

Introduction of a head and neck cancer dental screening pro forma

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Key points

Discusses a dental screening pro forma.

Highlights the current guidelines for head and neck cancer patients.

Provides evidence of potential improvement in compliance with national guidelines when carrying out a pre-oncology treatment dental screen thus reducing risks of complications such as osteoradionecrosis

Introduction There are approximately 9,200 new cases of head and neck cancer diagnosed in England and Wales per year. Each new patient should undergo a full dental examination utilising an orthopantomogram radiograph (OPG) before commencement of oncology treatment to ensure they are dentally fit. Patients should also be prescribed topical fluoride supplements (TFS). Both of which serve to reduce the risk of postoperative complications such as osteoradionecrosis. **Aim** To assess compliance with national guidelines regarding OPG and TFS prescription before oncology treatment. **Method** A two part audit of the compliance with national guidelines was carried out in a tertiary UK hospital centre. Following which a new dental screen pro forma was introduced along with simple education, and practice was re-audited to assess improvement. **Results** Part 1 showed 89.5% of patients had an OPG taken and 57.7% of dentate patients were prescribed a TFS. Following introduction of the dental screen pro forma 100% of patients had an OPG taken and 95.6% prescribed a TFS. **Conclusion** The introduction of a dental screening pro forma facilitates a thorough dental examination and improves compliance with the guidelines regarding OPG and TFS prescription for patients undergoing head and neck cancer treatment.

Introduction

There are approximately 9,200 new cases of head and neck cancer diagnosed in England and Wales per year.¹ Each new patient will be discussed during a multi-disciplinary team (MDT) meeting, made up of core and extended team members shown in Table 1. One of the core members defined by NICE guidelines is a restorative dentist,² however, a wider dental team may be responsible for performing a comprehensive dental

examination on all patients undergoing treatment for head and neck cancer and unless there is continuity and familiarity with the process, key guidelines for the dental treatment of these patients may not be followed.³

The BAHNO 2009³ standards that govern the management of patients undergoing head and neck cancer treatment state all patients should have an orthopantomogram radiograph (OPG) as part of their dental screen before primary treatment and should be prescribed a topical fluoride supplement (TFS). There are a number of other guidelines involving the care of patients with head and neck cancer, namely the British Association of Otorhinolaryngology Head and Neck Cancer: United Kingdom Multidisciplinary Guidelines 2016,⁴ the Royal College of Surgeons/The British Society for Disability and Oral Health 2012⁵ and NICE 2004² although there is no strict consensus on the exact regime of delivery of this fluoride, it is accepted that topical fluoride should be

prescribed in some form, including 1.1% (5,000 ppm) fluoride toothpaste.^{2,3,5}

An initial audit performed at Bristol Dental Hospital demonstrated that only 57.7% of patients diagnosed with head and neck cancer were prescribed a TFS for caries prevention and 89.5% had an OPG as part of their dental assessment.

This audit aimed to assess the improvement of the compliance of TFS and OPG prescription in pre-treatment head and neck cancer patients via the introduction of a dental screen pro forma (Appendix 1).

The objectives were to:

- Assess whether an OPG was taken and TFS were prescribed routinely for all head and neck cancer dental screenings
- Assess whether the introduction of a dental screen pro forma will increase compliance of the above
- Evaluate compliance with guidelines regarding OPG and TFS prescription at the pre-treatment phase for all head and neck cancer patients.

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Methods

This was both a retrospective and prospective audit carried out in two parts in a tertiary UK hospital head and neck cancer centre.

Part 1 of the audit included all patients who had received a dental screen before head and neck cancer treatment over a 12 month period between October 2011 and October 2012. A retrospective review of each patient's dental

screen, contained within their dental record was carried out, assessing compliance with the standards outlined in Table 2. Edentulous patients or patients treatment planned for a full dental clearance were excluded from assessment of TFS prescription.

Following part 1, a detailed dental screening pro forma was constructed based upon a locally established minimum examination dataset in order to correctly assess, facilitate

dental disease diagnosis and restoratively manage patients with head and neck cancer before cancer treatment.

The results of part 1 were disseminated to staff and education regarding the appropriate guidelines was carried out.

