<table>
<thead>
<tr>
<th>Reference (include title, author, journal title, year of publication, volume and issue, pages)</th>
<th>Evidence level (I-VII)</th>
<th>Key findings, outcomes or recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Academy of Pediatric Dentistry. (2013) Guideline on Dental Management of Pediatric Patients Receiving Chemotherapy, Hematopoietic Cell Transplantation, and/or Radiation. <em>Pediatric Dentistry</em>, 35(5), 185-193</td>
<td>VII</td>
<td>-the most frequent source of sepsis in the immunosuppressed cancer patient is the mouth; dentist plays key role in providing early individualized dental intervention and oral hygiene measures -key to success for a healthy oral cavity is patient compliance -paediatric recommendations provided on; -dental/oral care before initiation of cancer therapy -dental/oral care during immunosuppression periods -dental/oral care after cancer therapy is completed -specific considerations for HSCT patients</td>
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<tr>
<td>Author(s)</td>
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<td>Alvariño-Martín, C. &amp; Sarrión-Pérez, M-G.</td>
<td>2014</td>
<td>Prevention and treatment of oral mucositis in patients receiving chemotherapy.</td>
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<tr>
<td>Birmingham, M., Berryman, J., De Graves, S., Ladd, A. &amp; Windrum, H.A.</td>
<td>2010</td>
<td>Nursing Documentation Compliance to Oral Assessment Guidelines and Corresponding Nursing Interventions.</td>
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2017 Nursing Clinical Effectiveness Committee  
Co-Chairs: Fiona Newall & Sharon Kinney  
Contact: Nursing.Research@rch.org.au

- Findings suggest that chlorhexidine together with oral care may be helpful in alleviating mucositis when given prophylactically to children on chemotherapy.
- Findings indicated the use of chlorhexidine significantly reduced the severity of mucositis compared with benzydamine.
- Chlorhexidine may assist in reducing oral mucosal damage during chemotherapy, possibly through plaque control and a reduction in the oral microflora.


- Small study (14 children) supports the use of oral care protocols.
- Indicated the use of an oral care protocol alleviated the pain intensity associated with oral mucositis.


(New search for studies and content updated (no change to conclusions), published in Issue 1, 2010)

- 28 randomised controlled trials included in the review.
- Strong evidence that drugs absorbed or partially absorbed from the GI tract prevent oral candidiasis in patients receiving cancer treatment.
- Evidence that drugs absorbed or partially absorbed from the GI tract are significantly better at preventing oral candidiasis than drugs not absorbed from the GI tract.


(Edited (no change to conclusions), comment added to review, published in Issue 10, 2010)

