



Important Information for Patients Who Receive Radiation Therapy to the Head & Neck Region

Therapeutic Radiation & Oral Health

This leaflet should be given to patients attending the Head and Neck Cancer Oral
Care and Rehabilitation Clinic

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Introduction

You have been referred for a dental assessment prior to your planned radiation treatment.

We will always strive to ensure that you are seen as close to your appointment time as possible. However as we often have to see patients on an emergency or short notice basis, your understanding of delays is appreciated.

Radiation treatment can cause dental complications in the long term. Teeth that are in poor condition, are in the radiation area or are next to the tumour area should be removed before radiation treatment begins.

It is important that you follow the advice given regarding dental care and that you continue long-term follow-up as recommended by your dentist.

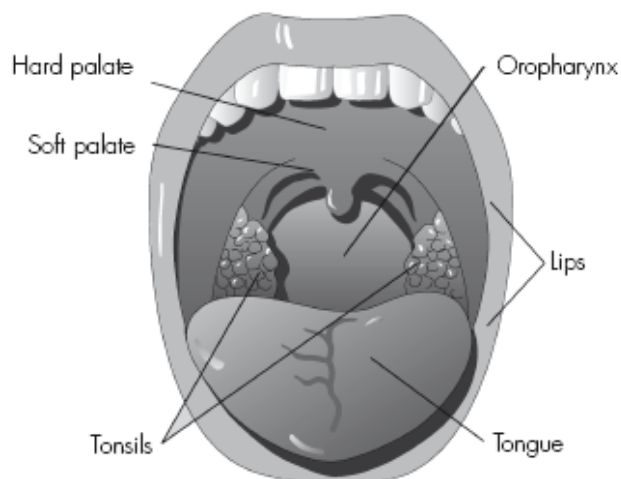
Here are some guidelines for keeping your mouth and teeth healthy:

- Daily brushing & flossing of your teeth.
- Avoid sugary food or drink – read labels on packaging to find “hidden” sugars
- Daily jaw exercises to maintain mouth opening –your dentist will advise you
- Do not smoke
- Regular attendance with your dentist and dental hygienist for routine dental care
- Keep your mouth moist and lubricated



Effects of Radiation Treatment on the Oral Tissues

Along with the benefits of radiation treatment for oral cancers, there may be associated short-term and long-term changes for tissues in the “field” or “area” of treatment.



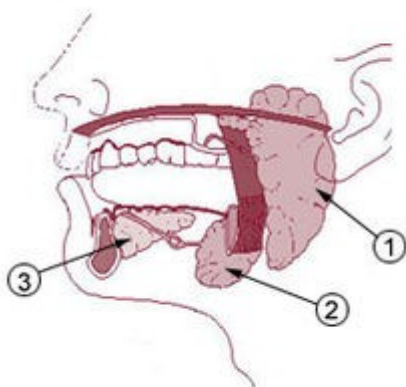
Short-term effects are mainly:

- Soreness of the mouth, throat and skin – this is called mucositis.
- Difficulty swallowing - this normally happens from second week of radiotherapy onwards.

These effects, which may be severe during treatment, tend to resolve after treatment.

Long-term Effect of Radiation Treatment on Salivary Glands:

Saliva is produced by the salivary glands. The **main salivary glands** are located on each side of the face and below the lower jaw. The function of saliva is to lubricate the mouth for speaking, eating and swallowing and protect the teeth from decay through its cleansing and soaking action.



