to use tobacco or alcohol, who suffer comorbidities such as diabetes, or who undergo concomitant chemotherapy, these mucosal changes may be intensified in severity and extended in duration. In the most severe cases, treatment may have to be delayed, interrupted, or discontinued to allow the mucosa to recover. Once radiation therapy is completed, the mucosa will return to a clinically normal appearance over a period of a few weeks to months; however, vascular and neurologic changes and mucosal atrophy may persist. Although the skin is similarly sensitive, we see less severe changes because of "skin-sparing" sources of irradiation and improved techniques such as IMRT.

Pain because of mucositis is a significant source of complaint for patients receiving HNC therapy. Oral prophylaxis may achieve a reduction in duration and

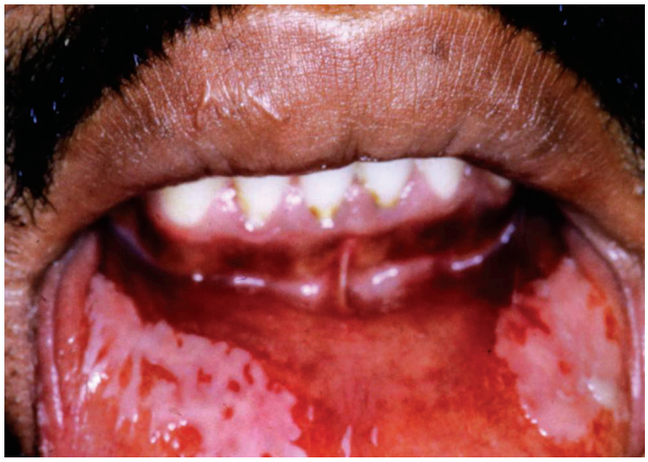


Figure 26.1 Mucositis.

severity of mucosal damage. Good oral hygiene, an atraumatic diet, and oral rinsing with saline are basic oral care recommendations. Food and Drug Administration–cleared devices for mucositis include coating agents such as sodium hyaluronate topical (Gelclair), mucoadhesive oral protectants (MuGard), and artificial saliva (Caphosol). Oral cooling with ice chips has been shown useful in short-acting, bolus chemotherapy, but not investigated in radiation therapy. Benzydamine (not available in the United States) has shown a preventive effect. Pain management should be provided as needed. Continuing studies provide reason for optimism for future advances in prevention and treatment of mucositis.[2]

Salivary Gland

After radiation of major salivary glands, reduced volume, increased viscosity, and changes in pH and inorganic and organic constituents of the saliva occur.[3] Saliva becomes more viscous and sticky and decreases in amount, leading to xerostomia (**Fig. 26.2A, B**). Radiation causes vascular damage, loss of acinar cells, and may lead to fibrosis of the salivary glands. This may contribute to not only discomfort and intensified mucositis but also persisting changes and symptoms. Hyposalivation predisposes the patient to dental caries. It may also contribute to changes in taste, difficulty in swallowing, and the ability to wear a removable dental prosthesis as well as make the performance of routine oral hygiene tasks more difficult. Radiation-induced xerostomia may persist indefinitely. Patients may not report persisting dry mouth because of an acquired tolerance. Salivary changes after chemotherapy most often return to pretherapy baseline.

After radiation therapy, there may be recovery of some acinar cells depending on the radiation dose and schedule.[4] It is not likely that salivary gland tissue recovers from tumoricidal doses of radiation. The use of IMRT increases the potential for stimulation of residual function by reducing the volume of damage in the head and neck by sparing normal tissues. Lin et al[5] have demonstrated the regeneration of salivary gland tissue in laboratory animals, but this has not yet been tried in humans.

Minimizing exposure of the salivary glands and other critical anatomic structures is a goal of treatment planning. IMRT may have the effect of wider field/lower dose radiation exposure, which may result in increased responsiveness to systemic sialogogues if dry mouth persists. Amifostine is a salivary gland protector, indicated for use in patients with HNC receiving radiation therapy. Diagnosis of hyposalivation may be based on history and clinical observation. However, in persistent dry mouth, patients may accommodate over time and not report it while the conditions favor oral disease. Assessment of salivary flow is valuable in diagnosis and evaluating the response to treatment.

