

Oral Health in Chemotherapy and Head and Neck Radiotherapy

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What is an Oral Medicine Specialist?

💧 Oral medicine specialist vs Dentist

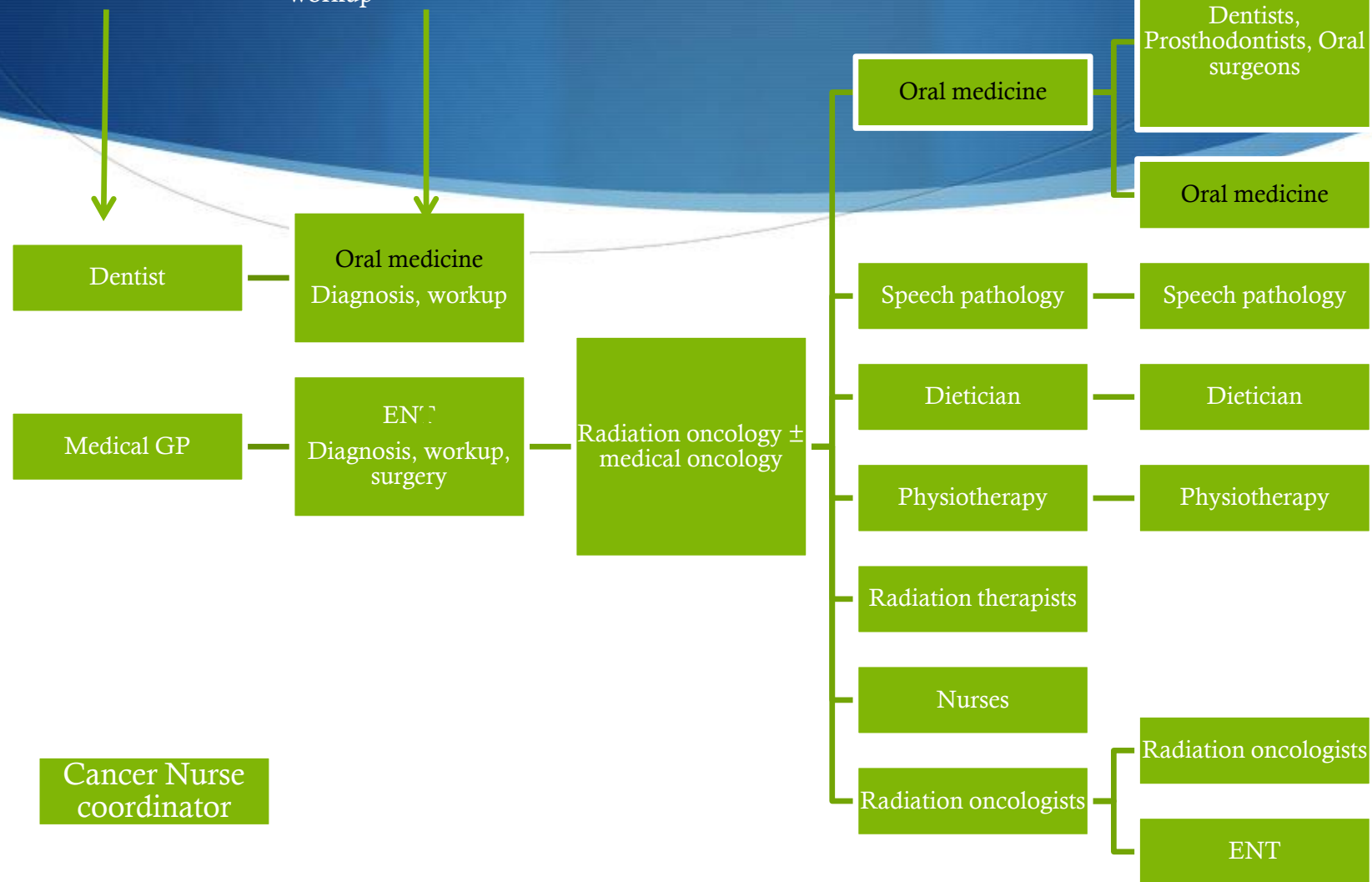


Initially see a lesion

Diagnosis of lesion and
workup

During radiotherapy
/ chemotherapy

Reviews and rehab



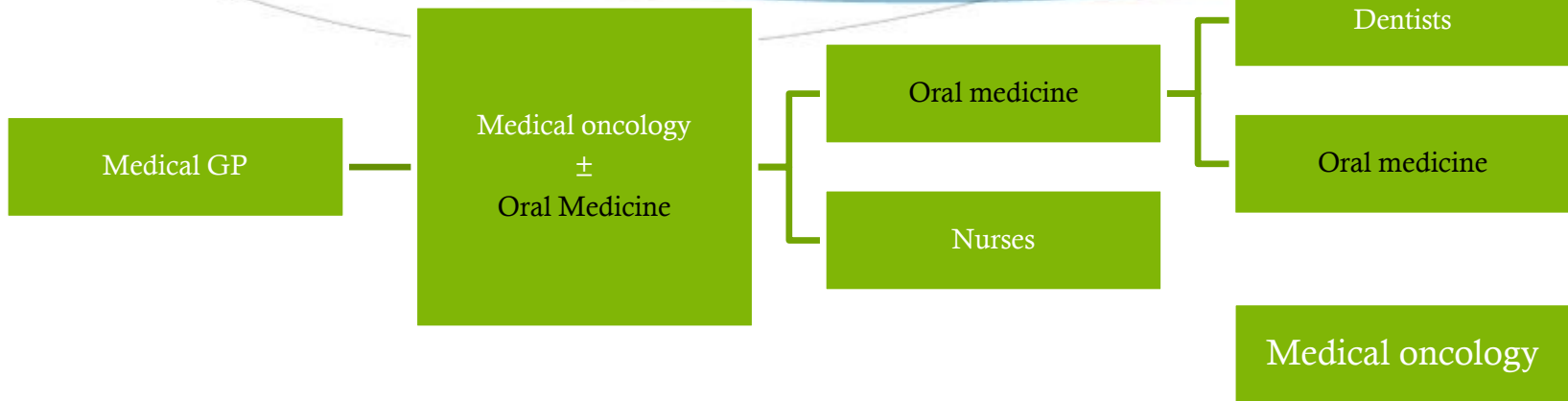
Cancer Nurse
coordinator

Initial diagnosis

Planning and workup

During chemotherapy

Reviews



Cancer Nurse coordinator



Outline

- 1. The importance of dental reviews before, during and after cancer treatment.
- 2. The oral side-effects of head and neck radiotherapy and chemotherapy.
- 3. The management of oral side-effects during and after head and neck radiotherapy and chemotherapy.
- 4. Future follow-up of cancer patients.

Chemotherapy

- ◆ Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells, either by killing the cells or by stopping them from dividing.
- ◆ The regime depends on the Staging and type of cancer.
- ◆ Each drug has certain characteristic side-effects to be aware of.

- 5-FU (5-fluorouracil)
- Capecitabine (Xeloda)
- Cisplatin

Combined with

- Dexamethasone
- Denosumab, Zolendronate



Need for pre-chemotherapy DENTAL review

- ◆ Prevent infections
 - ◆ Neutropenic and Thrombocytopenic
 - ◆ Transient bacteraemia
 - ◆ Teeth which require extractions should be performed prior to chemotherapy.
 - ◆ Good oral hygiene to reduce gingival bleeding, ie. from toothbrushing.
- ◆ Reduce long-term side-effects of some of the medications.
 - ◆ Antiresorptive
 - ◆ Used to reduce Cancer therapy-induced bone loss from systemic chemotherapy and hormone ablation therapy.
 - ◆ **Osteonecrosis of the jaws**

Radiotherapy

- Targets rapidly dividing cells and makes small breaks in the DNA inside cells. This stops further growth and cell divisions, often killing the cancer cells.

- Radiation location and dose.
- Modality
 - IMRT for head and neck.



