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# Oral and Dental Care Management in Head and Neck Cancer

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Cancer Care Alberta

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## Background

Canadian Cancer Statistics is a publication that is produced annually to provide estimates of the burden of cancer in Canada.[1] According to the 2015 publication, Canadians have a 2 in 5 chance of developing cancer in their lifetime, and in 2015, it is estimated that 196,900 Canadians will develop cancer. While men are more likely to get cancer than women, and although most people who develop cancer are over the age of 50, it can occur at any age.[1] In Alberta, 17,000 new cases of cancer will be diagnosed in 2015.[1]

In Canada, it is estimated that there will be 4,400 new cases of head and neck (H&N) cancer in 2015 with male-female ratio of 2:1.[1] Although the age-standardized mortality rate for H&N cancers in males has decreased from 6.2 deaths per 100,000 in 1986 to 3.4 deaths per 100,000 in 2015; the average annual number of new cases of H&N cancer in Canada is projected to rise by 58.9% in 2028-2032 from 2003-2007.[1] In Alberta it is estimated that the average annual new cases of H&N cancer in both sexes will increase 76.1% from 2003-07 to 2028-32.[1]

Head and neck cancer broadly affects the lip, base of tongue, gingiva, floor of mouth, major salivary glands, tonsils, oropharynx, piriform sinus and hypopharynx. Head and neck cancer can have a debilitating effect and complications can arise as a result of the malignancy or as a result of the side-effects of cancer treatment.

The post treatment quality of life for head and neck cancer patients has been reviewed in the literature. Many of the patients' issues in head and neck cancer relate to problems of the oral cavity. Some of the common problems include pain, xerostomia, speech and swallowing disorders, masticatory function, trismus, and aesthetic concerns. Although quality of life can be multifactorial and subjective, improvement may be achieved by recognizing and addressing problems during the course of treatment.

Because of the challenges conferred by the disease and its treatment, cancer patients require care provided by dental practitioners both for the prevention of oral-related morbidity and its management. Accurate diagnosis and evidence-based prophylactic and therapeutic oral care can significantly improve patients' quality of life and reduce morbidity and healthcare costs. Integration of oral care with oncology care in survivors requires effective and clear lines of communication between the multi-disciplinary teams involved in their care. This multi-disciplinary team approach in the oral and dental care management of these patients ideally needs to start at diagnosis.

Head and neck cancer support needs are highly individual and vary in severity across the cancer continuum. Support needs that warrant further investigation include management of changes to oral health and function, swallowing and nutritional compromise and psychological effects of cancer and its treatment.[2] Patients' oral and dental care and function is an important contributor to post-treatment social adaptation and life quality.[3]

The intent of this clinical practice guideline is:

- To provide a pathway for oral and dental care for patients with head and neck cancer undergoing treatment with surgery, radiotherapy and/or chemotherapy, and to help prevent cancer treatment interruption due to oral complications resulting from treatment.
- To continually measure and improve the quality of life (QoL) in patients with head and neck cancer by providing high standards of oral and dental care before, during and after treatment. This will be realized by utilizing existing quality of life measure indices and with a view to construct a custom QoL index for these patients.
- To provide maxillofacial and dental rehabilitation to patients with head and neck cancer with a view to improve function, comfort and dignity and quality of life.
- To reduce the oral and dental morbidity associated with head and neck cancer treatment by a coordinated multi-disciplinary team approach and to provide oral comfort and function.

## Guideline Questions

1. How should the dental and dentition related functional needs of head and neck cancer patients be managed ***before*** cancer treatment?
2. How should the dental and dentition related functional needs of head and neck cancer patients be managed ***during*** cancer treatment?
3. How should the dental and dentition related functional needs of head and neck cancer patients be managed ***after*** cancer treatment?
4. What oral and dental care and preventive advice should be given to head and neck cancer patients before, during and after cancer treatment?
5. How should osteoradionecrosis (ORN) be managed?

## Search Strategy

Peer-reviewed articles were searched on February 6, 2015 using MEDLINE and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). The following search terms for MEDLINE were used: *head and neck neoplasms* (MeSH [Medical Subject Heading]), *dental care* (MeSH), *oral health* (MeSH), *head and neck neoplasm**, *head and neck cancer**, *dental care, oral health*; results were limited to human participants >19 years of age, studies published in English, and publications after 1990. The search returned 362 results, of which 24 were relevant. The following search terms for CINAHL were used: *dental care* [(MH [subject heading]), *dental care for chronically ill* [MH], *otorhinolaryngology and head-neck nursing* [MH], *head and neck neoplasms* [MH]. The search returned 219 results, of which 3 were relevant. Hand-searching identified an additional 12 articles.

The National Guideline Clearinghouse (NGC, Agency for Healthcare Research and Quality, www.guideline.gov) was searched for clinical practice guidelines related to oral and dental care management in head and neck cancer. In addition, the webpages of well-recognized cancer guideline developers was hand-searched to ensure no clinical practice guidelines had been missed.

## Target Population

The recommendations outlined in this guideline are intended for adults over the age of 18 years with head and neck cancer being managed by surgery, radiation therapy, and chemotherapy, either as a single modality or a combination of modalities. Different principles may apply to pediatric patients.

## Recommendations

These recommendations were adapted from the Royal College of Surgeons of England and the British Society for Disability and Oral Health clinical practice guideline, The Oral Management of Oncology Patients Requiring Radiotherapy, Chemotherapy and/or Bone Marrow Transplantation.

