Head and Neck Cancer: An Overview of Evaluation and Treatment

• Upon completion of the presentation, attendees should be able to:
  • Discuss the advantages of pretreatment counseling for head and neck cancer patients.
  • Explain pre and post voice, speech and swallowing disorders in patients treated for head and neck cancer.
  • Discuss assessment, diagnostic and treatment for head and neck cancer patients.

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Multidisciplinary Team
• Otolaryngologist
• Radiation Oncologist
• Radiologist
• Plastic and Reconstructive Surgeon
• Head and Neck Nurse Coordinator/Clinical Nurse Specialist
• Dietitian

• Speech – Language Pathologist
• Social Worker
• Psychologist
• Physical Therapist
• Oral and Maxillofacial Surgeon
• Dentist/Maxillofacial Prosthodontist
• Facial Prosthetics

Head and Neck cancers are identified by the area in which they begin:
• Oral cavity
• Salivary glands
• Paranasal sinuses and nasal cavity
• Pharynx
  – Nasopharynx
  – Oropharynx
  – Hypopharynx
• Larynx
• Lymph nodes

6 Oral Cavity
• Oral cavity – lips, front two-thirds of the tongue, gingiva, buccal mucosa floor of the mouth under the tongue, hard palate, small area behind the wisdom teeth (retromolar trigone)

7 Salivary Glands
• Salivary glands- produce saliva that keeps mucosal surfaces in the mouth and throat moist
  – the major ones are in the floor of the mouth, and near the mandible

8 Paranasal Sinuses and Nasal Cavity
• Paranasal sinuses are small hollow spaces in the bones of the head surrounding the nose
• Nasal cavity is the hollow space inside the nose

9 Pharynx
• Pharynx is a hollow tube approx. 5" long that starts behind the nose and leads to the esophagus and trachea: 3 parts=
  – Nasopharynx (behind the nose)
  – Oropharynx (middle part of the pharynx which includes soft palate, base of tongue and tonsils
  – Hypopharynx (lower part of the pharynx)

10 Larynx
• Larynx – formed by cartilages just below the pharynx and includes the vocal folds
  • 9 cartilages
  • 13 muscles
  • 1 bone (hyoid)

11 Lymph Nodes in the Upper Part of the Neck
• Sometimes squamous cancer cells are found in the lymph nodes of the upper neck when there is NO evidence of cancer in other parts of the head and neck. When this happens, the cancer is called metastatic squamous neck cancer with unknown (occult) primary.

12 Other
• Cancers of the brain, eye, and thyroid as well as scalp, skin, muscles, and bones of the head and neck are not usually grouped with head and neck cancers.

13 General Considerations
• Head and Neck Cancer involves many types of malignancies. 90% of oral cavity and pharyngeal cancers, however, are squamous cell cancers.
• In the U.S., Head and Neck cancer constitutes 4-5% of all cancers (25,800 cases estimated
for 2010). However, H & N cancer is rated 6th most common cancer worldwide.

- More common in men and in people over age 50
- Head & Neck Cancer
  - Oral cancer – most common
  - Laryngeal cancer – second most common

**Histology**

- Most common type of head and neck cancer is squamous cell carcinoma, which arises from the cells that line the mucosal cells of the nose, sinuses, mouth and throat
  - Some cancers begin in glandular cells which are adenocarcinomas

- Squamous cell carcinoma > 90%
  - 56% glottic larynx
  - 31% supraglottic larynx
  - ~1% subglottic larynx

**Survival Rate**

- 5-year survival rate ~66% (all races -1995-2001)
- Advance disease (stage III or IV) < 40%

**Incidence of laryngeal CA in U.S.***

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
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<tbody>
<tr>
<td>Est. new cancer of larynx</td>
<td>9,510</td>
<td>7,700</td>
<td>1,810</td>
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<tr>
<td>Est. cancer deaths</td>
<td>3,740</td>
<td>2,950</td>
<td>790</td>
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  - www.seer.cancer.gov
  - http://www.cdc.gov/nchs/nvss.htm
  - http://caonline.amcancersoc.org

**Current Known Risk Factors for HNC**

- Tobacco and alcohol use
- Smokeless tobacco
- Areca (betel) nut
- Gutka or Paan Masalas (concoction of baked mixtures of betel nut, slaked lime and tobacco)
- Catha edulis (leaves from a shrub)

