

# CLINICAL GUIDELINES

## THE ORAL MANAGEMENT OF ONCOLOGY PATIENTS REQUIRING RADIOTHERAPY : CHEMOTHERAPY : BONE MARROW TRANSPLANTATION

### INTRODUCTION

In the United Kingdom there are approximately 1,200 new cases of childhood cancer<sup>1</sup> and almost a quarter of a million new cases of cancer in adults each year.<sup>2</sup> The oral cavity is a site where complications frequently develop either as a direct result of the malignancy or as an unwanted effect of the treatment. Up to 90% of paediatric oncology patients may suffer oral complications with implications both for longevity and quality of life during and after therapy.<sup>3</sup>

Adults with malignant disease, particularly of the head and neck, are more likely to be from deprived socio economic backgrounds, to smoke and to consume greater than average amounts of alcohol.<sup>4</sup> They are unlikely to avail themselves of health services except in an emergency<sup>5</sup>. In common with the general population they will increasingly keep their natural teeth to a greater age but they are likely to have more untreated dental disease.<sup>6,7</sup>

Child cancer patients largely reflect the child population in general since they represent a cross section of the population. They may have untreated dental caries<sup>8</sup> and, since many are under five years of age, a significant proportion may not have previously had a dental examination.

The outlook, following treatment for malignant disease, has significantly improved in the last three decades. In the future, therefore, dentists are increasingly likely to find that they have children in their care who have been treated for malignant disease and dentate adults who may present before or after cancer treatment requiring urgent dental care. Appropriate preventive regimens and timely oral care can minimise complications and improve quality of life.<sup>9,10</sup>

The Calman report on cancer care emphasised the need to focus treatment and management regimens on both longevity and quality of life.<sup>11</sup> The patient's oral care and function is an important contributor to post treatment social adaption and life quality.<sup>12</sup>

## **AIM OF THE GUIDELINE**

To improve the quality of life for patients with malignant disease, who are receiving cancer therapy that has implications for oral comfort and function, by promoting consistent high standards of oral care through a co-ordinated team approach.

## **MANAGEMENT**

### TARGET GROUP - PATIENTS WHO HAVE MALIGNANT DISEASE FOR WHOM MANAGEMENT HAS IMPLICATIONS FOR ORAL CARE (TABLE 1)

#### **1) Pathways of Care**

A clear pathway of care is necessary to prevent or minimise oral complications.

##### *1.1 Pre-treatment Assessment*

It is recommended that:

1.1.1 Every relevant oncology protocol (Table 1) includes an early pre-treatment oral assessment.

1.1.2 A permanent member of the oncology team is responsible for arranging the oral assessment.

1.1.3 A designated permanent member of dental staff is responsible for organising oral care.

##### **1.2 The Acute Phase of Cancer Therapy**

It is recommended that:

1.2.1 The Oncology Team must include a dental hygienist responsible for the patients' oral care.

1.2.2 The dental hygienist is responsible to the designated member of dental staff.

1.2.3 The designated member of dental staff is responsible for arranging or carrying out any active dental treatment required.

1.2.4 There are specific written nursing guidelines for routine oral care (Appendix 1).

### *1.3 Discharge following the Acute Phase of Therapy*

It is recommended that:

- 1.3.1 The oncology discharge protocol includes a procedure for ensuring continuing oral care.
- 1.3.2 The designated member of dental staff is responsible for organising and monitoring appropriate continuing oral care.
- 1.3.3 Following the receipt of a bone marrow transplant and discharge home, children are reviewed to continually monitor the oral condition.
- 1.3.4 There is an agreed patient-specific minimum period of oral health monitoring post-treatment.
- 1.3.5 Children are monitored during their period of growth and development.

## **2) Preventive and Clinical Regimen**

The oral cavity is a site where complications frequently develop either as the direct result of the malignancy or as an unwanted effect of treatment.<sup>13-16</sup> The acute and chronic changes that result in such complications have been summarised<sup>17,18</sup>, (Tables 2 and 3). The severity of these complications can be influenced and their impact ameliorated.<sup>19</sup> The management is outlined below and detailed in the Explanatory Notes by paragraph number. The guidelines apply to children and adults receiving radiotherapy, chemotherapy, combinations of both or in combination with surgery, unless otherwise stated. The recommendations must be seen as a contribution to total patient care and as such should always be implemented in conjunction with the care priorities agreed with the oncology team.

### *2.1 Prior to Cancer Therapy - at initial diagnosis*

It is recommended that:

- 2.1.1 Oral care information is provided as an integral component of the general care philosophy.<sup>20</sup>
- 2.1.2 Realistic simple preventive advice is given emphasising its value in maintaining oral comfort during therapy.

### *2.2 Prior to Cancer Therapy - oral/dental care*

It is recommended that:

- 2.2.1 A comprehensive oral assessment is undertaken.<sup>16,21</sup>
- 2.2.2 Detailed oral hygiene instruction with reinforcement and elaboration of diet advice is provided in cooperation with the dietician.<sup>16</sup>
- 2.2.3 Oral hygiene practices are supplemented with the use of a

chlorhexidine mouthwash or dental gel , if there is gingival disease diagnosed.<sup>22</sup>

2.2.4 Impressions of the mouth are taken for study casts to construct applicator trays and where appropriate for obturator planning.

2.2.5 Carious teeth that can be restored are stabilised with appropriate restorations.

2.2.6 All sharp teeth and restorations, are suitably adjusted and polished.

2.2.7 The patient is counselled about denture wear during therapy.

2.2.8 Wherever possible, teeth with a dubious prognosis are removed no less than ten days prior to therapy<sup>23</sup>

2.2.9 Orthodontic treatment is discontinued.<sup>24</sup>

### *2.3 During Cancer Therapy*

It is recommended that:

2.3.1 The patient receives appropriate support from a dental hygienist.

2.3.2 A high standard of oral hygiene is encouraged (to include denture hygiene).

2.3.3 The use of a chlorhexidine mouthwash, or dental gel, is continued.

2.3.4. Those patients receiving radiotherapy, or total body irradiation prior to bone marrow transplantation, receive a daily fluoride mouthwash to prevent dental caries and promote enamel remineralisation.<sup>25,26</sup>

2.3.5 Children and adults receiving bone marrow transplants often receive Acyclovir as a prophylaxis if there is a high risk of viral infections. This is usually prescribed by the oncology team.<sup>27-29</sup>

2.3.6 Antifungal medication is used following detection of oral candida. For children this should be used routinely as a prophylaxis.

2.3.7 Every effort should be made to reduce the severity of the mucositis.

2.3.8 Every effort is made to reduce the effect of the xerostomia.

2.3.9 Patients are advised that removable prostheses may be left out of the mouth if there is any evidence of ulceration. They should be examined by a member of the dental team.

2.3.10 When the mouth is too painful for cleaning, the tissues are swabbed with oral sponges.

2.3.11 Certain food, drinks and mouthwashes , which irritate the oral mucosa should be avoided to maintain oral comfort.

2.3.12 Dental treatment is avoided wherever possible during therapy.

#### *2.4 Following Cancer Therapy - Prevention and Monitoring*

It is recommended that:

- 2.4.1 Growth and development should be closely monitored for children.
- 2.4.2 There is a three months oral hygiene review for as long as the xerostomia continues.
- 2.4.3 Regular and appropriate oral healthcare monitoring is provided by the designated member of dental staff.
- 2.4.4 Strategies for dealing with xerostomia continue.
- 2.4.5 A remineralising solution, such as a fluoride mouthwash continues to be used regularly with confirmation of compliance. (See Explanatory Notes Paragraph 2.3.4.)
- 2.4.6 Chlorhexidine gel is applied with applicators every three months.
- 2.4.7 In the event of trismus, jaw exercises are implemented.