Treatment of hyposalivation should focus first on stimulating residual function. Systemic agents may be used to achieve an increase in volume and salivary constituents and may be documented with sialography. There are several choleretic medications such as pilocarpine (Salagen) and cevimeline (Evoxac) that are approved for this indication. Bethanechol (Urecholine) has been studied off-label. Other approaches have included acupuncture and nerve stimulation. If salivary flow cannot be improved, there are numerous mouth-wetting agents to consider, and treatment trials to identify the most helpful product should be conducted.

Jha et al[6] have described a technique for surgically transplanting the submandibular salivary glands to remove

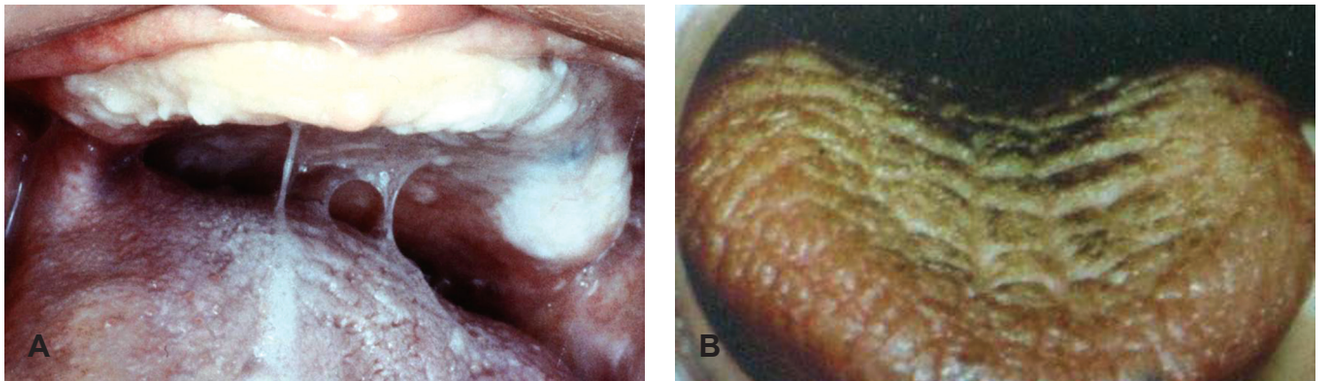


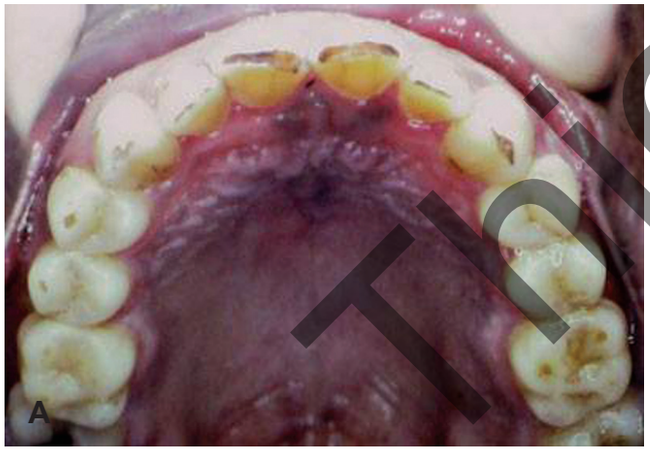
Figure 26.2 (A) Viscous saliva. (B) Severe xerostomia.

them from the field of radiation. The advent of IMRT may limit further study of this approach.

Teeth

It is unclear whether radiation has a direct effect on the enamel, dentin, and cementum of teeth. There have been conflicting reports regarding the changes in these structures caused by radiation and whether their solubility is affected.[7] It does appear that the dental pulp is significantly affected by tumoricidal doses of radiation. The vascular elements of the pulp fibrose and atrophy and sensory innervation may be affected. This may lead to an altered response to infection but may also decrease the degree of pulpal pain, even in the case of severe dental decay.