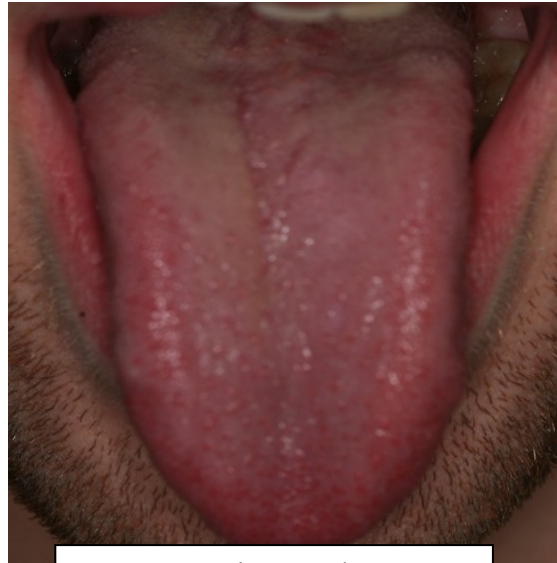
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| <ol style="list-style-type: none"> 1. Parotid gland 2. Submandibular gland 3. Sublingual gland |
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If the salivary glands are in the “field” of radiation treatment, the ability to produce good quantity and quality of saliva is decreased due to unavoidable damage. The effect of this may be long-term or permanent dry mouth.

The reduction of saliva flow after radiation puts you at a high risk of developing dental / tooth decay – called radiation decay, which can rapidly lead to dental extractions.



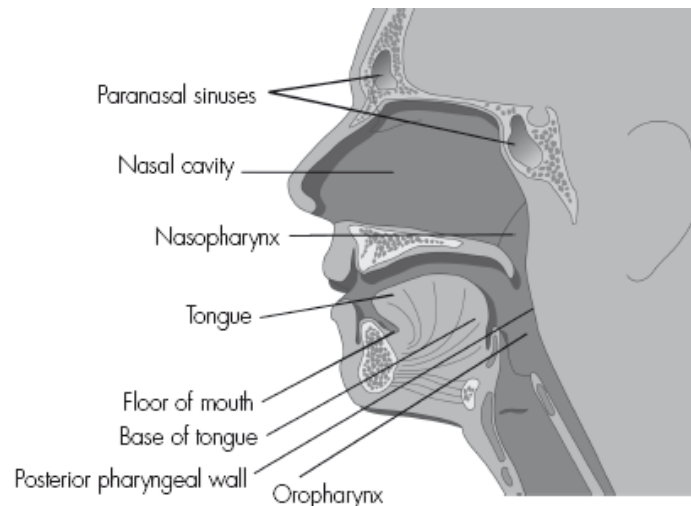
Dry mouth



Moist mouth

Long-Term Effects of Radiation Treatment on the Jawbone:

The normal healing processes and nourishment of the jawbone is provided through the generous blood vessel supply throughout the jawbone. If the jawbone has been in the “field” of radiation treatment, this important blood supply is decreased. Therefore, there is a decreased healing of this area of bone in the event of any injury such as a dental extraction, infection or surgery. It is vital to avoid, where possible, any procedure which might cause trauma to the area of irradiated bone. The resulting infection which may develop following trauma is called osteo-radio necrosis i.e. a serious infection of bone which heals with difficulty.

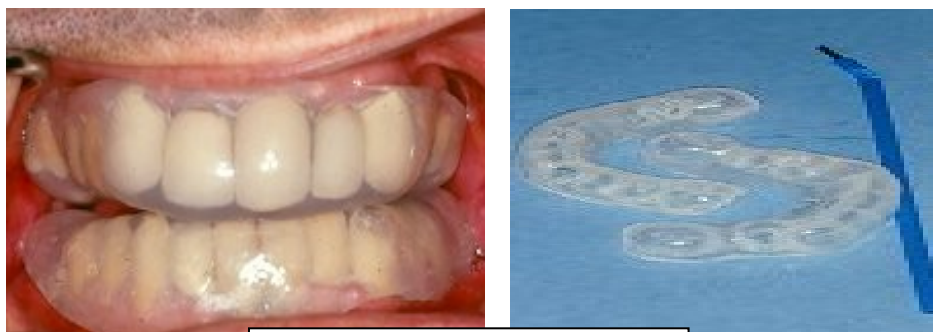


Dental Treatment Before Radiation

In order to reduce the risk of bony injury or infection following radiation, diseased teeth should be extracted before radiation treatment. Every effort is made to retain teeth and **you** must keep your remaining teeth in the best possible condition.

