

Role of Rehabilitation in Quality of Life

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DISCLOSURES


NONE



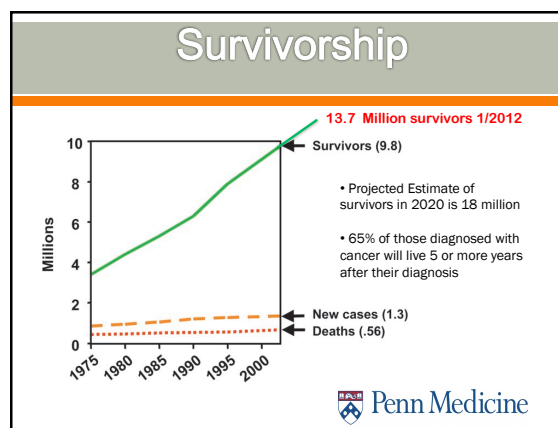
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OBJECTIVES


- Survivorship trends and care goals
- What is Cancer Rehabilitation and why the need
- Review common musculoskeletal complications and treatments
- Summarize
- Questions



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Cancer Survivorship



- Many "**cured**" are living with effects of cancer and cancer treatments
- Cancer is now being defined as a **chronic disease** that is likely to be associated with **disability** or a change in functional status during or after the course of the illness.

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Cancer Survivorship

- Cancer Survivor:**
 - Anyone who has been diagnosed with cancer, from the time of diagnosis and treatment through the remaining years of life
- Stages of Cancer Survivorship:**
 - Living with cancer:** experience of receiving a cancer diagnosis and any treatment that may follow (surgery, chemotherapy, radiation, etc)
 - Living through cancer:** period following treatment in which patients are at a relatively high risk of a recurrence of their cancer.
 - Many are relieved that treatment is over but anxious about the fact that they no longer see their cancer doctor on a daily, weekly, or monthly basis.
 - Living beyond cancer:** post-treatment and long-term survivorship.
 - Two thirds of cancer survivors say their lives return to what they knew before they had cancer. One third say that physical, psychosocial, or financial consequences continue.



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Cause of Distress?

According to a large study published in 2010 that included approximately 90,000 male and female cancer survivors sampled from a Medicare database, what is the most likely reason for cancer survivors' distress?




Cause of Distress?

LEVEL OF DISABILITY

"The risk of psychological distress in individuals with cancer relates much more strongly to their level of disability than it does to the cancer diagnosis itself."



Banks E, et al. Is psychosocial distress in people living with cancer related to the fact of diagnosis, current treatment or level of disability? Findings from a large Australian study. Med J Aust. 2010 Sep 6;193(5 Suppl):S62-67

The Disconnect

- 163 community dwelling patients with metastatic breast CA
- 92% had at least one physical impairment
- 530 impairments identified
- 92% of the impairments required physiatry but only 30% received this care
- 88% required PT and/or OT but only 21% received this care
- Conclusion: **More than 90% of patients needed cancer rehab but fewer than 30% received this care.**


Cheville AL, et al. Prevalence and treatment patterns of physical impairments in patients with metastatic breast cancer. J Clin Onc. 2008.

The Disconnect

- 160 Head & Neck cancer survivors surveyed on Oncolink
 - 83% swallowing/speaking difficulty
 - 88% decreased saliva production
 - 60% decreased neck mobility
 - 53% concerns about cognitive function
- Only 55% discussed concerns with a healthcare provider
- Common reasons for not sharing info with providers were:
 - "I did not think they would care"
 - "I did not want to upset or anger them"
- Need improved survivorship care after treatment, need to better educate patients about potential late effects and encourage them to report problems to healthcare providers

Hill-Kapser (Abstract #6335) at ASCO meeting 2012

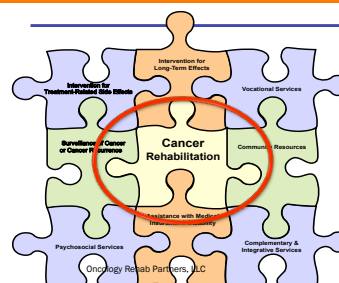


How can we bridge the gap?