The recommendations outlined in this guideline should be applied in the context of the recommendations outlined in Alberta Health Services, Cancer Care Alberta guideline, The Organization and Delivery of Healthcare Services for Head and Neck Cancer Patients.

**Before Cancer Treatment**

1. At least one member of the treatment team; an oral maxillofacial surgeon, maxillofacial prosthodontist, and/or dentist with expertise in dental oncology should attend regional head and neck tumour board meetings.
2. A dentist with expertise in dental oncology will be responsible for the initial oral and dental assessment and management.[5] That individual will liaise and coordinate with other members of the core and extended team to provide oral and dental care and preventive advice.[6]
3. All head and neck cancer patients should receive a comprehensive oral assessment[7-9] and this assessment should be presented at the tumour board. When patients are presented at tumour board rounds and have not yet received a comprehensive oral assessment, they should be referred to a dentist with expertise in dental oncology.
4. Patients whose treatment may affect maxillofacial complex should be examined by dentist or dental specialist with expertise in managing patients with head and neck malignancy. Any potential oral and dental problems should be identified and treated before start of cancer treatment.
5. Any dental problems that are identified should be treated as soon as possible to minimize delaying definitive cancer treatment.[10]
6. Comprehensive oral and maxillofacial assessment and management should include:
    - Identifying existing oral disease and eliminating potential source of infection.
    - Periodontal assessment needs to be carried out and periodontally involved teeth with doubtful or poor prognosis need to be extracted.
    - Endodontic assessment – any teeth with periapical lesion should be evaluated and appropriately managed.

- Restorative assessment – carious teeth that can be restored are stabilized with appropriate restorations. Any teeth with dubious restorative prognosis need to be removed at least 14-21 days prior to cancer therapy.[11]
- Impacted teeth – decision to remove or leave will need to be evaluated on a case-by-case basis.
- Patients' dental prostheses and tissue-supported prostheses need to be assessed for retention, support, comfort and wear of occlusion amongst other factors. If the retention, support and/or comfort are found to be poor, the prosthesis may be relined with a soft reline material.

7. Prepare the patient for the expected oral, dental and maxillofacial sequelae and side effects of cancer therapy (surgical, radiation and/or chemotherapy). Patient education, both oral and written, regarding oral, dental and maxillofacial complications and need for compliance with preventive protocols should be provided.[10,11] A printable patient information handout is available online. Consider also sending a copy of the handout to the patient's community dentist.
8. Establish an adequate standard of oral hygiene to meet the increased challenge by developing a plan for maintaining oral hygiene, providing preventive care and long-term follow-up.
9. A comprehensive rehabilitation assessment should be carried out. Dental impressions may be taken.[8] These may be useful for the fabrication of fluoride trays and for obturator fabrication planning if indicated. Consultation with a maxillofacial prosthodontist may be indicated to assess more complex restorative needs.
10. As part of ongoing efforts to reduce the effects of radiation to the teeth and potentially the surgical reconstruction, discussions should be had with the radiation oncologists where possible and without violating oncology management principles.

**During Cancer Treatment**

11. The period during cancer therapy (radiotherapy and/or chemotherapy) can be unpleasant for the patient because of oral side effects and therefore should receive appropriate support from a dental member of the head and neck cancer team.
12. The patient should maintain high standards of oral hygiene including denture hygiene. Removable prosthesis may become difficult to wear and patients should be advised to leave them out. If removable prostheses cause discomfort or ulceration; then that should be managed by a dental professional.
13. During both chemotherapy and radiotherapy, the patient will have a period of mucositis that will be extremely unpleasant. The patient should be reassured during this acute phase about the limited period of this side effect. Every effort should be made to reduce the severity of the mucositis.[10]
14. Use of an **alcohol free** chlorhexidine mouthwash (Appendix A – Table 1) should be recommended, as tooth brushing is unlikely to be adequate for plaque removal.[12] If the mouth is too painful for cleaning with a toothbrush, oral sponges can be used with alcohol free

chlorhexidine mouthwash for cleaning.[12] Other options for mouthwash include warm water, club soda, or a mix of 1 tablespoon of baking soda in 2 cups of water.

15. The side effects of radiotherapy can place the dentition at a high risk of dental caries and erosive damage and so dietary advice should be reinforced[5,6,12] and appropriate fluoride supplements should be prescribed.[11,13]
16. If oral candidiasis is detected, then appropriate antifungal management should be instituted. (Appendix A – Table 1)[11]

