CPD 1HR

Oral management of patients who have received radiotherapy to the head and neck region

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Head and neck cancer

Several thousand patients are diagnosed annually with head and neck cancer (HANC) in the UK, a significant proportion of all cancers that are diagnosed. Radiotherapy can be highly successful in managing HANC but also has several side effects in the oral cavity and associated structures. These sequelae present considerable short and long-term problems for dental professionals involved in the care of HANC sufferers.

Head and neck cancer is a collective term to describe a group of diverse malignant tumours affecting the upper aero-digestive tract. The term encompasses at least 30 different disease sites as described by the World Health Organisation (WHO) in their International Classification of Diseases and Health Related Problems (ICD 10).[1] The term HANC typically excludes other malignancies which may affect similar anatomical areas eg brain tumours, skin tumours or haematogenic malignancies.

A common site for the primary disease is the oral cavity which represents over 40% of global cases. Other common sites for the primary tumour include the pharynx, larynx, nasal cavity and paranasal sinuses. The vast majority of these cancers are squamous cell carcinomas (SCCs) with other histological types being individually rare.

Incidence and survival

Head and neck cancers represent 6% of all cancers that are diagnosed in the world.[2] Annually there are approximately 670,000 new cases that are diagnosed and 350,000 deaths worldwide. More than two thirds of new cases are reported in males although this disparity between genders has been slowly reducing over the last few decades.

The exact prevalence and incidence of HANC in the UK is hard to ascertain. This is because of a combination of incomplete reporting and fragmentation of the key data ie some data sets record HANC as a whole whilst others report data by histology or anatomical sites affected. Nonetheless estimates can be obtained from key documents.

In a one year period the Data for Head and Neck Oncology (DAHNO) recorded 6,133 new diagnoses of HANC in England and a further 325 diagnoses in Wales.[3] In a similar period there were another 1,173 new reported cases in Scotland.[4] This made HANC in Scotland the fourth most common cancer in men, the tenth most common in women and the fifth most common type of cancer overall.

The data also illustrate marked regional differences for HANC incidence and survival in the UK. For example, the incidence of HANC in males in the North Thames area is half the incidence of HANC in males in Scotland.[5] Similarly the one and five year patient survival figures for HANC are poorer in Scotland, Wales and Northern Ireland compared to more affluent regions of England.

HANC treatments

There are many different modalities available for treating cancers of the head and neck depending on parameters such as the site, TNM stage, grade, co-morbidities etc. Although surgery is the oldest and most common form of treatment, especially in the oral cavity, it may not be indicated or even possible for some forms of HANC.

Radiotherapy (radiation therapy) is defined as: '*... the use of high-energy radiation from x-rays, gamma rays, neutrons, protons, and other sources to kill cancer cells and shrink tumours...*'[6]

It has been used to treat patients diagnosed with cancer soon after X-rays were first discovered by Wilhelm Conrad Rőntgen in 1895.

Modern radiotherapy has been shown to have similar success in treating HANCs when compared to surgery if the lesion is at an early stage. Indeed, radiotherapy is now considered to be superior to surgery in many HANCs and is the primary treatment modality in patients with cancers of the pharynx and larynx. Radiotherapy may also be used in combination with surgery to improve clinical outcomes, especially if a clear margin of healthy tissue has not been excisable around the tumour or where there is involvement of the regional lymph nodes. Finally, radiotherapy may be used alone or in combination with chemotherapy (chemo-radiotherapy) as palliative treatment in

Table 1 The core clinical members of the multi-disciplinary team (MDT) for the management of HANC as advised by the National Institute of Health and Clinical Excellence (NICE)

HANC surgeons
Clinical oncologist
Restorative dentist
Pathologist
Radiologist
Clinical nurse specialist
Speech and language therapist
Dietitian
Palliative care specialist

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patients with advanced disease and/or otherwise unmanageable symptoms ie pain control.[7]

The restorative dentist is an integral part of a wider multi-disciplinary team (MDT) whose remit is to diagnose, manage and rehabilitate patients who have been diagnosed with HANCs (Table 1).[8,9] Their role is to work with other team members to provide prompt advice and treatment at all stages of the patient pathway from diagnosis to discharge.[10,11] The restorative dentist is often the clinician who will be seeing the patient long after their discharge from the care of the surgical and oncology team.