1st or 2nd Visit

- Dental Assessment including radiographs (x-rays)
- Your dental treatment plan will be discussed with you and agreed
- Your saliva flow will be measured
- Impressions for medication trays and/or radiation stents will be taken. A **medication tray** is an appliance to apply fluoride or chlorhexidine gel to the teeth to prevent dental decay.



Medication trays

- A **radiation stent** positions the jaw during radiation to reduce radiation effects on healthy tissue.



Radiation stent

- Teeth in poor condition will be extracted, especially teeth in the radiation field.

3rd Visit

- You will receive dietary, oral hygiene and smoking cessation advice
- The medication trays and/or radiation stents will be fitted
- Your teeth will be scaled and polished to remove tartar (where dental plaque calcifies and becomes hard)



- You will be shown how to do **jaw stretching exercises**, only if required.



3 Finger Test



Therabite

Dental Treatment during Radiation

How to look after your mouth during radiation treatment

Radiation treatment to your mouth and throat will make it sore and swollen and you will be prone to oral infection. This is called “mucositis”. It is very important to keep your mouth clean. The effects of radiation on your mouth may be severe during treatment but the soreness will stop after completion of treatment.

If you have your own teeth, you should:

- Brush your teeth gently using a soft toothbrush (e.g. TePe Special Care)
- Rinse your mouth daily with a mouthwash made from (new mix everyday):
 - 1 level teaspoon of soda bicarbonate (bread soda)
 - Diluted in ½ litre of tepid water
- Instructions for rinsing your mouth:
 - Rinse your mouth before & after eating
 - As treatment progresses you may find it more comfortable to rinse your mouth hourly.
 - Use 2 or 3 mouthfuls & do not swallow
 - Follow these instructions until your mouth has healed fully. This may take 6-8 weeks following your radiation treatment.
 - Do not use any other mouthwash unless advised by your doctor or nurse in the radiotherapy department.
- Suck an ice cube which may help with soreness in your mouth (mucositis)
- Use a diluted chlorhexidine mouthwash (Perio Kin or Corsodyl available from chemists) to control infection
- Use your fluoride/chlorhexidine trays if your mouth is not too sore. See information on page 7.

If you have dentures, you should:

- Clean your dentures with a soft toothbrush after use. Remember dentures, like teeth, need to be cleaned both morning & night.
- Leave dentures out of your mouth and soak overnight in a recommended denture cleaner
- If your dentures are not fitting properly or feel uncomfortable, leave them out.
- Radiotherapy may alter the muscles around your mouth. If you have had surgery to your mouth you may notice that your dentures don't fit well. Wait 3-6 months before getting a new set.
- If you have a dry mouth, it is more difficult to wear your dentures. Put a thin film of chlorhexidine gel onto your denture before placing it in your mouth.
- The muscle changes in your mouth may be associated with a reduction in your mouth opening and it is important that you do jaw stretching exercises everyday. Use your own fingers as a measure of your mouth opening.

Dental Treatment After Radiation

You must attend your dentist following completion of your radiation

It is very important that you keep your mouth and teeth healthy. You may experience the following problems after radiation:

- Dry mouth – your mouth may be partially or completely dry
- Dental Decay – often called **radiation decay** – can develop very quickly



2009



2011 – post radiation
dental decay



2012

- Risk of osteo-radio necrosis of the jaw bone
- Periodontal (gum) disease

Safe Dental Procedures following radiation

- Routine cleaning and dental hygiene methods
- Routine restorations such as fillings & crowns
- Routine endodontic (root canal) treatments
- Carefully made dentures to avoid overloading the gums and remaining teeth
- Daily use of fluoride/chlorhexidine containing trays. This is to prevent dental decay and will be provided by the dentist. You should start this treatment as soon as possible and continue long term.

Unsafe Dental Procedures following radiation

- Any procedure, which may cause injury to the jawbone. For example: extractions or surgery in the radiation area, dentures causing pressure.
- If a dental extraction is required this may be carried out here at the Dublin Dental School and Hospital. Antibiotic cover will be provided if the tooth is in the radiation field.
- There is no difficulty with any of these procedures in areas outside the field of radiation.