**Recurrent or Persistent Inflammation**

- Causal Mechanisms
- Types of Cancer
- Epstein-Barr virus Nasopharyngeal CA
- Particle Inhalation Sinonasal region
  • Asbestos, oil fumes,
  • Cement dust, wood dust
  • Nickel dust
- Human papillomavirus Oropharyngeal CA
  • Subtypes HPV 16 and
  • HPV18

20 Other Possible Factors
  • Gastroesophageal reflux
  • Diet (certain preservatives or salted foods)
  • Radiation to head and neck region for noncancerous conditions

21 Symptoms
  • Hoarseness > 3wks (dysphonia)
  • Lump in the throat feeling
  • Persistent throat clearing
  • Persistent coughing
  • Throat discomfort
  • Persistent sore throat
  • Difficulty breathing (stridor)
  • Breathlessness (dyspnea)
  • Reduced jaw opening (trismus)
  • Bad breath (halitosis)
  • Cough

22 Symptoms
  • Dysphagia
  • Pain when swallowing (odynophagia)
  • Referred pain from the larynx to ear (otalgia)
  • Burning sensation in the throat
  • Hemoptysis
  • Unexplained weight loss or loss of appetite (anorexia)
  • Reduced tongue movement
  • Nonhealing ulcer
  • Neck lump
  • Whitish or red patches on the gums, tongue, or lining of the mouth

23 Medical Evaluation
  • Case history
  • Indirect mirror laryngoscopy
  • Flexible fiberoptic endoscopy
  • Videostroboscopy (excellent for staging)
  • Videolaryngoscopy
  • Direct laryngoscopy
  • CT scan
PET scan
MRI
Biopsy
Laboratory tests

Staging & TNM Classification
- Developed by the American Joint Committee on Cancer (1992) with premise that
  Cancers of similar histology or site of origin share similar patterns of growth
- "T" refers to primary tumor size and extent
- "N" refers to absence or presence and extent of the regional lymph node metastasis
- "M" refers to absence or presence of distant metastasis

Survival has been related to both T & N
5-year survival rates:
- 87.5% with early localized tumors (T1, N0)
- 72.1% with advanced localized tumors (T3, N0)
- 46.2% with regional lymph node metastasis for all T stages (T1-4, N>0)

Regional lymph node involvement decreases survival by ~ 50%

Treatment
- The behavior of each cancer depends upon the site from which it arises (the primary site)
  i.e. BOT, VF, Oral cavity, etc.
- Head and Neck cancers typically spread in particular patterns:
  - Cancer will spread from the primary site to adjacent areas and structures
  - Metastases will spread via lymphatic channels to lymph nodes
  - Cancer can spread through blood vessels to distant parts of the body

Most common modalities for treatment
- Surgery
- Radiation
- Combination of surgery and radiation
- Chemotherapy with radiation
- Chemotherapy for palliative treatment

Treatment
- Treatment can affect the individual's ability to eat, speak, voice, breathe
- Individual may need to recovery in a nursing facility for a short-term rehabilitation after surgery.

Symptoms of Oral and Oropharyngeal Cancer
- Pain
- Radiating pain (earache, sore throat)
- "Lump in the throat" sensation
- Bleeding
- Swallowing complaints
- Loose teeth; ill-fitting dentures
• Ulcers
• White or red patches (leukoplakia)
• Neck swelling

Involved Neck Subsites

Regional & Distant Metastases

• 5 levels (I, II, III, IV, V)
  - Ia (submental) and Ib (submandibular) nodes - spread from lips and anterior oral cavity
  - IIa (subdigastric) - spread from posterior oral cavity and all subsites from the oropharynx tend to metastasize to level Iia
  - Well-lateralized tumors produce unilateral metastases but midline lesions or lesions close to midline may cause bilateral metastases

TNM Staging of Oral and Oropharyngeal Cancer

Primary Tumor
T0 Not detectable
T1 Diameter 2 cm or <
T2 Diameter >2 cm and not > than 4 cm
T3 Diameter 4 cm or >
T4a Invasion of deeper structures (bone/muscle)
T4b Invasion of deep, unresectable structures (carotid artery, skull base)