This article outlines the dental professional's role in the management of these patients from pre-radiotherapy dental assessment to the management of the radiogenic oral side-effects.

How radiotherapy works

Ionising radiation has the potential to cause damage to any component of a cell. The therapeutic effects of ionising radiation are affected through direct damage to the DNA of the cell or indirectly by damage to the DNA caused by free radicals released by the interaction of water and radiation. Once irreparable damage has been caused to the single or double stranded DNA the cell loses its ability to sustain cell division. If all the cells of a tumour are sterilised and lose their proliferative potential then the tumour will be cured. If partial sterilisation has occurred then the tumour will be in stasis or regression but will have the potential to re-grow when the cells regain their proliferative potential.

This damage is not, however, limited to cancer cells and thus radiotherapy has significant effects on the integrity and function of healthy cells. Similar to the effects on cancerous cells the injury to healthy cells is dose related. This dose-response relationship in healthy tissue is fundamentally dependent on the survival of the tissue's stem cells and the immediacy of the response is related to the turnover of its mature cells. For example, epithelial tissues such as the oral mucosa have a rapid cell turnover and thus frequently exhibit *acute effects*, often within days. Organs or tissues with a slower cell turnover eg bone, tend to experience *late effects* which can take months or years to manifest. It is often the risk of severe *late effects* that limits the dose of radiotherapy.

How radiotherapy affects the oral cavity

A large proportion of HANC patients present with a primary tumour in the oral cavity. Many of these tumours will be removed surgically with or without surgical reconstruction. Some of these patients, however, will not be able to have complete removal of their tumour or will not be fit for surgery and thus will require radiotherapy to the oral cavity.

These patients receive a significant dose of ionising radiation to the oral cavity (60 Grays plus) and often present with significant *acute* and *late* side effects that require the help of a dentist.

There is a larger cohort of patients who also receive radiotherapy due to a primary tumour in another part of the head and neck area but have the side effects of this presenting in the oral cavity.

The oral sequelae of radiotherapy to the head and neck region are well documented and include the following.[12]

Mucositis

Mucositis can simply be described as an inflammation of the mucosa and can occur anywhere in the alimentary canal. Ionising radiation is known to commonly cause this especially in the oral mucosa where it is described as radiation-induced oral mucositis. Patients who receive radiotherapy for an oral or oro-pharyngeal lesion inevitably develop oral mucositis which can be severely debilitating and in severe cases can limit the radiation dose. It is now believed to be caused by radiation-induced damage to the basal cells of the oral epithelium rather than direct superficial cell injury. Clinically oral mucositis follows a relatively predictable path presenting as erythema, atrophy, ulceration and eventual healing. The most commonly reported oral areas that are affected are the buccal mucosa, floor of mouth and the soft palate but there are no areas that are immune. It is worthy of note that the affected area may be in the pharynx or upper digestive tract and although not clinically visible may still severely limit a patient's ability to swallow. Oral mucositis usually appears early on in a radiotherapy regime and is often the first acute side effect. Its early signs are known to appear with as little as 10 Grays cumulative radiation dose which is often reached within the first week in a standard course of radiotherapy for a HANC.

> 'This damage is not limited to cancer cells and thus radiotherapy has significant effects on the integrity and function of healthy cells.'

Fig. 1 A patient who sipped lemon squash and in six weeks lost his entire dentition

Recent Cochrane Collaboration reviews have found that the quality of evidence available for the prevention and treatment of oral mucositis is relatively low. There is some evidence that patients may benefit from the use of ice chips and keratinocyte growth factor (Palifermin) in the prevention of oral mucositis and Sucralfate to reduce its severity.[13] Use of a low level laser has also been demonstrated to benefit patients who have severe mucositis and may reduce the amount of analgesia required.[14]