Always remember the following information

- Radiation damage to the jawbone is permanent. Advise your general dentist of your radiation. Always advise your dentist of your medical history.
- You must attend your general for regular check ups and routine dental care
- You will be advised if you are required to attend the Dental School & Hospital for yearly review

Appointment visits following radiation treatment

You will require dental assessment following your radiation treatment and this should be after 1 month, 6 months, 1 year & 2 years. Please continue to attend your own dentist.

The following will be checked for on these follow up visits:

- Dental decay & periodontal (gum) disease
- *Periodontal (gum) diseases include gingivitis (bleeding gums) & periodontitis - destruction of the tissues that hold the teeth in place (gum, bone, ligament).*
- Dietary & oral hygiene advice
- Jaw stretching exercises if required
- Your salivary flow will be measured

Dry Mouth

Some more information on Dry Mouth

Dry mouth is a side effect of radiation treatment on the saliva producing glands. It usually starts during or immediately following radiation treatment. Depending on the level of saliva gland injury some of your saliva flow may return over the following year. The dryness may be a result of reduction or total absence of saliva. Dry mouth makes eating, opening, speaking, swallowing and sleeping difficult.

The following suggestions may help:

- ✓ Take good care of your mouth and keep it clean. Saliva acts as a natural mouthwash and therefore you need to make up for this loss of natural protection.
- ✓ Do not smoke
- ✓ Avoid sugar in your diet. Use the fluoride and chlorhexidine gel as recommended by your dentist

- ✓ Moisturise your lips with lip balm/water soluble moisturizer
- ✓ Carry a small bottle of still water to sip during the day or keep at your bedside.
- ✓ Chew sugar free chewing gum – this may help to stimulate the saliva flow, if there is some remaining saliva gland function. There are also some tablets which your doctor can prescribe to help stimulate saliva.
- ✓ If you have no remaining saliva gland function, and are totally dry, there are a number of saliva substitutes on the market. Ask your dentist or nurse to recommend one. You may have to try a few before you find one that suits!
- ✓ Currently available saliva substitutes are BioXtra / Biotene gel, Saliva Orthana, MouthKote. If you have your own natural teeth, avoid products that contain citric acid as these will erode your teeth. Always read the list of ingredients.
- ✓ Try flavourless salad oil at night to lubricate your mouth.
- ✓ Increase your intake of fluids. Avoid too much fruit juice as they are acidic and will make your teeth sensitive. Tap water is best!
- ✓ At meal times, eat soft creamy foods, use gravy and sauces and take plenty of water when you are eating.
- ✓ You should avoid: very hot or spicy foods, hard coarse food (crackers, toast), smoking, alcohol, lemon glycerine swabs.

Prevention of Dental Decay

Fluoride/Chlorhexidine Gel for Decay Prevention

When there is a reduction in your saliva flow (dry mouth), you are at increased risk of developing decay in your teeth. You must limit the sugar in your diet and apply topical fluoride and chlorhexidine gels to your teeth.

Dental decay is caused by acid demineralisation of the tooth. The acid is the by-product of the action of bacteria in dental plaque on food, especially sugar. Fluoride has a scientifically proven effect helping remineralisation of teeth affected by dental decay. In Ireland fluoride is generally available in our tap water and also in fluoridated toothpaste. When you are at a high risk of decay more concentrated fluoride application is advisable.

Chlorhexidine gel will control bacteria in dental plaque, which forms on your teeth.

Fluoride and chlorhexidine gels may be applied to surfaces of teeth in several ways.

- To ensure that there is thorough contact of gel with the teeth, professionally made trays are used. These fit over the remaining teeth, like a mouth guard.
- You may also choose to brush the fluoride onto your teeth with your ordinary toothbrush.

Daily application will counteract the absent protective effects of the saliva.

Gel applications should be continued long-term. It is important to continue to use the fluoride/chlorhexidine regime even if you have a PEG (stomach) tube.

Your dentist will monitor saliva flow and dental decay at 6 months and 1 year.