- 32 randomised controlled trials included in the review.
- Limited evidence from 2 small trials that low level laser treatment reduces the severity of mucositis.
- Morphine can effectively control pain, less opiate used per hour for PCA versus continuous infusion.
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<th>Reference</th>
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<th>Page numbers</th>
<th>Notes</th>
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<tr>
<td>Dodd, M.J., Dibble, S.L., Miaskowski, C., MacPhail, L., Greenspan, D., Paul, S.M., Shiba, G. &amp; Larson, P. (2000)</td>
<td>Randomized clinical trial of the effectiveness of 3 commonly used mouthwashes to treat chemotherapy-induced mucositis. <em>Oral Surgery Oral Medicine Oral Pathology</em>, 90(1), 39-47</td>
<td></td>
<td>-the effectiveness of 3 mouthwashes to treat chemotherapy-induced mucositis was comparable; salt and soda, chlorhexidine, and “magic” mouthwash (lidocaine, Benadryl and Maalox) -as comparable results were obtained, authors suggest to use salt and soda as is the least costly mouthwash -non significant differences for pain ratings among the mouthwashes was observed</td>
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<td>-position paper by the Oral Care Study Group, Multinational Association of Supportive Care in Cancer/International Society for Oral Oncology (MASCC/ISOO) and the European Society for Blood and Marrow Transplantation (EBMT)</td>
<td>-outlines a multidisciplinary approach for oral and dental care for haematology-oncology and HSCT patients before, during and after chemotherapy and HSCT</td>
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<td>-five key areas discussed; prevention of infection, pain control, maintain oral function, managing oral complications of the underlying cancer or anti-cancer treatment, and quality of life</td>
<td>-mechanical toothbrushing with fluoride toothpaste for removal of plaque recommended</td>
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<td>-chlorhexidine rinse may be used for an antimicrobial effect but should not substitute mechanical cleaning</td>
<td>-select suitable pain scale for children to describe pain</td>
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<td>-avoid local anaesthetics in children due to adverse effects</td>
<td>-children should be referred for an initial consult with a paediatric dentist integrated within the cancer team, and then monitored during and after treatment for ongoing dental effects</td>
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<td>-role for prophylactic doses of antifungal and antiviral agents for at risk patients</td>
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- ‘best practice’ recommendations developed for appropriate dental care and basic oral hygiene
- oral complications occurring during and following cancer treatment are common and can cause pain, difficulty in swallowing and phonation, and poor nutrition, impacting on the patient’s quality of life
- a multidisciplinary team approach to oral hygiene should occur, with the dentist identified as key member
- parents and children should be given oral hygiene advice prior to commencing cancer treatment, and should be informed of the possible long-term dental effects from treatment for childhood cancer
- daily oral hygiene includes tooth brushing at least twice a day with a fluoride toothpaste appropriate for the age of the child
- the Oral Assessment Guide (OAG) by Eilers et al was identified as being a valid, reliable and clinically useful tool for assessing oral status in children and young people
- nursing staff are best placed for the regular assessment of the child’s oral status
- an appropriate pain assessment tool should be used to ensure adequate pain control
- no interventions have demonstrated a clear benefit for the prevention of oral mucositis in children receiving cancer treatment, however several have been shown to be potentially beneficial in adults
- antifungal prophylaxis is not recommended for most patients; when choosing an antifungal agent, one that is absorbed from the GI tract is recommended
- absorbed or partially absorbed antifungal agents could be used for the treatment of visible oral candidiasis
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<th>Reference</th>
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<tr>
<td>Hallett, K. (2015) A randomized clinical controlled trial to determine the variation in response of oral mucosa to low level red light therapy in children with cancer and undergoing bone marrow transplantation. 1-21 (Unpublished paper, Final Draft, Paediatric Dentist, Director – Department of Dentistry)</td>
<td>-randomized controlled pilot study (15 paediatric patients) to determine the response of oral mucosa treated with low level red light therapy (LLRLT) in children with cancer and undergoing bone marrow transplant (BMT) who were likely to develop oral mucositis (OM) -LLRLT demonstrated clinical efficacy by reducing prevalence and severity of OM in BMT patient -benefit of LLRLT for children with cancer undergoing chemotherapy was unclear (further clinical trials required) -adjunctive LLRLT may provide analgesia and assist healing</td>
</tr>
<tr>
<td>He, M., Zhang, B., Shen, N., Wu, N. &amp; Sun, J. (2018) A systematic review and meta-analysis of the effect of low-level laser therapy (LLLT) on chemotherapy-induced oral mucositis in pediatric and young patients. <em>European Journal of Pediatrics, 177, 7-17</em></td>
<td>- 8 clinical trials identified (373 paediatric patients) comparing LLLT to routine prevention or treatment during or after chemotherapy -prophylactic LLLT reduces mucositis and severe mucositis and decreases the average severity of oral mucositis in pediatric and young patients with cancer -therapeutic LLLT also reduces the average severity of oral mucositis and oral pain -further research needed to identify optimal parameters (dosage and frequency) of LLLT in pediatric and young patients</td>
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- saliva stimulants, artificial saliva, chewing sugar free gum or frequent sips of water for the relief of dry mouth should be considered
- aciclovir is only recommended as a preventative therapy for herpes simplex in HSCT patients
- aciclovir is effective for the treatment of herpes simplex in patients receiving chemotherapy and/or radiotherapy
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<th>IV</th>
<th>-the addition of ketamine to a morphine NCA/PCA improves analgesic efficacy in children with mucositis pain with no increase in the incidence of side effects</th>
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| VII | -review and update of previous clinical guidelines, outlining oral management prior to, during and following cancer therapy with the aim to prevent or minimize oral complications in this patient group Recommendations include:  
- oncology patients should receive a comprehensive pretreatment oral assessment by a dentist, and should be continually monitored during the acute phase of cancer therapy and following completion of therapy  
-a multidisciplinary team is involved including dentistry, dietetics and nursing staff  
-oral hygiene advice includes tooth brushing at least twice a day with a fluoride toothpaste appropriate for the age of the child  
-oral hygiene practices are supplemented with an alcohol free chlorhexidine mouthwash or gel if gingival disease is diagnosed  
-use of aciclovir as a prophylactic agent in bone marrow transplant patients at high risk of viral infections  
-use of antifungal medication following detection of oral candida  
-dental treatment is avoided wherever possible during therapy  
-outline of management of orthodontic devices, dental treatment and osteoradionecrosis |