Taste disturbance

Taste disturbance is a commonly reported sequela of radiotherapy to the head and neck region and affects up to 90% of patients to some degree.[15] It is predominantly caused by direct radiation damage to the thousands of taste buds that are distributed around a patient's lips, tongue, oral cavity, pharynx, upper oesophagus and nasal cavity. Further changes in taste perception are caused by a reduction in the quantity and quality of the saliva as well as opportunistic infections as discussed below. Taste disturbance develops early on in the treatment regime and peaks at 4-8 weeks. Taste disturbance can be broadly caused by three phenomena:

- Hypogeusia – a reduction in overall taste
- Dysgeusia – a distortion of normal taste. Bitter and salt are the most common tastes that are perceived to be reduced during and after radiotherapy
- Ageusia – an absence of taste.

Most patients recover their taste perception after their radiotherapy regime has been completed, however, a partial taste disturbance has been reported up to seven years post-treatment.[16] See Figure 1.

Opportunistic infections

The healthy oral cavity is able to support a variety of microbiota with more than 700 taxa isolatable using modern techniques. These are commensal organisms but may initiate or progress pathology if there are changes in environmental conditions such as those caused by the direct effects of radiation therapy (on other species) or indirectly (by causing mucositis, hyposalivation etc).

Common opportunistic infections during and after radiotherapy are summarised in Table 2.

Table 2 Common oral fungal, bacterial and viral infections seen in HANC patients treated with radiotherapy

Fungal infections	Candidiasis, aspergillosis, blastomycosis, etc	
Bacterial infections	Odontogenic	Caries, pulpal infection, pericorinitis
	Periodontal	Necrotising ulcerative gingivitis or periodontitis
	Other	Bacterial sialoadenitis
Viral infections	Herpes simplex, zoster, cytomegalovirus etc	

Xerostomia and salivary hypofunction

Salivary gland tumours are relatively rare and constitute only 5% of all HANCs. These patients are often treated with complete or partial surgical removal and/or radiotherapy and unsurprisingly suffer a degree of salivary hypofunction.

> 'Oral mucositis usually appears early on in a radiotherapy regime and is often the first acute side effect.'

The majority of patients, however, suffer xerostomia or salivary hypofunction due to radiotherapy for cancers of unrelated structures and thus as a direct side effect of treatment. In low radiation doses (less than 30 Gray) it is believed that damage may be reversible although in higher doses (more than 75 Gray) significant degeneration of the acini are seen with concomitant inflammation and fibrosis of the interstitium.

It is worth noting that salivary hypofunction can be described as an objective finding of the reduction in saliva from one or more gland and should be distinguished from xerostomia which is the subjective feeling of oral dryness regardless of objective findings.[17]

In a recent survey of 75 patients who had completed radiotherapy to the head and neck region more than six months prior to the study, 70 (93%) complained of continuing xerostomia and 40 (53%) complained of severe xerostomia. This questionnaire-based study also found that xerostomia had a significant negative impact on patients' lives including causing 'worry', 'tension' and 'depression'.[17]

In addition to the direct effects of xerostomia the reduction in saliva may also compromise a patient's ability to maintain an adequate peripheral seal around a removable prosthesis.

Trismus

It is unclear what proportion of HANC patients suffer from trismus (limited mouth opening of any cause) with estimates varying from 5 to 38%. The reason for this large range is primarily due to the lack of consensus as to when a patient has restricted mouth opening, disagreement about the range of normality and variable follow up periods. The authors suggest that the normal range of mouth opening is between 35 and 60 millimetres with significant variation within a healthy population.

Radiation damage to the TMJ and contiguous structures causes scarring and fibrosis of the muscles and ligaments leading to gradual reduction in opening beginning at about six months post-treatment. Trismus is usually seen as a late effect of radiotherapy due to the relatively slow turnover of the affected cells.

A recent UK based study found that there are several predictors of trismus in HANC patients including the size of the primary tumour, the type of surgical reconstruction and the use of radiotherapy.[18] Most significantly, radiotherapy to the TMJ and/or the pterygoid muscles may reduce mouth opening by 18%.[19] See Figure 2.