Part 2 of the audit prospectively evaluated the dental screening pro forma 12 months following its introduction. Compliance with the BAHNO Standards 2009 regarding OPG and TFS prescription was assessed. In all cases the dental screening process was either conducted or overseen by a dental specialist or consultant.

No ethical approval was sought as data were collected as part of the clinical audit process.

Results

Two outcome measures were evaluated (Table 3). Standard 1 states all head and neck cancer patients who receive a dental screen should have an OPG performed with no exceptions. Standard 2 states all patients should receive a prescription for 1.1% (5,000 ppm) fluoride toothpaste or 0.05% (225 ppm) daily fluoride mouthrinse.

Fifty-seven dental screens were performed on 57 patients during part 1 of the audit. Fifty-one (89.5%) patients had an OPG taken. When analysing standard 2, five patients were excluded as they were edentulous or treatment planned for a full dental clearance. Therefore, of the 52 included patients, 30 (57.7%) were prescribed fluoride mouthrinse or high fluoride toothpaste or a combination of the two.

Following introduction of the new dental screen pro forma and staff education, part 2 of the audit revealed 59 dental screens were performed on 59 patients. All of these patients had an OPG taken, which equates to a 10.5% improvement after introduction of the pro forma. When considering standard 2, 11 patients were excluded as they were either edentulous or treatment planned for a full dental clearance, following which 46 (95.6%) of the remaining 48 patients were prescribed a TFS, a 37.9% improvement. The improvements between part 1 and part 2, after the pro forma introduction, are both statistically significant.

The two patients who did not receive a prescription for a TFS were planned for treatment that would not affect the dental tissues or salivary glands, one patient was diagnosed with a laryngeal bed squamous cell carcinoma and the other was diagnosed with a preauricular cutaneous squamous cell carcinoma.

Core MDT members	Extended MDT members
Surgeons Eg, ENT/maxillofacial/plastics	Other specialist surgeons
Clinical oncologists	Anaesthetist
Restorative dentist	Health care professionals with expertise in gastrostomy creation
Pathologist	Ophthalmologist
Radiologist	Pain management specialist
Clinical nurse specialists	Nuclear medicine specialist
Speech and language therapist	Therapeutic radiographer
Senior nursing staff from ward	Maxillofacial/dental technician
Palliative care specialist	Dental hygienist
Dietician	Social worker
Team secretary	Benefits advisor
Data manager	Liaison psychologist
MDT co-ordinator	Counsellor
	Physiotherapist
	Occupational therapist

Standard	Target (%)	Exceptions
1 All head and neck cancer patients who received a dental screening should have had an orthopantomogram performed as part of the diagnostic work up.	100%	None
2 Daily topical fluoride application 1.1% (5000 ppm) fluoride toothpaste. OR 0.05% (225 ppm) Daily fluoride mouthrinse.	100%	Edentulous patients Or Patients planned for full dental clearance

Standard	Part 1 (2011-2012)		Part 2 (2015)		P - value
	N	n = yes (%)	N	n = yes (%)	
1 – OPG taken	57	51 (89.5)	59	59 (100)	0.01*
2 – TFS prescribed	52	30 (57.7)	48	46 (95.6)	<0.001*

*Statistically significant difference

Short term	Long term
Mucositis	Rampant dental caries
Oral bacterial infections	Trismus
Oral viral infections	Mastication difficulties
Oral candida infections	Osteoradionecrosis
Xerostomia	Xerostomia
	Altered anatomy

Discussion

An audit can only provide low level evidence and is not carried out with the rigorous protocols of a randomised control trial, however the results of this study give an indication that simple training and introduction of a dental screen pro forma may increase compliance with crucial guidelines. The BAHNO Standards 2009³ state all patients should have a pre-treatment (OPG) this is to aid the dental examination and highlight any potential inflammatory foci such as apical pathology, retained roots and unerupted teeth.^{5,6} It will also serve to highlight any cysts or teeth with a dubious prognosis which may require treatment or extraction⁵ thus reducing the chance of dental issues disrupting primary cancer resection or any radiotherapy and/or chemotherapy treatment.

In the longer term these pre-treatment radiographic and dental screens also serve to minimise the effects and potential complications caused by cancer therapy in the time that proceeds treatment.