#### *2.5 Following Cancer Therapy - Restorative Dental Care*

It is recommended that:

- 2.5.1 In the event of uncontrolled periodontal disease, vigorous treatment is initiated. This may involve identification of atypical pathogens.
- 2.5.2 Herpes labialis can be a chronic problem. Topical Acyclovir is effective.
- 2.5.3 Restorations are kept simple ensuring acceptable aesthetics and function.
- 2.5.4 Dental extractions, if essential, must be performed with appropriate precautions.
- 2.5.5 Dentures should be avoided wherever possible.
- 2.5.6 Implant stabilisation of prostheses and obturators may be feasible in some patients.

#### *2.6 Following Cancer Therapy - Requirements for Denture Wearers*

It is recommended that:

- 2.6.1 Removable prostheses are left out at night.
- 2.6.2 Glandosane saliva substitute should be used for edentate patients only.
- 2.6.3 Antifungals are used if a candidal infection is diagnosed.
- 2.6.4 Appliance wear is discontinued if the mouth becomes painful. Advice must be sought.
- 2.6.5 Obturators are reviewed regularly. They may require frequent attention with adjustment or remake.

## *2.7 The Management of Osteoradionecrosis*

It is recommended that:

2.7.1 Oral trauma is minimised.

2.7.2 A high standard of oral cleansing is established.

2.7.3 Topical local anaesthetic gel is applied to denuded bone to improve comfort.

2.7.4 High dose systemic antibiotics are prescribed.

2.7.5 In severe cases the use of hyperbaric oxygen therapy may be necessary.

2.7.6 Recent evidence suggests that ultra sound may be helpful.

2.7.7 Surgical excision of necrosed bone with primary closure may become necessary.

## EXPLANATORY NOTES

These explanatory notes refer to the paragraph numbers indicated in the Pathways of Care and the Preventive and Clinical Regimen (vide supra).

### 1) **Pathways of Care**

#### 1.1 *Pre-Treatment Assessment*

1.1.3 The time period between diagnosis of cancer and commencement of treatment is usually short. Time must be made available during the pretreatment phase for a dental assessment and necessary emergency care, especially when radiotherapy is planned. The member of dental staff responsible for organising oral care will need to ensure that dental treatment is provided rapidly, taking into consideration the patient's existing continuing care arrangements. For children, early involvement of a paediatric dentist is always necessary. Adults will require input from a specialist in restorative dentistry particularly when post treatment reconstruction may be necessary. 78% of patients experience severe difficulties in mastication following major head and neck surgery with implications for normal social adaptation<sup>12</sup>. The difficulties can be improved by carefully planned oral and dental reconstruction<sup>30</sup>. Depending on the specialty availability and the urgency, treatment may be provided either within the hospital service, the community dental service or the general dental service. Where there is any doubt about rapid efficient treatment, or the patient's general health status dictates, dental care should be undertaken within the specialist centre.

#### 1.2 *The Acute Phase of Cancer Therapy*

1.2.1 Oral care must be seen as an integral part of patient care. A dental hygienist should be responsible for the patient's oral care during therapy.<sup>31</sup> However, dental hygienists may be difficult to recruit. In such circumstances an appropriately trained member of nursing staff can undertake this role.<sup>32</sup>

1.2.4 It is particularly important for specific nursing guidelines to be available for oral care in the period leading up to and following bone marrow transplantation (Appendix 1).

#### 1.3 *Discharge following the Acute Phase of Therapy*

1.3.4 In the absence of recurrent disease oral health monitoring should at least be equivalent to the period of monitoring by the Oncology team. Oral

examination should be at least biannual. Patients with unstable oral health will require more frequent monitoring. In circumstances of stable oral health, monitoring should be agreed with the primary care dentist with an appropriate procedure for urgent re-referral.

1.3.5 Children who have received bone marrow transplants should have a strict follow-up for preventive oral care at four months intervals.

## **2) Preventive and Clinical Regimen**

### *2.1 Prior to Cancer Therapy - at Initial Diagnosis*

When presented with a diagnosis of cancer a patient will be unlikely to consider the oral implications as a high priority. However, it is important that patients and carers are counselled about oral care procedures, diet and the oral implications of the proposed treatment.<sup>32</sup> It is recommended that diet advice is given in liaison with the dietician and presented with the emphasis upon ensuring oral comfort during therapy. Information at this stage must be supported by an appropriately designed information leaflet.

### *2.2 Prior to Cancer Therapy - Oral/Dental Care*

2.2.1 The oral assessment must include a radiographic survey for both dentate and edentate patients. There should be a careful assessment of any prosthesis worn.

2.2.2 Preventive care introduced at the initial diagnosis should be expanded both for the patient and where appropriate the parent or carer. The advice needs to be set within the overall framework of care set by the oncologist and their support staff. Since many children and some adults need a frequent high calorific intake during therapy, this usually translates into an increased and frequent intake of refined carbohydrate (sugar) which, if sustained, can lead to dental caries.

2.2.3 The use of an aqueous chlorhexidine mouthwash or dental gel will contribute to the treatment of gingival disease in combination with improved oral hygiene practices. There is some evidence to suggest that it also reduces the incidence of oral complications.<sup>22</sup> Use either a mouthwash or dental gel twice daily for at least one week prior to commencing treatment.

The following are appropriate:

- i 10ml of 0.2% aqueous chlorhexidine gluconate or dental gel (Corsodyl: SmithKline Beecham)
- ii 18ml of 0.12% aqueous chlorhexidine gluconate solution (Peridex: Proctor and Gamble).

In children chlorhexidine is rarely used unless toothbrushing cannot be performed. There is often poor compliance because of the taste.

2.2.4 When maxillary surgery is to be combined with radiotherapy, study casts should be used for obturator planning in liaison with the surgical team. If multiple casts are required applicator trays can always be made on duplicate casts to avoid repeated impressions. The applicator trays are used for fluoride or chlorhexidine gel delivery later in the management process.

2.2.5 Where time permits it is preferable to restore teeth with a permanent restorative material. When time is limited glass ionomer cements make an effective provisional restoration.

2.2.6 Sharp teeth or restorations can be particularly uncomfortable during the period of mucositis. They can contribute to soft tissue damage and ulceration. They should be appropriately adjusted.

2.2.7 Dentures or obturators are uncomfortable during the period of mucositis. The patient may wish not to wear dentures during this time. Those who discontinue the use of their dentures often experience problems with denture stability when they return to them, probably as a result of adaptation loss. They should be counselled in advance so that they can make an informed choice and relatives can be prepared for any change in appearance. Obturators must be worn since wound contraction can occur within hours of removal. They must be examined by a member of the dental team if painful.

2.2.8 Patients are particularly at risk of osteoradionecrosis when tooth extractions are undertaken both immediately before and after therapy.

- i) The implications of any dental extractions subsequent to radiotherapy must be sensitively explained to the patient.
- ii) Extractions should preferably be undertaken up to 3 weeks prior to commencement of treatment. Ten days should be considered a minimum period.<sup>23</sup>
- iii) Patients about to undergo bone marrow transplantation should have any appropriate teeth removed at the time of the bone marrow harvest.