Lymph Nodes
N0 No detectable nodes
N1 Single ipsilateral node, diameter 3 cm or less
N1a Single ipsilateral node, diameter more than 3 cm and not > than 6 cm
N2a Multiple ipsilateral nodes, none > than 6 cm
N2b Bilateral nodes, none > than 6 cm
N2c Bilateral nodes, none > than 6 cm
N3 Diameter more than 6 cm

Distant Metastasis
M0 Not detectable
M1 Any distant metastasis

Sobin & Wittekind, 2002

Classification of Neck Dissection

• Radical Clearance of all neck levels, SCM muscle, XI accessory nerve
• Modified Radical Clearance of all neck levels SCM, and/or internal jugular vein and/or XI spared
• Selective Clearance of selected neck levels, SCM, Internal jugular and XI spared

Symptoms of Nasopharyngeal Cancer

• Neck swelling
• Nasal blockage
• Bleeding from nose or throat
• Eustachian tube dysfunction causing aural symptoms
• Headaches
• Cranial nerve palsy (CN III, IV, V, VI)
  – (Oculomotor, Trochlear, Trigeminal, Abducens)

36  **TNM Staging of Nasopharyngeal Cancer**

  • Primary Tumor  
    T0  Not detectable
    T1  Nasopharynx
    T2a  Extension into nasal cavity/oropharynx
    T2b  Parapharyngeal extension
    T3  Extension into bony structures/paranasal sinuses
    T4  Intracranial/orbital extension, cranial nerve palsy

37  **TNM Staging of Nasopharyngeal Cancer**

  • Lymph Nodes  
    N0  No detectable nodes
    N1  Unilateral node(s) <6 cm , above supraclavicular fossa
    N2  Bilateral node(s) <6 cm , above supraclavicular fossa
    N3a  Nodes, > than 6 cm
    N3b  In supraclavicular fossa

  • Distant Metastasis  
    M0  Not detectable
    M1  Any distant metastasis

38  **Oral Cavity**

  • If the defect is too large, or if the cancer involves multiple structures that alter the stability of the mouth, replacement tissue from other parts of the body may be required for reconstruction (free flap).

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43  **Goals**

• Head & Neck
  – Goal of surgical ablation is complete tumor extripation
  – Goal of reconstruction is the recreation of optimal function and cosmesis

  – Type of reconstruction is dictated by the location, size of the defect, type of structures removed, and the expected functional deficit
    • Small to moderate sized hard palate and buccal mucosa resections can often be left to granulate
    • Small floor of mouth defects left to granulate can cause significant tethering and
functional limitation
- Ideal reconstructions should be a single-stage procedure with low donor-site morbidity

44 Goals
Head & Neck Reconstruction
- Progressive spectrum of reconstructive options
  - “The reconstructive ladder”

Free Flap

Regional Flap

Local Flap

Graft

Secondary intention

45 Flaps
- A unit of tissue located beyond the resection site that is used to reconstruct a surgical defect
  - Flaps are defined based on the pattern of blood supply/location
    - Random – Rhomboid flap, Bilobed flap
    - Axial - Paramedian forehead flap, Melolabial flap
    - Pedicled - Pectoralis Major, Trapezius
    - Free

46 Flaps
- Regional pedicled flaps were the workhorse for head and neck reconstruction from the 1970s
- Numerous options
  - Pectoralis Major flap
  - Trapezius flap
  - Pedicled Latissimus dorsi flap
  - Sternocledomastoid flap
  - Platysma flap
  - Temporoparietal fascia flap
  - Deltopectoral flap

47 Flaps
- Pectoralis Major Flap
  - Introduced in 1979 by Ariyan
  - Widespread use of pedicled flaps ensued thereafter
  - Pectoral branch of Thoracoacromial artery (branch off 1st segment of Axillary A.)
  - Myocutaneous or muscle-only flap
  - Flap able to reach the oral cavity and inferior skull base defects
  - Limited by axis of rotation/clavicle
Microvascular Free Flaps

- Advantages of free tissue transfer
  - Potential two team approach/Immediate reconstruction
  - Improved vascularity and wound healing
  - Defect size of little consequence
  - Potential for sensory and motor innervation
  - Wide variety of available tissue types
  - Composite defects can be reconstructed with composite tissue with varying characteristics
  - Tailored to match defect
  - More efficient use of harvested tissue