Osteoradionecrosis of the jaws (ORNJ)

Osteoradionecrosis has several descriptions though the most commonly accepted one in the UK is when '*...the irradiated bone becomes devitalised and becomes exposed through the overlying skin or mucosa without healing for three months, without recurrence of tumour...*'[20]

With the exception of a recurrence of cancer ORNJ is one of the worst clinical scenarios that can occur in a HANC patient. Historically it was thought to be a combination of radiation, trauma and infection though Marx suggested that ORNJ is a function of wound healing

Table 3 A summary of the suggested pathophysiology of osteoradionecrosis of the jaws (ORNJ)

Radiation
↓
Hard and soft tissues become damaged (hypoxic, hypocellular and hypovascular)
↓
Traumatic or spontaneous breakdown of tissue
↓
Inability for tissue to heal as metabolic demand is greater than supply
↓
Chronic non-healing wound
↓
Super-infection with oral commensal bacteria
↓
Painless non-healing area of exposed bone

with subsequent super-infection with oral commensal bacteria.[21] Thus the ORNJ disease process is now believed to affect the oral mucosa and the bone in which inadequate mucosal healing from trauma leads to soft tissue and bone necrosis (Table 3).

There are varying estimates on the incidence of ORNJ depending on the country, time of follow up and treatment modality but a recent 30 year retrospective review of 830 cases found that the overall incidence was 8.2%.[22]

The mandible accounts for approximately 95% of all cases of the ORNJ because it has a relatively compromised blood supply compared to the maxilla and receives a larger cumulative radiation dose in most radiotherapy regimes due to the likely location of the tumour. The

posterior mandible is particularly vulnerable to ORNJ and accounted for 77.5% of all cases in one study.[23]

Clinically ORNJ is often painless at first and in some cases may remain this way until resolution of the lesion. In severe cases, however, patients may suffer intractable pain, dysaesthesia, fistulisation of the mucosa or pathological fracturing of bone (Fig. 3).

The dentition

Ionising radiation is able to cause both direct and indirect damage to the hard and soft tissues of a tooth. The reasons for the radiogenic damage to these structures are still contentious but believed to be mediated by disruption of pulpal collagen and degeneration of the odontoblastic processes causing fragility at the amelo-dentinal junction.[24,25] Indirect damage to the dentition is caused by caries precipitated by changes in the saliva, taste sensation, nutrition etc as summarised in Table 4.

Radiation caries is a unique rapidly progressing form of the disease which can be seen within several months of the onset of treatment. In severe cases it can leave a patient without a functioning dentition within a year.

Classic radiation caries is painless and affects surfaces and teeth that are normally resistant to caries such as the labial surfaces of incisors. It rarely begins beneath the contact point as seen in the majority of carious lesions and is commonly seen initially in the cervical areas which progress until the crown of the tooth becomes unsustainable under occlusal loading. Often the crown then fractures at its base leaving painless carious root stumps. It is the authors' view that these asymptomatic carious roots can be maintained almost indefinitely without further caries progression or periapical pathology (Fig. 4).

The periodontium

The supporting structures of the tooth are believed to be affected in a similar way to that of other oral tissues. The periodontium in irradiated areas of the mouth shows hypocellularity, hypovascularity and increased collagen production causing fibrosis. The cementum can become totally acellular and loses its ability to repair or regenerate and Sharpey's fibres may become disorientated.

This results in an overall reduction in the periodontal tissues' ability to resist infection and can result in localised bone destruction or even osteoradionecrosis. Furthermore, the loss of salivary protection along with an ecological shift in the oral bacteria can predispose to progressive periodontal destruction.[26]

Table 4 A summary for the suggested causes of radiation caries in HANC patients

A combination of the following factors is believed to cause radiation caries:
Reduction in the quantity of saliva
Reduction in the quality of saliva
Changes in taste perception requiring consumption of highly flavoured foods
Changes in nutritional status requiring consumption of highly calorific foods
Ecological changes to the oral microbiota
Direct radiation damage to the dentition

Table 5 A summary of the information required from the other members of the HANC MDT to allow a comprehensive pre-radiotherapy dental assessment and plan