- iv) Children should have all primary teeth within three months of exfoliation and those with any risk of pulpal involvement removed.<sup>16</sup>
- v) Permanent teeth with a doubtful prognosis should be removed. It should be borne in mind that permanent teeth with non symptomatic periapical lesions are rarely exacerbated by cancer therapy<sup>33</sup>. Judgement needs to be made on overall prognosis
- vi) All teeth in direct association with an intra oral tumour should be removed.
- vii) Teeth should be removed with a minimum of trauma and if possible primary closure achieved.

2.2.9 Children undergoing orthodontic therapy should have their orthodontic appliance removed and treatment discontinued until 1 year after completion of cancer therapy<sup>24</sup>.

### 2.3 *During Cancer Therapy*

2.3.1 The period of mucositis is extremely unpleasant. The patient should be constantly reassured during this acute phase about the limited period of this side effect of treatment.

2.3.2 Normal daily toothbrushing by the patient, carer or parent, should be undertaken regularly if necessary with a soft brush. If toothbrushing does have to be discontinued it should be resumed at the earliest opportunity.<sup>34</sup>

2.3.3 The chlorhexidine gluconate mouthwash should be continued in conjunction with and following toothbrushing. If brushing becomes too painful the chlorhexidine mouthwash should be used as an alternative. The mouthwash should be used three to four times daily<sup>16,35,36</sup>. The chlorhexidine helps with plaque control, although its value in reducing the symptoms of mucositis is less clear<sup>37,38</sup>.

2.3.4 The importance of preventing dental caries cannot be over-emphasised. In areas where public water supplies are not fluoridated, Children should be given fluoride tablets or drops according to the appropriate dose for their age to ensure incorporation into the developing tooth structure. Fluoride in the form of mouth rinses for children over six years of age and adults may be used daily or weekly, in addition to their fluoride dentifrice, in order to encourage remineralisation and prevent dental caries (e.g. Fluorigard 0.05% Sodium Fluoride mouthwash - Colgate Palmolive). Younger children should receive a brush-on Stannous fluoride gel daily (e.g. Omnigel: CTS Dental

Supplies, Reigate, Surrey, U.K.)<sup>39-42</sup>. There is some in vitro evidence that fluoride enhances the adsorption of chlorhexidine to tooth enamel<sup>43</sup>.

2.3.6 Antifungals should be used following the detection of oral candida<sup>44-52</sup> with denture hygiene implemented when relevant. The alternatives are:

- i) Nystatin 100,000 units per ml sugarfree suspension, 5ml: 4 times daily.
- ii) Miconazole oral gel 25mg. per ml. 5ml: 4 times daily.
- iii) Fluconazole Suspension-50mg per 5mls: up to 4 times daily.

Ketaconazole or Itraconazole are also helpful as a systemic medication.

iv) Nystatin pastilles or lozenges may be used in children if xerostomia is not severe. Compliance is poor because of the unpleasant taste.

v) The use of Nystatin and chlorhexidine simultaneously should be avoided, there is some evidence to suggest that both drugs inhibit each others action. It is preferable to separate administration by one hour<sup>53</sup>

2.3.7 Relief from mucositis is unpredictable. Very few therapies have been tested in randomised prospective trials. Recent evidence would suggest the use of a non-absorbable antibiotic lozenge reduces the most severe symptoms of mucositis. The evidence does not yet appear to be sufficiently compelling to recommend this treatment as part of standard practice<sup>54</sup>. Symptomatic relief may be achieved by:

i) Difflam (benzydamine hydrochloride) is effective in alleviating mild to moderate mucositis for some patients. It should be used prior to meals<sup>55</sup>.

ii) A 2% Lignocaine solution mouthwash will help when mucositis is more severe.<sup>56,57</sup>

iii) Aspirin - Mucaine mouthwash (aluminium hydroxide + magnesium hydroxide + oxethazine) will help to combat dysphagia when used prior to meals. This should not be used for children under 12 years of age.<sup>58</sup>

iv) Prostaglandin (P.G.E.2 tablets 0.5mgs 4 times daily), can help alleviate mucositis. However it should not be used following bone marrow transplanted since it increases the risk of herpes infections.<sup>59,60</sup>

v) Allopurinol is particularly valuable for chemotherapy induced mucositis - particularly that induced by 5 Fluorouracil and provides some protection for methotrexate induced mucositis.<sup>61-63</sup>

vi) Oral cooling - there is some evidence that mucositis can be reduced by using ice chips for 5 minutes prior to 5 Fluorouracil administration and for a further 25 minutes following administration.<sup>64,65</sup>

vii) An aqueous chlorhexidine gluconate mouthwash can help to relieve the symptoms of mucositis.<sup>38</sup>

viii) Steroid lozenges should not be used since they encourage the development of Candidal infections.<sup>66</sup>

ix) Kamillozan.

Kamillozan rinse is prepared from the camomile plant, the combined constituents having anti-inflammatory effects in addition to promoting granulation and epithelialization.<sup>67</sup>

x) Sucralfate.

Sucralfate is composed of a non-absorbable aluminium salt of sucrose octasulphate, which adheres to the ulcer base to create a surface barrier. It has an additional cytoprotective effect, probably mediated by prostaglandin release<sup>68</sup>. Children have difficulty coping with this treatment.

2.3.8 Parotid function can be partially maintained by radiotherapy delivery that spares the contralateral gland<sup>69</sup>. The symptoms of Xerostomia can be helped by:

i) Frequent sips of cold water/milk or other sugarfree non acidic cool drinks<sup>70</sup>.

ii) Saliva substitutes :

Saliva Orthana ) Both contain fluoride and are  
Luborant ) appropriate saliva  
) substitutes for dentate  
) people<sup>71</sup>

\*Oral Balance saliva replacement gel (Lactoperoxidase)<sup>72</sup>

\*Oral Balance mouthwash<sup>72</sup>

Glandosane mouthwash<sup>71</sup> ) - for edentate patients  
Salivix Pastilles ) only. These are  
) acidic and  
) consequently will  
) rapidly erode natural  
) teeth and cause  
) tooth sensitivity.

\*For these materials to be effective Oral Balance dentifrice must be substituted for conventional toothpaste. The sodium lauryl succinate in toothpaste destroys the bulking agent within the Oral Balance saliva replacement gel.

Alternatively a hospital pharmacy can formulate a saliva substitute using methyl cellulose.

iii) Flavourless salad oil or dietary fat at night time lubricates the lips and tongue.<sup>73</sup>

iv) Sugarfree chewing gum stimulates saliva production (e.g Orbit).<sup>74</sup>

v) Salivary stimulants can cause unwanted side effects that are often more distressing than the xerostomia. The following have been used:

Pilocarpine - ophthalmic drops - 5 -10 mgs. 3 times daily.<sup>75-77</sup>

Anetholetrithione (Sialor - sulfarlem, latema) 1-2 tablets  
3 times daily.

Pilocarpine and Anetholetrithione can be combined.<sup>78.79</sup>

vi) Ripe bananas are a good lubricant; however, they should be avoided for dentate patients because of their high refined sugar content.