An indirect effect on the dentition is decay secondary to hyposalivation, a change in saliva consistency and pH, and a decrease in the mineralizing constituents in the saliva. These carious lesions begin as demineralized sites on the teeth involving the incisal edges of teeth and at the gingival margins, especially interproximally, sites where decay is not usually seen. These lesions may progress to the extent that the entire crown of the tooth may be lost (**Fig. 26.3A, B**).



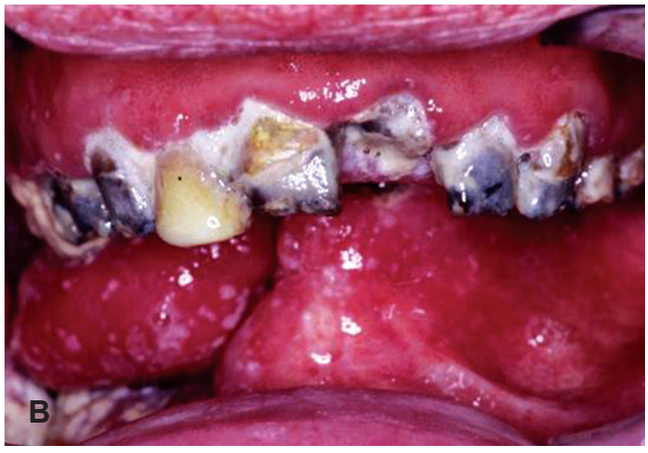


Figure 26.3 (A) Incipient radiation-induced dental caries. (B) Severe radiation-induced dental caries.

Changes in the oral flora are thought to be an indirect result of hyposalivation. An increase in cariogenic bacteria, such as *Streptococcus mutans* and *Lactobacillus*, predisposes to dental decay. A marked increase in the fungal population, most notably *Candida albicans*, may lead to an increase in oral infections.

Underlying risk factors should be addressed, including diet history, oral hygiene, and dry mouth. Dental structures may be better maintained with regular fluoride applications such as a daily fluoride rinse (ACT), a high-potency fluoride dentifrice, fluoride gel in a custom carrier, and/or fluoride varnishes. There are no studies documenting the most effective means of fluoride application. In patients with dry mouth, calcium and phosphate supplementation should be provided and management of hyposalivation should be attempted. Antimicrobials for the treatment of a shift to cariogenic oral flora should also be considered. The oral environment, the tooth structure, and the bacterial component must all be addressed in addition to strict oral hygiene and diet instruction. Candidiasis is a frequent oral infection and increases during and persists after cancer therapy (**Fig. 26.4**). Risk factors should be addressed. Reduction of antibiotics, steroids, and hyposalivation-inducing medications should be considered. The care provider may choose between topical and systemic antifungals, depending on circumstances and preference. It should be recognized that nystatin (Mycostatin and Nystan) suspension is sucrose sweetened, and in a patient with dry mouth, it may increase the caries risk dramatically.

Taste

Most patients who undergo radiation therapy experience a loss of taste. It is unclear whether this is due to a direct effect of the radiation on the taste buds or related to neural changes that affect them. In addition, salivary changes play a role, as loss of saliva may decrease both the number and the function of the remaining taste buds and limit the delivery of taste stimulants in solution to taste receptors. Loss of taste usually begins after the second week of therapy. In most cases, taste returns several weeks to months after the completion of therapy. In some cases, patients report a failure of taste to completely return, resulting in reduced or altered taste. This may be related to the total dose and ports of radiation. The loss of taste is significant aside from patient comfort. Patients report less desire to eat, and this may affect the body's ability to take nourishment to repair the damage to normal tissues injured by the radiation. Patients who experience altered or loss of taste will need to experiment with alternative diet choices. It is unlikely that those with normal taste experience can make appropriate recommendations.

Chronic taste alteration may be less common in those treated with IMRT. If dry mouth can be managed, it may assist in improving taste. Local oral, dental, and upper respiratory infection may affect taste and can be managed.

