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Oral Health Status of Patients Undergoing Treatment for Head and Neck Oncology in Northern Ireland

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Authors

Dr Ciaran Moore *
(BDS, MFDS)

Dr Simon Killough #
(BDS, MFDS, PhD, FDS (Rest Dent) RCSI)

Dr Neill Markey #
(BDS, MFDS)

Dr Lewis Winning #
(BDS, MFD, DChDent (Perio), FFD (Perio) RCSI StR in Restorative Dentistry)

Dr Gerald McKenna *
(BDS, MFDS, PhD, PgDipTLHE, FDS (Rest Dent) RCSEd, FHEA)

Address for Correspondence

Dr Gerald McKenna *

Email: g.mckenna@qub.ac.uk

* *Centre for Public Health, Queens University Belfast, Northern Ireland*

\# *Centre for Dentistry, Royal Victoria Hospital, Belfast Health and Social Care Trust, Northern Ireland*

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ABSTRACT

This study aimed to collect data on the oral health status of patients undergoing treatment for head and neck oncology across Northern Ireland. Data were collected on all patients referred to the Northern Ireland Multidisciplinary Head and Neck Oncology Team for discussion and treatment planning. Each patient underwent pre-treatment dental assessment in the Centre for Dentistry, Queen's University Belfast, between June 2013 and November 2014. Data were collected from clinical oral examinations supplemented with intra-oral radiographs. During the course of the study 96 patients were assessed and the levels of dental disease observed in this cohort were high. On clinical examination 43% were diagnosed with caries and 46% with periodontal disease. Ten patients were completely edentate. The disease profile of this patient group presents significant challenges to dental services tasked with rendering patients dentally fit prior to undergoing oncology treatment.

BACKGROUND

Management of head and neck oncology necessitates an extensive multidisciplinary approach combining input from surgeons, oncologists, radiologists, restorative dentists, and a range of other medical and dental specialists. Treatment is primarily based around surgical excision of the tumour with adjunctive radiotherapy and chemotherapy. Such aggressive interventions can lead to significant post-operative morbidity and have been shown to have detrimental impacts on quality of life.[1] The oral side effects of radiotherapy and chemotherapy are well documented and include mucositis, xerostomia, and susceptibility to infection.[2-6] Radiation caries, trismus, and osteoradionecrosis represent potential longer term issues.[7-9] Multidisciplinary guidelines published in 2011 by the British Association Otorhinolaryngology, Head and Neck Surgery, stress the importance of early involvement of a consultant in restorative dentistry or oral rehabilitation.[10] Similar clinical recommendations from The Royal College of Surgeons, England, indicate the need for oral care before, during and after oncology treatment.[11] This includes the need for an oral assessment and care to render each patient dentally fit before receiving surgery and embarking on a course of radiotherapy and chemotherapy.

Excluding tumour recurrence, osteoradionecrosis (ORN) is the most serious complication of radiotherapy. Its pathophysiology relates to spontaneous or trauma-induced breakdown of hypoxic, hypovascular and hypocellular irradiated hard and soft tissue, subsequent inability to heal, leaving a chronic wound susceptible to commensal infection.[12]

A recent systematic review reported that the overall incidence of ORN after dental extraction is around 7% in patients previously treated with head and neck radiotherapy.[13] The mandible was more commonly affected than the maxilla.[13] Currently, evidence pertaining to the appropriate timing of dental extractions remains inconsistent, with some researchers reporting higher ORN risk for teeth extracted pre-radiotherapy, whilst others suggest a higher risk for teeth extracted post-radiotherapy.[14,15] Nevertheless, current recommendations from the Royal College of Surgeons, England, suggest that teeth of dubious prognosis be extracted at least three weeks prior to beginning a course of radiotherapy, with an absolute minimum interval period of 10 days.[11] Given the pressures to begin timely treatment for head and neck oncology, dental services can be placed under severe pressure to render patients dentally fit by completing restorations and extractions in extremely short periods of time.

The aim of this study was to gather data on the dental status of patients undergoing treatment for head and neck oncology. Data was also collected on patient demographics, medical history, social history and dental attendance patterns. This information is vitally important to inform service provision and staffing requirements in managing this patient group in Northern Ireland.