Need for Pre-radiotherapy DENTAL review

- ◆ Prevent dental infections which may interrupt radiotherapy regime
 - ◆ Abscess
 - ◆ Swellings
 - ◆ pain
- ◆ Reduce radiotherapy short term side-effects
 - ◆ mucositis
- ◆ Reduce radiotherapy long term side-effects
 - ◆ ORN
 - ◆ Dental caries



	CHEMOTHERAPY	RADIOTHERAPY	CHEMOTHERAPY AND RADIOTHERAPY
Eliminate trauma- Fillings, broken teeth.	++	++	++
Eliminate infection	++	++	++
Oral hygiene regime			
Fluoride	+	++	++
Chlorhexidine	++	+	++
Brush and floss (after every meal)	++	++	++
Diet			
Reduce sugars	++ (if on anti-resorptive medication)	++	++
Reduce food irritants (spicy, acidic)	++	++	++
Education	++	++	++
Quit smoking	++	++	++
Reduce / eliminate alcohol	++	++	++
Remaining teeth to have a good long-term prognosis	+ (if on anti-resorptive medication)	++	++

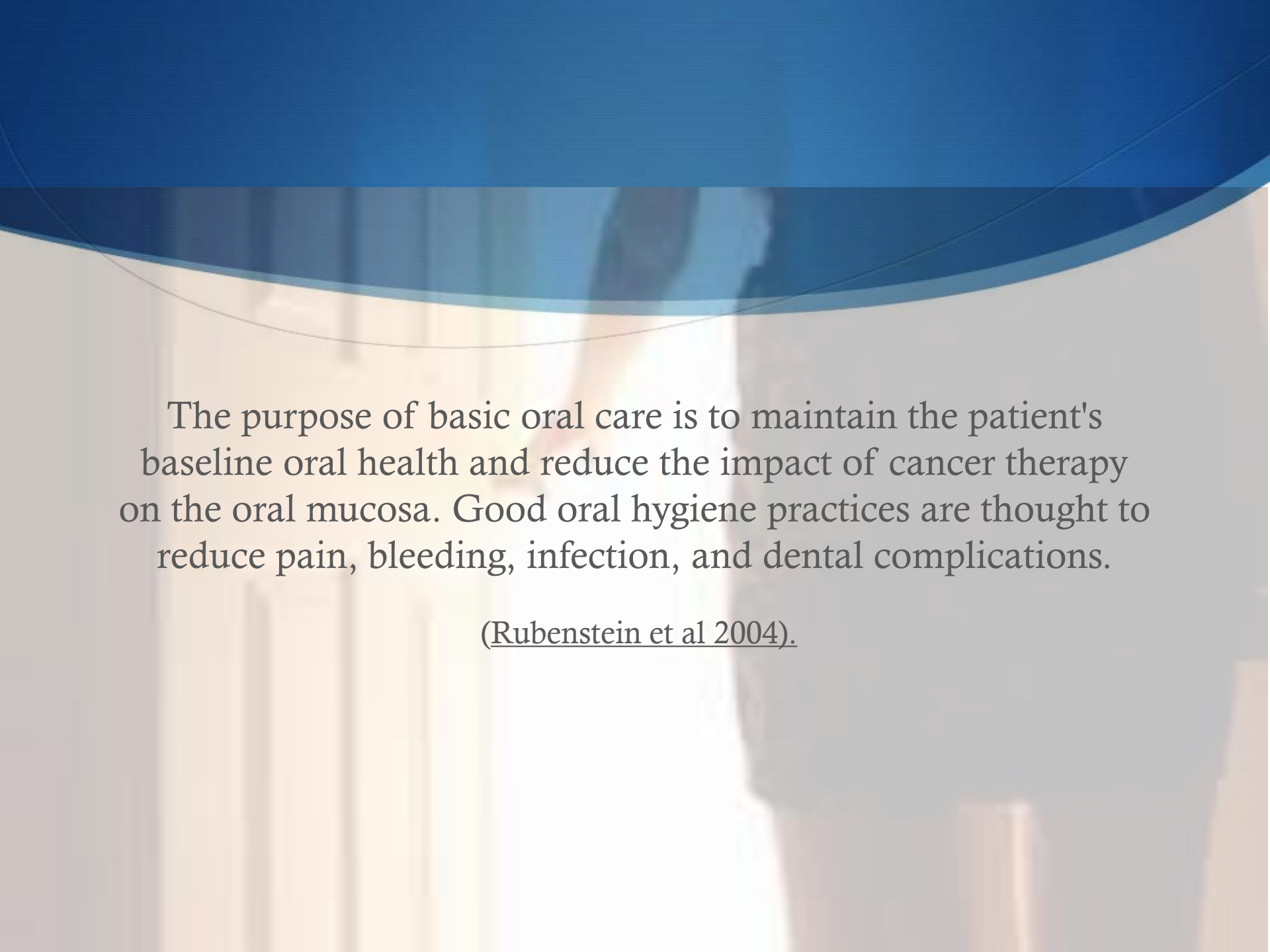
	CHEMOTHERAPY	RADIOTHERAPY	CHEMOTHERAPY AND RADIOTHERAPY
Oral hygiene regime			
Fluoride	+	++	++
Chlorhexidine	++	+	++
Brush and floss (after every meal)	++	++	++



