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This series aims to enhance the healthcare team's awareness of the importance of early detection by recognizing signs and symptoms of orofacial cancers and their management, and of prevention. It discusses treatment complications from surgery, radiotherapy (RT) and chemotherapy (CTX), summarizing the outcomes of a meeting on 'Oral Healthcare in People Living with Cancer' held in 2010, attended by 300 delegates from 33 countries – dentists, specialists, and Dental Care Professionals (DCPs), and the cancer support team. There is a considerable body of literature on oral cancer but very little is written on healthcare aspects of people living with cancer and a particular focus of this meeting was caring for survivors. The Faculty included European leaders in the field who have authored the series. The full peer-reviewed papers from the meeting are published in *Oral Oncology* 2010; **46**; 485–570.

Oral Cancer: Comprehending the Condition, Causes, Controversies, Control and Consequences

18. Dental Management

Possible complications following treatment of oral cancer by surgery, radiotherapy (RT), or chemotherapy have been outlined in previous articles of this series. Several complications, like liability to osteoradionecrosis (ORN), hyposalivation, limited mouth opening, problems of chewing, swallowing, speech and appearance may significantly influence dental management strategy.

The National Institute for Health and Clinical Excellence (NICE) guideline 'Improving Outcomes in Head and Neck Cancer' recognizes that optimal management of these patients depends on multidisciplinary teams providing treatment, rehabilitation and support. Timely oral health care before, during and after cancer therapy can reduce complications and assist with improving the patient's quality of life. Useful guidance can also be found in *Oral Health In Cancer Therapy; A Guide For Health Care Professionals*, third edition, 2010, Texas Cancer Center. Editors, Rankin KV, Jones DL, available online at http://www.doep.org/images/OHCT_III_FINAL.pdf

Risk factors

The most important risk factors for oral complications of cancer therapy are pre-existent oral or dental disease and poor care after cancer therapy.

The status of the oral cavity in

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- Avoid tobacco and alcohol
- Brush teeth gently after each meal. Use an ultrasoft, even-bristle TePe® brush and a bland toothpaste, preferably containing fluoride (eg Duraphat® 5000, BioXtra® Toothpaste, Biotene® Toothpaste). Brushing with a sodium bicarbonate – water paste is also helpful, Arm & Hammer® Dental Care toothpaste is bicarbonate based and reduces the mouth's acid pH. If a toothbrush is too irritating, cotton Q-tip® swabs or foam sticks can provide some mechanical cleaning. Chlorhexidine has an antiplaque action and rinsing the mouth 2–3 times a day is helpful when you cannot follow other oral hygiene procedures. Rinses containing chlorhexidine can alter taste and stain teeth. Non-alcohol chlorhexidine rinses are best. Alternatively, rinse with a warm, dilute solution of sodium bicarbonate (baking soda) or salt and bicarbonate (warm water with 1/2 teaspoonful each of salt and baking soda) every two hours to bathe the tissues and control oral acidity. You can also cleanse the mouth with a pulsating water device, eg Waterpik® irrigators to remove loose debris.
- Apply fluoride gel to your teeth using custom applicator trays or by brushing the fluoride gel (or the Duraphat 5000 toothpaste) onto the teeth for 5 minutes, after the usual toothbrushing. To ensure the teeth are well coated with fluoride, the excess gel/toothpaste is spat out but the mouth not rinsed out. Patients showing signs of decalcification should also apply *GC Tooth Mousse* onto their teeth after this, to help remineralize teeth.
- Use a barrier forming mouthwash (eg Gelclair®, Mugar®) to reduce the discomfort from mucositis. Benzydamine hydrochloride (Benadryl® elixir) is a non-steroidal drug with anaesthetic, anti-inflammatory and antimicrobial properties which reduces mucositis discomfort.
- Soft, lukewarm and non-irritating foods are easier to manage. A bland and liquid diet, avoiding alcohol, caffeine or any other irritants can be suggested.
- Maintain hydration using a humidifier or vapourizer in the sleeping area; it may alleviate or reduce night-time oral dryness.

Table 1. Patient advice on oral care.

cancer patients can differ little from that of the general population, so some have poorly maintained dentitions, periodontal disease, ill-fitting prostheses, and other pathologies associated with oral hygiene neglect. Some will also have co-morbidities that influence dental care.

The pressure to deliver cancer treatment promptly frequently forces dental clinicians to modify otherwise 'ideal' treatment plans because of time constraints. Satisfactory delivery of oral care can only be achieved if oral care is given due priority in care pathways.