https://www.rcseng.ac.uk/dental-faculties/fds/publications-guidelines/clinical-guidelines/
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- Review and update of previous guidelines produced by the Multinational Association of Supportive Care in Cancer & the International Society for Oral Oncology (MASCC/ISOO) using literature review; recommendations provided for gastrointestinal and oral mucositis
- An oral care protocol outlining brushing, flossing, & mouth rinses to maintain oral hygiene suggested as useful in the prevention of oral mucositis
- Unable to provide a clear guideline for the use of an oral care protocol in treatment of oral mucositis due to conflicting or inadequate evidence

Recommendations included:
- Palifermin recommended for the prevention of oral mucositis in patient receiving high dose chemotherapy and TBI followed by autologous HSCT
- Oral cryotherapy useful to prevent oral mucositis in patients receiving bolus doses of 5-FU, or high dose melphalan in the HSCT setting
- LLLT recommended to prevent oral mucositis in HSCT patients conditioned with high dose chemotherapy
- No guideline possible regarding the use of saline, sodium bicarbonate, chlorhexidine & other medications to treat oral mucositis due to inadequate evidence

- 74 randomised controlled trials included in the review
- Fluoride toothpastes are efficacious in preventing dental caries
- The effect of fluoride toothpaste increased with higher baseline levels of decay, missing and filled permanent teeth (D(M)FS), higher fluoride concentration, higher frequency of use and supervised brushing, but was not influenced by exposure to water fluoridation
- No conclusion regarding the use of fluoride toothpaste contributing to the risk of mottled teeth (fluorosis)
### Systematic review of basic oral care for the management of oral mucositis in cancer patients


