Use of the dental hygiene interventions of scaling of teeth and root planing including curetting surrounding tissue, orthodontic and restorative practices, and other invasive interventions for persons receiving or who have received chemotherapy.

Cite as
College of Dental Hygienists of Ontario, CDHO Advisory Chemotherapy, 2016-02-16

Scaling of teeth and root planing including curetting surrounding tissue, orthodontic and restorative practices, and other invasive interventions (“the Procedures”).

Chemotherapy

Advanced practice nurses
Nurses
Dental assistants
Patients/clients
Dental hygienists
Pharmacists
Dentists
Physicians
Denturists
Public health departments
Dieticians
Regulatory bodies
Health professional students

To guide dental hygienists at the point of care relative to the use of the Procedures for persons receiving or who have received chemotherapy, chiefly as follows.
1. Understanding the medical condition.
2. Sourcing medications information.
3. Taking the medical and medications history.
4. Identifying and contacting the most appropriate healthcare provider(s) for medical advice.

1 Persons includes young persons and children
5. Understanding and taking appropriate precautions prior to and during the Procedures proposed.
6. Deciding when and when not to proceed with the Procedures proposed.
7. Dealing with adverse events arising during the Procedures.
8. Keeping records.

TARGET POPULATION

Child (2 to 12 years)
Adolescent (13 to 18 years)
Adult (19 to 44 years)
Middle Age (45 to 64 years)
Aged (65 to 79 years)
Aged 80 and over
Male
Female

Parents, guardians, and family caregivers of children, young persons and adults receiving or who have received chemotherapy.

MAJOR OUTCOMES CONSIDERED

For persons receiving or who have received chemotherapy: to maximize health benefits and minimize adverse effects by promoting the performance of the Procedures at the right time with the appropriate precautions, and by discouraging the performance of the Procedures at the wrong time or in the absence of appropriate precautions.

RECOMMENDATIONS

UNDERSTANDING THE MEDICAL CONDITION

Terminology used in this Advisory

Resources consulted
- Chemotherapy: Canadian Cancer Society
- Chemotherapy and You: National Cancer Institute

Chemotherapy, “chemo”, cancer chemotherapy, cancer medication therapy, cytotoxic chemotherapy
1. is a method of treating cancer by using medications with the intention of
   a. curing cancer, to the extent that the chemotherapy has destroyed the cancer cells so that they can no longer be detected, and that there is good reason to believe that they will not recur
   b. controlling cancer, to the extent that the chemotherapy keeps the cancer from spreading, slows its growth, or destroys cancer cells that have spread to other parts of the body
   c. providing palliative care, to the extent that the chemotherapy shrinks tumours that are causing pain or pressure.
2. comprises various types, including
a. combination chemotherapy, destroying cancer cells with a mix of chemotherapy medications
b. neoadjuvant chemotherapy, shrinking a tumour before surgery or radiation therapy
c. adjuvant chemotherapy, destroying cancer cells missed by the surgery or radiation
d. ablative chemotherapy, destroying existing bone marrow prior to its replacement by stem cells or bone marrow from a donor
e. palliative chemotherapy, reducing pain and other symptoms of cancer.

3. is also used to kill bacteria, viruses, fungi, and not only cancer cells.

Other terminology used in this Advisory is as follows.
1. Cerebrospinal fluid
   a. circulates throughout the central nervous system within the spine and skull
   b. delivers nutrients to and removes waste from the brain and spinal cord
   c. cushions the brain and spinal cord against trauma.
2. Cytotoxicity, toxicity to or destructiveness of a cell.
3. Immunosuppression, when the response of the body’s immune system is reduced or absent as a result of disease or treatment.
4. Myelosuppression, where bone marrow activity is decreased, thereby reducing the production of red blood cells, white blood cells, and platelets, which occurs as a side effect of some cancer treatments.

Overview of chemotherapy

Resources consulted
- Cancer Chemotherapy: MedlinePlus
- Chemotherapy Side Effects At-A-Glance: National Cancer Institute
- Chemotherapy: Canadian Cancer Society
- Chemotherapy: MedicineNet
- Chemotherapy: PubMed Health
- Side Effects and Ways To Manage Them: National Cancer Institute
- Treating dental patients who are undergoing chemotherapy: Canadian Dental Association, Point of Care Question 2
- Understanding Chemotherapy: ChemoReady.ca

Application
of chemotherapy has the intention of
1. curing a cancer
2. stopping a cancer from spreading
3. relieving symptoms of a cancer that is incurable.