2.3.9 If dentures are left out during the period of mucositis they should be brushed with an unperfumed soap or toothpaste, soaked in a solution of sodium hypochlorite (Milton Solution : Dentural : Steradent for Metal Dentures) for 30 minutes and stored dry overnight.<sup>80</sup> If Candidal infection has been diagnosed, a Miconazole oral gel or varnish, should be applied to the fit surface prior to re-insertion. Miconazole must be avoided if the patient is on Warfarin medication.<sup>81</sup>

Obturator should not be discontinued. If painful, a clinical examination and adjustment is indicated.

2.3.10 When the mouth is too painful for cleaning and a mouthwash cannot be used the oral tissues should be swabbed with Polygon oral swabs (Rochaille Medical Limited, Cambridge, U.K) or a gauze soaked in chlorhexidine 3 to 4 times daily<sup>16</sup>. Polygon swabs are softer than cotton buds and cause less bleeding and pain when applied to the already inflamed mucosa.<sup>82</sup>

2.3.11 Avoidance of certain food, drinks and mouthwashes can help to prevent discomfort. The following should be avoided:

- i) Hard food.
- ii) Spicy food.
- iii) Strongly flavoured toothpaste.
- iv) Alcohol (spirits).
- v) Tobacco.
- vi) Fizzy drinks.
- vii) Sweets.
- viii) Acid drinks and fruit.
- ix) Hot (temperature) drinks.
- x) Many non prescription oral preparations are acidic, causing erosion and tooth sensitivity, or damaging to the mucosa - Listerine: Hydrogen Peroxide: Plax: Sodium Bicarbonate: Glycerin and Lemon swabs : Lemon/Raspberry Mousse.<sup>83-86</sup>
- xi) Glandosane mouthwash is very acidic (pH 5.1), and should not be used for dentate patients.<sup>71</sup>
- xii) Pineapple chunks and fruit flavoured ice cubes are also acidic and can contribute to tooth sensitivity in the dentate patient and can traumatise the mucosa.

2.3.12 Dental treatment should be avoided during the period of cancer therapy. If the patient has been inadequately prepared dental extractions may become unavoidable. Timing of extractions should be agreed with the Haematologists or the Oncology team. Pulp treatment of primary teeth during the course of chemotherapy is contra-indicated.<sup>16</sup>

#### *2.4 Following Cancer Therapy - Prevention and Monitoring*

The risk of uncontrolled dental disease following cancer treatment can continue for at least 12 months following radiotherapy or total body irradiation prior to bone marrow transplantation. Susceptibility to dental disease can be lifelong.

2.4.1 In children general growth and development including facial growth and dental development should be closely monitored.<sup>87</sup> Damage to developing teeth is a frequent complication following radiotherapy<sup>88</sup> or total body irradiation.<sup>89</sup> Chemotherapy on the other hand appears to have little permanent effect on oral health. There is some evidence to suggest that chemotherapy alone may result in an increased incidence of dental developmental disturbances.<sup>8</sup>

2.4.2 Following treatment, and as taste returns, there is an unpleasant period of altered taste. Many patients will seek comfort in sweet food and drink. Diet counselling needs to be rigorously reinforced at regular intervals particularly with regard to sugar and acid consumption. Plaque and gingival scores need to be carefully monitored by the dental hygienist.

Bone marrow transplant patients on Cyclosporin may need more frequent hygienist support to help maintain health in the presence of gingival hyperplasia.<sup>90</sup>

2.4.3 Regular oral healthcare monitoring should be undertaken by a designated member of dental staff in close liaison with the dental hygienist. Where continuing care is provided within the Community Dental Service or General Dental Service there should be liaison with the dentist responsible for that care.

2.4.5 The role of fluoride in the continuing prevention of dental caries is essential to the maintenance of oral health. Fluoride supplements should be used for children with developing teeth, topical application should continue and a fluoride dentifrice should be used ( Para.2.3.4 )

2.4.6 Chlorhexidine gel should continue to be applied every three months using an applicator. The gel should be placed in the applicator and seated in the mouth for five minutes each night over a two week period.<sup>9,91.</sup>

2.4.7 Despite better focused radiation dose and improved screening, progressive jaw stiffness and limitation of opening remains a common complication.<sup>92</sup> In the event of limitation a strict regimen of mouth exercises is advisable to minimise the problem. A simple wedge made by stacking and taping together tongue spatulas can be used by the patient both as a guide to improved opening and as a target for exercises at least 3-4 times daily.<sup>93</sup> Patients receiving treatment for a tumour of the masticatory muscles or temporo-mandibular joint should use exercises routinely post-treatment. Increasing trismus should be investigated for potential local recurrence.<sup>94</sup>

## 2.5 *Following Cancer Therapy - Restorative Care*

2.5.1 Uncontrolled periodontal disease can predispose to osteoradionecrosis<sup>95</sup>. It is essential therefore that any evidence of periodontal disease should be treated rigorously.<sup>96,97.</sup> In the few instances of Cyclosporin induced gingival hyperplasia, gingival surgery may be required.<sup>98</sup>

2.5.3 Restorations should be kept simple ensuring the maintenance of acceptable aesthetics and function. Where appropriate, a restorative material with fluoride release should be used. In children, routine restorative treatment must be delayed until the patient is in remission, when a careful study of the medical history should be made. Some children may have developed other medical complications as the result of treatment (e.g. cardiomyopathy) with implications for restorative care. If the patient is on maintenance chemotherapy it is still important to have a full blood count performed within the 24 hour period prior to any proposed dental treatment that might result in a bacteraemia. If platelet or neutrophil counts are low (Table 4), the elective procedure should be delayed until the patients haematological status has improved. A full blood count is prudent if an invasive procedure is planned. If a patient is thrombocytopenic or neutropenic, their management should be discussed with the haematologist prior to dental treatment.

2.5.4 Dental extractions following radiotherapy put the patient at risk of osteoradionecrosis and should be avoided if possible. If unavoidable they should be undertaken in a hospital environment with an appropriate antibiotic prophylaxis.

0.2% chlorhexidine gluconate mouthwash should be used prior to surgery. The extractions should be performed carefully with minimal trauma where possible ensuring soft tissue primary closure.

Systemic antibiotics should be used until healing has taken place.

Where multiple extractions are required hyperbaric oxygen therapy is recommended both before and after tooth removal.<sup>99</sup> However the significant number of “dives” involved can lead to poor compliance.

Patients are at particular risk of osteoradionecrosis when:

- i) The total radiation dose exceeded 60Gy.<sup>23</sup>
- ii) The dose fraction was large with a high number of fractions.
- iii) There is local trauma as the result of a tooth extraction, uncontrolled periodontal disease or an ill-fitting prosthesis.
- iv) The person is immuno deficient.
- v) The person is malnourished.

2.5.5 Dentures should be avoided wherever possible. Appliances will contribute to plaque retention and disease particularly when there is xerostomia. When dentures are essential to ensure good function following treatment, construction will aid ability to chew solid food, social adaptation and weight gain<sup>100</sup>.

2.5.6 Oseointegrated implants are a useful adjunct to fixed or removable prosthesis provision. Hyperbaric oxygen may be required to facilitate placement. The provision of implants should take into consideration both the patient's prognosis and the published national guideline on their use<sup>101</sup>.

## 2.6 *Following Cancer Therapy - Requirements for Denture Wearers*

2.6.1 Appliances removed at night should be subject to the cleansing regimen indicated previously (para 2.3.9). Obturators should not be left out at night for the six months following treatment.