***General management:***[14]

17. ***Mucositis:*** Good oral hygiene has been shown to reduce the severity of mucositis.[15] The patient should be advised on an appropriate diet and should be told to keep away from certain food and drinks to avoid discomfort. Hard, acidic, salty or spicy foods can irritate and traumatize the tissues. Cool or lukewarm foods and soft, pureed foods may be better tolerated. Alcohol and tobacco should be avoided. Poorly fitting dentures or sharp teeth may exacerbate symptoms and should be corrected. Magic mouthwash preparations including Akabutu's and Pink Lady may be used for symptom management. (Appendix A – Table 2) Benzydamine hydrochloride mouthwash (See Appendix A – Table 1 for product example; list not exhaustive) has also been shown to reduce the frequency and severity of mucositis. It is recommended that this is used four to eight times daily (15ml) starting before, during, and for two or three weeks after radiotherapy. Oral cooling (ice chips) can be used 30 minutes prior to chemotherapy when mucositis inducing chemotherapeutic agents are used (e.g. 5-FU).[16] In severe cases, 2% lidocaine viscous solution (See Appendix A – Table 1 for product example) prior to eating may be recommended for pain control.
18. ***Xerostomia:*** Alcohol and tobacco should be avoided as these can exacerbate xerostomia. Stimulation by sugar free chewing gum may be recommended where there is some salivary function, although the evidence base for this is limited. The most practical solution to manage xerostomia appears to be saliva replacement either with frequent sipping or sprays of water, or with artificial salivary replacement (Appendix A – Table 1). Appropriate artificial saliva should be prescribed to avoid acid erosion in dentate patients. The use of sialogogues (Appendix A – Table 1) and surgical procedures such as salivary gland transfer[17,18] may be considered where they are perceived to have benefit for oral health.[19-22]
19. ***Fungal infection:*** Patients receiving chemotherapy and/or radiotherapy are at increased risk of developing oral candida infections. Antifungal medication should be prescribed after a diagnosis of oral candida infection is made. Topical agents such as Nystatin oral suspension or systemic agents such Flucanozole or Itraconazole can be prescribed where appropriate (Appendix A – Table 1). Denture hygiene is also important as poor denture hygiene can contribute to oral candida infections. Denture hygiene should be reinforced, and during active infection an antifungal agent can be applied to the impression surface of dentures provided there are no contraindications.

20. ***Dental caries*:** The need to maintain proper nourishment and body weight can lead to consumption of high calorie and cariogenic food supplements. These nutritional requirements can increase the risk of dental caries. Dental professionals should work with dietitians to minimize the caries risk while also ensuring adequate nutrition. The mouth should be rinsed out with water or sugar free mouthwash after eating/drinking. Patients should be using high fluoride toothpaste (5000ppm) twice daily. Custom fluoride trays should be fabricated and used with 1.1% sodium fluoride gel.
21. ***Oral hygiene*:** Twice daily brushing should be carried out with a soft toothbrush along with interdental cleaning. If brushing is painful, then teeth and supporting soft tissues can be cleaned with an oral sponge or gauze moistened with alcohol free chlorhexidine mouthwash. Other options for mouthwash include warm water, club soda, or a mix of 1 tablespoon of baking soda in 2 cups of water.
22. ***Denture hygiene*:** Dentures should be removed and rinsed after every meal. They should be brushed every day with a toothbrush/denture brush with soap and water. They should not be worn at night and should be stored in a chlorhexidine mouthwash overnight. Alternatively they can be stored in a diluted sodium hypochlorite (bleach) solution if the denture does not contain any metallic elements. If dentures are left out during the period of mucositis, they should be cleaned and stored in a moist environment. Obturators must not be discontinued and if there is discomfort, adjustments will need to be carried out.

**After Cancer Treatment**

23. Immediately after culmination of cancer therapy (surgery, radiotherapy and/or chemotherapy), the patients can still be affected by the side effects of therapy. Regular monitoring and appropriate oral care by a dentist with expertise in oncology should be provided. This should include oral health advice and reinforcement of preventive regimens.
24. That radiation therapy may have profound consequences for the dentition and oral health is well established and long understood. The biological effect is further potentiated with chemoradiotherapy now in common use in the treatment of head and neck cancers. With the new levels of radiation dose delivered in head and neck care together with possible potentiation of biological effect with chemotherapy, the consequences for the dentition, osseous structures of the jaws, salivary glands and the oral soft tissues requires a new level of clinical vigilance. This vigilance includes prevention, assessment and care of dental and oral health as a continuum that should be provided as an integral element of the overall radiation therapy, chemotherapy and surgical management. General principles for continuing care management of dentition following cancer therapy based on their risk is provided in Appendix B.
25. After surgery, radiotherapy and/or chemotherapy, patients may experience altered taste that may take some time to return to normal. There are times when taste is not recovered. During this phase many patients will need to continue consuming high calorie cariogenic foods and/or

nutritional supplements. Dietary advice needs to be reinforced at frequent intervals regarding the risks of sugar and acid consumption.[6,12]