Complications

Primary surgical management of head and neck cancer may result in local anatomical changes that make the maintenance of dental tissues harder, however, a major concern regarding the future dental health and care are the effects associated with radiotherapy.⁷

Radiotherapy is associated with a number of oral side effects outlined in Table 4, some of the effects are relatively short lived and resolve following completion of radiotherapy; however, others can affect the patient longer term. Xerostomia can result from irreversible damage to minor and major salivary glands resulting in taste disturbances, which can lead to patients over salting foods and using excess sugar to taste, which can have a substantial negative effect on caries incidence rates.^{8,9}

Caries either results in an unrestorable tooth that requires extraction or, if left to progress, can cause insult to the pulpal tissue, potentially resulting in apical spread of infection, within the alveolar bone. Similarly to periodontal disease, this can progress to Osteoradionecrosis (ORN) due to the impaired repair mechanisms in irradiated bone.¹⁰⁻¹²

Radiation-induced caries is thought to be multifactorial and is of an indirect result of changes to the salivary flow, buffering capacity and microflora. There is also a suggestion radiation may cause direct changes to the tooth structure. The risk of development

is commonly exacerbated as these patients are often nutritionally compromised and therefore using high sugar dietary supplements, which increase the risk of future tooth extractions.^{2,9}

ORN is a key concern following radiotherapy. It has been described as a condition of exposed and devitalised bone that has been present for at least three months in an area that has been irradiated, with no sign of neoplastic disease.¹³ It has a predilection for the mandible and is more commonly seen in cases subjected to a higher dose of radiotherapy [>60 Gy]¹⁴ and has a reported occurrence rate between 5.2–7.4%.^{15,16}

ORN has been reported to spontaneously occur,¹⁷ but more commonly occurs with trauma or importantly for this patient group, tooth extraction.^{14,15} Therefore, preventing teeth from becoming carious, broken down or periodontally compromised, leading to subsequent extraction is essential in this group of patients and as caries has been described as the most common reason for tooth loss¹⁸ our primary approach should be to reduce this.

Educating patients with regards to oral hygiene and prescription of a TFS with a custom-made delivery tray are effective methods of reducing caries prevalence,^{19,20} therefore it is important the current national guidelines regarding post-operative dental management of these patients are adhered to to reduce the chances of a patient requiring an extraction and therefore the risk of ORN. This can be supported in primary dental care by facilitating regular prescriptions of TFS in addition to regular reviews given the substantial caries risk. Dental practitioners should also be aware that patients undergoing radiotherapy treatment may experience discomfort when utilising conventional toothpastes, to maintain fluoride delivery a sodium lauryl sulphate free toothpaste should be considered.

Guidelines also suggest daily use of a remineralising agent such as GC Tooth Mousse to initiate remineralisation of carious lesions, this effective method of reducing caries prevalence should also be utilised for high caries risk patients, particularly in cases where patients suffer from xerostomia.⁴

Pro forma

While there are no universally recognised guidelines as to what a dental screen record should contain,²¹ the screening pro forma designed as part of this audit process ensures a minimum dataset for each patient is collected to encourage a thorough dental screen to facilitate correct identification of dental disease, implementation

of a dental disease prevention regime and map out future restorative management before head and neck oncology treatment.

Our experience and the current literature²¹⁻²⁵ would suggest the minimum information that should be collected at such a visit would include the patient's complaint (if any), detailed medical history, an intra-oral examination including teeth present, carious teeth, mobile teeth, oral hygiene assessment, periodontal assessment and an assessment of current dental prosthesis.

It should also include reports from any special tests undertaken and a diagnosis. Importantly for this group, a baseline inter-incisal opening should be recorded if there is any risk of trismus to aid future management, particularly those who are planned to have radiotherapy treatment that includes a bilateral high dose to the muscles of mastication.^{26,27}

The dental management plan for patients undergoing head and neck cancer treatment broadly involves a prevention component, including TFS and aids to address trismus and xerostomia. The treatment component includes dental hygiene, restorations and dental extractions. Removal of dental calculus clearly has advantages with regards to surgical treatment, ensuring deposits don't transfer to surgical sites, while dental extractions should be carried out at least ten days before radiotherapy treatment.^{3,5} It finally contains a follow-up section to ensure the patient has a plan in place to address the immediate and long-term dental care following cancer treatment.