Treatment
involves various types of chemotherapy
1. varies considerably
   a. among patients/clients in the way it affects the cancer and in its side effects
   b. among cancer types
   c. in duration, pattern and frequency of delivery
2. is delivered in specialized clinics in hospitals, though some chemotherapy treatments can be delivered at home, which requires special support for family caregivers.

3. includes medications that travel the bloodstream throughout the entire body, so that chemotherapy is considered systemic treatment.

4. is administered
   a. variously by
      i. mouth as tablets or capsules
      ii. injection
         1. intra-muscular
         2. intravenous
         3. into the **cerebrospinal fluid**
         4. by catheter inserted into a large vein close to the heart when treatment is required over lengthy periods.
   b. along with radiation therapy (**CDHO Advisory**) before, during or after the chemotherapy.
   c. may be accompanied by surgery or biological therapy.
   d. most commonly in cycles which provide for periods of rest, sometimes lengthy.

5. is routinely checked against clinical progress and adjusted accordingly.

6. damages not only cancer cells, but also healthy ones though, over time, the healthy cells recover and repair themselves.

7. renders persons vulnerable to infection, which accounts for a major proportion of deaths.

8. may call for long-term or even life-long oral healthcare.

**Action**

of chemotherapy

1. is most effective on cells that divide often to make new cells, a characteristic of most cancer cells.

2. also damages normal, healthy cells, especially cells that divide quickly, including those in the
   a. oral mucosa, which may lead to oral side effects such as mouth sores
   b. blood
   c. hair
   d. lining of the gastrointestinal tract.

**Side effects**

1. of chemotherapy generally
   a. vary considerably from person to person even for a particular chemotherapy medication, dependent on the
      i. treatment schedule
      ii. particular medication
      iii. body’s reaction to the treatment overall
   b. arise from damage to normal, healthy cells, resulting in
      i. bleeding problems
      ii. fatigue
      iii. increased risk of infection, requiring
         1. personal hygiene including hand washing
         2. caution with pets and other animals.
iv. loss of weight, requiring attention to calorific intake
v. oral side effects
vi. pain associated with neurological damage
vii. poor appetite
c. vary in time of occurrence
i. arising
   1. during treatment
   2. immediately after treatment
   3. throughout an extended period following treatment
ii. depending on the length of time healthy cells need to recover from chemotherapy; the most affected of which are those that grow quickly
d. often gradually disappear when treatment is completed
i. depending on the
   1. types of medications used
   2. person’s general physical health
ii. though not always disappearing completely or permanently
e. may include
i. causing a cancer after a period of years
ii. life-threatening allergic reactions to a chemotherapy medication, which are medical emergencies room and which are signalled by some combination of
   1. sudden or severe itching
   2. rash or hives
   3. wheezing or difficulty breathing
iii. mood-altering feelings, which occur commonly with chemotherapy chiefly because it is inherently stressful, including
   1. anger
   2. anxiety
   3. depression
   4. fatigue
   5. fear
   6. frustration
   7. helplessness
   8. loneliness
iv. debilitation-related symptoms, such as
   1. pain, which arises from the chemotherapy treatment overall, rather than particular chemotherapy medications
   2. fatigue
   3. nausea
   4. vomiting
   5. hair loss.

