

Introduction

Changes to the oral cavity arising from malignant disease, treatment and other co-morbidity factors can have a profound affect on the person with cancer, causing pain, discomfort, lack of nutrition, longer hospital stays, and in some situations sepsis and death. It is the responsibility of the multi-professional team working together to address mouth care throughout the treatment trajectory, from early diagnosis, commencement of cytotoxic treatment, to the terminal phases of the disease when a person may no longer be able to care for themselves. While it is recognised that caring for the mouth is an important aspect of cancer care, all too often this aspect of care may be overlooked until problems arise. This leads to needless distress and discomfort and in some cases serious clinical consequences.

While mouth care may be neglected due to a number of reasons including other clinical priorities, part of the frustration for clinical practitioners is the lack of certainty surrounding the best approaches to implement. The reality is that there is clear and consistent evidence on how to assess and care for the mouth, which the team can implement while critically applying the best available evidence in the use of the multiple treatment agents available.

This module will enable the reader to address the key aspects of mouth care; assessment, care and treatment. In order to do this, the module will consider the pathophysiology of oral damage caused by disease and treatments, including cytotoxic induced mucositis. It will guide the reader to critically explore the key aspects of assessment, including the appropriate choice of assessment tool for the clinical area and the necessary training required for the team and the patient, to ensure an accurate and consistent assessment of the mouth. It will explore the best way to care for the mouth in the home, hospital and hospice setting. It will guide the reader to critically examine the multiple treatments available to prevent and treat oral damage and to apply these treatments to the particular clinical situation.

This module should take approximately 5 – 6 hours to complete, comprising the learning activities and time for reading, thinking and reflection.

Learning objectives

The activities and content of this module are built around the following learning objectives:

- Understanding the impact that disease and treatments can have on oral health
- Understanding the pathophysiology of oral damage caused by disease and treatments
- Developing skills in recognising and assessing oral damage
- Identifying and comparing oral assessment tools
- Identifying oral care strategies
- Critically exploring treatment options

Background

There is clear evidence that oral changes, including the development of mucositis can lead to many serious and distressing problems in the cancer setting. These may include severe pain

and discomfort leading to an inability to eat, drink, swallow or talk affecting the person's ability to recover and their quality of life. The alteration of the normal oral mucosa flora and the breakdown of the oral lining may also lead to an increased risk of local and systemic infections (Sonis, 2004, Bellm et al, 2000). These complications increase morbidity, sometimes requiring increased hospital stays, a need to decrease the dosage, delay or stop necessary cytotoxic treatment. All of this leads to increased physical, emotional and financial costs and in some cases may result in death.

Mucositis can simply be defined as inflammation of the gastrointestinal tract, however in the cancer setting it usually refers to the erythema, inflammation and ulceration that occurs in the mucosal lining of the mouth, pharynx, oesophagus, and the entire gastrointestinal tract secondary to cytotoxic (chemotherapy, radiation) treatment (Dodds, 2004). In Bellm et al's (2000) study to gain a better understanding of 38 patients' experiences while undergoing Haematology Stem Cell Transplantation (HSCT), patients reported mouth sores, nausea and vomiting, and fatigue as the most troubling side effects of the treatment. Mouth sores were selected as the single most debilitating side effect (42%), followed by nausea and vomiting (13%). Many of the patients mentioned that mouth sores made it difficult or impossible to eat (n=23), swallow (n=21), drink (n=17), and talk (n=8). Twenty patients reported pain in the mouth, throat and/or oesophagus. Two thirds of the patients reported receiving opioid analgesia to relieve oral pain.

In a local study to assess staff knowledge of oral care in the oncology setting, 22 (81%) of all respondents thought that mouth problems were distressing or very distressing to patients, yet 32 (65%) of patients surveyed reported that they had not received mouth care education and support, and 28 patients had received no information at all (Paska et al, 2009). These findings may not be unusual and other studies have identified barriers to care including; knowledge gaps, anecdotal practices, inconsistent assessment, diverse practices, insufficient evidence, low staffing and lack of support and lack of multi-professional collaboration (McGuire, 2003). The reality is, that despite its acknowledged importance, oral care may be one of the first things to be set aside when clinical workloads are excessive (McGuire, 2003).

Activity 1 (allow 30 minutes)

Task 1: Choose a patient you have cared for who has oral problems.

- Critically examine what factors are contributing to these oral changes.
- What are the symptoms the patient describes?
- How are these oral problems affecting the person and the treatment plan?

Allow 30 minutes

Resources required to complete this activity

Background reading

Bellm LA, Epstein JB, Rose-Ped A, et al. (2000) Patient Reports of Complications of Bone Marrow Transplantation. *Support Care Cancer*. 8: 33-39.

Dodds MJ (2004) The Pathogenesis and Characterisation of Oral Mucositis Associated with Cancer Therapy. *Oncology Nursing Forum*. 31(4): 5-11.

McGuire DB (2003) Barriers and strategies in implementation of oral care standards for cancer patients. *Supportive Care in Cancer*. 11(7): 435-41.