2.6.2 Edentate patients may apply Glandosane to the fit surface of their prosthesis prior to reinsertion to help alleviate xerostomia. Artificial saliva reservoirs, incorporated into complete or partial prostheses have been shown to relieve xerostomia for up to 2 hours per application<sup>102</sup>.

2.6.3 In the event of oral candidal infection, antifungals should be prescribed for at least two consecutive weeks:

- i) Miconazole varnish or gel. This should be avoided if the patient

is taking Warfarin, the anticoagulant effect is enhanced by Miconazole<sup>81</sup>.

- ii) Nystatin powder - 800,000 units per application of Viscogel can be incorporated into a denture soft lining material. The Nystatin powder is added when the powder and liquid of the liner are mixed. It can be effective for up to seven weeks<sup>103</sup>.
- iii) Amphotericin B should be avoided since it is inactivated by Viscogel.
- iv) Fluconazole may be indicated for resistant infections.

## *2.7 The Management of Osteoradionecrosis*

Strenuous efforts should be made to avoid osteoradionecrosis by careful oral health monitoring and ensuring prevention compliance, timely dental treatment and dealing promptly with oral trauma. It is a painful and debilitating condition for the patient and can be very difficult to treat.

2.7.1 Oral trauma can be reduced by implementation of a soft diet and adjustment or removal of any denture that could be contributing to trauma.

2.7.5 Hyperbaric oxygen therapy at 2-2.5 atmospheres pressure for 1.5 - 2 hours per day. Up to 80 sessions have been recommended to treat severe cases of osteoradionecrosis.<sup>104.105</sup>

2.7.6 There have been promising results with ultra sound at frequencies of 3mhz pulsed 1 in 4 at an intensity of 1w/cms sq. applied to the mandible for 10 minutes daily for 50 days<sup>106</sup>.

2.7.7 Excision of necrosed bone with primary closure and appropriate hyperbaric oxygen therapy is recommended. Closure of orocutaneous fistulae will be required. Hemi-mandibulectomy may be necessary in severe cases and reconstruction appropriate.<sup>107.108</sup>

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## **TABLE 1**

### **CANCER THERAPY THAT WILL NORMALLY RESULT IN ORAL COMPLICATIONS**

- **CHEMOTHERAPY**
- **BONE MARROW TRANSPLANTATION - INVOLVES  
CHEMOTHERAPY ALONE OR WITH TOTAL BODY  
IRRADIATION**
- **RADIOTHERAPY TO THE HEAD AND NECK**

**TABLE 2**

**ACUTE CHANGES DURING THERAPY**

ACUTE CHANGE	EXPLANATORY NOTES	RADIOTHERAPY	CHEMOTHERAPY	BONE MARROW TRANSPLANATATION (CHEMOTHERAPY AND TOTAL BODY IRRADIATION)
<b>1. Mucositis</b> <sup>109</sup>	<ul style="list-style-type: none"> <li>• Acute inflammation of the mucosa</li> <li>• White/yellow fibrinous slough, often with ulceration</li> <li>• Painful to speak/eat/swallow</li> <li>• Portal for microbial entry</li> <li>• Healing complete 2-3 weeks post completion cancer therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Onset 12-15 days after treatment commenced</li> </ul>	<ul style="list-style-type: none"> <li>• Onset usually one week after treatment commencement</li> <li>• Ulceration often severe</li> </ul>	<ul style="list-style-type: none"> <li>• Onset usually one week after treatment commencement</li> <li>• Ulceration often severe</li> </ul>
<b>2. Blood Changes</b> <sup>109</sup>	<ul style="list-style-type: none"> <li>• Anaemia</li> <li>• Neutropenia</li> <li>• Thrombocytopenia</li> <li>• Present from commencement of cancer therapy until up to 4 weeks post therapy</li> </ul>		<ul style="list-style-type: none"> <li>• Spontaneous gingival/mucosal bleeding</li> <li>• Crusting of lips</li> </ul>	<ul style="list-style-type: none"> <li>• Spontaneous gingival/mucosal bleeding</li> <li>• Crusting of lips</li> </ul>
<b>3. Immuno-Suppression</b> <sup>110-113</sup>	<ul style="list-style-type: none"> <li>• Increases susceptibility to bacterial/candidal/viral disease</li> <li>• Exacerbates pre-existing periodontal disease</li> </ul>		<ul style="list-style-type: none"> <li>• Periapically involved primary teeth can become a medical emergency</li> <li>• Acute herpetic gingivo stomatitis and candida with systemic involvement in children</li> </ul>	<ul style="list-style-type: none"> <li>• Periapically involved primary teeth can become a medical emergency</li> </ul>

**TABLE 2**

### ACUTE CHANGES DURING THERAPY

ACUTE CHANGE	EXPLANATORY NOTES	RADIOTHERAPY	CHEMOTHERAPY	BONE MARROW TRANSPLANATATION (CHEMOTHERAPY AND TOTAL BODY IRRADIATION)
<b>4. Changes in Salivary Flow/Composition</b> <sup>109</sup>	<ul style="list-style-type: none"> <li>• Saliva becomes thick, viscous, acidic</li> <li>• Xerostomia results but is less common in children</li> <li>• Onset within 14 hours of cancer therapy</li> </ul>	<ul style="list-style-type: none"> <li>• Xerostomia can be prolonged</li> <li>• Can last up to 2 years post therapy</li> <li>• Often permanent</li> </ul>	<ul style="list-style-type: none"> <li>• Salivary flow usually returns to normal within 2 months</li> </ul>	<ul style="list-style-type: none"> <li>• Salivary flow rarely returns to normal</li> </ul>
<b>5. Acute Ascending Sialadenitis</b> <sup>109</sup>	<ul style="list-style-type: none"> <li>• Can occur in children as a complication of xerostomia</li> </ul>			
<b>6. Loss of Taste</b> <sup>113,114</sup>	<ul style="list-style-type: none"> <li>• Onset on treatment commencement</li> <li>• Related to xerostomia and direct damage to taste buds</li> <li>• Sense of taste often returns with an unpleasant interim period of altered taste</li> </ul>			
<b>7. Dysphagia</b> <sup>113,115</sup>	<ul style="list-style-type: none"> <li>• As a result of mucositis and xerostomia</li> </ul>			<ul style="list-style-type: none"> <li>• Can be very severe due to severe ulceration</li> </ul>

**TABLE 2**

**ACUTE CHANGES DURING THERAPY**

ACUTE CHANGE	EXPLANATORY NOTES	RADIOTHERAPY	CHEMOTHERAPY	BONE MARROW TRANSPLANTATION (CHEMOTHERAPY AND TOTAL BODY IRRADIATION)
<b>8. Changes in Oral Flora<sup>116,117</sup></b>	<ul style="list-style-type: none"> <li>• Due to reduced buffering action and antibacterial action of saliva</li> <li>• Increase in cariogenic organisms within 2 weeks of cancer therapy</li> <li>• Increased susceptibility to candidal/viral infections</li> </ul>	<ul style="list-style-type: none"> <li>• Oral candidiasis more likely</li> <li>• Implications for increased dental caries</li> </ul>	<ul style="list-style-type: none"> <li>• Oral Candidiasis:               <ul style="list-style-type: none"> <li>- pseudomembranous candidiasis with ulceration and perioral inflammation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Oral candidiasis:               <ul style="list-style-type: none"> <li>- severe with ulceration</li> <li>- if persistent, indicative of systemic involvement</li> </ul> </li> <li>• Acute herpetic gingivostomatitis</li> <li>• Cytomegalovirus and Varicella zoster virus infections</li> </ul>
<b>9. Periodontal/ Gingival Disease<sup>118</sup></b>	<ul style="list-style-type: none"> <li>• Can be exacerbated by oral flora changes, mucositis, xerostomia and immunosuppression</li> </ul>	<ul style="list-style-type: none"> <li>• Acute gingivitis</li> </ul>	<ul style="list-style-type: none"> <li>• Acute gingivitis</li> <li>• Pericoronitis in children</li> <li>• Gingival hyperplasia in acute myeloblastic leukaemia</li> </ul>	<ul style="list-style-type: none"> <li>• Acute gingivitis</li> <li>• Pericoronitis in children</li> </ul>