METHODS

A retrospective analysis was undertaken of all patients referred to the Northern Ireland Multidisciplinary Head and Neck Oncology Team for discussion and treatment planning. Each patient underwent a pre-treatment dental assessment in the Centre for Dentistry, Queen's University Belfast, between the study period: 1st June 2013 until 30th November 2014. Data were collected for each patient from referral letters, written clinical notes supplemented with intra-oral radiographs, and Electronic Care Record. The data collected included:

- Basic demographic information: gender, age
- Medical history including smoking and alcohol consumption.
- Dental history: registration with a general dental practitioner, frequency of attendance.
- Head and neck diagnosis: initial referral source, site of tumour, date of diagnosis, date of first Multidisciplinary Head and Neck Oncology Team meeting.
- Head and neck treatment: combination of surgery/radiotherapy/chemotherapy, total radiation dose.
- Patient referral: date of referral, detail of referral.
- Dental assessment: date of assessment, clinical charting, dental diagnoses, radiographic report, dental treatment prescribed.

RESULTS

During the study period a total of 96 patients were referred to the Restorative Dentistry Department (n=96).

DEMOGRAPHIC INFORMATION.

The majority of oncology patients referred to the Restorative Dentistry Department were male (n=65) with smaller numbers of female patients (n=31). The mean patient age recorded was 66 years, with a range from 47 years up to 87 years.

MEDICAL AND SOCIAL HISTORY

In this study, 76 patients reported significant medical co-morbidities including cardiovascular disease and diabetes mellitus as described in Table 1. Large numbers of patients indicated high alcohol consumption and many were smokers *(Table 2)*. Patients consumed on average 25.9 units of alcohol per week and had smoked a mean of 40.5 pack years.

Table 1. Systemic co-morbidities of head and neck oncology patients.

Medical Condition	Percentage of patients (%)
Hypertension	29
Gastro-oesphageal reflux disease	25
Ischaemic heart disease	18
Diabetes mellitus	10
Valvular heart disease	7
Chronic obstructive pulmonary disease	6
Asthma	6
Hepatic disease	3
Hypothyroidism	3
Epilepsy	2
Bisphosphonate-medicated	2
Warfarin-medicated	2
Renal disease	1
Tuberculosis	1

Table 2. Smoking and alcohol consumption amongst head and neck oncology patients.

	Average Consumption (weekly units/pack years)	Percentage of patients with zero consumption (%)	Unknown consumption – not documented in notes (%)
Alcohol	25.9	17	24
Smoking	40.5	19	22

TUMOUR SITE AND INITIAL REFERRAL

Amongst the study group, the most common tumour sites recorded were the tonsils, oral cavity, oro-pharynx, and larynx *(Figure 1)*. 74% of patients were referred for initial outpatient assessment by their general medical practitioner prior to cancer diagnosis. 21% of patients were originally referred by their general dental practitioner *(Figure 2)*.

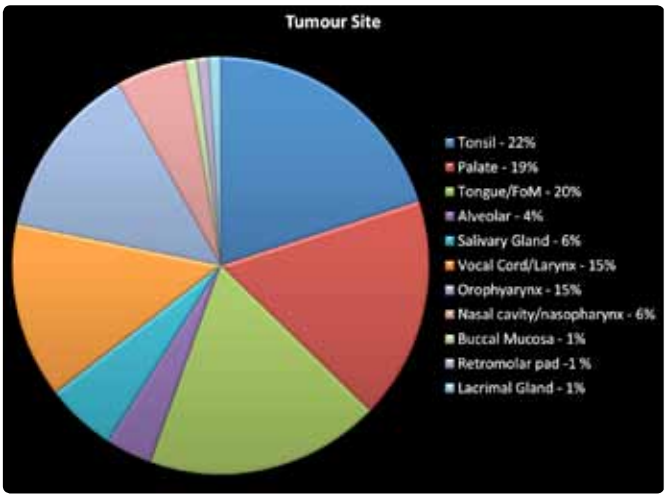

Figure 1: Site of primary tumour for all patients referred for oral screening.