Paska J, Scowcroft R, Campbell J. & Quinn B. (2009) Improving clinical based practice in mouth care. Poster session presented at ECCO15, 20 – 24 Sept 2009, Berlin, Germany.

Sonis ST (2004) The Pathobiology of Mucositis. Nature Reviews Cancer. 4: 277-284.

The oral cavity and the pathophysiology of cytotoxic damage

The oral cavity is lined with a mucosa membrane consisting of three layers, top layer, sub-mucosa and basement layer, consisting of multiple layers of cells, including epithelium, and connective tissue (Martini, 2007). Although oral damage caused by either, the disease, treatment or both can happen on any of all of these layers, the damage cannot always be seen (Sonis, 2004). It is for this reason that the clinician should carefully include in their assessment the individual patient's subjective experience of mouth changes including taste and sensation (also see the 'Oral assessment' section on page 7).

Thiobodeau & Patton (2007) describe the mouth as having three main functions:

1. to enable the ingestion of foods and fluids,
2. to aid communication
3. to support breathing.

Oral problems, which may present as pain, ulcerations, bleeding, infections, taste changes, change to saliva, bone and dentition changes or a combination of these, can affect the person's ability to use their mouth for these daily needs.

Although oral damage can be caused directly by the disease and/or treatment it can be exacerbated by the patient's inability to care for the oral mucosa as in the case of those individuals with advanced disease or in the terminal phase of illness. The amount of damage is influenced by a number of things, including, the type and extent of malignant disease, the type and dose of the cytotoxic drug or treatment administered, the number of treatment cycles required, previous or concurrent treatments that may have damaged the mucosa, prior oral health and the oral hygiene and nutritional status of the individual (see Table 1).

Table 1. Factors which may predispose a person to poor oral health

- Dehydration
- Poor nutritional intake
- Type and extent of malignancy, other co-morbidity factors
- Treatment interventions including, radiotherapy, chemotherapy, surgery
- Inability or lack of motivation towards undertaking oral hygiene
- Other drugs and therapies causing dryness or changing the normal mucosal environment e.g. opiates, diuretics, sedatives, oxygen therapy
- Age (older adults and children are more susceptible to oral problems)
- Breathing changes
- Pre-existing dental problems
- Alcohol/tobacco use

Barasch & Peterson, 2003; Beck,2004

The incident rates of mucosal damage in the cancer setting will vary according to the number of predisposing factors present including the type and dose of cytotoxic therapy.

Table 2. A sample of studies reporting the incidence of mucosal damage secondary to the incidence of chemotherapy/radiotherapy

Treatment	Malignancy	Incidence		
		Grade 3-4	All grades	Mucosal damage
Conditioning for HSCT ¹	Solid and haematological	67-98*	99*	Oral
Radiotherapy ¹ Chemotherapy ²	Head and neck cancer	60-77*	88-98*	Oral and/or GI
Chemotherapy ³	NSCLC	42*	No data	GI
Radiotherapy and 5-FU and CPT-11 ⁴	GI malignancy	53* 39*	No data	Oral GI
Myelosuppressive chemotherapy ⁵	Solid tumours	11**	37**	Oral and/or GI
High-dose melphalan, BEAM ⁶	Multiple myeloma, NHL	44*	87*	Oral

*% of patients; **% of cycles

Table courtesy of AMGEN

NSCLC, non-small cell lung cancer; NHL, non-Hodgkin's lymphoma;
GI, gastrointestinal; 5-FU, 5-fluorouracil; CT-11, irinotecan;
BEAM, carmustine (BiCNU), etoposide, cytarabine, and melphalan

1. Wardley AM et al. *Br J Haematol* 2000;110:292–299
2. Elting LS, et al. *Proceedings from the 17th MASCC/ISOO International Symposium 2005*; Abstract #15-097 and oral presentation
3. Kalemkerian GP et al. *Lung Cancer* 1999;25:175–182
4. Sonis ST et al. *Cancer* 2004;100(suppl 10):1995–2025
5. Elting LS et al. *Cancer* 2003;98:1531–1539
6. Blijlevens N et al. *Bone Marrow Transplant* 2006;37:S24–S25

Rubenstein et al (2004) describe the mucosal injury secondary to cytotoxic treatment as the collective consequence of a number of concurrent and sequential biologic processes. This has been described very well by Stephen Sonis (2004) who refers to the five stages of mucositis as:

1. Initiation: DNA and Non DNA damage
2. Upregulation & message generation: Damage triggers pro-inflammatory cytokines
3. Signalling & amplification: Tissue may appear normal but mucosa altered
4. Ulceration: Cytokine amplification, inflammation, pain, risk of sepsis
5. Healing: Renewal of epithelial proliferation & differentiation, return of microbial flora, but environment altered

Sonis (2004) reminds us that because the mouth already contains a vast array of microorganisms, these ulcerations which cause a break in the epithelial tissue, especially when patients are immunocompromised, increase the risk of infection and sepsis. The resident microbial flora previously contained by the epithelial barrier in the oral cavity is now free to enter the blood stream leading to a possible systemic infection (Blijlevens et al 2000).

