



National Dental
Centre Singapore
SingHealth



What You Should
Know About

RADIOTHERAPY AND ITS DENTAL IMPLICATIONS



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RADIOTHERAPY AND YOUR TEETH

Radiation therapy of the head and neck can cause long-term dental side effects, including:



Dry mouth (Xerostomia)



Increased risk of tooth decay



Difficulty in opening your mouth wide (Trismus)



Increased risk of bone death (osteoradionecrosis)

- may happen naturally or after extractions

BEFORE RADIOTHERAPY

Your oncologist will refer you to a dentist for a comprehensive check-up prior to your radiotherapy treatment.



Dental treatment should be done before the start of radiotherapy to



Remove existing and potential sources of infection



Remove teeth that require extraction or may require future extraction



Treat existing dental decay or gum disease

Our dentists will coordinate with your radiation oncologist to plan for your dental treatment and optimise your oral health.

He or she will be advising you on measures to improve your oral hygiene and manage the side effects of radiotherapy, including jaw exercises. Our dentists will also arrange for appointments during and after radiotherapy to follow-up on your oral health.

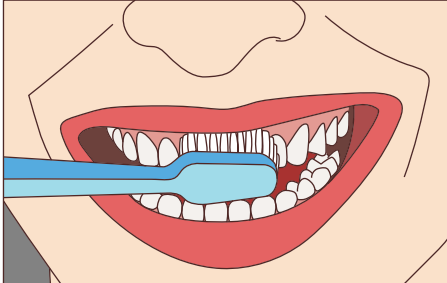


ORAL HYGIENE

Plaque (a sticky layer of bacteria on teeth) can cause tooth decay or gum disease. It can be removed by brushing.

Toothbrushing 101: A step-by-step guide to brushing correctly

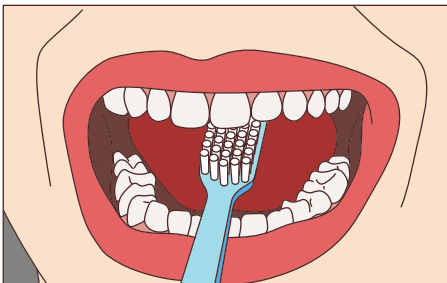
Duration : 3 to 5 minutes | **Toothbrush :** Soft bristles



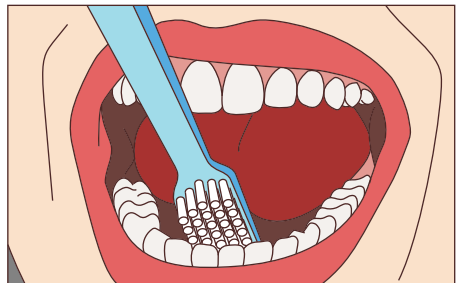
Step 1: Place the bristles at an angle of 45 towards the gum line. The bristles must be in contact with both teeth and gums.



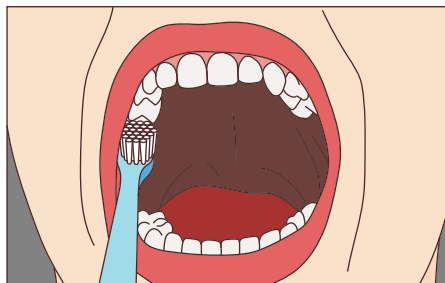
Step 2: Move the brush in a small, jiggling, circular motion.



Step 3: Clean the inside surfaces of the back teeth by moving the brush in the same circular motion.



Step 4: Tilt the brush vertically and use small up and down strokes to clean the inside surfaces of the front upper teeth.



Step 5: Move the brush in a scrubbing motion to clean the biting surfaces.



Watch A Video On
Proper Tooth Brushing
Techniques

i. Interdental brushes

They are more effective for teeth with larger gaps. Consult your dentist for the most appropriate size to use.



Insert the brush gently between your teeth. Do not force it in- if it does not fit, choose a smaller size. Move the interdental brush full length back and forth a few times. Curve the wire slightly to make it easier to reach back teeth.



ii. Single tufted brush

Your dentist may recommend this for teeth that are stand-alone or harder to reach.



Place the end-tufted brush along the gum line where the gum edge meets the tooth.