**TABLE 2**

**ACUTE CHANGES DURING THERAPY**

<b>ACUTE CHANGE</b>	<b>EXPLANATORY NOTES</b>	<b>RADIOTHERAPY</b>	<b>CHEMOTHERAPY</b>	<b>BONE MARROW TRANSPLANTATION (CHEMOTHERAPY AND TOTAL BODY IRRADIATION)</b>
<b>10. Tooth Sensitivity<sup>110</sup></b>	<ul style="list-style-type: none"> <li>Increased risk of toothwear and/or gingival recession present prior to cancer therapy</li> </ul>			
<b>11. Dental Pain</b>	<ul style="list-style-type: none"> <li>Related to leukaemic infiltration of dental pulp tissue and direct jaw infiltration</li> </ul>			
<b>12. Trismus</b>	<ul style="list-style-type: none"> <li>Must exclude posterior invasion of carcinoma into pterygomasseteric muscles as a cause</li> </ul>		<ul style="list-style-type: none"> <li>Can occur in children</li> <li>Jaw Pain related to Vincristine administration</li> </ul>	
<b>13. Graft Versus Host Disease</b>	<ul style="list-style-type: none"> <li>Can occur in an acute form after bone marrow transplantation and be followed by a chronic form</li> </ul>			

**TABLE 3**

**CHRONIC CHANGES FOLLOWING THERAPY**

<b>CHRONIC CHANGE</b>	<b>EXPLANATORY NOTES</b>	<b>RADIOTHERAPY</b>	<b>CHEMOTHERAPY</b>	<b>BONE MARROW TRANSPLANTATION (CHEMOTHERAPY AND TOTAL BODY IRRADIATION)</b>
<b>1. Progressive endarteritis</b>	<ul style="list-style-type: none"> <li>• Occurs in irradiated bone, especially the mandible</li> <li>• Can occur in muscle and cause trismus 3-6 months post therapy</li> <li>• Uncommon in children</li> </ul>	<ul style="list-style-type: none"> <li>• Implications for dental extractions/surgery (see management guidelines)</li> </ul>		<ul style="list-style-type: none"> <li>• Implications for dental extractions/surgery (see management guidelines)</li> </ul>
<b>2. Blood Changes</b>	<ul style="list-style-type: none"> <li>• Anaemia</li> <li>• Neutropenia</li> <li>• Thrombocytopenia</li> <li>• Prolonged by maintenance chemotherapy</li> </ul>		<ul style="list-style-type: none"> <li>• Implications for dental treatment (Table 4)</li> </ul>	<ul style="list-style-type: none"> <li>• Implications for dental treatment (Table 4)</li> </ul>
<b>3. Trismus</b>	<ul style="list-style-type: none"> <li>• Must exclude posterior invasion of carcinoma into pterygomasseteric muscles as a cause</li> <li>• Predominantly due to fibrosis as a direct effect of radiotherapy, but also related to endarteritis</li> </ul>			
<b>4. Prolonged Oral Flora Changes<sup>17</sup></b>	<ul style="list-style-type: none"> <li>• Increase in cariogenic organisms and candida</li> </ul>	<ul style="list-style-type: none"> <li>• Increased susceptibility to dental caries</li> <li>• Candidiasis more likely especially in denture wearers</li> </ul>		<ul style="list-style-type: none"> <li>• Increased susceptibility to dental caries</li> <li>• Candidiasis more likely</li> </ul>

**TABLE 3**

**CHRONIC CHANGES FOLLOWING THERAPY**

<b>CHRONIC CHANGE</b>	<b>EXPLANATORY NOTES</b>	<b>RADIOTHERAPY</b>	<b>CHEMOTHERAPY</b>	<b>BONE MARROW TRANSPLANATATION (CHEMOTHERAPY AND TOTAL BODY IRRADIATION)</b>
<b>5. Xerostomia<sup>69</sup></b>	<ul style="list-style-type: none"> <li>• May last up to 2 years post therapy</li> <li>• It is often considered permanent although this can be subjective</li> <li>• Predisposes to dental caries</li> </ul>	<ul style="list-style-type: none"> <li>• More prolonged if parotid glands are in the irradiation field</li> <li>• Salivary output can be maintained by ipsilateral parotid sparing during radiotherapy<sup>69</sup></li> </ul>		
<b>6. Tooth Erosion<sup>119</sup></b>	<ul style="list-style-type: none"> <li>• Due to prolonged xerostomia, removing protective action of saliva</li> </ul>			
<b>7. Periodontal/ Gingival Disease<sup>114</sup></b>	<ul style="list-style-type: none"> <li>• Can continue to be exacerbated by xerostomia and oral flora changes</li> <li>• Gingival recession</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid progression of periodontal disease</li> </ul>		<ul style="list-style-type: none"> <li>• Rapid progression of periodontal disease can occur in children</li> </ul>
<b>8. Adrenal Suppression</b>	<ul style="list-style-type: none"> <li>• Can occur as a result of corticosteroid therapy</li> </ul>			

**TABLE 4**

**THE PRECAUTIONS NECESSARY FOR PATIENTS  
ON CHEMOTHERAPY REQUIRING DENTAL TREATMENT**

<b>BLOOD CELL INVESTIGATION</b>	<b>PERIPHERAL BLOOD COUNT</b>	<b>PRECAUTIONS</b>
Platelets	>80 x 10 <sup>9</sup> /litre <80 x 10 <sup>9</sup> /litre	Routine Management Platelets required for Surgery
Neutrophils	>1.5 x 10 <sup>9</sup> /litre <1.5 x 10 <sup>9</sup> /litre	Routine Management Antibiotic Prophylaxis for Surgery
Erythrocytes	> 8 x 10 <sup>9</sup> /litre < 8 x 10 <sup>9</sup> /litre	Routine Management Special Care for General Anaesthesia

## APPENDIX 1: NURSING ORAL CARE GUIDELINES

### PRIOR TO CANCER THERAPY

Advise About Support Groups : Cancer BACUP : Changing Faces : Let's Face It

OBJECTIVE	NURSING ACTION
<b>1. Referral of all patients for a comprehensive assessment by a Dental Surgeon prior to cancer therapy</b>	<ul style="list-style-type: none"><li>• Complete Oral Health Screening Chart <b>(A)</b> and forward to dental team</li><li>• Liaise with the Dental team to develop and implement an individual care plan</li></ul>
<b>2. Advice on the oral side effects of treatment</b>	<ul style="list-style-type: none"><li>• Provide written information on side effects of treatment <b>(D)</b></li><li>• Give support and encouragement</li></ul>
<b>3. Preventive advice</b>	<ul style="list-style-type: none"><li>• See Practical Oral Care <b>(B)</b></li><li>• Ensure oral hygiene equipment is available</li><li>• Give support and encouragement with smoking cessation and alcohol problems</li><li>• Give dietary advice in liaison with the Dietician</li><li>• Provide written information (D)</li></ul>