5. The healing stage;

- Epithelial cell migration
- Proliferation
- Differentiation
- The time of healing is dependent on many factors including the dosing, timing and choice of agents, and the individual

Activity 2: (allow 60 minutes)

Task 1: Choose a text or website and have a critical look at the physiology and anatomy of the oral cavity and the different layers that make up the mucosa membrane. Consider how malignant disease and/or the treatments may affect the oral cavity.

Allow 30 minutes

Task 2: Critically examine the work of Stephen Sonis on the pathophysiology of mucositis in the field of oncology. Critically apply the theory of the five stages of mucositis to your clinical practice.

Allow 30 minutes

Resources required to complete this activity

Useful websites

Cancer Consultants

<http://www.cancerconsultants.com/mouth-sores-mucositis/>

National Institute of Dental and Craniofacial Research (Oral Complications of Cancer Treatment: What the Oncology Team Can Do)

<http://www.nidcr.nih.gov/OralHealth/Topics/CancerTreatment/OralComplicationsCancerOncology.htm>

Background reading

Barasch A & Peterson DE (2003) Risk factors for ulcerative oral mucositis in cancer patients: unanswered questions. *Oral Oncology*. 39(2):91-100.

Beck SL (2004) Mucositis. In: Henke-Yarbro C, Hansen-Frogge M. & Goodman M. (eds) *Cancer Symptom Management*. 3rd Edn. Jones and Bartlett, Sudbury. 276-292.

Blijlevens NMA, Donnelly JP & De Pauw BE (2000) Mucosal Barrier Injury: Biology, Pathology, Clinical Counterparts and Consequences of Intensive Treatment for Haematological Malignancy: An Overview. *Bone Marrow Transplant*. 25. 1269-1278.

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

Elting LS, Cooksley C & Garden AS. (2005) Clinical outcomes of radiotherapy-induced oral mucositis among patients with head and neck cancers. Proceedings from the 17th MASCC/ISOO International Symposium. Geneva, Switzerland. Abstract #15-096.

Kalemkerian GP, Belzer K, Wozniak AJ, Gaspar LE, Valdivieso M, Kraut MJ. (1999) Phase I trial of concurrent thoracic radiation and continuous infusion cisplatin and etoposide in stage III non-small cell lung cancer. *Lung Cancer*. 25(3): 175-82.

Martini F. (2007) *Fundamentals of Anatomy and Physiology*. 7th Edn. Benjamin Cummings, San Francisco.

Rubenstein EB et al (2004) Clinical Practice Guidelines for the Prevention and Treatment of Cancer Therapy-Induced Oral and Gastrointestinal Mucositis. *Cancer (suppl)* 100: 2026-2046.

Sonis ST (2004) The Pathobiology of Mucositis *Nature Reviews. Cancer*. 4: 277-284.

Spielberger R, Stiff P, Bensinger W, Gentile T, Weisdorf D, Kewalramani T, Shea T, Yanovich S, Hansen K, Noga S, McCarty J, LeMaistre CF, Sung EC, Blazar BR, Elhardt D, Chen MG, Emmanouilides C. (2004) Palifermin for oral Mucositis after Intensive Therapy for Haematologic Cancers. *New England Journal of Medicine*. 351. 2590-2598.

Thiobodeau GA & Patton KT (2007) *Anatomy and Physiology*. 6th Edn. Elsevier, St Louis.

Wardley AM, Jayson GC, Swindell R et al. (2000) Prospective evaluation of oral mucositis in patients receiving myeloablative conditioning regimens and haematopoietic progenitor rescue. *British Journal of Haematology*. 110: 292-299.

Oral assessment

Good oral care is an important aspect of clinical practice and requires four key tasks; careful assessment, correct diagnosis, care and treatment.

Thinking Point:

Accurate assessment leads to a correct diagnosis, which directs appropriate care and choice of treatment

A correct oral assessment enables the team to plan care and treatment, to monitor the effectiveness of the interventions used and to identify any new problems as they arise. Depending on the type of treatment, an oral assessment can be carried out by one of the health care team but also by the patient themselves. In a recent review of the literature by the Oral Mucositis Advisory Group (OMAG), made up of nursing, medical and dental experts from the European Group for Bone Marrow Transplantation (EBMT) and the European Oncology Nursing Society (EONS), the panel found that numerous different assessment tools (21) were used in the examined studies (Quinn et al 2008). Figure 2 shows examples of some of the oral assessment tools used. However, the number of oral tools being used in research and clinical practice is thought to be much higher. The high number of different assessment tools has led to

confusion and lack of consistency in assessment in clinical practice, leading experts in this field to suggest that oral problems are underreported in clinical practice (Sonis 2004, Blilevens 2000). Although these tools have been designed with different clinical situations and research objectives in mind, they contain some common elements. The majority of tools include subjective and objective elements and usually require the participation of the patient in the assessment process. The actual assessment of the oral cavity normally includes assessing for; the presence or absence of erythema, ulcers and pain, changes to saliva and whether the person is able to eat and drink.

