

**Dental Management
of the Oncology
Patient**

Prevention, Recognition, and
Intervention

Domenica Sweier, DDS, PhD
The University of Michigan School of Dentistry
dmsw@umich.edu
May 2017



Objectives

- Assess oral/dental needs prior to cancer treatment
- Recognize oral/dental complications as a result of cancer treatment
- Manage common oral/dental complications as a result of cancer treatment
- Advise patients on simple techniques to prevent complications from cancer treatment



**Head & Neck Cancer Diagnosis:
Pretreatment Considerations**

- Current and Updated Med Hx, Rx Hx, Family/Social Hx
- Updated radiographs and intra-oral and extra-oral exams
- Consultations
 - PCP
 - Oncologist
- Interdisciplinary
 - PT/OT
 - Nutrition
 - Social Work
 - Nursing
 - Psychology



Head and Neck Cancer: Surgery

- **Functional Deficits**
 - Soft and hard tissue
- **Remaining teeth**
 - Functional pairs
- **Restriction in movement**
 - Eating/Drinking
 - Speaking/phonation
 - Self care
 - Prosthesis
- **Esthetics**
 - Smiling/Social Interaction



Head and Neck Cancer: Chemotherapy

- **Immunosuppression: Drug Nadir**
- **Direct harm to oral tissues**
- **Indirect harm to oral tissues**



Chemotherapy: What the dentist knows

- **Is given orally, IV, by injection (SQ, IM, IL), or topically**
 - cycles depending on the treatment goals (type of cancer, how your body responds, how well you body recovers, etc.)
- **Affects all rapidly dividing cells**
 - Many side effects in all body systems
- **Oral complications from direct damage to oral tissues secondary to chemotherapy and indirect damage due to regional or systemic toxicity**
 - Frequency and severity related to systemic immune compromise, i.e. myelosuppression, immunosuppression



Chemotherapy: Pre-Therapy

- Referral from Physician for consult
 - Another provider from interprofessional team
- Thorough Medical history including medications
- Obtain plan of therapy, which drugs, amount, duration
 - Determine timing of myelosuppression
- Complete comprehensive dental exam, radiographs, and treatment planning



Chemotherapy: Dental Treatment

- Complete all invasive treatment 10-14 days prior to chemotherapy
- Avoid periodontal and endodontic surgery
 - Any surgery with active soft tissue disease-- extract
- Fabricate fluoride trays, provide fluoride Rx
- Instruction on diet, hydration, oral hygiene
- Educate on signs/symptoms of disease



Chemotherapy: During

- Weekly checks
- Monitor oral hygiene
 - Reinforce techniques
- Monitor myelosuppression
- Monitor salivary flow
 - Salivary substitutes
 - Salivary stimulation
- Address problems at first sign
 - Mucositis/stomatitis
 - Candidiasis
 - Cheilosis/cheilitis
 - Caries
- Supportive
 - Encouragement



Chemotherapy: After

- Allow tissues to heal when chemotherapy completed
 - This varies with the drug(s) used
- May return to pre-chemotherapy recall interval
- Treatment plan and provide dental treatment per pre-chemotherapy



Common Side Effects: Oral

- Mucositis (ulcerative)
- Reactivation of HSV
- Dysgeusia
- Dysphagia
- Infections
 - Fungal
 - Periodontium
 - periapices
- Neuropathies
- Salivary gland dysfunction/toxicity
 - Xerostomia



Special Case: MRONJ

- Medication Related Osteonecrosis of Jaw
 - Former ARONJ and BRONJ
- AAOMS special committee position paper
- Clinical Definition
 - Stages
 - With or without bone exposure
 - Emerging Imaging