Patient's demographic details
Scheduled time of pre-radiotherapy dental assessment
Name of surgeon
Name of clinical oncologist
Diagnosis of cancer with TNM staging
Prognosis for cancer
Type of radiotherapy prescribed ie external beam, IMRT, chemo-radiotherapy
Total cumulative dose
Fractions of radiotherapy
Field of direct radiotherapy with details of cumulative dose in Grays outside of this field
Scheduled time of commencement of radiotherapy

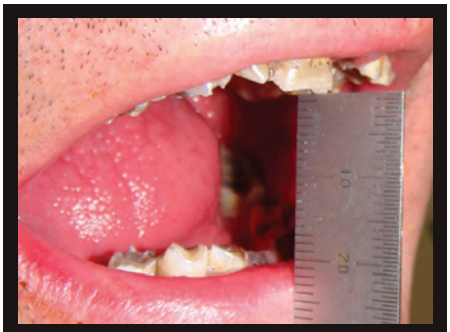

Fig. 2 Limited mouth opening of 19 mm

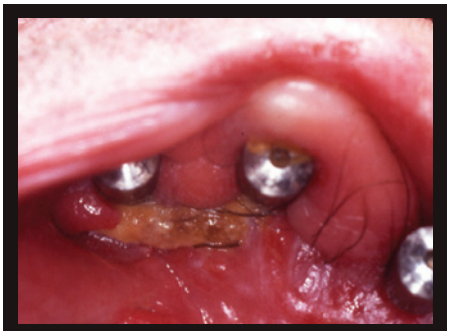

Fig. 3 Osteoradionecrosis around dental implants

Fig. 4 Classic radiation caries on labial surfaces of teeth

The pre-radiotherapy assessment

A typical pre-radiotherapy assessment request is instigated by the head and neck oncology surgeon or the clinical oncologist. The patient should ideally be referred promptly after the diagnosis of cancer has been provided by one of the MDT with details of the cancer and proposed treatment (Table 5).

The role of the dentist at the pre-radiotherapy stage is manifold and includes the following.[10,27,28]

The need for a pre-radiotherapy assessment and the role of the dentist in the MDT

In a recent study of 207 Brazilian patients who were assessed prior to radiotherapy 135 patients were dentate and 72 were edentate. Of the

Table 6 Important points to consider in the risk versus benefit decisions to extract or not extract teeth

	Factors favouring extraction	Factors not favouring extraction
	←	→
Patient's prognosis	Poor	Good
Likelihood of delay of radiotherapy	Low	High
Patient's wishes on extraction	Prefers to extract teeth	Prefers not to extract teeth
Patient's dental awareness	Low	High
Patient's dexterity	Low	High
Patient's wishes on prosthodontic replacement	Unlikely to desire prosthodontic replacement	Likely to desire prosthodontic replacement
Tooth prognosis	Hopeless	Excellent
Arch	Lower	Upper
Tooth position	Posterior	Anterior
Strategic value of tooth	Low	High
Likelihood of xerostomia	High	Low
Likelihood of trismus	High	Low

Table 7 A summary of the oral disease prevention advice that should be provided to patients prior to the start of their radiotherapy regime

Oral disease prevention advice:
• Smoking cessation advice if appropriate
• Reduction in the frequency of refined sugars
• Use of a high fluoride toothpaste eg Duraphat 5000 ppm
• Use of an alcohol free fluoride daily mouthwash
• Use of a fluoride tray eg with Oral-B pro-enamel expert
• Appropriate mechanical oral hygiene advice eg the modified bass technique, interdental and interspace brushes
• Dry mouth relief eg Biotene Oral Balance system, Saliva orthana, BioXtra, Saliveze, Xerotin or sugar-free chewing gum NB: Glandosane should NOT be prescribed for dentate patients
• Mucositis relief eg ice chips, Palifermin, Sucralfate.

dentate patients 120 (88.9%) had evidence of dental pathology. The commonest pathology noted was peridontitis (63.0%), residual roots (32.6%) and caries (18.5%).[29]

Although UK HANC patients rarely present with this volume of pathology their dental needs have been noted to be high with regular dental attendance uncommon.[30]