26. Dietitians may prescribe dietary supplements to combat weight loss. As these supplements can be highly cariogenic, appropriate oral hygiene measures should be reinforced.
27. The risk of acid erosion is real due to the lack of saliva due to radiation induced xerostomia. Salivary flow rates and its buffering capacity may modify the severity and distribution of erosion.[25] To minimize this risk, dietary analysis and appropriate dietary advice should be provided. The oral cavity should be rinsed out with water or sugar free mouthwash after eating/drinking. Brushing and flossing should be delayed for at least 20 minutes and possibly up to 60 minutes after eating/drinking.[23,24] The length of time the high calorie and cariogenic food supplements are used should be kept to a minimum to reduce the cariogenic and acidic challenges to the dentition.
28. Long-term strategies to deal with xerostomia should be discussed with the patient.[6,12,26] These may include use of plain water to sip or the use of proprietary artificial saliva.[27] Patients should be advised against sipping on fruit juice, soft drinks or flavoured water due to the acidic nature of the drinks, which can worsen acid erosion. Any sugary drink should also be discouraged because of the increased risk of dental caries. If patients do consume acidic or sugary food or beverages, the importance of oral hygiene after consumption must be emphasized. (See recommendation #27). He/she should be informed of the risk associated with xerostomia including risk of dental caries and fungal infection. The patient should also be made aware of the functional impact of xerostomia on speech, chewing and swallowing.
29. Susceptibility to caries and periodontal disease is dose dependent and lifelong. The severity of the risk may be worse with the concomitant use of chemotherapy and the risk of uncontrolled dental disease can continue after completion of radiotherapy and chemotherapy.[26,28-30]
30. Oral hygiene measures should include brushing two to three times/day with high fluoride content (5000ppm) toothpaste (Appendix A – Table 1) for adults. These measures should also include interproximal cleaning and patients should be instructed on the use of interproximal cleaning aids. Chlorhexidine gel (alcohol free) (Appendix A – Table 1) can be applied for a period of two weeks every three months using a fluoride tray.[31] Ideally, this should be performed after the 3 month visit with the dental hygienist. Chlorhexidine gel is loaded in the fluoride tray and seated in the mouth for five minutes every night over this two-week period. This should help in reduction of the bacterial load intraorally.
31. Where possible, dental extractions should be avoided because of the risk of osteoradionecrosis (ORN). If dental extractions are required, they need to be carried out with appropriate precautions and ideally under the care of an oral and maxillofacial surgeon and/or a dentist with expertise in dental oncology. Where there is a high risk of ORN and where it is clinically feasible, consideration for root canal therapy and restoration/crown amputation should be made.
32. Denture wear could be difficult in patients with xerostomia and can increase the risk of candidal infection. Trauma from dentures can cause ulcerations which can predispose to ORN

if undiagnosed or untreated. Dentures should be properly fitting and so patients need to be educated about their use and risks involved. Where possible, dentures should be avoided or relined with a soft reline material.[5,32]

33. Osseointegrated dental implants used for oral rehabilitation are highly effective for improving masticatory function when replacing missing teeth, or used to support oral prosthetics such as dentures and obturators.[33,34] The altered anatomy secondary to cancer surgery, reconstructive grafting procedures, radiation therapy, and/or chemotherapeutics makes placement of dental implants in oral and head and neck cancer patients' complicated and high risk.[35,36] Placement of implants in oral and head neck cancer patients should be carried out by practitioners with specific expertise in complicated implant therapy. These patients should be managed in a multidisciplinary environment by members of the head and neck cancer team.
34. Patients that have undergone surgery, radiation therapy, chemotherapy or a combination thereof are at risk of having altered functional capacity. Of particular concern is the development of dysphagia in the presence of altered ability to masticate and an airway that is at risk. As a result, those patients undergoing reconstruction and/or oral rehabilitation who are at risk of overt or silent aspiration should be assessed and managed accordingly by a dysphagia team when appropriate.
35. Comprehensive treatment of the oral and head and neck cancer patient is a continuum and often includes surgical removal of teeth or the supporting structures of the jaw. Patients felt to have reduced oral function (mastication, speech, swallowing), or significant cosmetic deformity as a result of cancer treatment that has compromised the dentition or the maxillofacial complex should be seen by the head and neck cancer team and a comprehensive management plan instituted for the short and long term. Patients should be referred to an oral and maxillofacial surgeon, prosthodontist, or dental specialist with expertise in the field of oral rehabilitation. Appendix D provides an overview of the different avenues of oral health care that patients can access in Alberta.
36. Implant hygiene is critical for success of osseointegrated dental implants. This is amplified in situation of increased risk in radiated patients, patients with implants in bone containing free flaps and patients with comorbidities that increase the risk of implant longevity. A continuing care program should be instituted for these patients (Appendix C).
37. Obturators should be reviewed regularly and may require frequent adjustments or remakes.[37] Obturators should not be left out at night for the first six months following treatment. If stability or retention is an issue, use of osseointegrated implants should be considered. Surgical closure of the maxillary defect should also be discussed and offered to patients if appropriate. Patients should be assessed by a Maxillofacial Prosthodontist with regards to oral rehabilitation. Timelines for fabrication and insertion of the various obturators should be carried out depending on the clinical situation and needs and in discussion with the patient.
38. Trismus is a major complication of cancer therapy and can significantly affect the quality of life for patients.[12,32,37,38] If trismus is an issue, patients should be referred to physiotherapy. Following assessment, an intensive regimen of jaw exercises may be required. This may

involve the use of various physiotherapy devices (Appendix A – Table 1). Other measures include use of analgesics and muscle relaxants; however, these must be used under the care of a specialist.

39. Radiation therapy carries an increased risk of progressive, uncontrolled periodontal tissue breakdown, which may lead to ORN.[39,40] If periodontal disease is suspected, it must be treated vigorously and strict follow-up protocols put in place.
40. Herpes labialis can be a recurrent problem. This can be managed by use of topical acyclovir cream 5% applied 5–7 times daily for 5–10 days. This should be started at the first sign of treatment for it to be effective. Oral antivirals can also be used for both suppression and for treatment.
41. Restorations that are required should be functional and provide satisfactory aesthetics. In areas of non-stress, a restorative material with fluoride release may be used. Cervical caries can be sequelae of radiation therapy in dentate patients. This can be managed with appropriate oral hygiene and conservative restorative treatment. If full coverage crowns are required, these should be provided with subgingival margins.[41]
42. After the acute symptoms associated with cancer therapies have passed and in the absence of recurrent disease, oral health monitoring should be at least equivalent to the period of monitoring by the Oncology teams. Oral examination should be at least biannual and patients with unstable oral health will require more regular monitoring. For patients with severe mucositis, xerostomia or trismus, frequent monitoring is recommended.(Appendix B)
43. After a period of shared care, once the oral health is stable, a review plan should be agreed to with the patient's dentist with appropriate safeguard put in place for urgent re-referral if required. Discharge protocol should ensure continuing oral and dental care for the patients.