Head and Neck Cancer: Radiation Therapy: What the dentist knows

- Goal is to kill cancer cells
- Measured in Gray (Gy) units of absorbed radiation: 1 Gy = 100 cGy = 100 rad
- Can be used alone or combined with surgery and/or chemotherapy
- Dependent on tumor tissue/type
- Average of 200 cGy daily for 5 consecutive days with two days of rest
- Total cumulative dose ranges from 5000 cGy to 8000 cGy for advanced tumors
- Threshold of permanent destruction is 2100- 4000 cGy



Radiation Therapy

- Image Guided (IGRT)
 - Movable tissues
- Intensity Modulated (IMRT)
 - Head and Neck
- Dose
- Direct
- Indirect



Common Side Effects: Oral

- Mucositis and Dermatitis
- Dysphagia
- Dysgeusia
- Trismus
- Osteo- and soft tissue necrosis
- Xerostomia
 - Fungal infections
 - Radiation Caries



Tissue Changes

- Irradiated tissue becomes hypocellular, hypovascular, and hypoxic resulting in fibrosis and vascular occlusion
- The destruction is mostly permanent
 - Irradiated tissue does not re-vascularize with time
- As a result, irradiated tissue does not heal well after injury
 - Maxilla vs mandible



Radiation: Pre-Therapy

- Referral from Physician for consult
- Thorough Medical history including medications
- Obtain plan of (surgery and) radiation including field(s), amount, duration
- Complete dental exam, radiographs, and treatment planning
- Consider use of Amifostine as a radiation protective agent



Radiation: Dental Treatment

- Complete all invasive treatment 10-14 days prior to radiation
- When in doubt -> extract
- Fabricate fluoride trays, provide R_x
 - Use cotton-tipped applicators if needed
- Instruction on diet, hydration, oral hygiene
- Instruct on exercises using tongue depressors
 - For trismus
 - Commercially available devices as well
- Educate on signs/symptoms of disease



Radiation: During

- Weekly checks
- Monitor oral hygiene
 - Reinforce techniques
- Monitor muscle trismus
- Monitor salivary flow
 - Salivary substitutes
 - Salivary stimulation
- Address problems at first sign
 - Mucositis/stomatitis
 - Candidiasis
 - Cheilosis/cheilitis
 - Caries
- Supportive
 - Encouragement



Radiation: After

- Place Patient on 3 month recall or less
- Avoid any invasive therapy if at all possible
 - Tissues will not heal as quickly
 - Wait at least 6 mos prior to construction of removable prosthesis
- Continue
 - Fluoride trays
 - Supportive salivary therapy
 - Monitor for fungal infections
 - Monitor for bacterial infections



Main Points

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Head and Neck Radiation | Chemotherapy |
| <ul style="list-style-type: none">• Salivary gland destruction in path of radiation is permanent• Aggressive dentistry pre-therapy• Aggressive prevention during and post-therapy (indefinitely) to decrease susceptibility to ONJ | <ul style="list-style-type: none">• Salivary glands are affected but they will rebound after therapy• Aggressive dentistry pre-therapy• Focus on time during therapy with aggressive prevention |



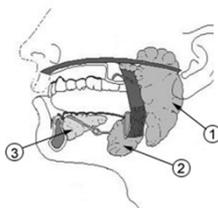
Functions of Saliva

- Lubricates
 - Serous and mucinous components
- Neutralizes
 - Near neutral pH
- Dilutes
 - Tastants to taste pores
- Flushes
 - Flushes oral cavity
- Begins Digestion
 - Aids in bolus formation for swallowing
- Re-mineralize
 - Minerals
- Anti-microbial
 - Lactoferrin
 - Peroxidase



Major Salivary Glands

- Parotid
 - One on each side of face with the intra-oral orifice opposite the upper molars
- Submandibular
 - One on either side of midline under the jaw with the intra-oral orifices in the floor of mouth under the tongue
- Sublingual



When there is not Enough

- Too little saliva can significantly alter a person's quality of life and the morbidity associated with multiple systemic conditions
 - How little is too little?