Important for radiotherapy
since salivary defence is
reduced



Important for
chemotherapy to reduce
bacterial load



The purpose of basic oral care is to maintain the patient's baseline oral health and reduce the impact of cancer therapy on the oral mucosa. Good oral hygiene practices are thought to reduce pain, bleeding, infection, and dental complications.

(Rubenstein et al 2004).

Side-effects during chemotherapy and radiotherapy

	CHEMOTHERAPY	RADIOTHERAPY	CHEMOTHERAPY AND RADIOTHERAPY
Mucositis	+	++	+++
Infections			
Candidal	+	++	++
Bacterial	++	+	++
Taste changes	+	+	++
Reduced / altered saliva	+	+	++
Halitosis	+	++	+++
Paraesthesia	++		+
Pain	+	++	+++

◆ In radiotherapy, this depends on the location, dosage of radiotherapy received.

1. Mucositis

- ◆ A painful inflammation and ulceration of the mucous membranes.



MILD MUCOSITIS

- Redness, no ulceration.
 - Depends on the location of the radiotherapy.
- Taste change
- Halitosis
- Dry mouth
- Thick saliva
 - Submandibular and sublingual glands are less sensitive than parotid glands.

SEVERE MUCOSITIS

- Pain
 - Depends on location
- Ulcers
 - Lost barrier
- Candidiasis
- Reduced diet
- Patient feels weaker

WHO oral toxicity scale

I	<ul style="list-style-type: none">• Soreness \pm erythema
II	<ul style="list-style-type: none">• Erythema• Ulcer• Patient can swallow solid foods
III	<ul style="list-style-type: none">• Extensive erythema• Ulcers• Patient cannot swallow food
IV	<ul style="list-style-type: none">• Mucositis to an extent that alimentation is not possible

(Sonis 1995)

- ♦ Oral effects vary between patients

Tonsillar SCC-
oropharynx, soft palate



Tongue SCC-
tongue, buccal mucosa, gingiva



Reducing severity or delaying mucositis

- ◆ Amifostine injections
- ◆ Good Oral Hygiene
- ◆ Benzydamine HCL
- ◆ Caphosol
- ◆ Swishing ice chips in the mouth for 30 minutes, beginning 5 minutes before patients receive **Fluorouracil**.



BENZYDAMINE:

- Reduced the frequency and severity of mucositis.
- Reduces Tumour necrosis factor- α .
- Offers effectiveness up to 50Gy.

(Epstein 2001); (Keefe 2007)



CAPHOSOL:

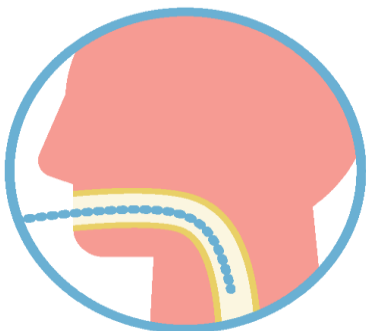
- Supersaturated solution of calcium and phosphate ions.
- Proven that if used from the beginning of radiotherapy and its duration, radiation mucositis is minimised.
- How it works
 - It lubricates the mucosa and helps to maintain the integrity of the oral cavity.
 - No randomised control trials.