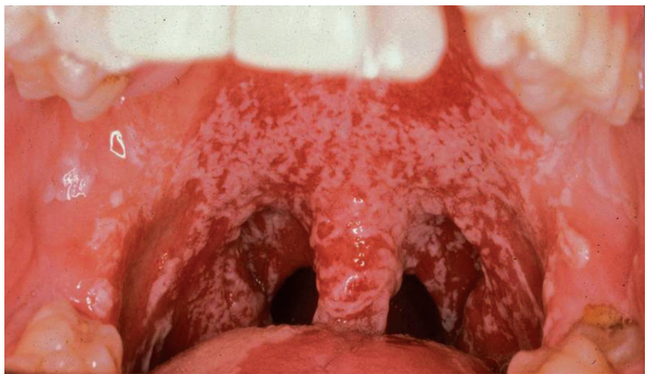


Figure 26.4 Candidiasis infection.

Effective management of persisting taste changes is not well documented. Zinc supplementation has shown conflicting results in trials to date. Clonazepam (Klonopin) has been considered in some cases and has been shown to be helpful in altered olfactory sensation.

Trismus

Many patients who complain of an inability to masticate food because of loss of teeth or saliva are, in fact, compromised by a reduced ability to swallow. Radiation affecting the pharynx results in a loss of elasticity and fibrosis that may lead to narrowing of the pharynx and limitation of movement, thus complicating deglutition.

Some surgical resections of tumors will involve the pterygoid space or the muscles of mastication. Muscle scarring as the result of wound healing may contribute to decreased oral opening. When the muscles of mastication are in the field of radiation, trismus or limitation of oral opening is a common side effect leading to disability. This is most often seen with tumors of the nasopharynx, soft palate, or parotid gland because of their location relative to these functional muscle groups. If the radiation is administered bilaterally or if in conjunction with surgery, the effects may be more severe.

Radiation causes fibrosis or scarring of the muscle fibers, limiting their ability to stretch and function normally. The limitation of oral opening will affect patient comfort and the ability to eat. Trismus may also limit the ability to have preventative and restorative dental procedures performed including fabrication of an obturator to restore speech and feeding. It may also limit the patient's ability to perform home hygiene procedures such as tooth brushing, dental flossing, and fluoride applications to the teeth. This may contribute to a rapid demise of the dentition.

Once it has occurred, trismus is permanent and patients do not recover fully. The most effective course in management is to minimize its occurrence by initiating a physical therapy program at the start of radiation and to continue it for 3 months after radiation therapy is completed. The use of IMRT in HNC is associated with lower risk of trismus. Several mechanical devices have gained popularity in managing trismus. Therabite (Atos Medical, West Allis, Wisconsin, United States) and Dynasplint (Dynasplint Systems, Severna Park, Maryland, United States) are two of the most popular devices. A comprehensive, active home exercise program has also been shown to be effective. In any case, patient compliance seems to be the key factor in success. If trismus is severe or long-standing, a little permanent, significant improvement in the range of opening is expected.

Bone

Tumoricidal radiation therapy has a significant effect on bone. Radiation-induced endarteritis causes a decrease in the size of the lumen of blood vessels and may cause total occlusion of fine vasculature within the bone. Bone that has been irradiated to tumoricidal doses may become acellular, avascular tissue, showing signs of fatty degeneration. The dynamic balance of osteoblastic and osteoclastic activity is interrupted and renders the bone a nonvital entity.[8–10] The mandible is denser than the maxilla and has less vascularity, which may explain the increased risk of necrosis compared with the maxilla. High-speed radiation and IMRT have helped to diminish these changes in recent years, but postradiation osteonecrosis (ORN) remains a serious side effect of radiation therapy (**Fig. 26.5**). It is a nonhealing wound in nonvital bone. It is not primarily an infection of bone, although the lesion may become secondarily infected. Pain associated with ORN varies widely from none to severe, often related to the presence of any secondary infection or to the presence of a pathologic fracture. Injury to overlying soft tissue alone may not cause ORN, but may result in bone exposure. If the injury extends through to expose bone or if the mucosa necroses, osteoradionecrosis may develop. The effects of radiation on bone are thought to be permanent. However, angiogenesis and collateral circulation may improve blood flow in irradiated bone over time. Still, most clinicians approach the oral treatment of patients who have had radiation therapy with great caution.