Soft-tissue free flaps
- Radial Forearm
- Anterolateral thigh
- Latissimus dorsi
- Rectus
- Lateral Arm
- Temporoparietal fascia

Bone-containing free flaps
- Fibula
- Scapula
- Osteocutaneous Latissimus dorsi
- Osteocutaneous radial forearm
- Iliac crest

Radial Forearm Free Flap

- Fasciocutaneous flap
- Artery: radial artery
- Vein: paired vena committante & cephalic vein
- Nerve: ateral antibrachial cutaneous nerve

- Workhorse flap for head and neck reconstruction
  - Small segment of radial bone can be included

Case example
- 86yo male with recurrent T3N0 oral cavity SCCA
- Left hemiglossectomy (oral tongue and partial base of tongue resection)
- selective neck dissection
- Radial forearm free flap

- Anterolateral Thigh Free Flap (ALT)
  - Musculofasciocutaneous or Fasciocutaneous flap (variable anatomy)
  - Artery: Descending branch of the lateral circumflex femoral artery
  - Vein: lateral circumflex femoral vein
  - Muscle: Vastus lateralis
  - Becoming an increasingly popular flap for head and neck reconstruction

- Latissimus Dorsi Free Flap
  - Musculocutaneous flap
  - Artery: Thoracodorsal artery
  - Vein: Thoracodorsal vein
  - Nerve: Thoracodorsal nerve
  - Large skin paddle available for reconstruction

- Rectus abdominus Free Flap
• Musculocutaneous flap (Rectus abdominus)
• Artery: Deep Inferior Epigastic artery
• Vein: Deep Inferior Epigastic vein
• Nerve: Segmental nerves (not very useful)

57 Microvascular Free Flaps
• Recipient Vessels - Arteries
  - Facial artery
  - Superior thyroid artery
  - Lingual artery
  - Transverse cervical artery
  - Common carotid artery
  - Occipital artery
  - Superficial temporal artery
  - Internal mammary artery

58 Microvascular Free Flaps
• Recipient Vessels - Veins
  - External jugular vein
  - Internal jugular v. branch
    • common facial
    • retromandibular
  - Internal jugular vein
  - Transverse cervical vein
  - Occipital vein
  - Superficial temporal vein
    • Retrograde
  - Thyroid veins
    • Retrograde

59 Microvascular Free Flaps
• Vessel preparation
  - Evaluate arterial flow - vessels must have strong pulsatile flow
  - Evaluate for atherosclerosis
  - Detailed initial inspection - at anastomosis site and proximal lumen
  - Dilation of vessel wall
  - Removal of the distal adventitia
  - Irradiated vessels
    • Technically more difficult—effects appear specific to arteries
• Higher incidence of atherosclerosis
• Vessel wall fibrosis, increased wall thickness, more intimal dehiscence
• No reported difference in outcome of microvascular anastomoses
• Microvascular anastomoses tolerate XRT well long-term

Microvascular Free Flaps
• Anastamotic failure
  - 93-95% success rate expected
  - Venous thrombosis more common than arterial thrombosis (at least 4:1). Other studies suggest ratio higher
  - Risk associated with tobacco use is controversial
  - Salvage 50% after vascular thrombosis in breast reconstruction literature
  - Age, prior irradiation, DM (well-controlled), method of anastamosis, timing, vein graft, and specific arteries/veins not felt to contribute to failure rate

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Microvascular Free Flaps
• Post-operative management
  – Attention to wound care
    • Wound management
      - Beyond fistula formation other wound complications occur
        » Tissue necrosis (often in chemoradiated patients)
        » Plate Exposure (frequently a delayed complication)
        » Vessel Rupture (Jugular/Carotid Blowout)
  • Airway management
    - Trach typically placed in operative HNC patients for a temporary period of time due to the associated swelling/bleeding of surgery.
    - Some patients will need a permanent airway
      » Total glossectomy (25-50% need permanent trach)
      » Laryngectomy or laryngopharyngoesophagectomy patients will have a permanent stoma