## Discussion

### ORN Management

The most serious osseous long term side effect associated with head and neck cancer management is osteoradionecrosis of the jaws. Patients who receive radiation therapy to manage local or regional control are at lifelong risk of ORN. Current strategies utilizing intensity modulated radiation therapy (IMRT) appear to minimize risk by focusing treatment to specific areas for cancer control and avoid increased doses to adjacent tissues within the field or adjacent to areas affected by scatter.[30,42-45] ORN is dose dependent and is less of a risk in patients receiving less than 4500 - 5000 cGy.[46] Most head and neck cancer patients receiving radiation therapy typically receive 6000 - 7000 cGY in the form of IMRT.

The best way to prevent ORN is to ensure optimal dental assessment and treatment prior to initiating radiation therapy. This would include oral hygiene measures, caries control, periodontal and endodontic treatment as necessary. Ideally extraction of indicated teeth should be completed at least 14 to 21 days prior to onset of radiation treatment.[42,47] In addition patient education is imperative to ensure continued oral hygiene and topical fluoride management. These strategies should be in place

to avoid future dental deterioration which could progress to infections and need for extractions. Infections of the oral region, denture injuries and extractions have been linked to the development of ORN.

If extractions are necessary, management continues to be controversial. Some protocols recommend the use of hyperbaric oxygen (HBO) for preventative perioperative care. Protocols have been set forth and are utilized by the HBO treatment centres in Alberta. These often include 20 preoperative dives and 10 postoperative dives.[48,49] Extractions can also be managed in an expedited fashion without HBO.

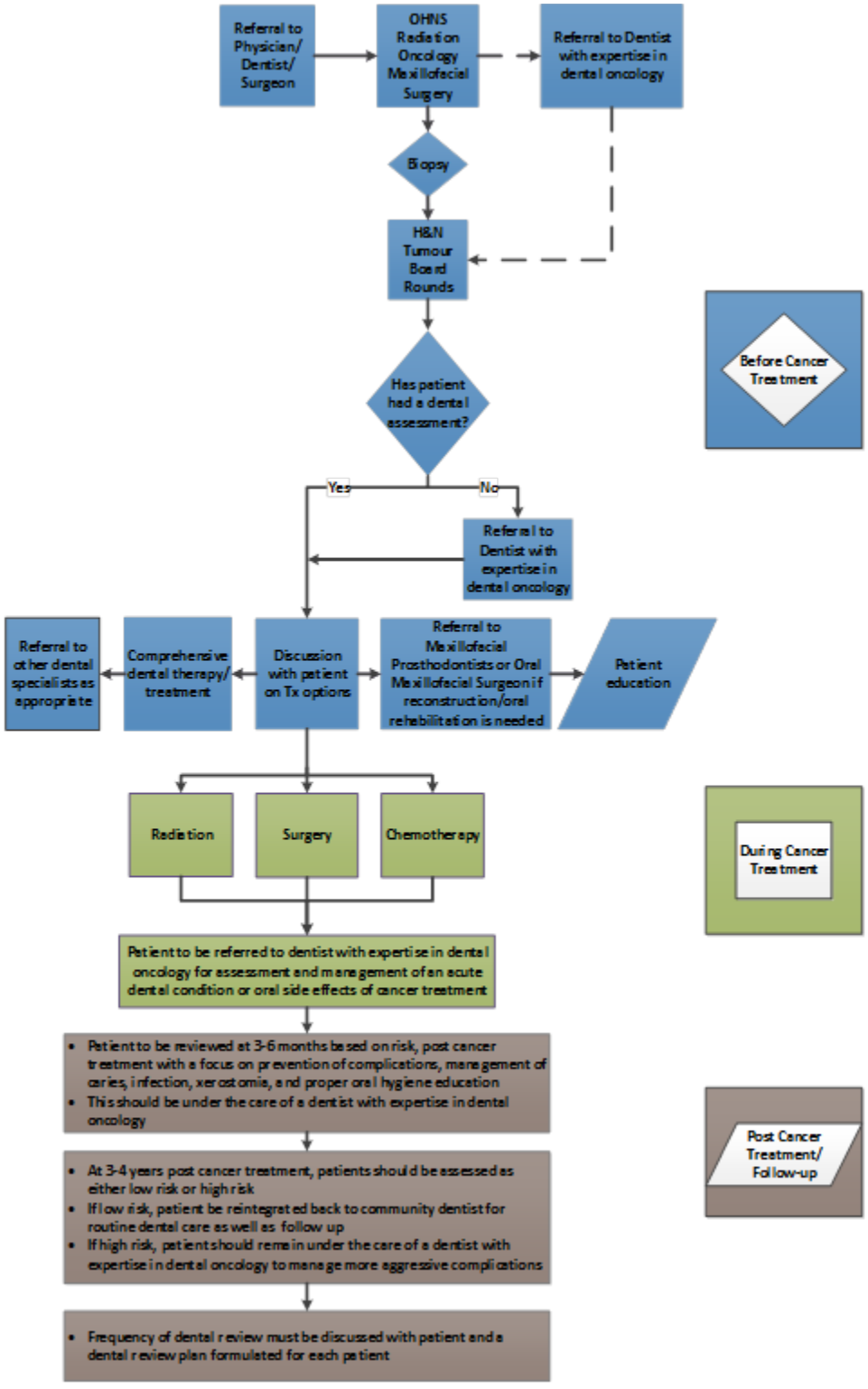
Initial management of existing ORN recommends the use of conservative measures as the most appropriate strategy focusing on aggressive local control with chlorhexidine mouth rinses, and possible oral or intravenous antibiotics. More aggressive treatment may be warranted with surgical debridement, with possible soft tissue coverage. The evidence base for the routine use of HBO for management of existing ORN remains inconclusive.[49,50] There can be potential benefits related to soft tissue vascularity and potential coverage of exposed bone in a small number of patients.[51,52] If conditions progress, pathologic fracture may occur and warrant management with microvascular soft and hard tissue flap reconstruction.[53] Drugs such as pentoxyphylline, tocopherol and clodronate have demonstrated some success, but there continues to be no validated treatment protocols to date or large RCT's, with current clinical trials ongoing.[54,55]