2. Includes oral side effects of chemotherapy, which
   a. are related to the general side effects of chemotherapy and are chiefly
      i. immunosuppression, which impairs the body’s defences against microorganisms, creating high risk of
         1. periodontal and odontogenic abscesses
         2. viral and fungal infection
      ii. myelosuppression, which reduces
1. platelet counts, which impairs blood clotting and creates risk of excessive hemorrhage
2. other white cells circulating in the blood, which impairs the body’s defences against infection

iii. *cytotoxicity*, which produces mucositis, the most common acute oral side effect of chemotherapy, which usually occurs 5 to 7 days after the start of chemotherapy
iv. mucositis and immunosuppression together, which
   1. arises from chemotherapy treatments involving combinations of medications
   2. creates extreme vulnerability to opportunistic infections
v. bleeding tendency, which is signalled by bleeding from the gums or nose
vi. infection risk, associated with depression of the white cell count

b. create changes in the mouth, lips and throat during chemotherapy, including
i. hyposalivation, associated with changes in saliva, such as
   1. increased viscosity
   2. reduced volume
ii. mucositis, associated with
   1. mucosal ulceration
   2. oropharyngeal pain
iii. mucosal infection
   1. fungal
   2. viral
iv. gingivitis
v. infections of teeth or tongue
vi. exacerbation of dental or periodontal disease
vii. caries or demineralization
viii. changes in taste and smell
ix. increased sensitivity to hot or cold foods
x. eating difficulty attributable to problems in the mouth

k. bring additional changes following cancer therapy, including chemotherapy-induced
i. mucosal conditions
   1. fibrosis
   2. atrophy
   3. sensitivity
ii. persistent salivary gland dysfunction
iii. problems with dental prosthesis fit or function
iv. osteoradionecrosis (*CDHO Advisory*)
v. oropharyngeal or head and neck pain fibrosis of muscles or soft tissue
vi. neuropathy
vii. speech difficulties
viii. esthetic concerns

d. have particular consequences for children, including observations that
i. childhood cancer survivors may be at an increased risk of caries and various developmental malformations of teeth, whether from the anti-cancer therapy or from the cancer itself
ii. children treated in the early years of their lives display the most severe dental defects, suggesting that immature teeth are at a greater risk of developmental disturbances than fully developed teeth.
e. include side effects that lower the quality of life, such as
   i. pain
   ii. fatigue
   iii. nausea
   iv. vomiting
   v. hair loss.

**Prognosis**

varies from complete recovery to palliative treatment, depending on
1. the stage of the underlying cancer
2. whether the cancer is localized or systemic
3. the cytotoxic agents chosen
4. the person’s general health and medical conditions other than the cancer.

**Social considerations**

include
1. many patients/clients’ feeling well enough to receive oral healthcare, which requires particular consideration to the oral health implications of chemotherapy’s side effects relative to the Procedures and to the advice given to patients/clients
2. the delivery of certain chemotherapy regimens to persons living at home, which requires support of family caregivers and advice on the maintenance of oral hygiene
3. the ability of many people to work during chemotherapy, who need to match their workloads to how they feel, which may require adaptation of work organization and arrangements.

**Comorbidity, complications and associated conditions**

Comorbid conditions are those which co-exist with chemotherapy but which are not believed to be caused by it. Complications and associated conditions are those that may have some link with it. Distinguishing among comorbid conditions, complications and associated conditions is especially difficult for chemotherapy.

**Impact of Comorbidity on Chemotherapy Use and Outcomes in Solid Tumors: A Systematic Review: American Society of Clinical Oncology** (Fee charged for access to full article)

1. A tentative conclusion appears to be that, among cancer patients with comorbidities, use of chemotherapy is diminished and cancer outcomes are generally inferior when compared to use and outcome among cancer patients without comorbidities.
2. Given the limitations and insufficiency of existing evidence, the relation between comorbidities and decreased use and inferior survival has yet to be reliably determined.

**Oral health considerations**

Resources consulted
- Canadian Dental Association, Point of Care at page 194
- Mouth and Throat Changes, US National Cancer Institute

1. The Procedures are contraindicated without prior advice from the treating physician or chemotherapy or radiation therapy team about
   a. implementing the procedures for patients/clients for whom cancer chemotherapy
i. is planned, when oral healthcare treatment is best delivered before the chemotherapy is begun, with the intention of reducing dental emergencies during the delivery of chemotherapy, and should include
   1. thorough periodontal cleaning
   2. appropriate mouth care generally

ii. is underway, when oral healthcare treatment should be undertaken only on an emergency basis, which
   1. may include periodontal debridement if warranted by
      a. active periodontal disease
      b. medical need for removal of a source, actual or potential, of infection
   2. requires account to be taken of the
      a. white blood cell count
      b. platelet count
      c. need for antibiotic prophylaxis
      d. the optimum point for oral healthcare in the individual patient/client’s treatment cycle