An insult to the bone is the most common precipitating factor in the development of ORN. Most often this is due to a dental extraction, but this may also be due to a periodontal or pulp infection, irritation from a removable dental prosthesis, or bone exposure may occur spontaneously followed by lack of healing of exposed bone. If a small sequestrum mobilizes sufficiently, it may be removed atraumatically. A more extensive surgical resection with bone reconstruction may be required for a larger necrotic area. Cronje described a protocal developed by Marx for the treatment of ORN that involves the use of hyperbaric oxygen (HBO) therapy and surgery. A controlled study of HBO alone did not show benefit in the recovery of ORN after radiation therapy. Many feel that surgical resection is an overly aggressive approach, but those who use it believe that it is the best way to treat the problem. Other approaches to management include the use of pentoxifylline (Trental) and vitamin E, which affect

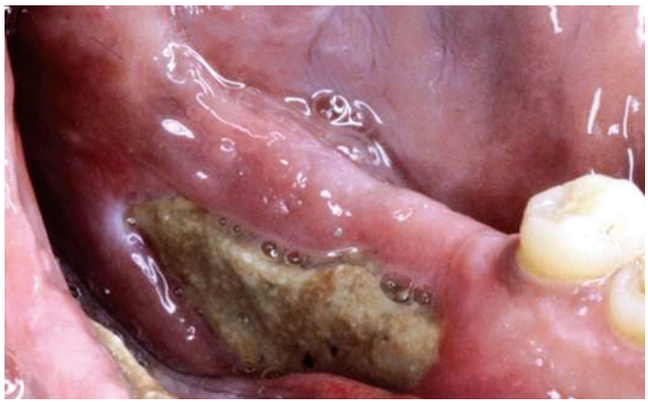


Figure 26.5 Osteoradionecrosis of the mandible.

fibrosis and blood flow and reduce tumor necrosis factor in the tissue. Prevention is paramount. Dental care before cancer therapy, an ongoing preventive program, and close follow-up are critical to minimizing the risk of ORN.

Chemotherapy Effects and Management

In the last 10 years, chemotherapy has become common in treating HNC. It may be used alone for induction therapy before combined chemotherapy and radiotherapy, as an adjunct to surgery and radiation, as a palliative measure, and most recently for control of persisting disease after standard therapy with a "curative intent." Many chemotherapeutic agents have toxicity profiles that result in oral side effects. Chemotherapy is used to treat non-HNCs such as breast, colon, and lung cancer; lymphoma; or leukemia, and adverse oral effects may occur.

Common side effects include nausea, vomiting, and diarrhea. The most common oral side effects associated with chemotherapy are mucositis, xerostomia, hemorrhage, and infection. Unlike radiation therapy where some side effects will linger indefinitely beyond the completion of treatment, the adverse side effects because of chemotherapy are more transient and resolve soon after therapy is completed and blood values return to normal. With today's more common chemoradiation protocols, each individual therapeutic modality potentiates the side effects of the other and may increase the severity and duration of both acute and chronic side effects.

There are several categories of agents used for chemotherapy that destroy or slow the growth of rapidly dividing tumor cells. These categories include both cell-cycle–specific and cell-cycle–nonspecific agents.[12] The most commonly used chemotherapy agents used to treat HNC are platinum derivatives, fluorouracil, taxanes, and epidermal growth factor antagonists. Unfortunately, normal cells may also be affected, most commonly those with a higher rate of proliferation including the oral cavity, digestive tract, and bone marrow.

Mucositis

Mucositis is the most common acute side effect of chemotherapy.[13,14] There is damage to mucosal vasculature, connective tissue, and epithelial compartments that result in erythema, thinning and loss of the epithelium, and degeneration of collagen. This process may initially appear with white changes in the mucosa but over a 2-week period progresses to erythema and ulceration. Although the etiology may differ, the associated oral pain is like that because of radiation therapy. Speaking, eating, taking oral medication, and performing oral hygiene may be difficult. In severe situations, ulcerative lesions may become secondarily infected, leading to a systemic infection that could be life-threatening. Sonis et al[15] developed the oral mucositis assessment scale to grade severity. It is based on subjective complaints, functional performance, and objective changes.