The goals of oral rehabilitation with implants as well as prostheses (dentures and obturators) can put the bone at risk for developing ORN. There is evidence for and against the use of HBO prior to implant placement in irradiated patients; however its use could be considered if deemed appropriate.[36,56]

Future randomized controlled trials are necessary to provide more concrete management strategies. While opinion is divided on the use of HBO, there is currently no sound data either for or against its use.

**This guideline offers consideration for the use of HBO as a supplemental tool in managing the post radiation effects, if deemed appropriate, by the treating clinician(s).**

# Treatment Algorithm



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# Appendix A: Select Product Names and Alberta Health Services Recipes

**Table 1. Common and trade names of select dental/oral products available in Alberta***

| Common Name | Example Trade Name |
|---|---|
| Alcohol free chlorhexidine mouthwash | Paroex, Perichlor |
| Alcohol free chlorhexidine gel 1% | To be compounded at a local pharmacy |
| Benzydamine Oral Rinse | Tantum Verde |
| Artificial salivary replacement | Biotene |
| Lidocaine viscous solution 2% | Xylocaine Viscous 2% |
| High fluoride content toothpaste (5000ppm) | Prevident 5000 Plus |
| Sialagogue | Salagen |
| Physiotherapy device | Therabite, Dynasplint |
| Antifungal medication [57] | Nystatin oral suspension or powder,Flucanozole oral tablets and suspension, Itraconazole |

* Commercial company names are used as examples only. No product endorsement is intended or implied.

**Table 2. Alberta Health Services Pharmacy Recipes***

**(Magic mouthwash preparations -** Magic mouthwash is the term given to a solution used to treat oral mucositis caused by chemotherapy and radiation therapy.)

| **Akabutu's Mouthwash** (last date revised 20-Oct-2014) | | | | |
|---|---|---|---|---|
| **Ingredients** | **Strength** | **Form** | | **Quantity Required** |
| Nystatin | 100,000 units/mL | SUSP | | 42 mL |
| Lidocaine HCL, viscous | 2% | | | 50 mL |
| Sodium chloride | 0.9% | INJ | qs to | 200 mL |
| Hydrocortisone | 10 mg | TAB | at the time of dispensing | 5 tab |
| Glycerin | 100% | PO SOLN | at the time of dispensing | 4 mL |
| **Directions** | 1. Combine the viscous lidocaine and nystatin and shake well. If making 10 x 200 mL at one time this works best in a gallon jug.<br>2. QS with normal saline.<br>3. Pour into an amber bottle.<br>4. AT TIME OF DISPENSING, triturate hydrocortisone tablets into a fine powder and levigate with glycerin to form a paste. Gradually add pre-mixed Akabutu's solution. Mix well.<br>5. Transfer to final container and label. | | | |
| **Notes** | Label (before dispensing) should read:<br>Akabutu's Mouthwash:<br>Triturate hydrocortisone tablets into a fine powder. Levigate with glycerin to form paste. Gradually add pre-mixed mouthwash. Mix well. Expires 14 days after adding hydrocortisone.<br>Hydrocortisone USP powder can be used instead of tablets.<br>Sodium chloride 0.9% for irrigation can be used instead of injection. | | | |

| | |
|---|---|
| | THIS FORMULATION IS NOT BASED ON LITERATURE, but is from unpublished data, historical use, or physician/pharmacy experience. |
| **Packaging** | Amber Plastic Bottle |
| **Labels** | Refrigerate, Shake Well |
| **Storage/BUD** | Refrigerator 3 months prior to addition of hydrocortisone (arbitrary expiry by Dr. Akabutu)<br>Refrigerator 14 days after hydrocortisone addition |
| **References** | Dr. Akabutu, UAH; Dr. Yanofsky; Cross Cancer Institute Edmonton, AB |