b. risk of infection, which
   i. is associated with depression of the white cell count and may require antibiotic prophylaxis for a patient/client with low white blood count
   ii. is countered by
      1. consulting with the treating physician
      2. obtaining medical advice prior to the use of aspirin, acetaminophen and any other anti-pyretic medications
      3. categorizing a fever in excess of 38° C as an indication for immediate medical advice
      4. emphasizing the need for close attention to care of the mouth, and oral and general hygiene on the part of the patient/client
      5. giving close attention to infection control on the part of the dental hygienist
      6. care of the mouth generally

c. risk from bleeding, which
   i. requires consultation with the treating physician
   ii. may lead the treating physician to recommend a platelet count prior to the Procedures.

2. The mouth of the patient/client receiving chemotherapy
   a. provides conditions favourable for microbial growth, particularly if the patient/client is debilitated
   b. is a portal of entry for infection of lungs, digestive tract, and circulatory system
   c. is especially susceptible to oral infection because
      i. pathogenicity of oral flora may be enhanced
      ii. host-defence mechanisms may be impaired
   d. requires meticulous attention to oral infection control, which
      i. includes particular attention on the part of
         1. the oral healthcare provider
         2. the patient/client receiving chemotherapy
      ii. involves well-laid oral healthcare treatment plans, including appropriate recall appointments
iii. may prevent or reduce oral complications such as
   1. mucositis
   2. local and systemic infection
   iv. may help enhance the general health and comfort of the patient/client.

3. Side effects include
   a. allergic reactions to chemotherapy medications, which may be severe enough to be a medical emergency
   b. oral side effects of chemotherapy, which
      i. are usually acute
      ii. often subside shortly after the chemotherapeutic medications lose their biological effectiveness
      iii. include mouth, throat and lip changes, which can affect teeth, gums, lining of the mouth, and salivary glands
   c. non-oral side effects of chemotherapy, of which some raise special concerns for oral healthcare, including
      i. anemia, arising from chemotherapy effects on bone marrow
      ii. appetite changes, which sometimes arise from mouth problems that make eating painful; eating well is important for patients/clients receiving chemotherapy, which can of itself also be associated with weight loss or gain
      iii. bleeding, caused by chemotherapy-induced abnormally low counts of platelets, which may cause bruising, small hemorrhages into the skin, or bleeding from the nose or mouth
      iv. diarrhea, caused by infections, chemotherapy, or medications used to treat constipation
      v. fatigue, which may persist after treatment is concluded, is associated with chemotherapy and its accompanying medications, the pressure of frequent visits for healthcare, feelings such as stress, anxiety, and depression, and with various medical problems.

MEDICATIONS SUMMARY

Sourcing medications information

1. Adverse effect databases
   - Health Canada’s Marketed Health Products Directorate
toll-free 1-866-234-2345
   - Health Canada’s Drug Product Database

2. Specialized organizations
   - US National Library of Medicine and the National Institutes of Health Medline Plus Drug Information
   - WebMD

3. Information about specific medications
   - American Cancer Society Guide to Cancer Drugs
   - British Columbia Cancer Agency (BCCA) Cancer Drug Manual
   - Cancer Care Ontario (CCO) Drug Formulary Medication Patient Information Sheets
4. Medications considerations
   All medications have potential side effects whether taken alone or in combination with
   other prescription medications, or as over-the-counter (OTC) or herbal medications.

5. Information on herbals and supplements
   - US National Library of Medicine and the National Institutes of Health Medline Plus
     Drug Information All Herbs and Supplements