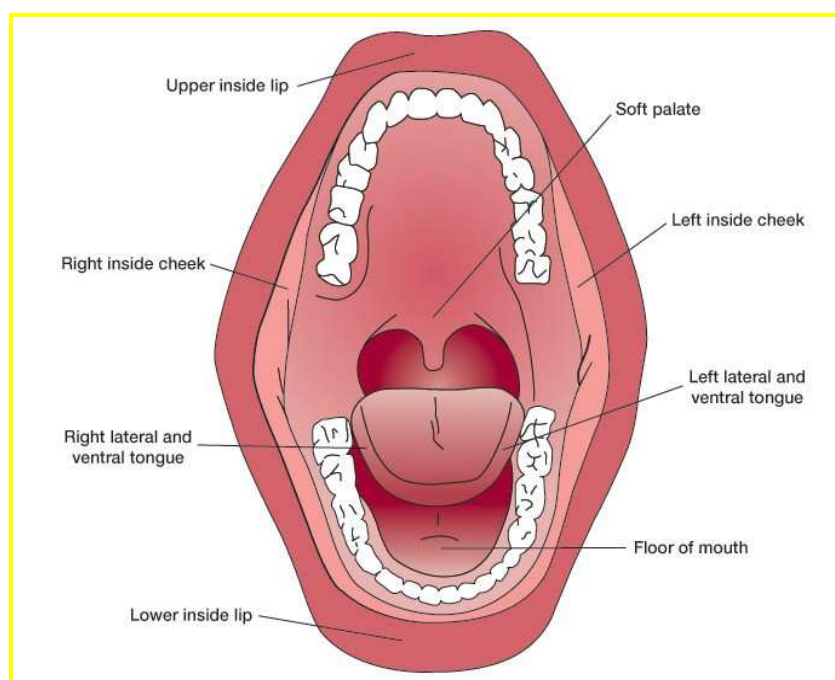
Figure 2. Examples of assessment tools (Quinn et al 2008)

Tool	Physical changes			Functional changes			Subjective changes		
	Erythema	Ulceration	Oedema	Salivary changes	Swallowing	Voice	Eating	Pain	Lips
WHO	✓	✓			✓		✓	✓	
OAG	✓	✓	✓	✓	✓	✓		✓	✓
NCI-CTC	✓	✓	✓	✓			✓	✓	
OMI	✓	✓	✓						
MacDibbs	✓	✓	✓	✓	✓	✓	✓	✓	
OMAS	✓	✓						✓	

WHO, World Health Organisation; OAG, Oral Assessment Scale; NCI-CTC, National Cancer Institute Common Toxicity Criteria; OMI, Oral Mucositis Index; OMAS, Oral Mucositis Assessment Scale;

In order to carry out a good oral assessment the following pieces of equipment are required: disposable gloves, gauze, tongue depressor and a good light source (such as a pen torch). Figure 3 shows the oral cavity and the areas of the mouth most susceptible to damage from cytotoxic treatment.

Figure 3. The oral cavity



Courtesy of AMGEN

The sites most susceptible to cytotoxic damage are:

- Upper lip (labial mucosa)
- Lower lip (labial mucosa)
- R. buccal mucosa
- L. buccal mucosa
- R. lateral & ventral tongue
- L. lateral & ventral tongue
- Floor of mouth
- Soft palate

While the hard palate, gums and tongue should also be assessed, these parts of the mouth are generally better protected from cytotoxic damage due to being thicker and more keratinised than other parts of the mouth. Following the review of the literature and based on expert opinion the OMAG group made the following recommendations in regards to undertaking an oral assessment (Table 3).

Table 3. OMAG Assessment Guidelines

Strongly recommended

- Use a standardised procedure for assessment
- Assessments should continue after treatment until OM is fully resolved
- Patient-reported outcomes should be included in all assessments and take place before physical examination
- OM assessments should use instruments (or a combination) with objective, subjective and functional measures