Procedures for Fluoride & Chlorhexidine Gel Applications

- Before application, clean and floss teeth

- Apply a light coat of Fluoride or Chlorhexidine to the tray as advised by your dentist (usually fluoride one day and chlorhexidine the next)



OR brush on with your toothbrush.

- It is also important to apply the Fluoride or Chlorhexidine in-between your teeth using a TEPE brush



The following products are available and your dentist will advise you:
 0.4% Stannous Fluoride gel (Gelcam, Omnigel, Stop)
 0.2% Sodium Fluoride gel (Miraflor)
 Sodium fluoride paste 2800 / 5000ppm fluoride (Duraphat)
 0.2% Chlorhexidine gel (Corsodyl)

- Place the tray over the teeth for 10-15 minutes OR brush on with your toothbrush.
- Do not swallow the gel and spit out any excess
- It is also important to apply the Fluoride or Chlorhexidine in-between your teeth using a TEPE brush
- Avoid rinsing your mouth for an hour after the application – this will allow the gel to be effective for longer
- The tray should be washed out with cold water and set aside until the next day
- Avoid extreme heat with the applicator tray

Here is a checklist for some of the unwanted effects of treatment and what you can do!

(Reference: www.rcseng.ac.uk)

Unwanted effects of treatment	What can I do?	What Happens	What to avoid
Tooth Decay	Brush teeth with fluoride toothpaste Use fluoride or chlorhexidine gel Visit your dentist/hygienist regularly	Saliva protects the teeth Absence of saliva encourages tooth decay	Sugary food or drinks
Difficulty with dentures	See your dentist if your dentures are causing discomfort Clean your dentures carefully after meals, at least twice a day. Soak dentures overnight in an appropriate cleanser	Lack of saliva & mouth soreness makes dentures difficult to wear	Wear your dentures if possible but do not persist if they are hurting you
Loss of taste	There is little you can do Taste will return, as it does you will notice an unpleasant taste for a while but this will improve	Taste buds are damaged by radiotherapy & chemotherapy	Sweet food or drinks
Loss of weight	Eat high energy food such as pasta, bread, yams and potatoes It will be arranged for you to see a dietician if you are losing weight	Mouth soreness, dryness and difficulty swallowing will reduce your appetite	
Difficulty swallowing	Eat moist food and sip water frequently	Dryness & soreness of your mouth makes swallowing difficult	Alcohol
Jaw Stiffness	Gentle jaw exercises will be given to you	The muscles that move the jaw can become stiff as a result of radiotherapy	
Sore Mouth (during treatment)	Clean your teeth with a fluoride toothpaste & soft toothbrush Always use soda bicarbonate mouthwash as directed Suck an ice cube to help mucositis Corsodyl mouthwash can sting – dilute with water Mouthwash may stain your teeth but it can be easily removed later You may need medication if you have fungal infection (thrush)	Radio & chemotherapy damages normal cells. The inside of the mouth, tongue and throat become red, swollen & ulcerated. You will have difficulty speaking, eating, swallowing, and brushing your teeth. The soreness may also be due to fungal infection	Hard, spicy food Hot drinks Alcohol Tobacco Strongly flavoured toothpaste
Dry Mouth	Sip tap water frequently Chew sugar free chewing gum Try saliva substitutes. Use one that contains fluoride, if possible Flavourless salad oil or butter lubricates the lips and tongue and will help you sleep at night	Saliva moistens the mouth and protects against tooth decay & sensitivity Radiotherapy damages the glands, which produce saliva. The dryness is worst during treatment but slowly improves. Saliva may not return completely	Fizzy, diet and fruit juice drinks Sugary food or drinks Non-prescriptive oral preparations may be acidic and will damage the teeth or mouth lining. Always check ingredients
Bleeding Gums or Periodontal Disease	Brush & floss teeth carefully and attend you dentist for examinations	Build up of dental plaque resulting in inflammation of the gum	

Contacts

Websites which maybe of interest

Irish Cancer Society
Dental health foundation

www.mouthcancerfoundation.org
www.bahnon.org.uk
www.nidr.nih.gov
www.patietn.co.ukshowdoc

Patient Information

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