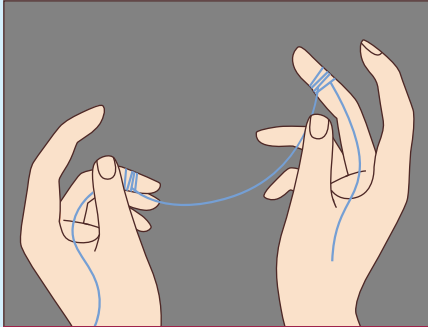
Slowly move the brush along the gum line applying light pressure.



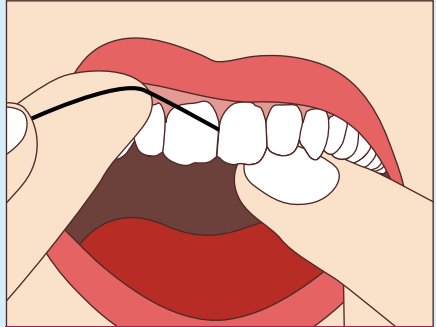
Trace along the wavy gum line moving from tooth to tooth, adding a circular motion between the teeth.



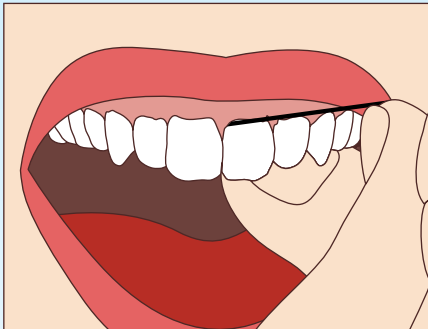
iii. Flossing



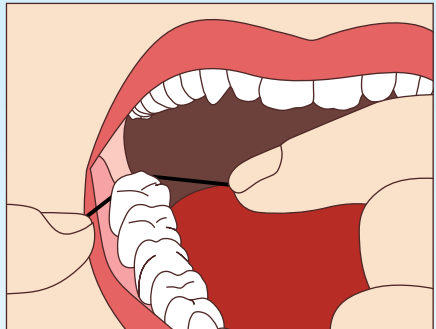
a. Take about 50 centimetres of floss and wind most of the floss around each middle finger.



b. Holding the floss tautly between your thumbs and index fingers, slide it gently between your teeth. Never snap the floss onto the gums.



c. Gently curve the floss around the base of one tooth. Use an up-and-down motion, making sure you go beneath the gum line. Gently curve the floss around the other tooth and use the same technique.



d. Be sure to also floss at the back surfaces of the last molars.

JAW EXERCISES 1

These are lifelong exercises that should be done daily to prevent trismus (please see page 23). It should begin one week before your radiotherapy treatment.

We advise you to do the following exercises - **10 times per action, for three times a day. Hold each stretch for 3 seconds.**



1. Open your mouth to the widest till you feel a stretch, but no pain (at least 3 fingerbreadths).



2. Move your lower jaw to the right.



3. Move your lower jaw to the left.



4. Move your lower jaw forward.

JAW EXERCISES 2

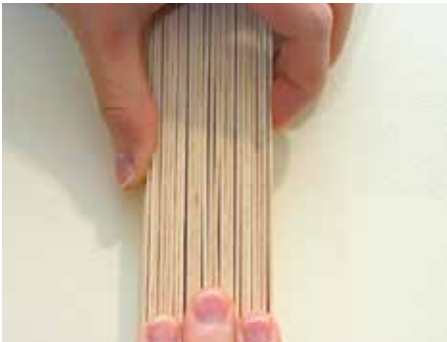
Your dentist may advise you to use wooden tongue spatulas or ice cream sticks (taped together) to help with the jaw exercises if you currently have difficulty in opening your jaw wide.



1. Open your mouth to the widest and fit as many ice cream sticks as you can. Record this number.



2. Put your index, middle and ring fingers together. Count how many ice cream sticks can fit the width of these three fingers and record this number.



3. Increase the number of ice cream sticks you can fit in your mouth by one per day or every two days, till you reach the number of ice cream sticks recorded in step two.