Unfortunately, a pre-radiotherapy dental assessment is still not commonly available for HANC sufferers. The National Head and Neck Cancer Audit 2010 reported that only 8.5% of registered HANC patients had a pre-radiotherapy assessment and that this is likely to be a reflection of a lack of restorative dentists available to the HANC MDT.[3] This is far short of the British Association of Head and Neck Oncologists' (BAHNO) recommendation that every patient, not just those planned for radiotherapy, should have a dental assessment.[31]

The MDT should be responsible for ensuring that specialised dentistry is available for all patients who require it. Expert dental assessment and treatment is important both before and after treatment, especially when radiotherapy is being considered.[8] Many of these patients have complex needs that cannot be adequately met by primary care dental services. A consultant with experience in maxillofacial prosthetics and implantology is required to manage patients who need oral rehabilitation. This consultant should co-ordinate the dental care of patients after treatment by liaison with primary care dental practitioners.[8]

Experience dictates that this is often a difficult dental appointment for the patient and the clinician. The patient is often in a state of shock or denial about the diagnosis that they have just been given which may manifest as stoicism, hysteria, aggression or even apparent apathy. Patients often later admit that they have little or no recollection of the information provided to them at this appointment or even of attending the appointment at all. This is quite understandable as the patient would have been inundated with recent information and thus the authors strongly advocate clear, concise information, directed partly at any carer, and reinforced with written information and a summary letter.

The patient should firstly be advised why they are being examined by a dentist prior to their radiotherapy as it may seem unrelated to their diagnosis of cancer. They should also be told that they are likely to see the dental team at least until the end of their radiotherapy regime and possibly for several years after.

A standard history should then be taken including current and recent complaints, medical diagnoses, social history and dental history. This should be supplemented by a thorough oral and dental examination, special tests to allow definitive dental diagnoses and prognoses for individual teeth.

The patient should then be advised about the likely effects of radiotherapy to their oral and dental structures with particular reference to the sequelae outlined above.

Short-term recommendations for disease control prior to and during radiotherapy

The authors recommend that teeth of guarded long-term prognosis or worse should be removed if they are in the direct field of radiotherapy. In addition the authors recommend removal of teeth that are unopposed or will become unopposed after extraction of other teeth. This is primarily to prevent the need for post-radiotherapy extraction which predisposes a patient to ORNJ. This affects 7% of all patients who require dental extractions after they have had their

jaws irradiated. This risk of ONRJ is highest for mandibular teeth in areas that have received more than 60 Grays of radiation.[32]

The decision should be made on an individual patient basis with careful analysis of the risks and the benefits of extraction (Table 6). Due to the subjective nature of the decision, however, there is significant variation amongst dentists in the UK regarding the need for pre-radiotherapy dental extractions with some favouring a more cautious approach. In patients receiving radiotherapy to the posterior part of their mouth this often means that patients will be left with a shortened dental arch which has been shown to provide adequate function for the majority of patients.[33,34]

Recommendations for extractions are often not well received by the patient and/or their carer, which is very understandable. It is often perceived as adding 'insult to injury' on a day that they have been told about a life changing diagnosis.

The patient's remaining teeth should be restored if required and any removable prostheses adjusted to allow adequate cleaning and prevent trauma to the oral tissues.

The patient should be provided with prevention advice on how to maintain their oral health during and after radiotherapy as outlined in Table 7.

Finally, the patient should be provided with regular appointments with an oral health educator and/or a dental hygienist whose primary role is to reiterate the advice given to the patient and help mitigate the effects of radiotherapy to the oral tissues.

Long-term recommendations regarding oral health maintenance post-radiotherapy and any oral rehabilitation

The patient should be reviewed three months after the cessation of radiotherapy or sooner if the patient desires. At this appointment the dentist should check the patient's understanding and compliance of the suggested oral health regime and answer any questions in relation to it. This should be followed by a thorough oral examination to evaluate any new pathology or local recurrence.

The patient is also likely to have questions relating to their long-term oral rehabilitation. This is especially the case if multiple pre-radiotherapy extractions have been prescribed of posterior teeth or the extraction of any anterior teeth.