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Treatment Options
• Radiation therapy
  - Definitive treatment for early stages of cancer
  - Definitive or adjuvant (additional) treatment for advance stages
  - Conventional accelerated (daily)
  - Hyper-fractionated acceleration (2x daily with doses given from 1.1 – 1.6 Gy w/6hrs between treatments)
    • Can be higher dose with 84 Gy in 70 fractions over 7 weeks
  - Intensity-modulated radiotherapy (IMRT)
    • Delivery to tumor and sparing normal tissue
    • Uses beam with variable dose intensities across the beam and multiple directions focused on the targeted area

63 Radiation Therapy
• Irradiation damages the DNA structure and disables the cancer cells by disrupting the repair system which prohibits the cells from continuing to divide and multiply
• Dose is expressed in Gray (Gy)
• Total dose in head and neck varies between 50 and 80 Gy in fractions of 1.8 to 2 Gy given 5 days a week for 5 to 6 weeks

64 Side Effects of Radiation Therapy
• Difficulty swallowing (decrease saliva and amylase to break down starches)
• Diminished taste
• Skin irritation (dramatic darkening, tenderness, blistering, ulcerations, peeling)
• Tissue swelling
• Tissue hardening (fibrosis)
• Breathing problems secondary to edema
• Decreased salivary flow
• Dry mouth (xerostoma) (> 25 Gy given decrease return of saliva)
• Sore throat
• Tiredness
• Nausea
• Mucositis
• Ulcerations
• Osteoradionecrosis (ORN) (rate is <1%)

65 Chemotherapy
• Cytotoxic drugs target cell growth by interfering with the DNA and impairing the cells to reproduce
• Generally not a curative treatment of laryngeal CA alone
• Used in concert with radiation therapy to improve local or regional control of the disease
• Induction chemotherapy helps debulk the tumor
• Palliative role for Pts whom can not receive surgical, or additional radiation or have unresectable cancers

66 Chemotherapy and Mechanisms of Action
• Antimetabolic agents
• Alkylating agents
• Antimicrotubule agents
• Antitumor agents

**Chemotherapy**

- Most common chemotherapy agents used in laryngeal CA
  - Cisplatin (Platinol) - alkylating agent, react and damage DNA
  - 5-fluorouracil (5-FU, Adrucil) - antimetabolites, interfere with production of DNA
  - Methotrexate
  - Carboplatin (Paraplatin)
  - Vinblastine
  - Bleomycin
  - Paclitaxel (Taxol)
  - Cetuximab (Erbitux)

Chemotherapy may be given in a variety of ways, including a low daily dose, a moderately low weekly dose, or a relatively higher dose every three to four weeks.

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**Pre-Operative/Treatment Counseling**

- Information-educational session, "What has your doctor told you about your condition?"
- Effects on Speech
  - May need to write (magic slate, pen and paper), gesture, or mouthing words
  - Articulation
  - Resonance
  - Pitch
  - Phonation
- Maintain good oral care
- Maintain skin care

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**Pre-Operative/Treatment Counseling**

- Changes from normal swallow
  - Potential difficulties in eating and drinking
  - Changes in taste
  - Tube feeds (NG/PEG)
  - Need for instrumental evaluation of swallowing (MBS or FEES)
  - Importance of maintaining adequate nutrition and weight (eat small meals frequently throughout the day); fluid intake = pee pale
  - Dietitian to assess nutrition

- Changes in saliva production and consistency (use of Salagen). Mouth washes of baking soda and water or salt water rinses

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**Pre-operative**

Effects of Radiation (if prescribed post-operatively)

Changes with previous radiation therapy
- Fibrosis and scarring of tissue
- Reduced lingual range of motion
  - Reduced base of tongue movement
  - Reduced pharyngeal constriction

Stress importance of team approach in treatment

Special Considerations
- Psycho-social concerns
  - Adjustments to reaction of the disease, physical changes as the result of surgery, self-concept based on the feeling of adequacy and appearance, & emotional reactions related to the physical and psychological changes
  - Need to maintain independence and not become dependent on another family member
  - Role reversals during hospitalizations and rehabilitation
  - Personal and sexual relationships may also be affected
  - Need to communicate needs

Swallowing Rehabilitation
- SLP directly involved during acute postsurgical recovery
- SLP involved during treatment and postoperative radiation
  - Ongoing monitoring, minimizing discomfort
  - Compensatory management during healing and maximize the efficiency of swallowing
  - Monitor nutrition status and work with dietitian
  - Provide counseling, education, and support