4. Complement this exercise by performing steps two, three and four of the jaw exercises as well.

BEFORE RADIO THERAPY: CHECKLIST

Things to Do	Please tick
Completed urgent dental treatment (e.g. extractions, fillings for deep decay, surgeries)?	
Has our dentist monitored the healing of your extraction socket or surgical site?	
Are you brushing at least twice a day, according to the guide on page 4?	
Have you started doing the jaw exercises (page 7) one week before radiotherapy?	
Have you measured how wide you can open your mouth? (Number of fingers: _____)	



DURING RADIOTHERAPY



Most side effects start effects will begin within **two to three weeks** of treatment and can be aggravated as treatment progresses.



Our dentist will conduct regular reviews with you during your course of radiotherapy treatment to assess how you are coping with these side effects.

Do continue with the jaw exercises and practicing good oral hygiene.

SIDE EFFECTS



Sores in the mouth or throat (Mucositis)



Persistent dry mouth (Xerostomia)



Thicker saliva



Difficulty or pain when swallowing



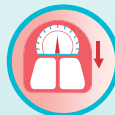
Difficulty in wearing dentures or prosthesis



Changes in taste (Dysgeusia)



Nausea



Weight loss

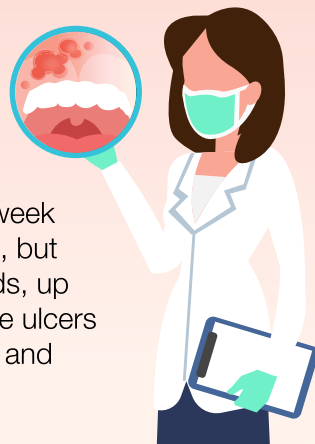


Fungal infection (Candidiasis)

SORES IN THE MOUTH OR THROAT (MUCOSITIS)



You may develop sores and ulcers during week two or three of your radiotherapy treatment, but these may decrease from week five onwards, up to a month after your treatment ends. These ulcers may interfere with normal chewing, speech and oral hygiene.



What can you do?

- Rinse your mouth with warm alkaline saltwater solution (one teaspoon salt and one teaspoon baking soda dissolved in a 240ml glass of warm water) after meals or drinks.
- Apply anaesthetic gel to numb the mouth before eating or brushing your teeth.
- Avoid alcoholic beverages and tobacco use.
- Avoid foods that may irritate your mouth, e.g. foods that are very sweet and spicy, acidic or citrus in nature, hot, dry and hard (e.g. chips) and juices.

- Eat foods that are soft, moist and bland in nature. Take small bites and chew well. Pureed food will be easier to eat, as with foods served with sauces, gravy and butter. Ask your physician for liquid food supplements if you have difficulty eating.
- Avoid alcohol-based mouthwashes.
- Use toothpaste or mouth rinses that are free of sodium lauryl sulfate (SLS).
- Although your mouth may be sore, you should still brush your teeth, gums and tongue as best as you can with a toothbrush with soft bristles to reduce risk of fungal infection or tooth decay.

DRY MOUTH (XEROSTOMIA)



Saliva lubricates the mouth and helps with speech and swallowing. It also protects your teeth by washing away food particles after each meal.

As radiotherapy destroys cells in your salivary glands, you will experience a decrease in the usual salivary flow and thicker saliva, making swallowing difficult. It also results in dry mouth, which may lead to:



Discomfort while eating



Difficulty in wearing dentures or prosthesis
(please see page overleaf)



Increased risk of tooth decay
(please see page 20)

What can you do?

- Drink more fluid to loosen the thick saliva and lubricate your mouth. Try taking a drink in between each bite of food.
- You may use salivary substitutes or lubricants available for purchase at retail stores and pharmacies.
- Use an aerosol pump spray bottle filled with water to moisten your mouth.
- Ensure the mouth rinse you are using is alcohol and SLS free.
- Minimise caffeinated drinks e.g. tea and coffee, which may worsen the dry mouth.

