

Dental management of a patient with head and neck cancer: a case report

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Key points

Describes the role of the dental team in the multidisciplinary head and neck cancer pathway.

Details the dental management of a patient with head and neck cancer.

Outlines the common orofacial complications of head and neck cancer therapy.

Abstract

Head and neck cancer is the eighth most common cancer in the UK. Management may include surgery, chemotherapy, radiotherapy or a combination of these. A multidisciplinary approach is required, with the dental team forming an integral part of the patient pathway. Prior to commencement of cancer therapy, patients should have a dental assessment and urgent treatment should be provided as necessary. This article presents the case of a 49-year-old male with previous T4N0M0 squamous cell carcinoma of the pharynx. Surgery, chemotherapy and radiotherapy had been provided four years prior to presentation. The patient had significant post-operative complications of cancer therapy which were significantly affecting his quality of life. The patient underwent dental treatment, including preventive care, periodontal therapy and restorative care, with the multidisciplinary dental team. This case illustrates that oral assessment and urgent dental treatment should start prior to cancer treatment. Post-operative regular dental follow-ups should be instigated for monitoring and maintenance.

Introduction

Head and neck cancer (HNC) can affect various structures including the upper aerodigestive tract (nasal cavity, oral cavity, pharynx and larynx), paranasal sinuses, and salivary and thyroid glands.¹ It is the eighth most common cancer in the UK and accounts for 3% of all cancers.² It is predicted that oral cancer incidence will continue to increase.³ Depending on the stage and site of the disease, patients may undergo surgery, chemotherapy and/or radiotherapy.^{4,5} Management requires a multidisciplinary approach,⁴ with the dental

team forming a vital component of the wider team.⁶ Dental professionals are increasingly likely to become involved in the management of this cohort.

There is no universally accepted pre-cancer therapy dental protocol due to lack of clinical trials evaluating the efficacy of specific protocols. The Royal College of Surgeons of England (RCS Eng) and Restorative Dentistry-UK have produced guidelines for the oral management of oncology patients, including patients undergoing HNC therapy.^{7,8} It is recommended that patients undergo oral assessment before cancer therapy, and it is the responsibility of the medical team to instigate this. A preventive regime should be instigated and urgent dental treatment completed, including the removal of teeth with a poor prognosis. Although routine dental treatment should be avoided while the patient is undergoing cancer therapy, access to supportive oral care should be available to assist in the management of acute complications. As part of the oncology discharge protocol, plans should be in place for continued oral care. It is recommended that follow-up occurs at least biannually.

This is a case report of a patient who was diagnosed with HNC, where this dental pathway was not in place. The patient did not have a dental assessment pre-cancer therapy and presented several years after completing treatment. The case demonstrates the complications encountered if there is lack of a coordinated approach, the management of a HNC patient, and the importance of a clear dental pathway.

Case report

A 49-year-old male presented to the special care dentistry (SCD) department at a London-based teaching hospital. He was referred by the medical oncology team for dental management as reportedly the local dentist was having challenges providing treatment due to limited mouth opening.

Presenting oral complaint

The patient's main presenting complaint was that he was in constant pain and his teeth were 'breaking down', especially following radiotherapy. In addition, due to his limited

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Fig. 1 Trismus with maximum inter-incisal distance of 21 mm



Fig. 2 Mucosal atrophy of the right buccal mucosa



Fig. 3 Keratosis of the right lateral border of the tongue



Fig. 4 Widespread dental caries



Fig. 5 Orthopantomogram

mouth opening, he experienced difficulties receiving dental treatment of posterior teeth.

Medical history

The patient was diagnosed with T4N0M0, poorly differentiated squamous cell carcinoma of the parapharyngeal, oropharynx and nasopharynx, four years before presentation. He received two cycles of chemotherapy (cisplatin and fluorouracil), which were ceased due to the deterioration of his renal function. Therefore, radical radiotherapy was given at 65 Grays (Gy) in 30 fractions. Follow-up scans revealed treatment response with persistent local disease.

Later that year, the diagnosis was revised to a high-grade hyalinising clear cell carcinoma of the pharynx, for which he received four cycles of a different chemotherapy regime (carboplatin, fluorouracil and cetuximab), followed by maintenance chemotherapy (cetuximab). Although curative surgery was not possible, the patient underwent resection of the right parapharyngeal tumour to improve function.