Radiation and Swallowing
- Postoperative radiation
  - Dysphagia dependent on dosage, energy level, amount of tissue irradiated
  - Effects may be edema, acute and chronic pain, mucosal sensitivity, inflammation, xerostomia (dry mouth), altered or reduced taste, mucosa or bone cell death, reduced mobility of the tongue, lips, and jaw which impact chewing and swallowing (Epstein et al., 1999)

Mucositis and Xerostomia
- Mucositis
  - 5-7 days after radiation
- Xerostomia
  - One week after initiation of radiation

Mucositis
- Treated with palliative pain reduction therapy
  - Miles mixture (RX)
  - Mild baking soda rinses
- Eliminate secondary causes of inflammation
- Alcohol
- Smoking
- Coarse foods
- Hot foods
- Alcohol based mouthwashes
- Sodium products that dry oral tissue

**Xerostomia**
- Temporary or irreversible
  - Salivary gland dysfunction causes reduced saliva production
    - Impairs ability to lubricate bolus and form a cohesive bolus
    - Reduces access to the sense of taste
    - Increases friction of the bolus as it tries to pass into and through the pharynx
    - Increases swallowing transit times

**Treatment for Xerostomia**
- Mouth rinses (Biotene)
- Saliva substitutes (Oasis/Oral Balance, etc)
- Gustatory stimulants
- Increase water intake (pee pale)
- Avoid acidic and carbonated beverages
- Reduce sodium intake during radiation tx

**Swallowing Intervention**
- Dietary modification – primary compensatory technique during early weeks
- Use of smoother foods with high fluid content
- Use of strategies
  - Pharyngeal flushing or liquid push
  - Multiple swallows to facilitate bolus transit
  - Alter bolus size (larger vs smaller)
  - Alter head position

**Swallowing Intervention**
- Effortful swallow after healing is complete (designed to assist bolus movement through the neopharynx by increasing base of tongue and posterior pharyngeal wall movement)
- Intensive swallowing therapy
  - Improving lingual strength
    - Oropharyngeal propulsion force depends on strength of tongue base movement and posterior pharyngeal wall excursion

**Improve Jaw Opening**
- Assessment
  - Use assessment techniques document reasons
  - Assess post surgery (early and later)
- Negative indicators
  - Radiation induced fibrosis
    - Trismus (pt may benefit from passive jaw mobilization device i.e. Therabite or DynaSplint)
    - Weakness of lips
  -

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Passive Jaw Mobilization Devices
- Therabite
- DynaSplint

Improving Lingual Strength
Commercial Devices
- IOPI (Iowa Oral Performance Instrument)
  - Provides pt's with quantifiable feedback of lingual effort during strength training
- Madison Oral Strengthening Therapeutic (MOST) Device

Lingual Strengthening Devices
- IOPI
- MOST

Non Commercial Lingual Strengthening Devices
- Tongue Depressors
  - (Lazarus, et al. 2003)

Base of Tongue
- Massako maneuver (Tongue hold maneuver)
  - Increase pressure between base of the tongue and posterior pharyngeal wall
  - Reduces pharyngeal residue
  - Can assist lingual propulsion of the bolus and bolus clearance
  - Perform multiple times daily

Maximizing Propulsion Effort
- Effortful swallow technique
  - Increased base of tongue and posterior pharyngeal wall movement will occur if a swallow involves greater physiological effort
  - Reduces pharyngeal residue
  - Use technique as a direct therapeutic exercise
  - Use with surface electromyographic (SEMG) feedback

Intensity and Repetition
- No optimal levels have been established
- Direct biofeedback is beneficial on effort level and task performance such as with the (IOPI/MOST/SEMG)
- Research by Lazarus et al. 2003
  - Lingual strength training
    - 5 practice sessions per day 5 days per week for 1 mo

Functional Obstructions That Can Impair Bolus Flow
- Stricture/stenosis
- Cricopharyngeal dysfunction

Esophageal Strictures
- Identified in esophagrams
- Narrowing or stenosis
- Clinical manifestations
  - Food sticking in the throat
- Oral or nasal regurgitation

