Oral health after radiotherapy for head and neck cancer: two case reports

Abstract

This paper reviews two cases of individuals who have had radiation treatment for head and neck cancer. The cases illustrate the importance of ongoing preventive care and support, including advice on oral hygiene, diet, fluoride use and dry mouth, to maintain oral health in this population.

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Introduction

The term head and neck cancer (HNC) is used to describe a heterogeneous group of cancers affecting the oral cavity, pharynx, nasal cavity, sinuses and larynx. The National Cancer Registry in Ireland reports approximately 700 new cases of HNC annually in Ireland, with 400 of these affecting the oral cavity and oropharynx.[1] This cancer commonly affects middle-aged men; however, a notable trend is the increase in the rate of HNC presenting in women and younger individuals. Major risk factors include smoking and alcohol, with an additive effect if the individual drinks and smokes. An association between oropharyngeal cancer incidence and infection with human papillomavirus (HPV) is reported.

Treatment for patients with HNC includes surgery, radiotherapy, chemotherapy, or combinations of these treatment modalities. The standard dose of radiation administered is 60-70Gy and doses of above 40Gy are associated with irreversible damage to the salivary glands and jawbone.[2] The field of radiation is dictated by the staging of the cancer.

Upon completion of radiation treatment, the HNC survivor will attend the general dentist for routine dental care.[3] Judicious implementation of preventive regimens, very regular oral examination of these already high-risk patients, and recognising the need for specialist care, are all of paramount importance in facilitating the maintenance of a healthy, functioning dentition and a good quality of life.

The following cases, which are similar dentally, illustrate the importance of oral health and preventive care post radiotherapy.

Case 1

A 75-year-old female attended for pre-radiation dental assessment in 2016 – the cancer diagnosis was squamous cell carcinoma of the tongue. Her cancer was treated surgically with a hemiglossectomy followed by a soft tissue skin graft to reconstruct the tongue. She then had intensity-modulated radiotherapy (IMRT) of 60Gy:30fractions to the right mandible and neck – a radiation stent was also used. Pre-radiation clinical and radiographic examination revealed a well-maintained reduced dentition with no evidence of active caries. No extractions were deemed necessary. The patient was given oral hygiene instruction, dietary advice, and was prescribed daily high-fluoride toothpaste. Due to medical complications she did not return until one year post radiation. In spite of being a previous regular dental attender, she had not attended a dentist or dental hygienist, and had not used the recommended fluoride regime. On re-examination, she had poor oral hygiene, poor diet, and rampant dental caries secondary to radiotherapy-induced severely dry mouth (**Figure 1**).

Case 2

A 67-year-old male patient attended for pre-radiotherapy dental assessment in 2010 – the cancer diagnosis was squamous cell carcinoma of the larynx. Pre-radiation clinical and radiographic examination revealed a well-maintained reduced dentition with no evidence of active caries. No extractions were deemed necessary. The patient was given oral hygiene instruction, dietary advice, and was prescribed daily high-fluoride toothpaste and chlorhexidine

Dr Danielle S. Dineen
BDS NUI MJDF RCS (Eng)

Dr Lilia Collazo
BA BDentSc MFD RCSI

Dr Denise MacCarthy
BDS NUI MDentSc FDS RCS (Edin)

Corresponding author: Denise MacCarthy, Dublin Dental University Hospital, Lincoln Place, Dublin 2.
E: denise.maccarthy@dental.tcd.ie

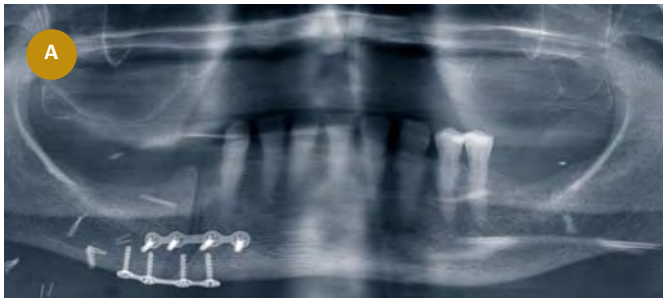

FIGURE 1: A. OPG of a 75-year-old female before commencing radiotherapy for a squamous cell carcinoma of the tongue. Note the bone fixation to stabilise the mandible following mandibular split to gain access for resection of the tongue and floor of mouth. B. The same patient one year post radiotherapy, demonstrating generalised radiation caries. Note the skin graft reconstruction on the RHS of the tongue.