(Miyamoto 2009)

Mild – Moderate Mucositis	Severe Mucositis
Salt and bicarbonate rinses	Systemic analgesia - Fentanyl patch
Benzydamine rinses Curasept rinses (chemotherapy pts)	Topical morphine
Oral 7 products	
Xylocaine viscous	
Swishing ice chips	
MucoLox- Coating agent- effective with minimal side-effects	

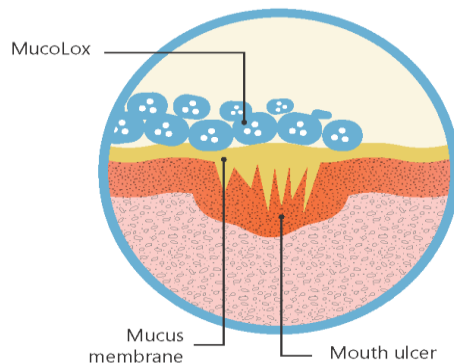
Oral Application

Swish and spit for oral or swallow for esophageal.



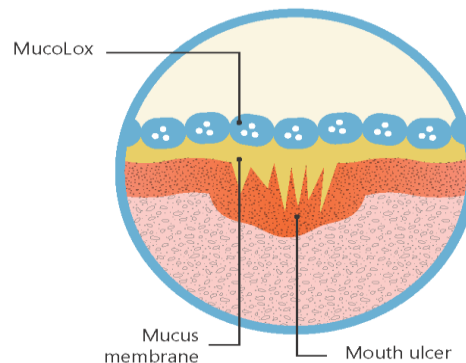
Better Coverage

Thicker consistency coats, covers and protects as it is applied.



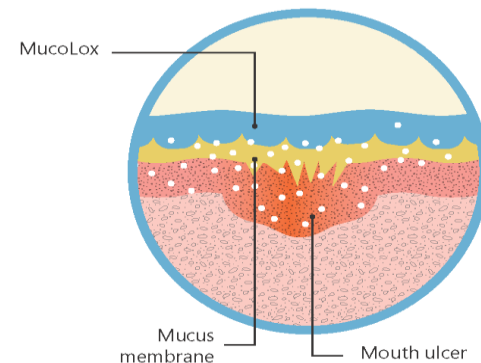
Stronger Adhesion

Polymer network bonds to mucus membrane for increased contact time.



Better API Dispersal

Increased contact time delivers more medicine to affected areas.



MucoLox:

Formulated without dye, gluten, casein, dairy, soy, egg, nuts, ethanol, parabens, propylene glycol, or flavors

2. Infections: Candidiasis



◆ May present as:

- ◆ Redness of the mucosa,
- ◆ White, removable plaques,
- ◆ Oral discomfort.



Daktarin- Miconazole

Nilstat- Nystatin (variety without sucrose)

4 x day

2. Infections: Periodontal

- ◆ May present as:
 - ◆ redness of the gingiva,
 - ◆ Swelling of the gingiva,
 - ◆ oral discomfort.



Chlorhexidine gel and/or rinse (Curasept)

Brushing and flossing



Good education and oral hygiene usually prevents this

3. Reduced taste

- 💧 Direct damage to taste buds
- 💧 Xerostomia

- Copious rinsing (salt/bicarbonate)
- Tongue cleaning (gentle)
 - Allows some (if any) saliva to enter the taste buds.



4. Reduced / Altered saliva

- ◆ Dried secretions may become caked on the mucosal surfaces, particularly the palate (and often misdiagnosed as candidiasis).