Recommended

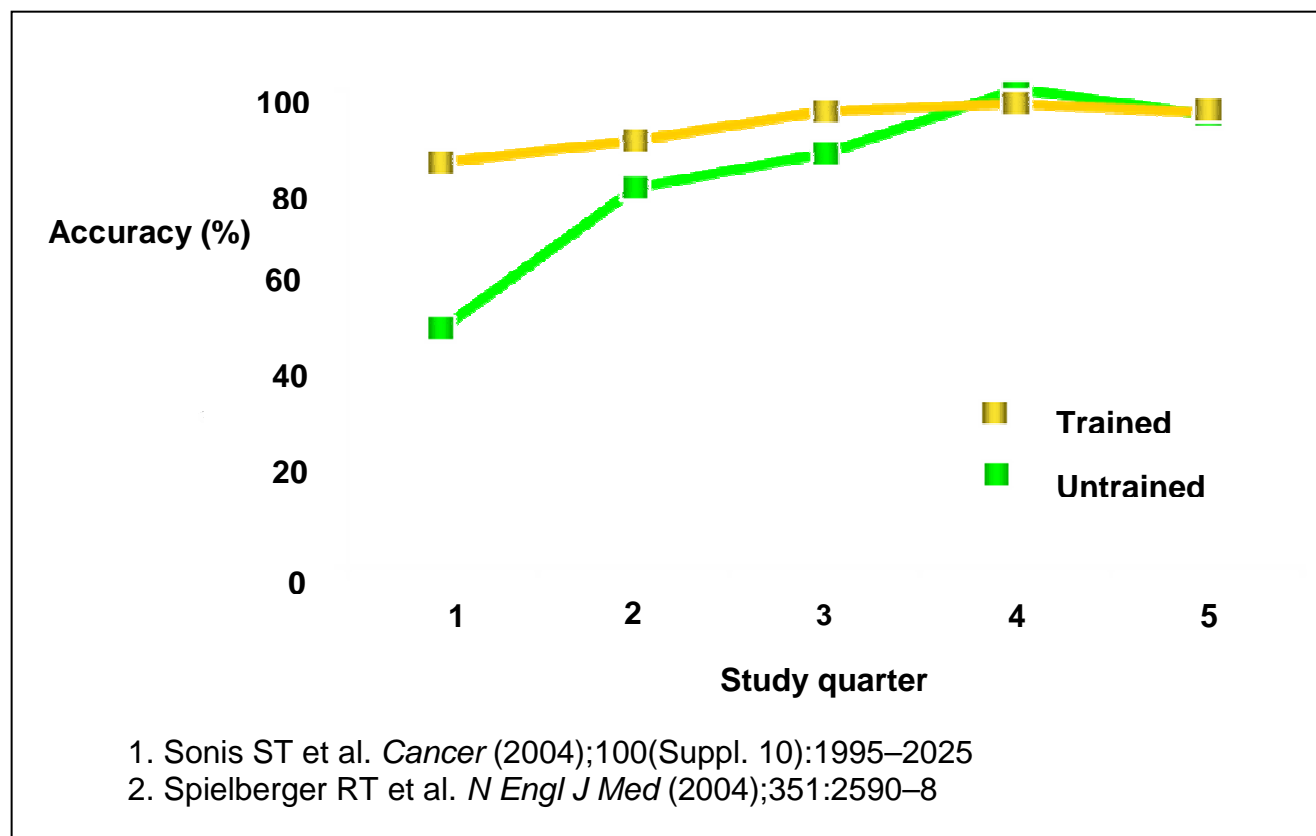
- Routine assessments should take place, and should include self-reporting
- Frequent assessment is recommended throughout treatment especially for high-risk patients

Expert opinion

- Baseline assessments should be made: close to treatment; where OM is expected; and take place close to first dose of treatment
- Pain scoring should form part of OM assessment
- Validated assessment instruments should be used; validation of modified or new scales recommended
- Assessments should be easy to use and comfortable for the patient
Clinicians should be specifically trained (Figure 4)

OMAG
Quinn et al, 2008

Figure 4. Oral mucositis incidence is reported as higher if assessors are trained and use a standard grading scale



The following elements should be included in any oral assessment tool

- Subjective: Soreness described by patient
- Objective: Presence of erythema & ulceration
- Functional: (NB) ability to eat solids, liquids or nothing at all

Some key points to consider when carrying out an oral assessment (Quinn et al 2008)

- What type of tool should I use?
 - Consider the setting
 - Standardized, validated tool, or a combination
 - Easy to use
 - Comfortable
- What should I be assessing?
 - Physical, functional and subjective changes, including pain
 - Self-reporting
- How often should I assess?
 - At baseline
 - Routinely and regularly until resolution

Activity 3 (allow 60 minutes)

Task 1: Does your organisation have a mouth care policy? What oral assessment tool do you use with your patient group? Have members of the team been trained in how to use this tool?

Allow 20 minutes

Task 2: Take a selection of oral assessment tools and identify the common elements and the differences.

Allow 20 minutes

Task 3: Thinking of your patient group, which of the examined tools would best suit your clinical area ?.

Allow 20 minutes

Resources required to complete this activity

Useful websites

Mouth Care for Children and Young People with Cancer: Evidence-based Guidelines
<http://www.cclg.org.uk/library/19/MouthcareGuidelineReportFeb06.pdf>

Background reading

Blijlevens NM, A., Donnelly, J.P., & De Pauw, B.E.(2000) Mucosal Barrier Injury: Biology, Pathology, Clinical Counterparts and Consequences of Intensive Treatment for Haematological Malignancy: An Overview. Bone Marrow Transplant. 25. 1269-1278.

Malkin B. (2009) The importance of patients' oral health and nurses' role in assessing and maintaining it. Nursing Times. 105: 17. early online publication.

<http://www.nursingtimes.net/nursing-practice-clinical-research/acute-care/the-importance-of-patients-oral-health-and-nurses-role-in-assessing-and-maintaining-it/5000784.article>

Quinn B, Potting C, Stone R, Blijlevens N, Fliedner M, Margulies A & Sharp L. (2008) Guidelines for the assessment of oral mucositis in adult chemotherapy, radiotherapy and haematopoietic stem cell transplant patients. European Journal of Cancer. 44(1): 61-72.

Sonis ST (2004) The Pathobiology of Mucositis Nature Reviews. Cancer. 4: 277-284.