### DURING CANCER THERAPY

OBJECTIVE	NURSING ACTION
1. Maintenance of oral hygiene	<ul style="list-style-type: none"><li>• Provide advice and assistance where appropriate</li><li>• Follow Practical Oral Care (B)</li></ul>
1. Inspection of the oral cavity should be carried out daily	<ul style="list-style-type: none"><li>• The Oral Assessment Guide (C) should be completed daily and placed in the patient's individual care plan: contact the dental team for guidance prior to completion if required</li><li>• Document findings in the patient's individual care plan to monitor any changes</li><li>• Refer to the dental team when indicated</li></ul>
3. Monitor compliance in performing oral care	<ul style="list-style-type: none"><li>• Supervise and provide assistance; give instructions to carers where appropriate</li><li>• Give support and encouragement</li></ul>
4. Pain control	<ul style="list-style-type: none"><li>• Give topical / systemic analgesia, as directed</li></ul> <b>Refer to main clinical guideline: Explanatory notes para 2.3.7</b>
5. Oral candidal infections (Thrush)	<ul style="list-style-type: none"><li>• Give topical / systemic antifungal agents, as prescribed</li><li>• Stagger the use of chlorhexidine gluconate mouthwash and nystatin suspension by one hour</li></ul> <b>Refer to main clinical guideline: Explanatory notes para 2.3.6</b>
6. Manage xerostomia	<ul style="list-style-type: none"><li>• Give advice to help with a dry mouth</li></ul> <b>Refer to main clinical guideline: Explanatory notes para 2.3.8</b> <ul style="list-style-type: none"><li>• Ensure recommended saliva substitute is prescribed and used when appropriate</li></ul>

### AFTER CANCER THERAPY

OBJECTIVE	NURSING ACTION
1. Arrange follow-up visit to the dental team	<ul style="list-style-type: none"><li>• Provide the patient or carer with a contact telephone number</li><li>• Arrange an appointment</li><li>• To ensure follow up occurs when the patient is discharged, an oral care entry should be made in the summary notes / discharge letter</li></ul>
2. Reinforce preventive messages	<ul style="list-style-type: none"><li>• Provide equipment for home care where appropriate</li><li>• Ensure patient information leaflet has been provided to support the advice given</li></ul>

# (A) ORAL HEALTH CARE SCREENING CHART

N.B. Please forward to the Dental Team **prior** to the commencement of Cancer Therapy

Name: \_\_\_\_\_ Hospital: \_\_\_\_\_

D.O.B.: \_\_\_\_\_ Consultant: \_\_\_\_\_

Address: \_\_\_\_\_ **Inpatients:**

\_\_\_\_\_ Ward: \_\_\_\_\_

\_\_\_\_\_ Ward telephone no: \_\_\_\_\_

\_\_\_\_\_ Date admitted: \_\_\_\_\_

Telephone no: \_\_\_\_\_ Duration of stay: \_\_\_\_\_

<b>DIAGNOSIS:</b>	1. 2. 3.
<b>PAST MEDICAL HISTORY:</b>	1. 4. 2. 5. 3 6.
<b>CURRENT MEDICATION</b>	1. 4. 2. 5. 3. 6.
<b>TREATMENT TO DATE:</b> (including radiotherapy and chemotherapy)	1. 2. 3.
<b>TREATMENT PROPOSED, WITH DATES:</b> (including radiotherapy and chemotherapy)	1. 2. 3.

Tick as appropriate:

**URGENT**  
(Contact Dental Team by phone)

**ROUTINE**

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Status: \_\_\_\_\_

## (B) PRACTICAL ORAL CARE

Care of the edentulous patient should start at step 5. References relate to the the Clinical Guideline reference list.

ORAL CARE	NOTES
1. <b>Tooth brushing</b>	<ul style="list-style-type: none"><li>• Use a soft toothbrush</li><li>• Encourage or assist with gentle thorough brushing of teeth and gums at least twice daily</li><li>• Use a fluoride toothpaste</li><li>• Rinse or aspirate after toothbrushing to remove excess toothpaste</li><li>• If toothbrushing has to be discontinued it should be resumed at the earliest opportunity <sup>34</sup>.</li></ul>
2. <b>Aqueous Chlorhexidine Gluconate Mouthwash</b>	<ul style="list-style-type: none"><li>• Use twice daily following toothbrushing</li><li>• If toothbrushing is discontinued, use three to four times daily <sup>16.35.36</sup>.</li></ul> <p><b>N.B.</b> Stagger use of chlorhexidine mouthwash and nystatin antifungal agent - separate administration by at least one hour <sup>53</sup>. Mouthwashes may need to be diluted for comfort, i.e. 10ml mouthwash to 10ml water, ensuring the whole diluted volume is used</p>
3. <b>Fluoride mouthwash</b>	<ul style="list-style-type: none"><li>• Fluoride should be used both during and after cancer therapy</li><li>• Use a fluoride toothpaste when toothbrushing</li><li>• Use a fluoride mouthwash daily as directed by the dental team</li><li>• Fluoride gel may be used for children between three and six years of age, as directed by the dental team <sup>39-42</sup>.</li></ul>
4. <b>Dietary advice</b>	<ul style="list-style-type: none"><li>• Preventive advice to reduce the risk of dental decay, should be given in liaison with a Dietician . Emphasis should be placed on adequate hydration. Refer to the main clinical guideline para 2.2.2</li><li>• Assist with healthy meal choices</li></ul>
5. <b>Gentle Swabbing of the oral Tissues</b>	<ul style="list-style-type: none"><li>• Polygon/gauze swabs soaked in chlorhexidine mouthwash may be used to gently clean the oral tissues <sup>16.82</sup>.</li><li>• If the above cannot be tolerated, the swabs may be soaked in 0.9% saline (N.B. no antibacterial effect)</li></ul>

contd.

ORAL CARE	NOTES
<b>6. Moisten mouth and lips frequently</b>	<ul style="list-style-type: none"><li>• Advise regular sips of water <sup>70</sup>.</li><li>• K.Y. jelly may be frequently applied to the lips, but should be removed when in the radiation field</li><li>• Lubricate lips and tongue at night with flavourless salad oil <sup>73</sup>.</li><li>• Use recommended artificial saliva substitutes <sup>71.72</sup>.</li></ul> <p><b>Refer to main clinical guideline explanatory notes para 2.3.8</b></p>
<b>7. Swabs for candidal superinfection</b>	<ul style="list-style-type: none"><li>• Regular swabs should be taken for detection of candida</li><li>• Topical / systemic antifungal agents should be prescribed following the diagnosis of candida <sup>44-52</sup>.</li></ul> <p><b>Refer to the main clinical guideline explanatory notes para 2.3.6</b></p>
<b>8. Care of appliances</b>	<ul style="list-style-type: none"><li>• After each meal / at least twice daily, dentures and obturators should be removed and meticulously cleaned with a tooth or denture brush</li><li>• It is advisable to do this over a basin of water to prevent damage if the appliance is dropped</li><li>• Use unperfumed household soap <sup>80</sup>.</li><li>• Rinse well before replacing in cleaned mouth</li><li>• Antifungal agents, as prescribed may be applied to the fit surface of the denture prior to re-insertion</li><li>• Remove all dentures at night and clean; soak in an appropriate sodium hypochlorite cleanser (Milton: Dentural: or Steradent if a metal denture is worn) for 30 minutes following removal and store dry overnight <sup>80</sup>.</li><li>• Leave dentures dry at night except for when they are left out for &gt;24hrs, when they should be stored damp. If stored away from the patient they should be appropriately labelled</li></ul>
<b>9. Appliance wear</b>	<ul style="list-style-type: none"><li>• Removable prostheses should be left out of the mouth if there is any evidence of ulceration</li><li>• Dentures should be removed at night</li><li>• Denture should be moistened with water or an appropriate saliva substitute before reinsertion</li><li>• Obturators should not be left out at night. A specialist opinion should be sought if there is evidence of ulceration.</li></ul>