6. Complementary and alternative medicine
   - National Center for Complementary and Alternative Medicine

Types of medications

Chemotherapy medications
1. are delivered by various routes, including
   a. injection: intramuscular, subcutaneous or directly into a cancerous lesion of
      the skin
   b. intra-arterial: directly into the artery supplying the cancer
   c. intraperitoneal: directly into the peritoneal cavity
   d. intravenous: directly into a vein, which
      i. may involve a vein-residing catheter instead of an IV needle
      ii. may be accompanied by anti-nausea medication
      iii. requires from 15 minutes to 3 hours for each treatment
   e. topical: as cream for the skin.
   f. oral: pills, capsules, or liquids, which
      i. require strict adherence to the prescribed directions
      ii. may require medication reminders, such as dosettes
      iii. could require an advisory procedure for dealing with forgotten doses
      iv. requires hand-washing after taking the chemotherapy substance
      v. requires avoidance of contact with the medication by persons other
         than the patient/client
      vi. requires cleansing of the spoon and other utensils used for the
         chemotherapy substance.
2. used for and with chemotherapy are indexed in resources such as
   - Drug Index for Patients: BC Cancer Agency
   - Drug Information for Patients: Cancer Care Ontario
   - Drug Therapy Information: Cancer Care Nova Scotia

Side effects of medications

See the resources above to the specific medications.
THE MEDICAL AND MEDICATIONS HISTORY

The dental hygienist in taking the medical and medications history-taking should
1. focus on screening the patient/client prior to treatment decision relative to
   a. key symptoms
   b. medications considerations
   c. contraindications
   d. complications
   e. comorbidities
   f. associated conditions
2. explore the need for advice from the primary or specialized care provider(s)
3. inquire about
   a. pointers in the history of significance to chemotherapy, such as changes in the mouth
   b. symptoms indicative of side effects of chemotherapy, such as
      i. infection history
      ii. bleeding problems
      iii. severe allergic reactions
   c. changes in chemotherapy and other medications prior to and during chemotherapy treatments made by the patient/client without the advice of the chemotherapy provider or treating physician; these
      i. may involve
         1. prescription medications
         2. over-the-counter medications
         3. vitamin supplements
         4. mineral supplements
         5. herbal remedies and other natural health products
         6. complementary and alternative therapies.
      ii. should be accurately reported by the dental hygienist to the chemotherapy provider or treating physician
   d. the patient/client’s understanding and acceptance of the need for oral healthcare
   e. problems with previous dental/dental hygiene care
   f. problems with infections generally and specifically associated with dental/dental hygiene care
   g. the patient/client’s current state of health
   h. how the patient/client’s current symptoms relate to
      i. oral health
      ii. health generally
      iii. recent changes in the patient/client’s condition.

IDENTIFYING AND CONTACTING THE MOST APPROPRIATE HEALTHCARE PROVIDER(S) FOR ADVICE

Identifying and contacting the most appropriate healthcare provider(s) from whom to obtain medical or other advice pertinent to a particular patient/client

The dental hygienist should
1. record the name of the physician/primary care provider most closely associated with the patient/client’s healthcare, and the telephone number
2. obtain from the patient/client or parent/guardian written, informed consent to contact the identified physician/primary healthcare provider
3. use a consent/medical consultation form, and be prepared to fax the form to the provider
4. include on the form a standardized statement of the Procedures proposed, with a request for advice on proceeding or not at the particular time, and any precautions to be observed.

UNDERSTANDING AND TAKING APPROPRIATE PRECAUTIONS

Infection Control

Dental hygienists are required to keep their practices current with infection control policies and procedures, especially in relation to
1. the Recommendations published by the Centers for Disease Control and Prevention (a frequently updated resource)
2. relevant occupational health and safety legislative requirements
3. relevant public health legislative requirements
4. best practices or other protocols specific to the medical condition of the patient/client.

DECIDING WHEN AND WHEN NOT TO INITIATE THE PROCEDURES PROPOSED

With active chemotherapy or radiation therapy the Procedures are contraindicated without prior consultation with the appropriate chemotherapy or radiation treatment provider(s).