In many circumstances, the patient's primary care dental team, with advice from the local oncology team, is pivotal, as few UK cancer centres have the resources to provide comprehensive dental care on site. Patients also often prefer to be treated by their own dentist. This is an opportunity for community dental teams and dentists to play a useful role in these patients' health care, whilst also helping to conserve hospital resources. An off-site dental evaluation programme, where the dentist performs the entire evaluation and treatment planning guided by a protocol from the dental

- Sipping cool water frequently (every ten minutes) all day helps most patients. Allowing ice chips to melt in the mouth may be comforting.
- Artificial saliva sprays, eg Xerotin®, *Moi-Stir*, *Salivart*, *Xero-Lube*, *Saliva Orthana*, can be used as frequently as needed to make the mouth moist and slick during the day. A mouth moisturizing gel like BioXtra® or Biotene OralBalance® saliva replacement gel may be helpful.
- Keep the lips lubricated with petrolatum or a lanolin-containing lip preparation at night. A moisturizing gel can be used to coat the inside of the mouth to avoid it drying out.
- Avoid mouth rinses containing alcohol, coffee, tea and colas with caffeine, as they tend to dry the mouth. Use alcohol-free mouthrinses with added fluoride (eg BioXtra® mouthrinse, Biotene® mouthwash).
- Sugarless lemon drops eg Saliva Stimulating Tablets (SST®) help stimulate residual saliva glands.
- Xylitol or sorbitol-containing chewing gums (eg Biotene® or BioXtra® chewing gum) stimulate saliva flow and have an anti-caries effect.
- Medications like pilocarpine (Salagen®, 5mg tds) and cerimeline (Evovac®, 30mg tds) can also increase saliva flow.

Table 2. Patient Advice (dry mouth).

oncology service, can allow most treatment to be provided within the community, leaving the centre's specialist (restorative or special care) to focus on maxillofacial rehabilitation.

Pre- cancer treatment evaluation

The aim is to eliminate or stabilize oral disease to minimize local and systemic infection and help maximize the quality of life. For cancer patients who are often unclear as to the need for dental care and should have the reasons explained, this offers an opportunity to inform them about possible complications from treatment, and their role in maintaining long term dental health.

History

A history of past dental care can be an indicator of a patient's motivation to maintain a high level of oral hygiene. While oral discomfort might be due to the tumour, recent surgery or biopsy, the dentist should be alert to dental or myofascial causes of pain.

Examination

Examination should include the head and neck (lymph nodes, salivary glands, temporomandibular joint, masticatory muscles) in addition to the mouth (oral mucosa, periodontium and teeth). The teeth should be examined for periodontal disease, caries or tooth surface loss, failing restorations, and vitality. The fit, retention and stability of any dentures worn should be evaluated.

Recent dental radiographs are essential. Patients who have limited ability to tolerate intra-oral dental radiographs because

of pain or limited opening, can be examined with a panoramic, plus supplementary bitewings and periapicals as required.

Treatment planning

The dental treatment plan is determined by the patient's individual circumstances. Complex treatment is seldom indicated; there is rarely sufficient time before RT or other therapy starts. The management of a patient with a very poor overall prognosis may be primarily symptomatic through improvement of comfort by removal of teeth, prophylaxis and provision of fillings and simple removable dentures.

Dental management before cancer therapy

Elimination of dental disease by judicious restorative dentistry and extraction of teeth with a questionable prognosis (deep caries, deep periodontal pockets, non-vital teeth) are important preventive strategies to avoid future dental extractions, an important risk factor for ORN. Teeth with doubtful prognoses or in direct association with the cancer, or in the direct radiation beam path should be extracted, at least 3 weeks before RT. Sharp edges of teeth should be smoothed to reduce the risk of trauma to the mucosa. Preventive oral health care is important. Thorough debridement of plaque and calculus should be done to decrease gingivitis and help decrease the severity of mucositis.

Patients should be taught good oral hygiene before RT begins. The main issue for dentate patients is the need to minimize

the risk of caries by:

- Maximizing tooth mineralization before oral hygiene becomes too difficult to maintain owing to mucositis;
- Caries prevention and containment measures. Dietary advice to avoid caries should also be given.

Dental management during cancer therapy

Elective dental treatment should be avoided during RT: dental management is best limited to treatment of acute dental infections and symptoms. Patients may have to discontinue wearing full and partial dentures during cancer therapy, to avoid soft tissue trauma. Advice on how to maintain a measure of oral hygiene despite difficulties should be given (Table 1).

The management of oral mucositis, hyposalivation and infections is covered in other articles in this series.

Dental management of patients after cancer therapy

Patients should be on a follow-up and maintenance programme particularly aimed at following up at regular 3–4 monthly intervals with a view to motivating them to maintain a good level of oral hygiene and caries prevention – the frequency dictated by individual needs to identify early carious lesions with a view to avoidance of complex treatment or extractions. Continued follow-up is also important to identify early ORN or cancer recurrence so appropriate intervention can be provided. The role of dental hygienist or therapist is crucial.

Cervical and incisal 'radiation caries' lesions can develop soon after RT, so patients should be closely evaluated and compliance with diet, oral hygiene and fluoride use monitored, with appropriate recommendations to improve deficiencies. Hyposalivation can be managed as described in Article 15 and Table 2.

After surgery, patients often require rehabilitation to improve their mastication, speech, swallowing and appearance. The restorative dentist, and clinical dental technician with specialist maxillofacial prosthodontic skills play crucial roles in this area. Osseointegrated dental implants placed in non-irradiated bone may prove useful and are helpful in retaining prostheses.