A year and a half later, he was diagnosed with locally recurrent disease associated with lung and pleural metastasis. He received a further course of chemotherapy (carboplatin and paclitaxel), with six cycles in total. There was evidence of a small volume of recurrent mass in the right masseter space, which is under observation. The lung metastasis is also

on surveillance. In addition, a percutaneous endoscopic gastrostomy (PEG) was placed due to difficulties with chewing/swallowing.

The rest of his medical history was unremarkable. He took regular analgesia, namely ibuprofen and paracetamol, for pain control, largely due to discomfort from his teeth.

Dental history

Although the patient had not received a dental assessment before or during cancer therapy, he sought dental care when his teeth began to deteriorate and he was seen biannually. Dental treatment and attempts at stabilising the teeth were undertaken with local anaesthesia, with the additional adjunct of intravenous sedation for dental extractions. Toothbrushing was attempted three times per day with a fluoride toothpaste (1,450 ppm sodium fluoride). In addition, he used chlorhexidine 0.2% mouthwash four to five times per day, largely because he felt it was too uncomfortable to brush his teeth effectively. Although he was largely PEG-fed, he was able to have pureed food orally, in addition to drinks, with one litre of fruit juice consumed per day and coffee with sugar three times per day.

Social history

The patient lived alone and independently. He was an ex-smoker, having stopped one year after his cancer diagnosis. Prior to this he smoked approximately ten cigarettes per day for ten years. Average alcohol consumption was 1–2 units per week.

Clinical examination

Extraoral examination revealed tenderness of the right temporomandibular joint on palpation, and deviation to the left-hand side on opening. The right masseter and lateral neck muscles were fibrosed and firm. The maximum inter-incisal distance was 21 mm (Fig. 1).

Intraorally, saliva was thickened, viscous and frothy. The clinical oral dryness score was three out of ten, indicating mild xerostomia.⁹ Chronic oral mucosal atrophy was observed with sensitivity on contact; this was most prominent on the right buccal mucosa (Fig. 2) and palate. There was white coating on the dorsum of the tongue and keratosis of the right lateral border (Fig. 3). On the upper right edentulous alveolar ridge in the region of the 17, a pinpoint 2 mm probing depth through the mucosa was observed.

The gingiva was inflamed and tender to palpation and probing. Gross plaque and calculus deposits were evident, predominantly lingually and posteriorly. There was dental caries of 17 teeth (11, 12, 13, 14, 15; 21, 22, 23; 31, 32, 33, 37; and 41, 42, 43, 44, 45), four (14, 15, 37, 45) of which were unrestorable (Fig. 4).

Investigations

Radiographic investigations were undertaken, namely an orthopantomogram (Fig. 5) and full mouth periapicals. The extent of caries was confirmed, as well as presence of periapical radiolucency associated with the lower left second molar (37). In addition, a retained root of the upper right second molar (17) was confirmed. Bone loss around the remaining teeth was minimal.

Dental diagnoses

The following diagnoses were made:

1. Objective mild-moderate xerostomia
2. Chronic atrophy of the oral mucosa
3. Chronic gingivitis
4. Multiple carious lesions (11, 12, 13, 14, 15; 21, 22, 23; 31, 32, 33, 37; and 41, 42, 43, 44, 45)

Table 1 Risk assessment and treatment modification

Risk assessment	Treatment modification
Risk of osteoradionecrosis	Avoid extractions of teeth in the field of high radiotherapy dose; root canal treatment ± decoronation of unrestorable teeth Oral surgery opinion for 17 retained root
Pain secondary to atrophic mucosa	Lubrication of soft tissues Tailored oral hygiene instructions (soft toothbrush) Periodic use of sodium lauryl sulphate free toothpaste when there is increased pain Reduce frequency of chlorhexidine mouthwash use from five times daily to twice daily
Reduced access to mouth	Lubrication of peri-oral tissues with vaseline Mouth opening exercises (stack of tongue spatulas) Staged treatment with shorter appointment time
Increased risk of caries	Preventive regime: High fluoride toothpaste (sodium fluoride 1.1%) NaF 0.05% mouthwash to be used at an alternative time to toothbrushing Sodium fluoride 2.26% varnish applied professionally every six weeks Chlorhexidine 0.2% mouthwash twice daily Dietary advice: reduce fruit juices / sugar in hot drinks, consider use of straws
Increased risk of periodontal disease	Oral hygiene instructions (modified bass technique, small headed soft toothbrush, interdental cleaning)
Increased risk of tooth surface loss, mainly erosion	Dietary review and advice
Risk of aspiration secondary to dysphagia	Semi-supine patient positioning High-volume suction