- Mucolytic agents, help to soften and dislodge them.
 - **Alkolol**- Not readily available
 - **Sodium bicarbonate** - a mucolytic agent

Dry mouth

- ◆ Reduced desquamation of cells.
 - ◆ Reduced saliva flow.
-
- ◆ Use of biotene / Oral Seven products.
 - ◆ Short-term lubrication – oil with water.
 - ◆ Thick secretions- change in mucous : serous ratio
 - ◆ Salt / bicarbonate rinses



5. Halitosis

🔹 Micro-organisms and plaque are increased due to:

- 🔹 Reduced salivary flow
- 🔹 Thick, mucous, acidic saliva
- 🔹 Soft diet
- 🔹 Immunosuppression

Management

- Tongue cleaning
 - Tongue scrapers
 - Teaspoon
- Rinses
 - Biotene / OralSeven
 - Salt / bicarbonate (breaks down mucin)

Maintaining oral hygiene during chemotherapy and radiotherapy

- ◆ The regime prior to commencement to radiotherapy should be followed until the initiation of oral symptoms (mucositis).
- ◆ Change in toothbrush
 - ◆ Ultra soft bristles
 - ◆ Massage of sulci, palate.
 - ◆ Reduce and dislodge plaque accumulation.
- ◆ Change in toothpastes
 - ◆ No SLS
 - ◆ Increased salivary enzymes and lubrication

**Biotene / OralSeven
toothpaste**

Salt / Bicarbonate slurry

Chlorofluor gel

Mouth exercises-

- Tongue, mouth opening.



SZ Wholesale (Pty) Ltd
Wholesaling Health Care Products

Oral prostheses: Cleaning

- ◆ **Dentures**
- ◆ **Obturator**
- ◆ Rinsed after every meal.
- ◆ Cleaned with a toothbrush and mild soap.
- ◆ Weekly soak in Steradent.



6. Paraesthesia

- ◆ Most common in chemotherapy.
- ◆ Patients often experience sensory symptoms such as numbness, tingling, or burning sensations.
 - ◆ Damage to the peripheral nervous system, caused by some chemotherapy agents, ie Cisplatin.
- ◆ Severity of symptoms is related to the cumulative dose of the drug received.

7. Pain

- ◆ Comes to a point that the use of systemic medication is mandatory:
 - ◆ will reduce central somatisation, which can worsen and prolong pain.
- ◆ NSAIDs and non-opioids first, but most likely need
- ◆ Opioids
 - ◆ Fentanyl patch

Are we considering the patients psychological status?

- ◆ Pain somatisation
 - ◆ Cognitive behavioural therapy
 - ◆ Medications
 - ◆ Treatment with antidepressants will not only contribute in reducing depression but also reduces pain somatisation.

- ◆ Must encourage and support patients

→ to get them through the treatment to avoid disruptions

Post-radiotherapy and post-chemotherapy

- ◆ Patient is **relieved** that management has been completed!
- ◆ Nevertheless,
 - ◆ meticulous oral hygiene will need to be continued, and
 - ◆ a sugar-free diet should be instituted / maintained.
- ◆ **This is indefinitely! (especially for radiotherapy)**

After chemotherapy and head and neck radiotherapy:

◆ AIMS:

- ◆ Management of side-effects
- ◆ Consideration of dental replacement (if required).

Long-term side-effects

	Chemotherapy	Radiotherapy	Chemotherapy and Radiotherapy
Dry mouth	+	++	++
Reduced taste	+	++	++
Dental caries		+	+
Periodontal / gingival disease	+	+	+
Dentinal sensitivity		+	+
Trauma susceptibility		+	+
Osteoradionecrosis		+	+
Osteonecrosis	+		+
	(if on antiresorptive medications)		
Fibrosis		+	+
Dysphagia		+	+
Psychological	+	+	+

Majority of the long-term side-effects affect patient's who have undergone radiotherapy treatment.
These side-effects vary depending on the location and dose of the radiotherapy.