(brush-on). Following surgery, he received radiotherapy (66Gy:35fractions) to the neck and mandible. The patient attended a dentist and hygienist regularly, and used chlorhexidine and fluoride daily. Upon review in 2018, the patient was clinically caries free (**Figure 2**) with excellent oral hygiene in spite of having a very dry mouth.

Discussion

The above case reports highlight the need for excellent oral hygiene, sugar-free diet, fluoride use, management of dry mouth, and regular oral review in patients post radiotherapy for HNC. The rapid deterioration in oral health seen in Case 1, where a regular preventive regimen was not adhered to, contrasts with Case 2, where the patient remained caries free at an eight-year review.

These cases also highlight the fact that there is no simple formula for oral care in these patients. Consideration must be given to the complexity of the patient's cancer treatment, and possible medical complications that cannot be fully predicted at initial pre-radiotherapy assessment. The past history of oral care is also significant, and the continuing exposure to risk factors such as smoking. The need for excellent communication, with verbal and written information, is also vital.

Awareness of the potential complications of radiotherapy is essential in order to deal with any side effects the patient may suffer from (**Table 1**).

References

1. **McDevitt, J., Walsh, P., Deady, S., Comber, H.** National Cancer Registry Ireland. Cancer trends No. 24. Cancers of the head and neck. October 2014. Available from: www.ncri.ie.
2. **MacCarthy, D., Omer, O., Nunn, J., Cotter, E.** Oral health needs of the head and neck radiotherapy patient: 1. Epidemiology, effects of radiotherapy and role of the GDP in diagnosis. *Dental Update* 2005; 32: 512-514.
3. **Moore, S., Burke, M.C., Fenlon, M.R., Banerjee, A.** The role of the general dental practitioner in managing the oral care of head and neck oncology patients. *Dental Update* 2012; 39: 694-702.
4. **MacCarthy D.** 2019. Personal comment.
5. **Sroussi, H.Y., Epstein, J.B., Bensadoun, R.-J., *et al.*** Common oral complications of head and neck cancer radiation therapy: mucositis, infections, saliva change, fibrosis, sensory dysfunctions, dental caries, periodontal disease and osteoradionecrosis. *Cancer Medicine* 2017; 6 (12): 2918-2931.

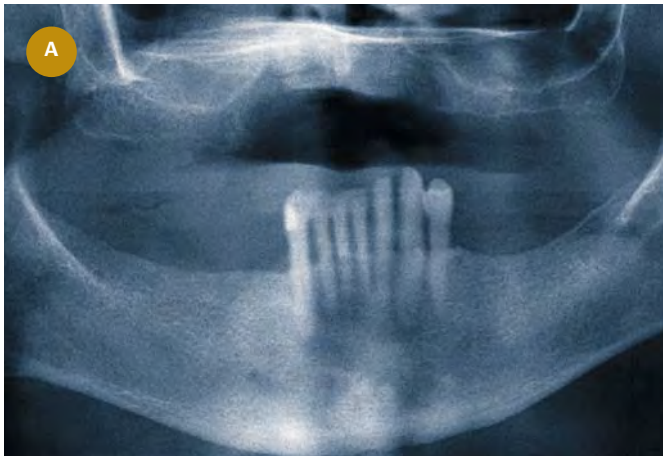

FIGURE 2: A. OPG of a 67-year-old male before commencing radiotherapy for a squamous cell carcinoma of the larynx. B. The same patient eight years post radiotherapy, demonstrating a sound dentition.

Table 1: Post-HNC radiation oral problems and practical tips for their management in the general dental practice.