Spielberger R, Stiff P, Bensinger W, Gentile T, Weisdorf D, Kewalramani T, Shea T, Yanovich S, Hansen K, Noga S, McCarty J, LeMaistre CF, Sung EC, Blazar BR, Elhardt D, Chen MG, Emmanouilides C. (2004) Palifermin for oral Mucositis after Intensive Therapy for Haematologic Cancers. New England Journal of Medicine. 351. 2590-2598.

Stone, R et al (2005) Management of Oral Mucositis at European Transplant Centres. Eur J Oncology Nursing 11 (Suppl 1) 3-9.

Care of the oral cavity

While many patients will be self-caring and will want to carry out their own oral care, others may need encouragement and others may need members of the nursing team to carry out this important aspect of care. The team should carefully explain why caring for the oral cavity is important throughout treatment. Care of the oral cavity should be addressed when discussing the disease or planning any treatments which may affect the oral mucosa such as surgery or cytotoxic treatments, and should be reiterated at the commencement of each treatment cycle. The team with the patient should assess the changes to the oral cavity at the beginning of every new cycle of treatment or therapy, especially when treatments are known to be a high risk of causing oral damage. Some of the newer biological therapies may predispose the patient to mouth changes and this should be carefully assessed.

Caring for the oral cavity is extremely important in the terminal phases of disease when the person is no longer able to care for themselves. The team should also pay particular attention to patients who are no longer able to take food and fluid orally because of treatment complications and are being fed and hydrated via naso-gastric (NG), naso-jejunum tubes (NJ) or Percutaneous gastrostomy (PEG) tubes, intravenous fluids and total parental nutrition. It may be helpful to begin oral care planning by asking the patient how they normally care for their mouth. Dentures should be removed before oral care commences and thoroughly cleaned with a toothbrush and cleaning agent. The nursing team can advise the patient or support the patient to remove any debris and prevent the build up of plaque, ensure the mucosa and lips are kept moist, as a range of medications and treatments are likely to dry out the oral cavity. Depending on the extent of oral damage, the team may need to ensure the patient has received adequate analgesia before commencing oral care. Cooley (2002) suggests that the main aims of oral care are; to keep the oral cavity (including the lips) clean, soft, moist and intact in order to prevent infection, to remove debris and prevent the build up of dental plaque, to alleviate pain and enhance comfort, to encourage oral intake, to prevent foul smelling mouth and to freshen the mouth.

There has been much debate about the frequency of care required but this should be carried out at regular intervals and will depend on the nature of the patient's disease and the anti-cancer treatments the patient is undergoing. While some patients at home might be asked to carry out oral care four times a day, a patient having undergone oral surgery or undergoing radiation treatment to the head and neck region may require hourly care. Patients who are dying may also require hourly care. While each clinical area should have general guidance to support staff, each clinical situation should be assessed on an individual basis.

Care of the oral cavity includes:

- Patient education/support
- Regular cleaning
- Rinsing
- Removal of debris
- Soft toothbrush & toothpaste
- Assessment of moisture
- Prevent dry lips
- Adequate hydration/nutrition

The factors previously highlighted in Table 1 should also be considered when planning care of the oral cavity.

Activity 4: (allow 2 hours)

Task 1: Using the materials suggested in the previous sections and below, above plan and deliver a short teaching session on the care of the oral cavity for your clinical team. Consider the learning outcomes you wish to achieve.

Allow 2 hours

Resources required to complete this activity

Useful websites

Mouth Care for Children and Young People with Cancer: Evidence-based Guidelines
<http://www.cclg.org.uk/library/19/MouthcareGuidelineReportFeb06.pdf>

Background reading

Beck SL (2004) Mucositis. In: Henke-Yarbro C, Hansen-Frogge M. & Goodman M. (eds) Cancer Symptom Management. 3rd Edn. Jones and Bartlett, Sudbury. 276-292.

Cooley C (2002) Oral health: basis or essential care. *Cancer Nursing Practice*. 1(3): 33-39.

Dickinson L & Porter H (2006) Oral Care. In: Grundy M (Ed) *Nursing in Haematological Nursing*. 2nd Edn. Balliere Tindall, Edinburgh. 371-86.

Malkin B. (2009) The importance of patients' oral health and nurses' role in assessing and maintaining it. *Nursing Times*. 105: 17. early online publication.
<http://www.nursingtimes.net/nursing-practice-clinical-research/acute-care/the-importance-of-patients-oral-health-and-nurses-role-in-assessing-and-maintaining-it/5000784.article>

Quinn B. (2008) Personal Hygiene: Oral Care. In: Dougherty L & Lister S *The Royal Marsden Hospital Manual of Clinical Nursing Procedures*. 7th Edn. Wiley Blackwell, Oxford. 647-659

Sweeney P. (2005) Oral Hygiene. In: Davies A & Finlay I (Eds) *Oral Care in Advanced Disease*. Oxford University Press, London. 21-36.