Effects on Salivary Glands

Chemotherapy is thought to have a direct, systemic effect on major and minor salivary glands.[16] It tends to be less severe and more transient than that induced by radiation therapy. Hyposalivation may increase pain and discomfort associated with mucositis and may lead to taste changes. In addition to the discomfort associated with decreased salivary flow, there is reduction of the protective constituents in saliva that may contribute to dental decay and secondary infection.

Oral Hemorrhage

The potential for oral hemorrhage is directly related to thrombocytopenia, liver function, and mucosal damage. Hemorrhagic mucositis is seen with reactivation of herpes viruses. In addition to being caused by the chemotherapeutic agents that are used to treat HNC, this condition may be manifested by other systemic cancers, such as leukemia, lymphoma, and Hodgkin disease, whereas myelosuppression occurs because of the agents used to treat them. When the platelet levels drop below 25,000 cells/mm^3, there is a risk of induced or spontaneous, uncontrolled hemorrhage. During chemotherapy, the platelet levels must be monitored to avoid such dangers and platelet transfusions may be necessary before any necessary traumatic procedures such as an emergency dental extraction are performed.

Clinical signs of hemorrhage within the oral cavity include petechiae, ecchymosis, gingival oozing, hematoma, or frank bleeding. These may occur because of unintentional traumatic injuries from toothbrushing, wearing a removable dental prosthesis, or eating coarse foods. These may occur at the site of an existing oral ulceration. Spontaneous intraoral bleeding occurs most commonly from the gingival sulcus (**Fig. 26.6**). The epithelium is only a few cells thick, and it is not uncommon to have inflammation present because of gingival or periodontal disease that may be preexisting or may have developed as the result of the patient's

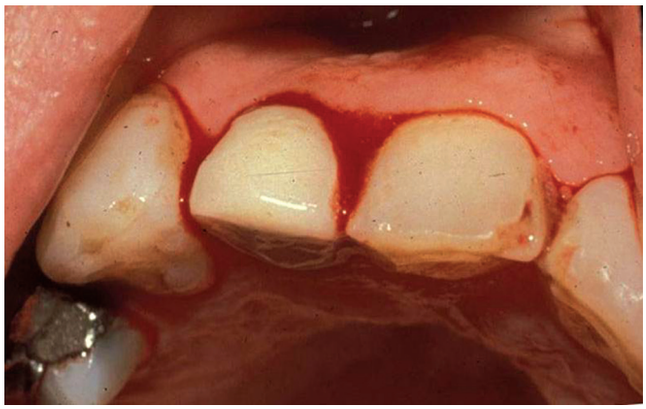


Figure 26.6 Gingival hemorrhage induced by chemotherapy and decreased platelet count.

compromised ability or desire to perform daily oral hygiene procedures.

Infection

Chemotherapy-induced immunosuppression related to the treatment of cancer (head and neck or other) increases the risk of serious infections that may ordinarily be controlled. Opportunistic microorganisms that normally inhabit the oral cavity may colonize, invade, and cause systemic infection because of neutropenia and loss of mucosal barriers.

A common site is the gingival sulcus where microorganisms normally tend to aggregate. A daily hygiene regimen that removes plaque from around teeth is important but must be carefully tempered by the consideration for inducing oral hemorrhage. Ulcerations present from mucositis are also common sites for secondary infection. If not controlled, these infections may be life-threatening.

Pretreatment Oral Management

All patients who are to undergo radiation and/or chemotherapy should receive a complete oral evaluation before treatment.[17] This should be completed as soon as possible after diagnosis, followed by a review once the oncologic treatment plan has been established. There may be significant oral discoveries made at the oral/dental examination that may affect oncologic treatment planning. In any event, the complete oral examination should be conducted at least 2 weeks before the initiation of therapy. This allows time for healing should any oral surgical procedures be necessary. This period also permits time for any restorative or hygiene procedures that need to be completed. The overall goals are to eliminate existing and potential sources of infection, stabilize the dentition, and to project future dental needs.