The details of the prosthodontic rehabilitation of a post-treatment radiotherapy patient is beyond the scope of this article and we refer the reader to recent instructive articles.[35,36]

In general, however, many patients accept that the risks of prosthodontic rehabilitation of the posterior teeth outweigh the benefits if that area has been irradiated. The authors' experiences also suggest that irradiated patients are unlikely to wear upper and lower Kennedy Class 1 removable partial dentures. Nonetheless, they can be fabricated to aid chewing function and cosmesis in a patient who is able to maintain effective plaque control on the prostheses and their remaining teeth.

Fixed prosthodontic rehabilitation is often complex in irradiated patients and fraught with the increased risks of failure and its sequelae. Conventional bridges are rarely indicated because of their destructive nature and the consequences of radiation caries and periodontitis on the abutments.

Adhesive bridges can be used to restore anterior teeth if the abutments are minimally restored. Alternatively four distally cantilevered bridges may be provided from the premolar teeth to give the patient two more occluding units.

Implant placement in irradiated bone should be approached with caution and is reported to have a lower chance of osseointegration.[37] Nonetheless, if implants are to be used in the oral rehabilitation then many centres advocate primary placement ie at the time of surgery or placement soon after the end of radiotherapy. This is because the changes that occur in bone are *late changes* and are irreversible. The radiation has both direct and indirect effects on the micro-vasculature causing hyperaemia, endarteritis and vascular occlusion. Eventually the endothelium may atrophy with a significant reduction in osteoblast, osteoclasts and their pre-cursor cells. Thus the earlier the implant fixtures are placed in the jaws the more vascular and cellular the tissue is and the lower the likelihood of ORNJ and implant failure.

There is limited high quality research evidence on the immediate placement of implants during surgical reconstruction, however, a lower chance of osseointegration has been reported and a significant number of the integrated fixtures are likely to be suboptimally placed or unusable.[38,39]

Conclusion

There are more than 7,000 new head and neck cancers diagnosed annually in the UK. It is one of the more common sites for cancer and there are significant regional variations in incidence in the UK.

Radiotherapy is a common treatment modality for HANCs and is the treatment of choice in areas where organ preservation is important eg larynx and pharynx. It also plays a significant role in the post-surgical treatment of HANC to reduce recurrence or symptomatic management of patients who have untreatable disease.

Unfortunately radiotherapy affects healthy tissues as well as cancers. In the oral cavity this may present as:

- Mucositis
- Taste disturbance
- Opportunistic infections
- Xerostomia and salivary hypofunction
- Trismus
- Osteoradionecrosis of the jaws (ORNJ)
- Caries
- Worsening periodontitis.

Dental professionals play an important part in the care of HANC sufferers before, during and after radiotherapy.

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VITAL READER PANEL

Steph Horner,
Dental Nurse/Decon Lead

During my career as a dental nurse, one of the surgeons I have worked alongside treated patients who were post HANC surgery. A few had had extensive surgery and required intricate reconstruction.

Seeing patients shortly after their procedure is often an emotional appointment. It's likely to be the first time they have returned to you and there has been an immense change for them, both physically and mentally. For the patient that has had to have a large tumour removed they are quite likely to be wearing some sort of prosthesis; this may well be a complex and extensive obturator. Removing this for the dental team can be a sensitive moment; after all any involvement in a person's medical well being is an invasion of privacy and I strongly believe that extends to dentistry. It's also quite likely that the team were their first port of call when an unusual lesion was originally noticed and returning to the scene of the crime, so to speak, isn't always looked upon in a favourable light. It's early days in the patient's rehabilitation so care and support need to be given. Your dentist will probably be concentrating mainly on the practical aspects of their patient's treatment so as the nurse this falls to you. Gauging the appropriate amount can be difficult as every patient has a different way of coming to terms with the distress they have had to endure. For some the experience of overcoming cancer can be overwhelming and they find it difficult to function on a day to day basis. Others remain incredibly strong and positive. Whichever way your patient leans it's important to remember that they may not always feel this way, so your ongoing attention to their welfare needs to be monitored for some time to come. My patients have been kind enough to express to me what a source of comfort the practice and I have been to them and their relatives during this period of adjustment.