5. Chronic apical periodontitis of the 37
6. Retained root of the 17.

Risk assessment and treatment modification

Prior to treatment planning, it was essential to complete a thorough risk assessment and plan treatment modifications, which are presented in Table 1.

Dental treatment

The following dental treatment was provided:

1. Preventive advice
2. Non-surgical periodontal therapy
3. Restorations of restorable teeth
4. Root canal treatment of unrestorable teeth
5. Retained root of 17 left *in situ*.

A multidisciplinary approach was taken to deliver dental treatment. The patient was referred to the dental hygiene and therapy department, and a preventive regime for high caries and periodontal disease risk was initiated in accordance with *Delivering better oral health: an evidence-based toolkit for prevention*.¹⁰ This consisted of high fluoride toothpaste (sodium fluoride [NaF] 1.1% or 5,000 ppm) to be used twice daily with a soft toothbrush, and NaF 0.05% mouthwash to be used at an alternative time to toothbrushing. Interdental brushes were also recommended. The use of alcohol-free chlorhexidine 0.2% mouthwash was advised as an adjunct when there is increased pain preventing the patient from toothbrushing effectively. NaF

2.26% (22,600 ppm) varnish was applied to all teeth to further reduce the caries risk. At subsequent visits, the patient complained that he experienced mucosal pain with the high fluoride toothpaste. Sodium lauryl sulphate-free toothpaste was recommended to use periodically. The dental therapists undertook non-surgical periodontal therapy and completed restorations of restorable teeth.

As the patient was at a high risk of developing osteoradionecrosis, root canal treatment of teeth with gross caries and/or apical pathology was completed by the SCD team. Unrestorable teeth were subsequently decoronated, root canal treatment provided as required, and glass ionomer cement coverings placed on the retained roots. An oral surgery opinion was sought regarding the management of the 17 retained root, and a best interest decision was made to leave retained roots *in situ* (17), in view of the high osteoradionecrosis risk.

Follow-up

At subsequent visits, the patient presented with further dental disease. The lower right central incisor (41) had fractured and was tender on palpation. Diagnosis of acute periapical periodontitis was made. Further restorable caries was detected on eight teeth. The retained root of the 17 was causing mild discomfort. However, conservative management with the prescription of antibiotics in the first instance was advised by the oral surgery department. The patient expressed his preference in leaving the root *in situ*, avoiding a surgical procedure.

He was aware of the potential risk of recurrent pain and infection associated with this.

Discussion

It has been recognised for many years that patients diagnosed with HNC should be assessed by the dental team pre-cancer therapy.⁶ The patient presented in this article attended the SCD department having already completed multiple courses of chemotherapy and high dose radiotherapy, in addition to surgery for HNC. Unfortunately, he had not received a comprehensive oral assessment before his cancer therapy, although this is recommended by national guidelines.^{6,7} A factor that could have contributed to this may be the lack of a clearly defined dental referral pathway and access to specialist dental care in the head and neck cancer unit where he received his cancer therapy. Urgency of cancer treatment should not preclude dental assessment. However, it is recognised that not all cancer pathways have an integrated dental component, with only 35% of patients receiving pre-treatment dental assessment.¹¹

Although the patient reported that he had access to a primary care dentist and had previously attended yearly, a dental assessment focusing on the risks of cancer therapy had not been undertaken. This resulted in a lack of a coordinated dental intervention before cancer therapy. Additional preventive measures were also not put in place to mitigate the risk of deterioration of oral health due to factors

Table 2 The role of GDPs before, during and after cancer therapy

Before	During	After
Undertake dental treatment prescribed by a dental specialist in secondary care where available (restorative / special care dentistry)	Supportive care, including liaison with hygienist/ therapist	Regular monitoring
Preventive care	Avoid elective dental treatment	Maintenance (preventive care, periodontal treatment, restorations)
Seek advice from a dental specialist regarding treatment planning if this has not been provided (restorative dentistry/ special care dentistry)	Refer to dental specialist (oral surgery/oral and maxillofacial surgery/special care dentistry) in secondary care for urgent dental treatment	Refer to dental specialist if required (oral surgery/oral and maxillofacial surgery/special care dentistry/restorative dentistry)

such as xerostomia, reduced oral access and discomfort of the oral mucosa.