The dental hygienist
1. should not implement the Procedures without prior consultation with the appropriate primary or specialist care provider(s)
   a. if the patient/client’s current treatment includes chemotherapy with or without radiation therapy
   b. if the patient/client has undergone or is about to undergo chemotherapy with or without radiation therapy
   c. if the patient/client’s condition or treatment calls for
      i. antibiotic prophylaxis
      ii. pre-medication
2. may postpone the Procedures pending medical advice if the patient/client
   a. appears debilitated
   b. is experiencing symptoms suggestive of complications of chemotherapy or its treatment
   c. has not complied with pre-medication, including antibiotic prophylaxis, as directed by the prescribing physician
   d. has recently changed significant medications, under medical advice or otherwise
   e. recently experienced changes in his/her medical condition such as medication or other side effects of treatment
   f. is unable to provide the dental hygienist with sufficient information about
      i. medications
      ii. bleeding problems
      iii. infections that may be related to chemotherapy or radiation therapy
iv. a history such as life-threatening allergic reactions associated with chemotherapy

g. has symptoms or signs of
   i. exacerbation of the medical condition
   ii. comorbidity, complication or an associated condition of chemotherapy
   iii. not recently or ever sought and received medical advice relative to oral healthcare procedures
   iv. is deeply concerned about any aspect of his or her medical condition.

DEALING WITH ANY ADVERSE EVENTS ARISING DURING THE PROCEDURES

Dental hygienists are required to initiate emergency protocols as required by the College of Dental Hygienists of Ontario’s Standards of Practice, and as appropriate for the condition of the patient/client.

First-aid provisions and responses as required for current certification in first aid.

RECORD KEEPING

Subject to Ontario Regulation 9/08 Part III.1, Records, in particular S 12.1 (1) and (2) for a patient/client with a history of chemotherapy, the dental hygienist should specifically record

1. a summary of the medical and medications history
2. any advice received from the physician/primary care provider relative to the patient/client’s condition
3. the decision made by the dental hygienist, with reasons
4. compliance with the precautions required
5. all Procedure(s) used
6. any advice given to the patient/client.

ADVISING THE PATIENT/CLIENT

The dental hygienist should

1. urge the patient/client to alert any healthcare professional who proposes any intervention or test
   a. that he or she has a history of chemotherapy
   b. to the medications he or she is taking
2. should discuss, as appropriate
   a. the importance of the patient/client’s
      i. self-checking the mouth regularly for new signs or symptoms
      ii. reporting to the appropriate healthcare provider any changes in the mouth
   b. the need for regular oral health examinations and preventive oral healthcare
   c. oral self-care including information about
      i. choice of toothpaste
      ii. tooth-brushing techniques and related devices
      iii. dental flossing
      iv. mouth rinses
      v. management of a dry mouth
   d. the importance of an appropriate diet in the maintenance of oral health
e. for persons at an advanced stage of a cancer or debilitation
   i. regimens for oral hygiene as a component of supportive care and palliative care
   ii. the role of the family caregiver, with emphasis on maintaining an infection-free environment through hand-washing and, if appropriate, wearing gloves
   iii. scheduling and duration of appointments to minimize stress and fatigue
f. comfort level while reclining, and stress and anxiety related to the Procedures
g. medication side effects such as dry mouth, and recommend treatment
h. mouth ulcers and other conditions of the mouth relating to chemotherapy, comorbidities, complications or associated conditions, medications or diet
i. pain and fever management with aspirin, acetaminophen and any other anti-pyretic medications.

BENEFITS/HARMS OF IMPLEMENTING THE RECOMMENDATIONS

POTENTIAL BENEFITS

1. Promoting health through oral hygiene for persons who have received, are about to receive, or are receiving chemotherapy.
2. Reducing the adverse effects, such as risks of infection and excessive bleeding associated with dental hygiene interventions by
   a. informed communication with the appropriate chemotherapy or treatment provider(s)
   b. generally increasing the comfort level of persons in the course of dental hygiene interventions
   c. using appropriate techniques of communication
   d. providing advice on scheduling and duration of appointments.
3. Reducing the risk of oral health needs being unmet.

POTENTIAL HARMS

1. Causing infection or excessive bleeding.
2. Performing the Procedures at an inappropriate time, such as
   a. without prior consultation with the treating physician
   b. for non-urgent oral healthcare during chemotherapy
   c. in the presence of complications for which prior medical advice is required
   d. in the presence of acute oral infection without prior medical advice.
3. Disturbing the normal dietary and medications routine of a person with chemotherapy.

CONTRAINDICATIONS

CONTRAINDICATIONS IN REGULATIONS

Identified in the Dental Hygiene Act, 1991 – O. Reg. 218/94 Part III

ORIGINALLY DEVELOPED

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