Mucositis	Occurs during radiation and chemotherapy. Usually resolved six weeks following completion of treatment. There may be residual radiation damage to the oral tissues. Give careful oral health instruction (OHI) and dietary advice. Remove sharp edges from teeth, restorations and prostheses.
Trismus and tissue fibrosis	The normal range of maximum inter-incisal opening (MIO) is 40-60mm. Identify reduction of the VMO early using the 'three finger test', and manage immediately with wood sticks or TheraBite – early intervention is essential.
Loss of taste/altered taste and difficulty swallowing (dysphagia)	Altered taste often improves with time. Unfortunately, it may be permanent. Dysphagia can cause nutritional difficulties and weight loss due to difficulty chewing foods and forming a bolus. Always ask about difficulty swallowing as it carries the risk of fluid or microbial aspiration when using water irrigation during dental treatment.[4]
Dry mouth	A major complaint of HNC survivors is dry mouth. Most patients report a preference for plain tap water in the long term, as saliva substitutes give only short-term relief. Dry mouth sufferers should be encouraged to try various products as it is difficult to predict which product will work best for each individual. If there is some residual salivary gland function, sugar-free, leaf-style chewing gum or pilocarpine may help. If there is no residual salivary gland function, salivary substitutes should be recommended. Salivary substitutes may also be applied to the denture-fitting surface to aid retention. Products containing citric acid should be avoided if the patient is dentate.
Dental caries and demineralisation	Dietary advice regarding sugar restriction is very important. A fluoride regimen must be in place to prevent and arrest caries, as well as to reduce sensitivity: ▸ Colgate Duraphat 5,000ppm or 2,800ppm NaF toothpaste is prescribed for patients post radiation to prevent dental caries. Long-term topical application at bedtime daily, either with a toothbrush and interdental brushes, or in custom-made trays. ▸ Fluoride varnish may be professionally applied every three months. ▸ Chlorhexidine liquid 0.2% may be used as a brush-on to control microflora.
Periodontal disease	Excellent oral hygiene is very important and will define long-term oral health. Chlorhexidine liquid 0.2% may be used as a brush-on if the oral health is poor or the gingiva inflamed. A small-headed paediatric toothbrush and an end-tufted brush are recommended. Interdental brushes, floss and Perio Pic for interdental cleaning. Air Floss and Water Pic are useful for removing debris in molar areas: interdental food stagnation is common when the mouth is very dry. Monitor furcation areas carefully as they are sites where osteoradionecrosis (ORN) can develop. Undertake very careful subgingival scaling due to the potential for trauma-induced ORN.
Osteoradionecrosis of the jaws (ORN)	Regular examination of the oral cavity for signs of exposed bone.[5] Extractions from high-dose radiation sites only if unavoidable – consider root canal treatment and decoronation if possible. If extraction is the only option, referral to an oral surgeon may be indicated. Prophylactic antibiotics should be prescribed. Remove sharp edges on dentures and place soft lining for fit and comfort.
Oral cancer recurrence	Careful oral examination must be completed at each visit.

CPD questions

To claim CPD points, go to the MEMBERS' SECTION of www.dentist.ie and answer the following questions:

1. **How many new cases of head and neck cancer are diagnosed in Ireland annually?**

- ○ A: Approximately 800 cases
- ○ B: Approximately 700 cases
- ○ C: Fewer than 600 individuals
- ○ D: 500-600 individuals

2. **What is the normal range of maximum inter-incisal opening (MIO)?**

- ○ A: 60-70mm MIO
- ○ B: 40-60mm MIO
- ○ C: 20-40mm MIO
- ○ D: Less than 40mm MIO

3. **Which of the following is NOT associated with dysphagia (difficulty swallowing) post head and neck radiation?**

- ○ A: Nutritional difficulties and weight loss
- ○ B: Speech difficulty
- ○ C: Use of ultrasonic scaler with water causing aspiration and choking
- ○ D: Difficulty chewing food and forming a bolus

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