This evaluation should be performed by a dentist who has experience in managing patients with HNC—preferably one who is part of the HNC team. The evaluation should include complete head and neck, intraoral soft tissue, and dental examinations. Ideally, a complete dental radiographic examination should be included as part of the evaluation, but a panoramic radiograph may provide sufficient information. Standard intraoral photographs of the maxillary and mandibular dentitions are a useful supplement to any written record. This pretreatment evaluation should be required of all patients whether they have natural dentition or are edentulous. Areas of denture sores, retained roots, or affected teeth, bone cysts, abscesses, or other lesions should be identified to determine the need for removal before the initiation of therapy.

As a general rule, all teeth with severe decay or advanced periodontal disease should be extracted. Within the high-dose radiation field, those with moderate or severe dental caries or periodontal disease should be removed before therapy. The goal is to eliminate all symptomatic oral disease and potential sites of later infections or that would require future surgical intervention. Healthy teeth may be retained, even if in the direct site of the radiation, if maintenance of oral health and function is projected. Routine procedures such as dental restorations for moderate caries control, oral prophylaxis, and even endodontic therapy (root canal) may be performed. Extensive periodontal therapy or complex dental restorations should be avoided if they may delay the beginning of therapy. Any teeth that cannot be maintained for a lifetime should be deemed hopeless and be extracted.

Any planned removable partial or complete dentures should be deferred until after the oral soft tissues have recovered from the side effects of therapy. Preprosthetic surgery such as tori removal, smoothing of sharp bony areas, or tuberosity reductions should be performed before radiation therapy. This pretreatment planning is essential to avoid later prosthesis compromise and potential failure. If placement of a feeding tube or port is planned, any oral surgical procedures may be coupled with these procedures to limit the number of general anesthetics required.

If the patient is already wearing removable partial or complete dentures, these must be evaluated to determine whether they are a potential source of tissue trauma. If so, they must be adjusted or not worn during cancer treatment as they pose a potential for soft tissue irritation. If natural teeth remain, the patient must adhere to a strict regimen of oral home care that includes proper brushing, flossing, and daily application of fluoride to the teeth. Impressions for custom fluoride applicators should be made by the dentist before commencement of therapy.

Oral Management during Therapy

During therapy, prevention and management of acute oral complications are facilitated by experienced providers working on the oncology team. Oral evaluations should be conducted weekly or when symptoms develop. During therapy, only emergency dental care should be performed.

Proper pretreatment management should have eliminated the need for all but most emergent, unforeseen care.

As previously mentioned, the most common acute complaint is pain related to oral mucositis. Pain may be so severe as to interfere with normal oral care where even toothbrushing is too painful. Daily application of a chlorhexidine (Peridex) with an oral swab, such as a Toothetten (Sage Products, Cary, Illinois, United States), will decrease inflammation and make oral hygiene easier, whereas use of a sponge brush alone has been shown to have no effect on gingival health.

Taste change and alteration in saliva consistency and volume are anticipated. Dysphagia and odynophagia are problems associated with mucositis and may make eating difficult. Proper nutritional intake is important to combat the stress and demands placed on the body by radiation, chemotherapy, or both. Nutritional counseling should be provided by the oncology team to establish a comfortable, balanced diet. If mucositis is severe and oral intake is greatly reduced, a gastric feeding tube is used. Because of the toxicity of chemoradiation, placement of such a tube is often a part of the pretreatment protocol.

Posttreatment Oral Management

Having completed cancer therapy, patients should be placed on a 3-month dental recall until the oral status has stabilized adequately to resume regular 6-month evaluations. Routine dental procedures, such as oral prophylaxis, dental restorations, and endodontic therapy, may be performed. Some recommend prophylactic antibiotic therapy for endodontia in case of over instrumentation of the root canal with a possibility of infection, but this has not been borne out in any scientific studies.