- Review and update of previous guidelines conducted by the Basic Oral Care Section of the Multinational Association of Supportive Care in Cancer & the International Society for Oral Oncology (MASCC/ISOO) using systematic review;
- Recommends the use of oral care protocols in the prevention of oral mucositis in all age groups and across all cancer treatment modalities;
- No guideline possible due to insufficient and/or conflicting evidence for the following:
  - The use of oral care protocols in the treatment of oral mucositis in any population
  - The use of dental care in the prevention or treatment of oral mucositis in any population, (however suggest professional dental care should be considered a foundation of care for patients receiving cancer therapy)
  - The use of normal saline, sodium bicarbonate, chlorhexidine mouthwash, mixed medication or “magic” mouthwash, calcium phosphate mouthwash
- Acknowledges;
  - Normal saline is a harmless bland rinse helpful for oral hygiene and patient comfort
  - Sodium bicarbonate is a harmless bland rinse helpful for oral hygiene and patient comfort (may be unpleasant and distasteful for children)
  - Chlorhexidine useful for treatment of gingivitis and plaque control
  - Limitations with mixed medication mouthwashes include short lived pain relief, suppression of gag reflex with overuse of lidocaine, tooth decay with high sugar content of some mouthwashes & potential for contamination of product in storage
- Use of chlorhexidine for prevention of oral mucositis is not recommended for head and neck patients receiving radiotherapy
<table>
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<tr>
<th>Reference</th>
<th>Summary</th>
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<tr>
<td>Nashwan, A.J. (2011) Use of Chlorhexidine Mouthwash in Children Receiving Chemotherapy: A Review of Literature. <em>Journal of Pediatric Oncology Nursing</em>, 28(5), 295-299</td>
<td>-the use of oral assessment tools, oral hygiene care, dental consultations, patient teaching and nursing intervention can reduce the incidence of oral mucositis -majority of studies support the use of chlorhexidine mouthwash in reducing oral mucosal damage during chemotherapy in the paediatric oncology population, through plaque control and reduction in oral microflora</td>
</tr>
<tr>
<td>Potting, C.M.J., Uitterhoeve, R., Scholte Op Reimer, W. &amp; Van Achterberg, T. (2006) The effectiveness of commonly used mouthwashes for the prevention of chemotherapy-induced oral mucositis: a systematic review. <em>European Journal of Cancer Care</em>, 15, 431-439</td>
<td>-the use of chlorhexidine as well as other mouthwash for preventing oral mucositis in patients undergoing chemotherapy is not recommended -one study indicated although there was no difference in mucositis between four different mouthwash regimens, bacterial and fungal oral infections were found less often among the patients using chlorhexidine</td>
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| -14 randomised controlled trials included in the review  
- evidence that oral cryotherapy can lead to large reductions in oral mucositis in all severities in adults receiving 5FU for solid cancers  
- evidence suggests that oral cryotherapy reduces oral mucositis in adults receiving high-dose melphalan before HSCT however less certain about the size of reduction  
- no conclusive evidence on the effects of oral cryotherapy in children undergoing cancer treatment (only one paediatric study) |
| -35 randomised controlled trials included in the review  
- evidence that keratinocyte growth factor (KGF) is beneficial in the prevention of oral mucositis in adults receiving  
  a) radiotherapy to head and neck with cisplatin and fluorouracil  
  b) chemotherapy alone for mixed solid and haematological cancers  
- KGF may be beneficial in reducing the risk of moderate/severe mucositis in adults in the HSCT setting, dependent on multiple factors such as use of TBI, allogenic/autologous HSCT  
- KGF relatively safe intervention  
- no conclusive evidence about the use of cytokines and growth factors in children undergoing cancer treatment (insufficient evidence), may be beneficial but consideration should be given to factors such as cost, lack of data on adverse effects  
- due to limited research, review uncertain of any beneficial effects of other cytokines and growth factors |
-suggest cryotherapy may be offered to cooperative children receiving chemotherapy or HSCT conditioning with regimens associated with a high rate of mucositis (regimens appropriate for cryotherapy are restricted to agents with a short infusion time and short half-life)
-suggest low-level light therapy may be offered to cooperative children receiving chemotherapy or HSCT conditioning with regimens associated with a high rate of mucositis
-suggest keratinocyte growth factor (KGF) may be offered to children receiving HSCT conditioning with regimens associated with a high rate of mucositis (considerations prior to implementation; lack of efficacy and toxicity data in children, lack of long term follow up data in children, risk of adverse effects from mucosal thickening)

-discusses complications which occur during intensive inpatient phase and management which may reduce or prevent oral complications
-discusses an Australian clinical trial that indicated systemic antifungal agents clearly more effective than topical antifungal agents in preventing candidosis; topical antifungal agents were also poorly tolerated
-evidence based recommendations for use of products that support oral health in the oncology patient
-10 interventions; aloe vera, amifostine, cryotherapy, granulocyte-colony stimulating factor (G-CSF), intravenous glutamine, honey, keratinocyte growth factor, laser, polymixin/tobramycin/amphotericin (PTA) antibiotic pastille/paste and sucralfate, showed some statistically significance evidence of benefit (albeit sometimes weak) at preventing or reducing the severity of mucositis associated with cancer treatment
-cryotherapy and keratinocyte growth factor showed some benefit in preventing mucositis
-sucralfate effective in reducing the severity of mucositis
-strength of the evidence was variable, benefits may be specific for certain cancer types and treatments |
-drugs absorbed from the gastrointestinal (GI) were beneficial in eradication of oral candidiasis compared with drugs not absorbed from the GI tract
-insufficient evidence to support or refute a benefit of any antifungal agent in treating candidiasis, further trials needed
-clinicians need to make a decision on whether to prevent or treat oral candidiasis in patients receiving cancer treatment |

| II | - review and update of previous guidelines conducted by the Mucositis Study Group of the Multinational Association of Supportive Care in Cancer & the International Society for Oral Oncology- (MASCC/ISO) using systematic review; - suggest zinc supplements administered orally may be of benefit in the prevention of oral mucositis in oral cancer patients receiving radiation therapy or chemoradiation -no guideline possible due to insufficient and/or conflicting evidence for the following natural agents; vitamin A, vitamin E, oral glutamine, honey, aloe vera gel, chamomile mouthwash, indigo wood root, manuka and kanuka oils and chinese herbal drug mouthwashes -use of intravenous glutamine is not recommended for the prevention of oral mucositis in patients receiving high-dose chemotherapy prior to hematopoietic stem cell transplant |