Post-radiotherapy: Dry mouth

- ◆ Reduced saliva flow.
- ◆ Short-term lubrication
 - ◆ Oral 7 and Biotene products
 - ◆ oil with water
 - ◆ Mucolox
- ◆ Gustatory stimulants
 - ◆ xylitol chewing gum, xylitol lozenges
- ◆ Thick secretions- change in mucous : serous ratio
 - ◆ Salt / bicarbonate rinses





💧 **Pilocarpine**

- 💧 parasympathomimetic agent
- 💧 functions primarily as a non-selective muscarinic agonist

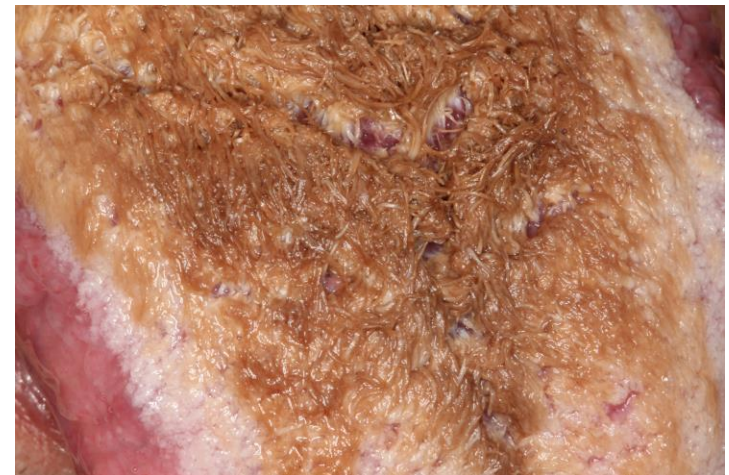
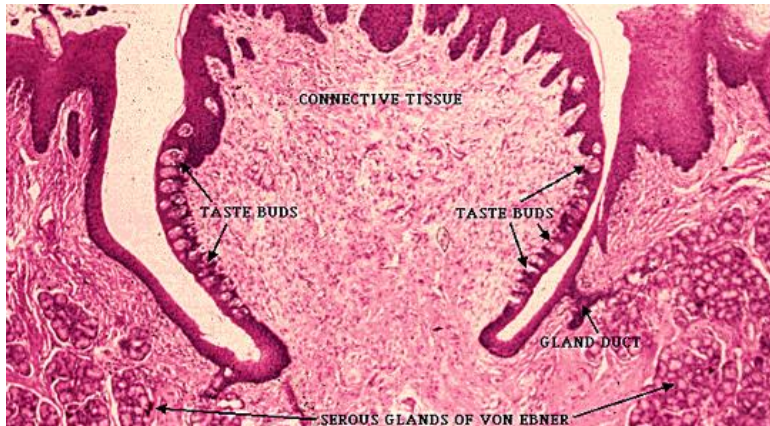
Side-effects

Reduced taste

- Direct damage to taste buds
- Hyposalivation
 - Tongue cleaning
 - Allows some (if any) saliva to enter the taste buds.



Sometimes taste returns- *there is a period of unpleasant taste.*



Post-radiotherapy: Dental caries



Regular dental
visits-
At least every 6
months.

Less saliva:

= pH in the oral cavity is decreased (more acidic)

= More cariogenic micro-organisms and less chance of remineralisation.



Post-radiotherapy: Other dental effects

- ◆ Periodontal / gingival disease-

- ◆ Recession

- ◆ Worsening disease

- ◆ Tooth sensitivity

- ◆ Increased tooth wear

- ◆ Gingival recession

Post-radiotherapy: Dysphagia

- ◆ Xerostomia
- ◆ Fibrosis of the swallowing muscles.
- ◆ Fibrosis and narrowing of the esophagus.
- ◆ Stiffening of the soft palate.

→ Aspiration pneumonia

Dieticians, speech therapists- Very important !

Post-radiotherapy: Trismus

- ◆ Muscles of mastication fibrosis
 - ◆ Reduced mouth opening.
 - ◆ Difficulty cleaning the teeth.
- ◆ Usually increases 6 months after radiotherapy
- ◆ More noticeable when radiotherapy is bilateral and at higher doses.



Need physiotherapy and speech therapy after radiotherapy.

- Home exercises
- Tongue blades

Post-radiotherapy: Trauma susceptibility

- Reduced saliva
 - Less lubrication
 - Reduced immune response
 - Reduced healing
 - Altered lining mucosa
- Fibrosis
- Decreased circulation



Post-radiotherapy: Osteoradionecrosis (ORN)

- A radiation-induced ischemic necrosis of bone with associated soft tissue necrosis of variable extent, occurring in the absence of local primary tumor necrosis, recurrence, or metastatic disease .