Due to the lack of dental care being integrated within the cancer pathway, the patient presented with high dental treatment need, with multiple carious lesions, some of which were unrestorable. Increased caries and periodontal disease are recognised side effects of cancer treatment.¹² Changes in saliva composition, lower pH level and xerostomia predispose individuals to caries.^{13,14} Only irradiated tissues are affected, and the risk of xerostomia is reduced with intensity-modulated radiotherapy (IMRT). This technique allows accurate targeting of tumour cells and the ability to spare salivary glands.¹⁵ In addition, taste disturbance and high calorie diet with changes in nutritional status may further increase the risk.¹⁶ The patient experienced difficulties eating and nutritional intake was supplemented by the use of a PEG. The patient drank high-cariogenic drinks. To reduce these risks, it is vital to have appropriate preventive measures in place, as discussed previously. This should include smoking and alcohol cessation advice to reduce the risk of cancer recurrence.^{7,10} Dental hygienists and therapists are integral in providing preventive care. The RCS oncology guideline advises that dental hygienists must be part of the wider oncology team and patients should have access to a hygienist during cancer therapy.⁷

Moreover, the patient had other post-operative complications of cancer therapy which are known to have a significant impact on quality of life.¹⁷ In general, there is an increased risk of complications with a higher dosage of cancer therapy,¹⁸ as this patient received. Mucosal changes are common, secondary to chemotherapy and radiotherapy.^{12,19} Mucositis is a short-term complication that resolves several weeks after completion of treatment. In

this case, the patient presented with generalised painful atrophic mucosa which is a long-term complication.²⁰ This may have rendered good oral hygiene practices a challenge. The patient attempted to manage this by frequent use of chlorhexidine 0.2% mouthwash; however, this alone was insufficient in controlling the plaque level and in turn dental disease.

Trismus is a common side effect of radiotherapy that may result in challenges in providing dental treatment, especially to posterior teeth.¹² Treatment was provided in stages, which was more manageable for the patient. In this case, mouth props were not used to improve oral access, as the patient found them uncomfortable. Instead rolled up gauze swabs were used as required.

Osteoradionecrosis (ORN) of the jaw can occur following radiotherapy. The higher the dose, dictated in the Gy, the higher the risk of ORN.¹² The patient received 65 Gy in 30 fractions, which is a high dose rendering him more susceptible to ORN. When treatment planning this was taken into consideration and led to the decision of undertaking decoronation and root canal treatment of unrestorable teeth. Moreover, the patient expressed his wishes to monitor the 17, and he was fully aware of the risk of pain and infection. The risks and benefits of the treatment options were discussed at length with the patient to ensure that he made an informed decision.

This case describes some of the orofacial complications of cancer therapy. Earlier dental intervention, with integrated oral assessment at the outset before cancer treatment, may have reduced the extent of dental disease and improved this patient's quality of life. Unfortunately not all cancer pathways have an integrated dental component (restorative, special care, oral surgery, hygiene and therapy) and these patients may present to

local general dental practitioners to access dental screening. The role of the general dental practitioner (GDP) is outlined in Table 2.^{7,21} An appropriate preventive regime should be adopted, with support from dental hygienists/therapists. Regular dental follow-up is essential in reducing further risk of dental disease as well as recognising potential early signs and symptoms of cancer recurrence.

Conclusions

Head and neck cancer incidence rates are increasing, and dental professionals are likely to be involved in managing this patient cohort. Cancer treatment increases the risk of oral diseases, which are mostly preventable. This case illustrates that oral assessment and urgent dental treatment should start before cancer treatment. Patients should have access to the dental team, including hygienists during cancer therapy, with prevention to minimise complications. Post-operative regular dental follow-up should be instigated for monitoring and maintenance. Care should be provided on shared care basis, with collaborative working between GDPs and dental specialists.

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