Oral care agents

Although a wide range of treatment agents are available, there still exists a scarcity of evidence to always guide the choice of treatment. In most centres, the cancer team will have developed their own set of treatment guidelines to guide practice. Such guidelines should be reviewed regularly as new anti-cancer agents and newer oral agents become available. A team of experts in mucositis from the Multinational Association of Supportive Care in Cancer and the International Society for Oral Oncology (MASCC/ISOO) have critically examined and reviewed the literature on many of these oral agents and have developed guidelines (Keefe et al 2007). However, due to the sometimes scarcity of robust research, it was impossible for this team to give guidance on all treatment choices and in all cancer settings. However, such guidelines are helpful to consider when examining current and suggested changes to clinical practice. In drawing up local guidelines to prevent and treat oral damage it might be beneficial to include members from the pharmacy, medicine, nursing, dentistry, dietetic and palliative care teams.

It is generally agreed that a soft or medium toothbrush and toothpaste should be used, however toothpaste should be thoroughly rinsed from the mouth in order to prevent the prolonged exposure of some toothpaste ingredients which may damage the teeth and mucosa. Flossing between the teeth will help to remove any unwanted debris but patients who are at risk of thrombocytopenia and other bleeding disorders may need to use extreme caution when flossing. Some form of oral rinse should be used which may include normal saline (Sodium chloride 0.9%) which helps to clean the mouth, remove debris, moisten the mucosa and promote healing (Cheng et al 2001). The team may wish to advise the patient to add a small amount of salt to a cup of warm water and to use it as an oral rinse, and then to rinse again with cold water. There is some evidence to suggest that the use of sodium bicarbonate may interfere with the normal flora of the mucosa and so may be contra-indicated. It is difficult to gain clear guidance on the vast range of mouthwashes, mucosal protectants and anti-septic agents available (Table 4). Opinion varies on the benefits of some of these agents and they should be considered critically before being applied to particular clinical settings. In one clinical setting certain treatments can bring benefits and in others they may be contra-indicated. It may be helpful to audit the use of new treatments introduced into the clinical area, however, more robust research studies are required to demonstrate the benefit of many of these agents. While some patients like to use mouthwashes that can be bought from shops and pharmacies, some of these agents, for example, with an alcohol base, may irritate an already damaged mucosa, so the team should consider the ingredients of products when advising on such oral care agents. Lubricants may be applied to the lips to protect them from cracking and to provide comfort. However, the team should again consider the ingredients of these lubricants as they may be contra-indicated in some clinical settings. Some lubricants may cause further damage in patients undergoing radiation to the head and neck region.

Depending on the clinical setting and the potential risk from oral damage, the team may wish to consider topical or systemic agents for the prophylactic treatment of bacterial, fungal or viral infections. However, these treatments should only be initiated after gaining advice from the microbiology and pharmacy teams. Particular high-risk patients may include those undergoing high doses of chemotherapy or radiation such as in the haemato-oncology and stem cell transplantation, or patients undergoing radiotherapy and/or chemotherapy for head and neck cancers.

The presence of xerostomia (inadequate production of saliva) alters the environment of the oral cavity and can cause a range of problems including infection, an inability to eat, swallow or talk, and many patients describe the distress this causes. Treatment may include advising the patient to sip fluids regularly to help relieve symptoms or the use of an artificial saliva agent.

Appropriate analgesia should be provided either topically or systemically. Topical agents may include, Lidocaine, Capsaicin, Gelclair, paracetamol, aspirin, codeine and morphine based rinses. The choice of such treatments need to be carefully considered, morphine based agents may contain alcohol and irritate the damaged mucosa, aspirin may cause further bleeding in high risk patients and paracetamol may mask a temperature and the underlying presence of infection. Systemic agents may include, Paracetamol, Codeine, Diamorphine (subcutaneous injection) and Patient Controlled Analgesia (PCA), and anti-inflammatory agents such as chamomile, oral corticosteroids. The team should be aware that adequate analgesia alone is not enough and the underlying damage or potential damage to the oral mucosa needs to be addressed. Careful assessment of the patient's nutritional and fluid intake should be assessed and addressed regularly and may require nutritional advice such as suggesting that the patient try different foods when taste has been affected, offering supplementary foods, advice on NG, NJ and PEG feeding tubes or TPN. All these interventions will support the patient's nutritional needs thereby supporting the healing of the oral mucosa.

Table 4. Selecting treatment

Self care & education	<ul style="list-style-type: none"> • Self care & education
Careful assessment	<ul style="list-style-type: none"> • Good oral care – remove debris, assess moisture, promote healing • Correct assessment scale and trained assessor
Rinses	<ul style="list-style-type: none"> • 0.9% Saline, Sodium bicarbonate
Cryotherapy	<ul style="list-style-type: none"> • Ice chips
Mucosal protectants	<ul style="list-style-type: none"> • Sucraflate, Caphosol, Prostaglandin E, Hydroxypropyl cellulose film, Amifostine
Multi-agent rinses	<ul style="list-style-type: none"> • Consider the contents of these range of agents
Antiseptic agents	<ul style="list-style-type: none"> • Chlorhexidine, Hydrogen peroxide, Povidine-iodine
Anti-inflammatory agents	<ul style="list-style-type: none"> • Chamomile, oral corticosteroids
Topical agents	<ul style="list-style-type: none"> • Lidocaine, Capsaicin, Gelcair, Morphine
Growth factors	<ul style="list-style-type: none"> • G-CSF, GM-CSF, TGF-B-3, EGF
Other agents	<ul style="list-style-type: none"> • Palifermin, Glutamine*, Benzydamine (Difflam)
Systemic analgesia	<ul style="list-style-type: none"> • Codeine, Morphine, Diamorphine, Patient Controlled Analgesia
Nutritional support	<ul style="list-style-type: none"> • Supplementary foods, Naso- gastric (NG), Percutaneous gastrostomy (PEG), naso-jejunum tubes (NJ) Total parental nutrition (TPN)