Salivary Gland Hypofunction: Xerostomia

- Commonly referred to as “dry mouth”
- Diminished salivary flow rate, typically accepted as a 50% decrease in the clinically determined rate in healthy individuals not taking medications
 - Resting Flow Rate 0.3-0.4 ml/min
 - Resting flow rate represents the basal rate present for about 14-16 hours of the day and important for oral comfort and protection
 - Stimulated Flow Rate 1-2 ml/min
 - Stimulated flow rate represents the functional capacity of the gland and is important for swallowing and oral clearance, present for about 2 hours of the day



Objective vs Subjective

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• Objective<ul style="list-style-type: none">- Major gland secretions<ul style="list-style-type: none">• Resting flow rate with a Carlson-Crittenden Cup- Minor gland secretions- Whole saliva<ul style="list-style-type: none">• Stimulated flow rate with citric acid, wax | <ul style="list-style-type: none">• Subjective<ul style="list-style-type: none">- Complaints of dry mouth- Questionnaire- Thirst- The “cracker” test<ul style="list-style-type: none">• Ability to chew and swallow one cracker with nothing to drink |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Carlson-Crittenden Cup



Clinical Signs/Symptoms of Xerostomia

- Dryness of mucous membranes
- Tongue fissuring and lobulation
- Inflammation/cracking corners of mouth
- Thrush
- Denture sores
- "Ring around the collar" cavities
- Thick, ropey saliva
- Difficulty swallowing
- Difficulty with taste
- Difficulty eating/speaking/wearing prosthesis
- Swelling of the salivary glands
- Difficulty expressing saliva
- Cheek biting
- Persistent need for fluids



"Ring Around the Collar" Caries



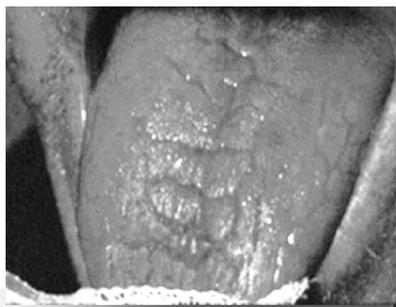
Denture Sores



Mouth Pain/Inflammation



Fissured/Lobulated Tongue



Management of Salivary Dysfunction

- Visit the dentist regularly
- Address problems when they first appear
- Meticulous oral hygiene
- Stay well-nourished and well-hydrated
- Keep an updated list of all medications you are taking (Rx, OTC, herbal, regularly or not)
- Update your medical, social, and diet histories often
- Keep in communication with your physicians, dentists, and other health care providers



Oral Hygiene

- Rinse/wipe oral cavity and associated structures after every meal
- Rinse/wipe any removable prosthesis
 - Denture brush
 - Remove at night and between meals
 - Anti-fungal soak
- Mechanical plaque removal
 - Soft toothbrushes
 - Moist gauze
 - Toothettes good for soft tissue cleansing
 - Use mild toothpaste and avoid alcohol-containing products
- Interdental Aids
 - Floss
 - Proxy brush
 - Stimudents



Oral Hygiene Aids



Pain and Inflammation

- Rinses
- Coating Agents
- Analgesics



Pain/Inflammation: Rinses

- Goals
 - Cleanse
 - Moisturize
 - Lubricate
- Preparations
 - Salt and soda (1/2 tsp each in 8 oz warm water) every 2 hours
 - Salt or soda (1 tsp one or other in 8 oz warm water) every 2 hours
 - Hydrogen peroxide diluted 1:1 in water or saline; 1-2 days maximum
 - Particularly useful to debride ulcerated/crusted area
- OTC/Rx
 - Other commercial non-alcohol containing rinses



Pain/Inflammation: Coating Agents

- Goals
 - Sustained moisturizing and lubricating
- Water soluble lubricating jelly
- Topical Anesthetics
 - Coating
- Home preps: local anesthetic with
 - Milk of magnesia
 - Kaolin with pectin suspension
 - Example: Benadryl 12.5mg/5ml kaopectate