**Pink Lady** (last date revised 04-Mar-2015)

| Ingredients | Strength | Form | Quantity Required |
|---|---|---|---|
| Lidocaine viscous | 2% | PO<br>SOLN | 15 mL |
| Aluminum hydroxide – magnesium hydroxide | 40 mg – 40 mg/mL | SUSP (Maalox, Almagel or quivalent) | 15 mL |

| | |
|---|---|
| **Directions** | 1. Measure out equal amounts of both ingredients.<br>2. Combine ingredients and mix well.<br>3. Transfer to final container and label. |
| **Notes** | The ingredients can be mixed just prior to administration and used immediately. Various other dilutions have been used.<br>Assign expiry date using USP 795 Guidelines, since no stability data available.<br>USP 795 guidelines - Water-Containing Formulations:<br>The beyond-use date is not later than 14 days for liquid preparations when stored at cold temperature between 2°C - 8°C.<br>THIS FORMULATION IS NOT BASED ON LITERATURE, but is from unpublished data, historical use or physician/pharmacy experience. |
| **Packaging** | Amber Plastic Bottle |
| **Labels** | Shake Well |
| **Storage/BUD** | Refrigerator 14 days |
| **References** | USP 34 – NF 29, 2nd Volume 1. Chapter 795: Pharmaceutical compounding – Nonsterile preparations. Rockville, MD, USA: United States Pharmacopeial Convention; 2010 |

*Alberta Health Services employees with access to the AHS intraweb can access the most up-to-date pharmacy recipes by clicking here.

# Appendix B: Continuing care management of dentition – general principles

Prevention, assessment and therapy should be seen as a continuum by individual centers delivering cancer care within the healthcare system in Alberta. The protocol for dental assessment and therapy must be implemented pre-treatment, during treatment and after cancer therapy.

Dental assessment and therapy must be carried out based on risk related to[30]:

1. Dose delivered to the jaws, dentition and salivary glands:
    a. 60Gy or above: Assessment and therapy (in particular prophylaxis) must be carried out at three or six months based on patient's oral hygiene for the lifetime of the patient.
    b. 30-60Gy: Assessment and therapy (in particular prophylaxis) must be carried out at three to six monthly intervals for the lifetime of the patient.
    c. 30Gy and below: Assessment and therapy must be carried out at 6-12 month intervals as deemed necessary by the attending dental professional
2. Elapsed time from administration of radiotherapy:
    a. Risk will increase with elapsed time after radiation therapy treatment. It has been demonstrated that for each one month elapsed time since radiation therapy, a 6% increase in odds of having moderate-severe tooth damage existed.
    b. Clinical need based on assessment of elapsed time should be used to determine frequency of assessment

**Care Delivery**

1. Responsibility for care delivery of dental assessment and therapy stages will be with the centers delivering cancer care within the healthcare system in Alberta
2. Where referral for dental care is made outside of the centers responsible for delivering cancer care within the healthcare system in Alberta, it is the responsibility of the center to monitor the progress and outcome of care provided by external sources.

# Appendix C: Continuing care management of dental implants – general principles

For programs providing treatment involving the installation of implant care within centers delivering cancer care within the healthcare system in Alberta, hygiene services should be made available:

1. An implant and dental hygiene service must be in place, be integrated into implant care and have a care plan that includes the protocols for assessment, therapy and outcomes measures.
2. An implant and dental hygiene assessment and therapy plan for implants and any residual dentition must be established for all patients undergoing implant care.
3. The implant and dental hygiene assessment and therapy plan must be diligently delivered for each implant patient. This is particularly important due to the relationship between existing periodontal disease and peri-implants soft tissue adverse response.
4. Where radiation therapy has been delivered the implant and dental hygiene assessment and therapy care plan must follow the dose and elapsed time related process described in Appendix B.
5. Where patients are able to access implant and dental hygiene therapy with a provider external to the head and neck cancer team, an implant and dental hygiene care plan must be established by the centers delivering cancer care within the healthcare system in Alberta. It is the responsibility of the centers delivering cancer care within the healthcare system in Alberta to communicate with the external provider, provide an implant and dental hygiene care plan and assess status of oral hygiene at the appropriate intervals.
6. Where patients are not able to access implant and dental hygiene therapy with a provider external to the head and neck cancer team, an implant and dental hygiene care plan must be established by the centers delivering cancer care within the healthcare system in Alberta. It is the responsibility of the centers delivering cancer care within the healthcare system in Alberta to provide a dental hygiene care plan and provide dental oral hygiene assessment and dental hygiene therapy that follows the dose and elapsed time related process described Appendix B.

**Care Delivery**

1. Responsibility for care delivery of implant assessment and therapy stages will be at the centers delivering cancer care within the healthcare system in Alberta
2. Where referral for implant care is made outside of the centers responsible for delivering cancer care within the healthcare system in Alberta, it is the responsibility of the center to monitor the progress and outcome of care provided by external sources.

# Appendix D: Avenues of Oral Health in Alberta

**1. OMDS**

The Oral and Maxillofacial Devices and Services (OMDS) Program may provide funding for some high-cost dental services required in conjunction with an oral surgical procedure insured under the Alberta Health Care Insurance Plan. In order to qualify, the program recipients must require dental services in relation to severe oral/facial conditions caused by birth defects, jaw abnormalities (tumours), major facial trauma or temporomandibular joint (TMJ) disorder. A formal referral to the program by an Oral and Maxilliofacial Surgeon on behalf of the patient is required. Benefits are limited to payment for services such as orthodontics, prosthodontics, dental implants and presurgical work-up fees. The OMDS Program is the payer of last resort; all private dental insurance benefits must be utilized prior to funding being requested and an explanation of benefits must accompany the dental claim. All dental claims must be submitted to the OMDS Program within one year of the date of service, or provision of the device.