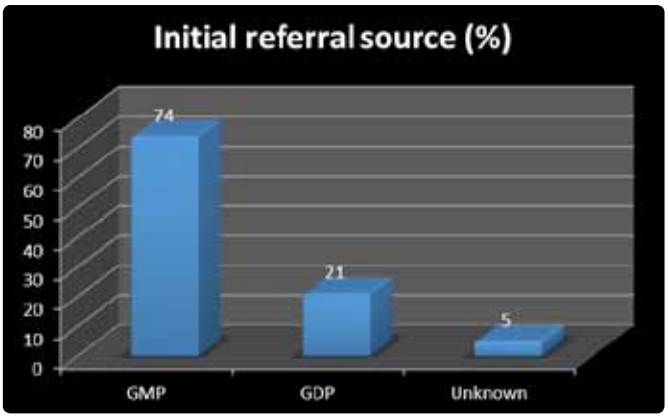

Figure 2: Referral source for all patients referred for initial outpatient assessment prior to cancer diagnosis.

DENTAL ASSESSMENT AND TREATMENT

43% of patients were diagnosed with caries, 46% periodontal disease, 10% apical pathology and 7% toothwear *(Figure 3)*. 36% required at least one restoration (mean = 3.6 restorations) and 4% required root canal treatment. 43% of the patient cohort required at least one extraction, with an average of 5.4 extractions per patient.

Fourteen patients were referred to their general dental practitioner for extractions prior to radiotherapy. The remainder of patients (n=27) had extractions completed within the Centre for Dentistry. 69% of extractions (n=19) completed within the Centre were carried out pre-radiotherapy (mean = 11 days prior to radiotherapy) with 31% of extractions completed post-radiotherapy (n=8). Eight patients had extractions completed within 10 days prior to the start-date for radiotherapy (6 cases within the Centre for Dentistry and 2 within primary care).

Table 3 demonstrates the contribution of different dental specialties and grades to completing the operative oral care for the head and neck oncology patients.

Table 3. Dental professions providing care for head and neck oncology patients.

Treating clinician	Percentage of patients (%)
Restorative Consultant	22
Oral Surgery Consultant	14
Restorative Staff Grade/SHO	17
General Dental Practitioner	45
N/a (OHI only)	26

Table 4. Frequency of attendance for those patients registered with a general dental practitioner.

GDP Attendance	Percentage of patients (%)
'Regular'	30
'3-monthly'	1
'6-monthly'	9
'Yearly'	6
'Not regular'	10
'As required'	1
Unknown/not recorded	42

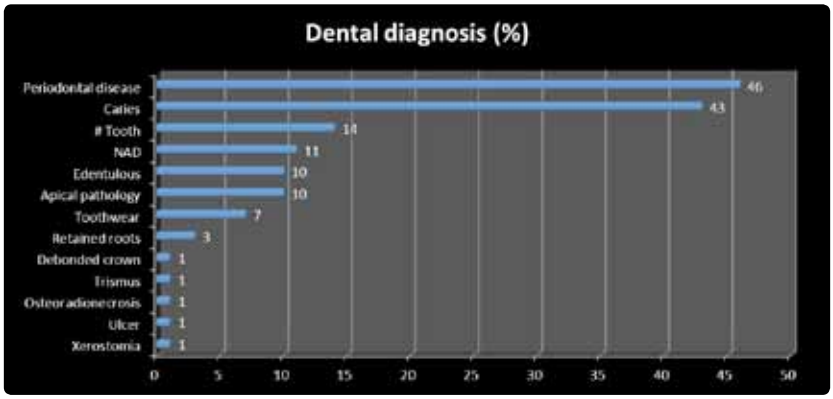

Figure 3: Dental pathology diagnosed for all patients referred for oral screening.

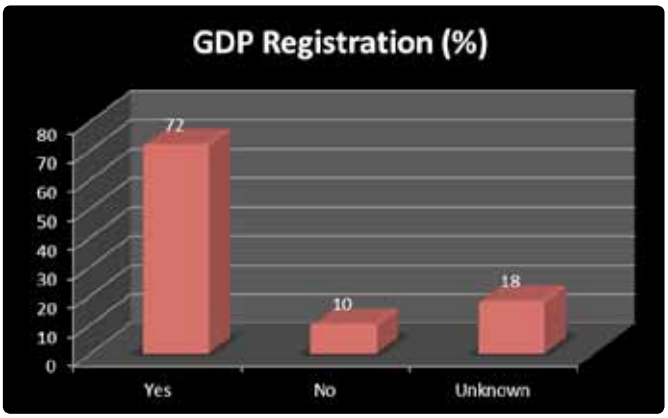

Figure 4: Levels of self-reported GDP registration amongst all patients referred for oral screening.