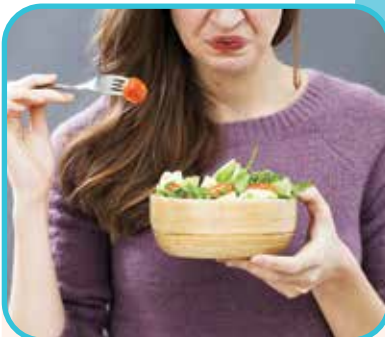
DIFFICULTY IN WEARING DENTURES OR PROSTHESIS



This is a result of decreased saliva production and soreness in the mouth.

What can you do?

- Avoid wearing dentures during the treatment period.
- You should consult your dentist before you begin wearing your dentures after radiotherapy. If your existing dentures are ill-fitting, he or she will need to assess whether it needs adjustment or if a new set has to be fabricated.



CHANGES IN TASTE (DYSGEUSIA)



Food will taste differently during radiotherapy as your taste buds will be affected by the treatment. Your sense of taste will improve and return to normal with time, which generally takes six to 12 months.

NAUSEA



What can you do?

- Inform your physician; they may be able to prescribe medication to alleviate the symptoms.
- Avoid foods which may upset your stomach, e.g.
 - **Hot food with strong odours**
 - **Spicy and oily foods**
 - **Very sweet foods**
 - **Acidic or citrus foods**
 - **Juices**
 - **Alcohol**
- Consume foods that are less likely to upset your stomach, e.g.
 - **Food at room temperature**
 - **Soft fruits and vegetables**
 - **Cool, chilled or clear liquids e.g. vegetable juice**
 - **Yoghurt**
- Have a balanced diet that is high in calories and protein. Consult your physician if you need liquid nutritional supplements.

FUNGAL INFECTION (CANDIDIASIS)



Candidiasis appears as multiple white spots on the roof of the mouth, inside of the cheeks or surfaces of the tongue.

These spots can be rubbed off, leaving an area of reddish skin underneath. It may cause pain and discomfort while eating.

What can you do?

- Practising good oral hygiene can prevent the accumulation of the *Candida* fungus in the mouth. Remember to brush your tongue!
- Good denture hygiene is especially important. Dentures should be brushed daily on all surfaces with dishwashing liquid or soap (not toothpaste), to remove plaque build-up and bacteria.

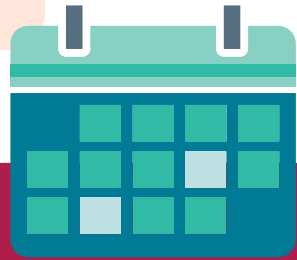
DURING RADIOTHERAPY: CHECKLIST

Things to Do	Please tick
Are you continuing with the daily jaw exercises (page 7)?	
Are you brushing at least twice a day, according to the guide on page 4?	
Have you had a review with your dentist during the course of your radiotherapy treatment?	



AFTER RADIOTHERAPY

Radiotherapy may cause side effects that will affect your oral health in the long term. Practicing good oral hygiene, continuing to perform jaw exercises and visiting your dentist for regular reviews are vital ways to prevent and arrest dental problems early.



You will be given follow up appointments with our dentists at the National Dental Centre Singapore. Once your condition has stabilised, you will be referred to a primary care partner or general dental practitioner in the community, who will continue managing your condition and provide the basic dental treatment (e.g. scaling, polishing etc.) that you need.



DRY MOUTH (XEROSTOMIA)

How to reduce mouth dryness?

1. Please refer to page 12 for more information.
2. Perform facial exercise to improve hydration of your mouth.



Step 1:

Pull the cheeks with air and slide from side to side to massage the cheek muscles.



Step 2:

Massage the sides of the face, near the angle of the jaw, in a circular action to improve saliva flow from the parotid glands.

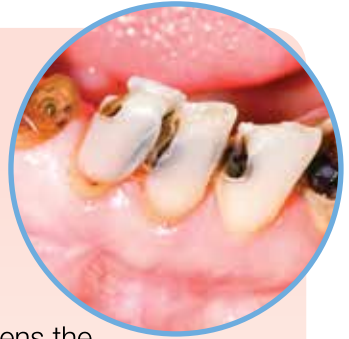


Step 3:

Slide the tongue along the inner surfaces of the cheek to exercise the tongue muscles.