Usually occurs at a dose of
52Gy and above.



Patients are usually unaware- dead bone- no sensation.

Osteoradionecrosis (ORN): Risk factors

- ◆ Smoking, alcohol consumption
- ◆ Diabetes, high BP
- ◆ Poor oral health
- ◆ Total radiation dose
- ◆ Treatment modality, fraction size and dose rate.
- ◆ Invasive procedures
- ◆ Dentures-
 - ◆ poorly fitting

The risks last indefinitely!



Recurrences / New cancers



- A need to have an early diagnosis:
 - surgery is usually the only management.

Reducing risk of side-effects, recurrences / new cancers

- 💧 Smoking and alcohol
- 💧 Oral hygiene maintenance
- 💧 Diet
- 💧 Reviews / monitoring

Encourage **no** smoking and **no** alcohol consumption

- ◆ Synergistic effect
- ◆ Reduces longterm prognosis after cancer treatment.



Post-radiotherapy: Oral hygiene

- ◆ Oral hygiene regime
 - ◆ NeutroFluor 5000
 - ◆ Fluoride, alcohol free rinses
- ◆ Customised medicament trays-
 - ◆ Fluoride varnish / foam/gel application, three times per year.
- ◆ Regular frequent dental evaluations to detect dental disease.
 - ◆ GC tooth mousse
 - ◆ Regular dental checks



Post-radiotherapy: Diet

- ◆ Diet instructions
 - ◆ Reduced caffeine
 - ◆ Diuretic
 - ◆ Reduced sugar
 - ◆ Dental caries.

→ Liaise with Dieticians

Patient recalls

- ◆ 1 month, then 2 months and then 3 monthly.
- ◆ Later 6 monthly and then to 1 year.

- ◆ Patients are seen indefinitely in Oral Medicine on at least a yearly basis.
 - ◆ Continual reinforcement of OH and social habits and diet
 - ◆ Detection of oral pathology
 - ◆ Traumatic lesions
 - ◆ Recurrences
 - ◆ ORN prevention
 - ◆ Management of dry mouth and its sequelae.

- ◆ Dieticians-
 - ◆ must be able to eat and maintain nutrition
- ◆ Speech therapist-
 - ◆ must be able to swallow
- ◆ **No time point for discharge-**
 - ◆ **Patient dependent!**

Dental Rehabilitation

- ◆ Dentures

- ◆ Implants



- ◆ **New Dentures**
- ◆ **Addition to dentures**

- ◆ Delay for 3 – 12 months post-radiotherapy.
- ◆ Time depends on-
 - ◆ Anatomy of ridges,
 - ◆ location and doses to areas of irregularity.



No significant risk of developing complications from well-constructed dentures.

(Gerngross 2005)

(Kumar 2015)



◆ **Implant rehabilitation**

- ◆ Reduced retention rate.

BUT



- ◆ No failures in irradiated jaw bone or bone grafts.
- ◆ Failures in irradiated bone that had been provided as part of a composite (soft tissue and bone) free flap.
 - Decreased vascularisation
 - Bulky soft tissues- peri-mucositis.

(Barrowman 2011)

• **Effect of radiation dose :**

Favorable osseointegration

= radiation doses less than 45-50 Gy.

(Colella 2007)

TIMING

- ◆ Jacobson (1985) recommended that dental implantation should be done at least after one year of completion of radiation. (animal study)
- ◆ Taylor (1993) and Franzen (1995) believe that implant placement should be delayed at least two years after completion of irradiation therapy.
- ◆ **CONSIDER:**
 - ◆ Suitability
 - ◆ Costs / risks vs Benefits

(Jacobsson 1985)
(Taylor TD 1993)
(Franzèn 1995)

Conclusions

Individuals who have undergone cancer management, will require continual reinforcement and advice regarding oral health.

We want advice to be consistent!

Must work as a cohesive TEAM!

Thank you

💧 QUESTIONS?