As many dental team members will be involved in the care of these patients it is important that there is a document in the patient record clearly outlining the prescribed plan to ensure continuity of care. The pro forma addresses this, clearly outlining the treatment plan for the patient with regards to prevention, management and follow-up. The pro forma has been modified since part 2 to also include supplementary notes paraphrasing the guidelines, adjacent to the key sections on the pro forma to ensure compliance with these guidelines. It is thought that this will remind clinicians familiar with the process and make unfamiliar clinicians aware of the current guidelines regarding the dental treatment of these patients. Namely, ensuring all patients have an OPG taken and are prescribed topical fluoride supplements. The results of this audit clearly show the benefit this dental screen pro forma, in addition to education, has on ensuring compliance to the guidelines.

Conclusion

The introduction of a dental screening pro forma to be filled out when examining patients before head and neck cancer treatment along with simple education of the guidelines can improve the compliance with the guidelines that advise OPG and topical fluoride supplements should be prescribed to all patients undergoing head and neck cancer treatment. It also facilitates a thorough dental screen examination.

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Appendix 1 Head and neck oncology dental screen pro forma

Head and Neck Oncology Dental Screen

Date		Patient Details/Label
Name of Consultant Oncologist/Surgeon		
Tumour Staging	T N M	
Tumour Type and Site		Date of last dental exam _____ Patient has GDP? Yes/ No GDP Name/ Address:
Radiotherapy	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
MDT management plan- (Chemotherapy/ Radiotherapy/ Surgery)		
Start date of oncology Tx		

Patient Complaint

Medical History

Medications

Smoking
Alcohol
Allergies

Extra-oral examination	Lymph nodes - TMJ - MOM - Interincisal opening = ____mm Between which teeth? 	
Intra-oral examination	Soft Tissues- BPE- 	Mobile teeth
	Oral Hygiene- <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	
Teeth Present		
Carious Teeth		
Prostheses		

Head and Neck Oncology Dental Screen

Investigations	Findings
OPG <small>(N.B If there is no recent OPG, <u>All</u> patients should have a OPG taken)</small> <input type="checkbox"/>	
Bitewings <input type="checkbox"/>	
Intra-oral Periapicals <input type="checkbox"/>	

Problem List / Diagnoses / Justification for Tooth Extraction

Management Plan	Details	Arranged? Y/N. Date.
Prevention plan <small>(N.B <u>All</u> dentate patients should be at least prescribed Alcohol Free Fluoride M/W for caries prevention)</small>	Prescriptions: <input type="checkbox"/> 5000ppm Fluoride Toothpaste <input type="checkbox"/> 0.05% Alcohol Free Fluoride Mouthrinse <input type="checkbox"/> Trismus risk? SALT referral <input type="checkbox"/> Xerostomia risk? Saliva substitute <input type="checkbox"/>	
OHI/Scaling/ Denture Hygiene <small>(N.B <u>All</u> patients receiving radiotherapy should see a hygienist)</small>	Hygiene appointment required? Yes/No Where- Staff Hygienist/School of Hygiene/GDP/PCDS/Other	
Restorations Required	Teeth to be restored: <table style="display: inline-table; border: 1px solid black; width: 150px; height: 40px; vertical-align: middle;"></table> Where? GDP/ Staff Hospital / PCDS	
Extractions <small>(N.B <u>All</u> extractions should be carried out at least 10 days prior to the start of radiotherapy treatment and marked on the DPT print out)</small>	Marked on OPG print out? ExLA <input type="checkbox"/> ExGA <input type="checkbox"/> <table style="display: inline-table; border: 1px solid black; width: 150px; height: 20px; vertical-align: middle;"></table> IV Sed <input type="checkbox"/>	
Dental follow-up/ On-going care	Own GDP <input type="checkbox"/> PCDS <input type="checkbox"/> Oral Rehabilitation - Hospital <input type="checkbox"/> Head and Neck review clinic <input type="checkbox"/>	

Examined by _____ Signature _____
Date _____