Pain/Inflammation: Analgesics

- Topical Analgesics
 - Lidocaine 2% viscous
- Systemic Analgesics
 - Ibuprofen
 - Opioids (Narcotics)
 - Be aware of agents that cause GI distress and alter hemostasis



Infection

- Antifungals
 - Nystatin 100,000 units/ml
 - Clotrimazole troches 10mg
 - May have trouble dissolving in xerostomic mouth
 - When a removable prosthesis is worn, be sure to treat it as well: dilute bleach solution works well
- Steroids
 - Triamcinolone 0.5%
 - Temovate 0.05%
- Antibiotics
 - Penicillin, clindamycin, amoxicillin, cephalosporins
 - Culture resistant organisms
 - Chlorhexidine gluconate 0.12%



Preventatives for Cavities

- Prevention
 - Chlorhexidine gluconate 0.12%
 - Fluoride varnish (off label)
 - Fluorides as rinse or applied via custom trays
 - Custom trays highly recommended for gel
 - Gel better than foam
 - Stannous fluoride gel 0.4%
 - Sodium fluoride gel 1.0%, 1.1%
 - OTC fluoride rinse
 - Silver Diamine Fluoride
 - FDA approved 2014 for hypersensitivity
 - Arrests caries in dentin



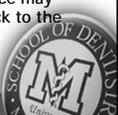
Cavities-Modify Diet

- Diet
 - *How* you eat is as important as *what* you eat
 - Frequency and amount of refined carbohydrates
 - Frequency and amount of acidic substances (even if sugar free)
 - Diet soda pop
 - Energy drinks
 - Sports drinks



Hyposalivation: Substitutes

- Large Selection
 - Mouthwashes, toothpastes, moisturizers, gums, sprays
- Poor patient acceptance
 - Feels like someone else's saliva
- "Home" Remedy Best Tolerated
 - Frequent sips of water
 - Ice Chips
 - Avoid larger ice cubes since the larger surface may actually stick to the dry mucosa



Saliva Subs: Constituents

- Proteins
 - Lactoferrin
- Coating Agents
 - Carboxymethyl cellulose
 - Xanthum gum
 - copovidine
- Preservatives
 - Preferably none
- Enzymes
 - Lactoperoxidase
 - Glucose Oxidase
 - Lysozyme
- Flavorings
 - Mint
 - Citrus
 - None



Hyposalivation: Stimulation

- Gustatory
 - Sugarless hard candies
 - Avoid citric candies since they may irritate mucositis and promote acidic destruction of tooth structure
- Mechanical
 - Sugarless chewing gums (xylitol)
 - Hard foods such as carrot or celery sticks, good and healthy for snacking!



Hyposalivation: Pharmacologic Stimulation

- Pilocarpine HCl
- 5mg tablets, one three to four times daily
- Titrate up to two tablets per dose, not to exceed 30mg daily dose
- Muscarinic cholinergic agonist
- Targeted for Sjogren's Syndrome
- Cevimeline HCL
- 30mg taken three times per day
- Insufficient evidence for higher or more frequent dosing
- Muscarinic cholinergic agonist
- Targeted for Sjogren's Syndrome



Additional Aids....

- Avoid spicy foods
- Add liquids to diet
- Humidify the air
- Filter room air
- Lip moisturizers



References

- JR Kouvaris et al. Amifostine: The First Selective-Target and Broad-Spectrum Radioprotector. *The Oncologist* 2007;12:738-47.
- JF Weiss and MR Landauer. History and Development of Radiation-Protective Agents. *Int J Radiat Biol* 2009;85(7):539-73.
- RL Quock. Xerostomia: Current Streams of Investigation. *Oral Surg Oral Med Oral Path Oral Radiol* 2016;122(1):53-60.
- D Rosella et al. Medication-related Osteonecrosis of the Jaw: Clinical and Practical Guidelines. *Journal of International Society of Preventive & Community Dentistry* 2016;6(2):97-104.



Thank You!

Questions?