In total, 72% of patients indicated that they were registered with a general dental practitioner *(Figure 4)*, however, only 46% indicated that they attended on a regular basis *(Table 4)*.

DISCUSSION

Dental management of patients awaiting treatment for head and neck oncology can be challenging for both clinicians and patients. Timeframes for commencing treatment are often short and difficult to adhere to alongside other concurrent medical interventions such as scanning and imaging. The presence of moderate or severe systemic comorbidities has been shown to have a detrimental effect on head and neck cancer prognosis.[16] Furthermore, the formulation and implementation of a dental treatment plan may be constrained by a patient's medical or drug history. In this study, 80% of patients reported significant co-morbidities including cardiovascular disease *(Table 1)*. Possible implications could include the need for sedation or general anaesthetic to achieve adequate stress control in those with unstable ischaemic disease; or the need for tailored management of an anticoagulant regime for those requiring extractions. Both scenarios would entail intensive preparatory time in cases where the window for optimal dental treatment may be short. Other medical issues could include the risk of osteochemonecrosis, in addition to ORN, in patients needing extractions and who have been taking oral or intravenous bisphosphonates (2%); the prescription of pharmacological agents in those with hepatic and/or renal defects (4%); and the risk of opportunistic oral infections in diabetic patients (10%) undergoing further immunosuppression.

Alcohol and tobacco are well-established risk factors for head and neck cancer. They account for the aetiology in approximately 75% of all cases.[17] For some head and neck cancers, the risk for smokers is reported as ten times that of non-smokers.[18] For those who don't smoke, the intake of 3 or more drinks per day versus never drinking has been shown to double the risk of developing a head and neck cancer.[19] Combined alcohol and smoking consumption has also been associated with a greater than multiplicative increase in risk.[20] In this study mean alcohol consumption was 25.9 units per week. This exceeds previous government guidelines recommending a maximum weekly consumption of 21 units for men, and far exceeds the 14 units recommended for women.[21] More recent guidelines focus on daily rather than weekly consumption. Men and women are recommended to not regularly consume more than 3-4 and 2-3 units per day respectively.[21] For study participants the average number of pack years smoked was 40.5. Only 19% of patients were confirmed as 'never-smokers'. Given the risk posed by alcohol and tobacco, and the frequency with which dentists tend to review and treat patients, dental practitioners should be major players in the charges of smoking cessation and alcohol-intake reduction.

Studies on the dental health status of newly diagnosed head and neck cancer patients suggest that they often present with significant oral disease. In a 2014 UK study, Critchlow *et al.* assessed 100 patients prior to the start of head and neck cancer treatment and found that 71% had periodontal disease and a further 61% had one or more decayed teeth.[22] The mean number of carious teeth per dentate patient was 2.422. Other studies have demonstrated similar oral disease burdens for these patients.[23-26] According to the results of this study these findings are mirrored within the Northern Ireland patient cohort. High levels of dental disease were observed with obvious implications for arranging care to render patients dentally fit. In 31% of the cases reported in this study it was logistically impossible to arrange for extractions to be completed prior to undertaking radiotherapy so therefore they were completed after treatment. Through close working relationships with colleagues in primary care, the

majority of treatment was completed by the patient's general dental practitioner. This emphasises the importance of including primary care clinicians in the multidisciplinary management of patients undergoing treatment for head and neck oncology.

Further work is required, however, to encourage patients to attend their general dental practitioner on a regular basis. In this study whilst 72% of patients indicated that they were registered with a general dental practitioner, less than half actually attended on a regular basis. As well as providing regular oral cancer screening, regular attendance with a primary care clinician is vitally important to reduce the disease burden amongst this group of patients.

CONCLUSIONS

High levels of dental disease were observed amongst this patient cohort. Overall, 46% were diagnosed with periodontal disease and 43% with dental caries. Given the known aetiology of oral cancer it is not surprising that recorded levels of alcohol consumption and smoking were high and relatively small numbers of patients attended their general dental practitioner on a regular basis (46%). Given these patterns of disease, providing oral care to render head and neck oncology patients dentally fit in a timely manner continues to be a challenge for dental services in Northern Ireland.

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