**Strictures or Stenosis**
- Dilatation of the esophagus with Maloney catheters
  - Can also use a balloon catheter

**Oral and Nasal Backflow**
- After surgery may be related to range, strength, and coordination of palatal movement during swallowing (especially in a graft)
- Address small frequent meals
- Remain upright for 1 hour after meals
- Sleep with head elevated
- May need palatal augmentation

**Altered Tongue Function**
- Can affect mobility and strength due to loss of tissue, fibrosis, or denervation
- TL have to generate greater pressure during the swallow for effective bolus transfer
- Compromised base of tongue can result in inability to produce the higher than normal pressures needed for bolus propulsion and clearance through the oral cavity and neopharynx

**Long Term Complications**
- Radiation
  - Reduced mobility of oral structures
  - Osteoradionecrosis (death of bony tissue)
  - Fibrosis (deterioration in muscular activity due to damage to the capillaries that perfuse muscle fibers in the radiated area)
  - Trismus (difficulty open/close jaw) - mouth stretching exercises are good pre/during/post tx)
  - Lingual and pharyngeal muscles weaken
  - Stricture formation
  - Always be cognizant of possible return of recurrence of cancer if there is a change from the "new normal"

**Pink ISO Functional Material**
- Slow setting characteristics
- Enables production of extremely accurate impressions when performing functional tasks (swallowing, speaking)
- Good for rebasing and muscle trimming
- Good for impressions of dentures, root surfaces and posts

**Pressure Indicator Paste (PIP)**

**Regional Lymph Nodes**
**Head and Neck**
Regional Lymph Nodes
Axillary & Inguinal

• 4 to 24 nodes in thigh and inguinal area
• 25 to 50 nodes in the axillary area

Lymphatic Drainage of the Head and Neck

• Lymph nodes
  - Act as a barrier against disease
  - Are usually soft, non-palpable structures
  - Become swollen, hard, painful, and palpable with infection or inflammation due to cancerous changes
  - Are arranged in nodal groups to combat disease and prevent it from reaching the major lymphatic channels
  - Knowledge of H & N lymphatic drainage
    • Allows prediction of disease progression
    • Allows for design of effective cancer treatment
      • XRT, Surgery, Chemotherapy, Multi-modality treatment

Lymphatic Drainage of Head and Neck
Numerical Classification System

• IA Submental lymph nodes
• IB Submandibular lymph nodes
• II Internal jugular (deep cervical) chain from the base of the skull to the inferior border of the hyoid bone
• III Internal jugular (deep cervical) chain from the hyoid bone to the inferior border of the cricoid arch
• IV Internal jugular (deep cervical) chain between the inferior border of the cricoid arch and the supraclavicular fossa
• V Posterior triangle of spinal accessory nodes
• VI Central compartment nodes from the hyoid bone to the suprasternal notch
• VII Nodes inferior to the suprasternal notch in the upper mediastinum


Lymphedema in the Head and Neck Cancer Patient

• Abnormal buildup of fluid in soft tissue due to blockage in the lymphatic drainage system.
• When nodes are removed or damaged, lymphatic fluid collects in the surrounding tissue, causing the tissue to swell which results in discomfort and tightness.
• Accumulation of excessive protein
• Neck is the most common site in H & N CA pts
• Can occur below the chin, in the face and inside the mouth
• H & N lymphedema can affect the vision, eating, and in some pts, breathing

Causes and Risk Factors

• Surgery that removes or obstructs the lymphatic structures (nodes and vessels) from transporting fluid into the bloodstream
• Radiation
• Harm to the lymph nodes or vessels from the cancer itself
• Infection or injury that impairs lymphatic drainage
• The risk of lymphedema increases with the number of lymph nodes and vessels removed or damaged during cancer treatment
• Approximately half of pts treated with H & N CA develop lymphedema
• Surgery and XRT – most severe symptoms

103 Symptoms
• Swelling of the eyes, face, lips, neck or area under the chin
• Discomfort of tightness in the affected areas
• Difficulty moving the neck, jaw, or shoulders
• Fibrosis (scarring) of the neck and facial skin
• Decrease vision secondary to swollen eyelids
• Difficulty swallowing, speaking or breathing
• Drooling or loss of food from the mouth while eating
• Nasal congestion or chronic middle ear pain if swelling is severe