***If you have any questions about the OMDS Program, please contact:***

Alberta Health & Wellness

Oral and Maxillofacial Devices & Services Program

10th Floor – 10025 Jasper Avenue NW

PO Box 1360 Station Main

Edmonton, AB T5J 2N3

Phone: + 1 780-415-1475

**2. iRSM**

The Institute for Reconstructive Sciences in Medicine (iRSM) is dedicated to reconstruction and rehabilitation of patients who have been born with missing structures or have lost structures of the head and neck. In this regard, iRSM has a particular interest in providing care to reconstruct the jaws or face in patients who have cancer. The Institute is a partnership between Alberta Health Services, Covenant Health and the University of Alberta. iRSM has clinical and research facilities at the Misericordia Hospital and the University of Alberta.

iRSM has a multidisciplinary team that provides services to patients from across Alberta as well as patients from other provinces. iRSM works with the head and neck cancer services in both Edmonton and Calgary. In Edmonton, iRSM is integrated with the head and neck cancer surgery service at the University of Alberta and works closely with the Cross Cancer Institute. Head and neck cancer patients are cared for through the process of surgery, reconstructive care and rehabilitation. iRSM has a particular interest in using advanced technology to plan surgery, to employ where possible advanced techniques to decrease time to complete care and plan for rehabilitation after cancer care.

Care provided at iRSM is part of public health care in Alberta. Patients registered in Alberta are covered under their provincial health care plan. It should be noted that iRSM does not provide any routine dental care. Patients may be referred to iRSM by a clinician or as a self-referral. Once referred, a visit will be scheduled to determine if the care needed matches the profile of care provided by iRSM.

***If you have any questions about iRSM, please contact:***

Institute for Reconstructive Sciences in Medicine

1W-02, Misericordia Community Hospital

16940 – 87 Avenue, Edmonton T5R 4H5

Email: IRSM@albertahealthservices.ca

Phone: +1 780-735-2660

Fax: +1 780-735-2658

**3. Cancer Care Alberta (CCA), Alberta Health Services Dental Program For Cancer Patients**

The CCA uses the services of dental consultants at the Cross Cancer Institute and the Tom Baker Cancer Centre which forms a part of the Head and Neck Treatment Group and provides consultancy services required to assisting in the management of CCA patients with malignancy where cancer treatment necessitates expert dental care. The Dental Consultants plan, deliver and/or coordinate appropriate interceptive and rehabilitative dental care to cancer patients. If delegation to a community dentist is deemed necessary for considerations of patient convenience or expediency, CCA will be responsible for the prescribed procedures only and not for duplicated diagnostic services. The program does not cover maxillofacial prosthetic care to cancer patients.

Eligibility for participation in the CCA Dental Program is restricted to patients who are Alberta Residents who are registered at a CCA facility with a diagnosis of malignancy requiring radiotherapy to the head or neck region, leukemia or are undergoing chemotherapy treatment for any type of cancer.

The CCA Dental Program is not a dental carrier and should not be considered a primary insurer for any claim. CCA is a funder of last resort. The CCA will determine levels of coverage based on the Alberta Blue Cross fee guide and may establish financial ceilings on certain procedures where deemed appropriate. Any dental claim over $500.00 must be justified by the Dental Consultant.

***If you have any questions about the CCA, Alberta Health Services Dental Program For Cancer Patients, please contact:***

Clerk V, General Ledger

Alberta Health Services

Cubicle 09-009, North Tower, Seventh Street Plaza

10030 – 107 Street

Edmonton, Alberta T5J 3N4

Phone: +1 780-735-0783

**4. Dental Coverage in Alberta**

http://www.albertahealthservices.ca/assets/programs/ps-1042857-dental-treat.pdf

## Development and Revision History

This guideline was reviewed and endorsed by the Alberta Provincial Head and Neck Tumour Team. Members of the Alberta Provincial Head and Neck Tumour Team include medical oncologists, radiation oncologists, surgical oncologists, head and neck reconstructive surgeons, prosthodontists, nurses, pathologists, pharmacists, dentists, dietitians, and other allied health professionals. Evidence was selected and reviewed by a working group comprised of members from the Alberta Provincial Head and Neck Tumour Team and a methodologist from the Guideline Resource Unit. The recommendations below are adapted from the Royal College of Surgeons of England and the British Society for Disability and Oral Health.[4] A detailed description of the methodology followed during the guideline development process can be found in the Guideline Resource Unit Handbook.

## Maintenance

A formal review of the guideline will be conducted at the Annual Provincial Meeting in 2022. If critical new evidence is brought forward before that time, however, the guideline working group members will revise and update the document accordingly.

## Abbreviations

HBO, hyperbaric oxygen; H&N, head and neck; IMRT, intensity modulated radiation therapy; OHNS, otolaryngology head and neck surgery; ORN, osteoradionecrosis; RCT, randomized controlled trial; QoL, quality of life.

## Disclaimer

The recommendations contained in this guideline are a consensus of the Alberta Provincial Head and Neck Tumour Team and are a synthesis of currently accepted approaches to management, derived from a review of relevant scientific literature. Clinicians applying these guidelines should, in consultation with the patient, use independent medical judgment in the context of individual clinical circumstances to direct care.




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