Activity 5: (allow 60 minutes)

Task 1: Consider the following clinical scenario:

Abdul is a twenty seven year old man with acute myeloid leukaemia and eight days ago he received a stem cell transplant from an unrelated donor. He is currently neutropaenic and is on intravenous antibiotics. He tells you that he finds it hard to swallow and no longer feels like eating or drinking anything, he even finds it difficult to communicate. What oral care and treatments will Abdul require?

Allow 30 minutes

Task 2: Consider the following clinical scenario:

Mary is a sixty six year old lady with Non Small Cell Lung Cancer who is in the terminal stages of her disease. Mary is no longer able to eat or drink and requires full nursing care. What oral care would you give to Mary at this stage in her illness? Develop a care plan considering the following - the equipment you will need, the choice of treatment agents, the frequency of care. How can you encourage your team to continue with your treatment plan?

Allow 30 minutes

Resources required to complete this activity

Useful websites

ICE – Improving the Chemotherapy Experience: nursing impact before, during and after chemotherapy

<http://www.cancerworld.org/cancerworldadmin/getStaticModFile.aspx?id=1975>

Multinational Association of Supportive Care in Cancer

<http://www.mascc.org/>

Background reading

Cheng KK, Molassiotis A, Chang AM, Wai WC & Cheung SS. (2001) Evaluation of an oral care protocol intervention in the prevention of chemotherapy-induced oral mucositis in paediatric cancer patients. *European Journal of Cancer*. 37(16): 2056-2063.

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Eilers J. (2004) Nursing Interventions and Supportive Care for the Prevention and treatment of Oral Mucositis Associated with Cancer Treatment. *Oncology Nursing Forum* 15 (3) 13-23.

Keefe DM, Schubert MM, Elting LS, Sonis ST, Epstein JB, Raber-Durlacher JE, Migliorati CA, McGuire DB, Hutchins RD & Peterson DE (2007) Updated Clinical Practice Guidelines for the Prevention and Treatment of Mucositis. *Cancer*. 109(5): 820-831.

Quinn B. (2008) Personal Hygiene: Oral Care. In. Dougherty, L. & Lister, S. *The Royal Marsden Hospital Manual of Clinical Nursing Procedures*. 7th Edn. Wiley Blackwell. Oxford. 647-659.

Quinn B, Potting C, Stone R, Blijlevens N, Fliedner M, Margulies A & Sharp L. (2008) Guidelines for the assessment of oral mucositis in adult chemotherapy, radiotherapy and haematopoietic stem cell transplant patients. *European Journal of Cancer*. 44(1): 61-72.

White R (2004) *Trends in Oral Health*. Care Quay books, Wiltshire.

Discussion Board

The discussion board is a forum in which you can exchange ideas with other participants. This activity relates to the work you will have completed in earlier tasks and provides an opportunity for you to explore the difference in perspectives between the participants.

Discussion Board

When will it take place

For a 3 month period from date of publication of this article.

Which discussion thread

Assessing mouth care and responding with appropriate care and treatment in cancer care: What are the challenges we face?

What is expected of you as a participant

In particular consider the following:

- What is the impact that disease and treatments can have on oral health?
- What is the pathophysiology of oral damage caused by disease and particularly cytotoxic treatments?
- What skills are required to recognise and assess oral damage?
- What are the different oral assessment tools?
- What constitutes good oral care?

Summary of this module

Caring for the mouth is an important aspect of cancer care that may be overlooked until problems arise leading to distress, discomfort and in some cases, serious clinical consequences.

- Oral care is an important aspect of cancer care
- Oral damage secondary to disease and treatment can be serious and distressing
- Team working will enhance management of this complication
- Nurses may take the lead but collaboration is essential
- An accurate assessment guides diagnosis and directs care and treatment
- Clear guidelines exist that can support assessment and care
- Many treatment options are available but they must be applied critically to the particular clinical scenario.

On completion of this module you will have had the opportunity to:

- Critically explore the impact that disease and treatments can have on oral health
- Increase your understanding the pathophysiology of oral damage cytotoxic treatments
- Develop skills in recognising the signs and symptoms of oral damage
- Critically choose an appropriate oral assessment tool for your clinical setting
- Identify and plan oral care strategies
- Critically explore and choose suitable treatment options for oral complications
- Raise the awareness of the importance of oral care in your clinical setting

Barry Quinn

Senior Nurse for Oncology
St George's Hospital
Blackshaw Road
London SW17 0QT
UK

email: barry.quinn@stgeorges.nhs.uk