<b>MUCOUS MEMBRANES/GINGIVA</b> 3 = ulceration / bleeding - gentle pressure 2 = candidal infection suspected - reddened/ coated or white patches 1 = pink and moist	<b>Observe the  appearance of the  tissues</b>									
<b>ORAL CLEANSING COMPLIANCE</b> 3 = unable to clean 2 = cleans but needs help 1 = no difficulties	<b>Observe tooth  brushing/denture  cleaning</b>									

(Adapted from Eilers, J., Berger, A., Peterson, M. Development, testing and application of the Oral Assessment Guide . Oncology Nursing Forum 15(3): pp 325-330a: 1988)  
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**Useful Addresses:**

Cancer BACUP  
3 Bath Place  
Rivington Street  
London EC2A 3JR

Tel 0171 696 9003  
Fax 0171 696 9002

BACS  
British Association of Counselling  
1 Regent Place  
Rugby  
Warwickshire CV21 2PJ

Let's Face It  
Christine Piff  
14 Fallowfield  
Yateley  
Hampshire  
GU46 6LW

Tel: 01252 879630  
Fax: 01252 872633

London Office:  
Julia Wallace  
Tel/Fax: 0181 931 2829

Changing Faces  
1 & 2 Junction Mews  
London  
W2 1PN

Tel 0171 706 4232  
Fax 0171 706 4234

**THE CARE OF THE MOUTH  
DURING  
RADIOTHERAPY  
OR  
CHEMOTHERAPY**

**Radiotherapy to the head and neck and chemotherapy are treatments that are used to remove cancer.**

**Radiotherapy and Chemotherapy can have harmful effects in the mouth. Your oral health needs to be as good as possible before the start of treatment to avoid problems later.**

**Ensure that you have a thorough dental check-up, including advice, from a dentist or dental hygienist before therapy starts. If you don't have your own dentist this may be arranged by your oncology team.**

**Throughout your radiotherapy or chemotherapy your mouth needs careful monitoring by either a dental hygienist or an appropriately trained nurse**

### **What can I expect during cancer treatment?**

About two weeks after the start of treatment you may notice an increase in mouth ulcers and mouth soreness. Your mouth will become dry and there will be a loss of taste. These changes will make it difficult to swallow and eat. They are worst between two and five weeks after starting treatment after which they will gradually improve.

In this leaflet it is explained what can be done to help you cope with the unwanted effects of treatment.

---

**UNWANTED EFFECTS OF TREATMENT**

---

***Loss of taste***

---

The taste buds are damaged by radiotherapy and chemotherapy

- Unfortunately there is little you can do
- Taste will return, as it does you will notice an unpleasant taste for a time but this will improve

- Sweet food or drinks - a great temptation at this time but if taken between meals or before bedtime you will rapidly get tooth decay
- 

---

***Difficulty Swallowing***

---

Dryness and Soreness of the mouth makes swallowing difficult

- 
- Rinse your mouth or gargle with Difflam, a pain relieving mouth wash, before eating.
  - Eat moist food and sip water frequently

- Alcohol will increase mouth dryness
- 

---

***Jaw Stiffness***

---

The muscles that move the jaw can become stiff as the result of the radiotherapy

- 
- Gentle jaw exercises will be given to you
  - You may be given an appliance to help you

**WHAT HAPPENS?****WHAT CAN I DO?**

---

**WHAT TO AVOID?**

---

**UNWANTED EFFECTS OF TREATMENT**

---

***Dry mouth***

Radiotherapy damages the glands which produce saliva. The dryness is worse during treatment but slowly improves. Saliva may not return completely.

are available on prescription. Always choose one that contains fluoride (Saliva Orthana)

- Flavourless salad oil or butter lubricates the lips and tongue and will help you to sleep at night

- Many non-prescription oral preparations are acidic and will damage the teeth or the mouth lining
- Avoid pineapple chunks and flavoured ice cubes, they will also make your teeth sensitive

---

### ***Sore mouth***

---

Radiotherapy and chemotherapy damages normal cells. The inside of the mouth, tongue and throat become red, sore and ulcerated. You will find it uncomfortable to eat, speak, swallow and brush your teeth. The soreness may be due to a thrush infection.

- 
- Clean your teeth with a fluoride toothpaste and soft toothbrush
  - Always use a Corsodyl mouthwash. The mouth wash can sting, dilute it if you need to with water but always use the full quantity directed.
  - The mouthwash may stain your teeth but it can easily be removed later
  - You may need medication if you have thrush

- 
- Hard food, spicy food and hot drinks will be painful
  - Avoid alcohol and tobacco, they will make the sore dry mouth worse
  - Strongly flavoured tooth paste will be uncomfortable to use and should be avoided

---

### **WHAT HAPPENS?**

Saliva moistens the mouth and protects against tooth decay and tooth sensitivity.

---

### **WHAT CAN I DO?**

- Sip sugarfree drinks frequently - cold water or tooth kindly drinks
- Chew sugarfree gum
- Try saliva substitutes which

---

### **WHAT TO AVOID?**

- Fizzy drinks, diet drinks and fruit juice are acidic and will make your teeth sensitive
- Food or drinks containing sugar should be avoided between meals

---

### **UNWANTED EFFECTS OF TREATMENT**

#### ***Tooth decay***

---

**Loss of Weight**

Mouth soreness, dryness and difficulty swallowing will reduce your appetite and enthusiasm for food

- pasta, bread, yams and potatoes
- It will be arranged for you to see a dietician if you are losing weight

---

**Difficulty with Dentures**

---

Lack of saliva and mouth soreness makes dentures difficult to wear

- 
- See your dentist if your dentures are painful
  - Clean your dentures carefully after each meal, at least twice daily
  - Clean the dentures with unperfumed soap or toothpaste and a brush
  - If left out at night, after cleaning, soak in an appropriate cleanser for up to 20 mins and afterwards keep the appliances dry

- 
- Leaving your dentures out during cancer treatment can make them difficult to accommodate to when you need to use them later

---

**WHAT HAPPENS/**

---

Saliva normally helps to protect the teeth. The absence of saliva encourages tooth decay

---

**WHAT CAN I DO?**

- 
- Brush your teeth regularly with a fluoride toothpaste
  - Always use a fluoride mouth wash or gel as directed by your dentist
  - You should visit your dentist and hygienist regularly at least twice yearly.

---

**WHAT TO AVOID?**

- 
- Food or drink containing even small amounts of sugar between meals or before bedtime are damaging to the teeth
  - Limit sweet food and drinks to meal times only
- 

- 
- Eat high energy food such as