TOOTH DECAY

Tooth decay is caused by the accumulation of plaque (a sticky film of bacteria) on tooth surfaces. After radiotherapy, your risk for tooth decay will be much higher due to reduced salivary flow. Decay may happen rapidly and all round the gum margin of the tooth, or at areas where decay does not usually occur. This weakens the tooth, and may cause it to fracture suddenly.



Severe cases of tooth decay may require extraction (with a risk of osteoradionecrosis - see page 23), root canal treatment or decoronation (leaving the tooth as a root stump covered by a filling). Decoronated teeth however, still need to be brushed!

If left untreated, you may experience pain, swelling due to an infection, or even spontaneous osteoradionecrosis.

How to reduce your risk of tooth decay?

A. Practicing good oral hygiene

Brush regularly after each meal to prevent decay, according to the guide on page 4.

Food can get stuck between teeth, especially if you have gum recession and gaps between your teeth. You should also clean in between the teeth can be done with interdental brushes or floss.



B. Dietary Advice

In addition to confectionery and soft drinks, sugar can also be found in healthy foods like fruits, white rice and cereals. We recommend **avoiding or reducing your intake of foods and drinks that are high in sugar.**

The frequency of sugar intake is more important than the amount of when determining a person's risk of tooth decay. Frequent snacking of food that is high in sugar causes a continuous acidic attack on the minerals of your teeth, leading to higher chances of decay.

Reducing your frequency of snacking or consumption of drinks that are high in sugar, and timing them close to or during meal times can also reduce the risk of tooth decay.

Most fruits also contain acids that can erode your tooth enamel when consumed over long periods of time e.g. sipping on lemon water or sucking on a lemon. We recommend consuming acidic food or drinks closer to meal times and rinsing your mouth thereafter.

Do also **rinse your mouth with water after consuming** any foods or drinks that contains sugar.



C. Fluoride Measures

Tooth decay can be reversed in its early stages with the help of fluoride. Fluoride is found in our drinking water, most toothpastes and in certain mouth rinses.

Depending on your risk of tooth decay, your dentist may recommend additional measures apart from using a fluoridated toothpaste with at least 1450ppm of fluoride.



- 1. Spit, instead of rinsing your mouth after toothbrushing.**
This allows the fluoride to remain on your teeth, protecting it effectively.
- 2. Use fluoride mouth rinses twice a day.**
- 3. Use fluoride gel (only available via online sources).**

D. Regular Dental Reviews



Regular reviews with your dentist are vital to prevent and arrest dental problems that may otherwise require extensive treatment. Prolonging your visit to the dentist may also result costlier or riskier treatments that could otherwise be avoided.

Your dentist will advise you on your risk on your risk of tooth decay and frequency of your dental reviews - which may be quarterly, semi-annually or yearly.

BONE DEATH (OSTEORADIONECCROSIS)

Tooth extractions done after radiotherapy may result in chronic, non-healing extraction sockets as the treatment impairs the ability of the blood vessels within your mouth to carry nutrients and oxygen to your jaw, causing bone death.



Osteoradionecrosis may also occur spontaneously, especially when there are sources of infection or trauma in your mouth.

Treatment of this condition is usually symptomatic and aims to prevent infection. It is important for you to reduce your risk of osteoradionecrosis by adhering to the steps on preventing tooth decay (page 20) and attending regular dental reviews.

REDUCED ABILITY TO OPEN WIDE (TRISMUS)

Radiotherapy may cause scarring (fibrotic changes) of the chewing muscles, resulting in reduced ability to open your mouth wide.



This combined with dry mouth, may interfere with speech, eating and the ability to maintain oral hygiene. Trismus may set in any time after radiotherapy.

Please **continue with the daily jaw exercises**.

AFTER RADIOTHERAPY: CHECKLIST

Things to Do	Please tick
Are you continuing with the daily jaw exercises (page 7)?	
Are you brushing at least twice a day, according to the guide on page 4?	
Are you using floss or an interdental brush to clean in-between teeth?	
Have you had a review with your dentist after your radiotherapy treatment?	
Have you adhered to the fluoride measures recommended by your dentist?	
Have you made changes to your diet (e.g. reducing your intake or frequency of consuming foods and drinks that are high in sugar or acidic in nature)?	



GERIATRIC SPECIAL CARE DENTISTRY UNIT

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