After the completion of oncologic therapy, oral surgical procedures, such as dental extractions, periodontal surgery, and placement of osseointegrated dental implants, should be avoided within the high-dose radiation field. The lasting effects of radiation in bone makes it a subject of risk for healing following such procedures. The concern for ORN is greater with these procedures but may also occur spontaneously or at the site of a denture irritation or a pretreatment extraction site.

Removable partial and complete dentures may be fabricated, but these must be monitored closely to ensure that they do not cause soft tissue irritation that could contribute to ulcerations, soft tissue necrosis, and bone exposure.

To minimize posttreatment oral complications, standard oral hygiene procedures including proper brushing and flossing are recommended. The use of antiseptic mouthwashes to reduce the biofilm burden (e.g., chlorhexidine) has been suggested.

While an established and long accepted protocol[7] includes HBO therapy to promote vascularization, recent randomized trials have not shown benefit. In addition, there is a concern that HBO may provide increased oxygenation increasing tumor cell proliferation. Vascularized bone and soft tissue free flaps have been used for the management of localized defects. More recently, treatment aimed at elevated tumor necrosis factor and limited vascularization and fibrosis have been managed by using pentoxifylline and vitamin E. It is possible to extract a tooth after radiation therapy, but the protocol for doing this is not unanimous. Some dentists will do so without the benefit of prophylactic HBO but will opt for its use if postoperative healing is compromised and depending on the extent of surgery required. Other considerations for its use are total dose and fields of radiation, time because radiation has been completed, the cost of HBO, and access to it.

Survivorship issues (**Table 26.1**) are common and require assessment, diagnosis, and management, whenever possible. After therapy, all routine general dental procedures may be performed including dental prophylaxis, endodontic therapy, and restorative procedures such as fillings and crowns. Removable partial and complete dentures may also be made but must be monitored closely to make sure they do not cause soft tissue irritation that could lead to more serious consequences. Surgical and invasive procedures can be conducted out of the high-dose field of radiation therapy. Therefore, treatment planning must

Table 26.1 Survivorship and Chronic Oral Complications

Hyposalivation
• Mucosal infection
• Caries risk
• Periodontal disease
• Taste
• Dysphagia
• Speech
• Mucosal sensitivity
Neurologic
• Neuropathy
• Taste
• Speech
• Dysphagia
• Mucosal sensitivity
Fibrosis
• Trismus
• Limited soft tissue movement
Vascular change
• Soft tissue, bone necrosis risk
Recurrent cancer, second cancer

include details of the earlier treatment and prognosis of the treatment.

The background of many of the most reported complications is hyposalivation. If hyposalivation persists, oral functions of taste, speech, retention of prostheses (if present); formation of a food bolus; and swallowing are affected. The nutritional compromise may relate to weight increase, nutrient availability, and systemic health. Hyposalivation is associated with the risk of infection including candidiasis and dental caries and periodontal health. Mucosal sensitivity because of neuropathic changes or chronic infection and mucosal atrophy may contribute to adverse quality of life and also lead to dietary change. Postsurgical and radiotherapy fibrosis may affect range of movement of the jaw, oral aperture, tongue mobility, and dysphagia. All these aspects of chronic complications affect cost of care and quality of life, and prevention or management is needed.

Conclusions

Radiation and chemotherapy, either alone or in combination, are effective modalities used to treat HNC. Each has its side effects that may pose discomfort and even danger to the patient. A qualified dentist should be part of the management team and should evaluate, manage, and follow the patient before, during, and after cancer therapy to minimize the side effects.

Tips to Avoid Complications

- All patients should be seen by an oncologic dentist before cancer therapy begins.
- A dentist with experience managing the side effects of radiation and chemotherapy should be part of the cancer treatment team.

Clinical Pearls

- Radiation therapy and chemotherapy are common modalities used to treat head and neck cancer.
- Both acute and chronic side effects are inevitable.
- Some effects may be profound and chronic.
- Management by a qualified dental specialist is important to minimize these adverse effects and maintain a patient's quality of life.

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