104 Head and Neck Lymphedema
How are they different?
• Head and Neck
  • Less common: less research
  • Worst in the morning
  • Improves during the day
  • Tight but not painful
  • More responsive to initial self treatment & less carryover need
  • Surgery and XRT, no chemo
  • Bandaging/garment worn less often
  • Limited garment choices
  • Less access to experienced clinicians – harder to find help
• Extremity
  • More frequent: better understood
  • Best in the morning
  • Worsens during the day
  • Heavy, tight, may be painful
  • Intensive treatment required initially with long term carryover
  • Surgery, XRT, Chemo
  • Garment/bandages worn consistently/permanently
  • Good selection for garments
  • More experienced clinicians in community

105 Head and Neck Lymphedema: Research
• Minimal incidence/prevalence statistics
  – Buntzel, et al 2007 Germany
    • 851 pts receiving xrt, 408 with lymphedema (48.4%)
      • Only good source of frequency of radiation
  Limited scientific research
  Piso, Eckhardt, et al 2001 Germany
  Early intervention for general postoperative edema. Results suggested less chronic edema than control group. Established facial measurement protocol
Withey, Pracy, et al 2001 England
Documented sensory deprivation from severe facial lymphedema.
Bruns, et al 2004 Germany
Daily Selenium for 4-6 wks post XRT reduced endolaryngeal edema

Preisler, et al 1998 Germany
Manual Lymph Drainage does not promote metastasis
191 pt 100 MLD/91 no MLD, 37 recurrence 18 MLD/19 no MLD
Szolnoky et al 2007, 2006 Hungary
MLD : reduces postoperative edema after wisdom tooth extraction
  reduces trapdoor effect associated with free flaps
Katsura and Hayashi 2005
47 pts (39 RND, 8 MRND)
Lymphedema identified in neck for up to 2 years

Lymphedema Classification
Stage 0
• Reported tightness or fullness but no pitting or significant edema.
  • May fluctuate during the day

Lymphedema Classification
Stage I
• Pitting edema that is quickly reversible
  • No fibrosis or tissue changes
  • Improves during the day and worsens at night

Lymphedema Classification
Stage II
• Not spontaneously reversible
  • Longer lasting pitting
  • Fibrosis
  • No severe tissue changes, breakdown, etc

Lymphedema Classification
Stage III
• Not typically seen in the head and neck
  • Severe tissue changes
    • Hyperkeratosis
    • Papillomatosis
    • Wounds
  • Severe fibrosis
  • Cannot pit

Complete Decongestive Therapy: Manual Lymphedema Drainage
• Lymph production, lymph transport, and relaxation
• Moves lymph from congested area to nodes in closest functioning drainage area
• Insufficient single therapy, part of total MLD program
• Intensive and Maintenance phases

Contraindications to MLD
• Acute DVT
• CHF
• Cardiac edema
• Renal failure
• Uncontrolled HTN
• Severe carotid blockage
• Sensitive carotid sinus
• Acute infection(cellulitis)
• Active disease
• Tissue breakdown

Treatment of Head & Neck Manual Lymphedema Drainage
• Credit Danish Emil Vodder, Ph.D, Massage Therapist in 1930’s
• Developed techniques for treatment of chronic sinusitis
• Treated a variety of ailments including lymphedema
• Vodder 1965, Asthet Med (Berl);14:190-191.
• Foldi and Foldi combined MLD with compression bandaging, simple physical exercise, and skin care to create complete decongestive therapy (CDT)
• Now accepted as the “gold standard” in treatment of lymphedema

Cancer Survivorship (NCI) Statistics
• 11.9 million cancer survivors in the US (as of 01-08)
• Approx. 15% of cancer survivors were diagnosed 20 or more years ago
• In 5 yrs, approx. 67% of adults diagnosed with cancer will be alive
• Over 75% of childhood cancer survivors will be alive after 10 yrs
  http://cancer.gov/cancer

Definition of Survivorship
“the experience of living with, through, or beyond cancer”


Cancer Survivor
• An individual is considered a cancer survivor from the time of cancer diagnosis, through the balance of his or her life (NCI, 2011)
  • Office of Cancer Survivorship (NCI)

References


Thank you!
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