"I'm really clear on what I'm trying to say..."



Elements of Survivorship Care



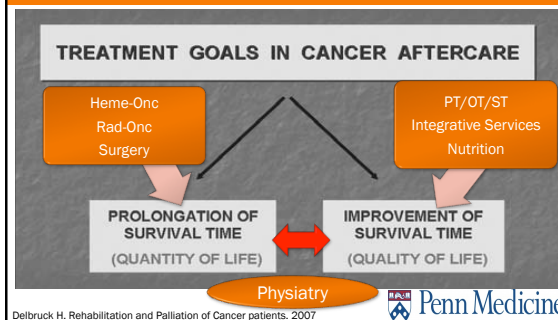
Survivorship Care

- Am College of Surgeons' Commission on Cancer (CoC) **mandates** presence of rehabilitation specialists and rehabilitation services at all cancer centers for accreditation
- Am Society of Clin Oncology (ASCO) Recommendations for High Quality Survivorship Care:
 - Standardize the long-term follow-up care of cancer survivors
 - Expand educational programs for clinicians and patients
 - Legislation to assure access to survivorship care
 - Focus funding towards survivorship research.
 - Rehabilitation services listed as essential part of survivorship care and educational efforts**

McDabe S. American Society of Clinical Oncology Statement: Achieving High Quality Cancer Survivorship Care. J Clin Oncol. 2013
Jemal A. Annual Report to the Nation on the status of Cancer, 1975-2009, featuring the burden and trends in HPV associated cancers and HPV vaccination coverage levels. J Natl Cancer Inst. 2013



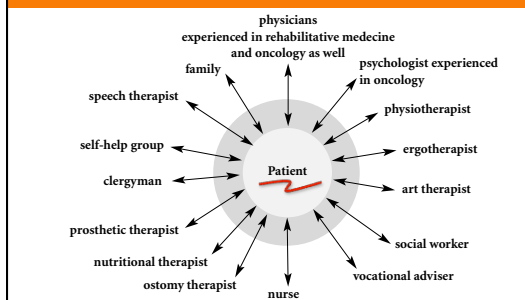
Balancing of Goals



Delbruck H. Rehabilitation and Palliation of Cancer patients. 2007



The Rehab Team



Delbruck H. Rehabilitation and Palliation of Cancer patients. 2007



Physiatry = Physical Medicine & Rehabilitation (PM&R)

- Restoration of **function and quality of life**
- Not organ-based – treat the whole patient
- Non-surgical management of neurologic, musculoskeletal, neuromuscular and lymphatic disorders



Cancer Rehab Physician (Physiatrist)

A specialist in the identification, evaluation, and rehabilitation of neuromuscular, musculoskeletal, lymphatic and functional disorders **associated with cancer and it's treatment**

- Work in conjunction with physical, occupational and speech therapists
- Collaborate with Pain Management & Palliative Care



How Physiatry can help YOU

- Pain
- Fatigue
- Impaired mobility/decreased ROM
- Weakness
- Impairment in Activities of Daily Living
- Trismus
- Cervical dystonia
- Cognition (chemo-brain)
- Neuropathy/nerve disorders
- Lymphedema
- Shoulder dysfunction
- ALL GENERAL MUSCULOSKELETAL SYMPTOMS**



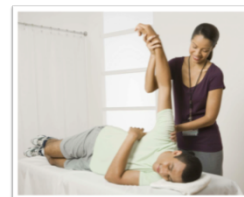
What exactly do we do?

- ✎ Diagnose – physical exam, ultrasound, EMG
- ✎ Expertly prescribe personalized rehabilitation program
- ✎ Bracing/equipment
- ✎ Medication management (pain, neuropathy)
- ✎ Interventional procedures (joint, soft tissue, trigger point, nerve blocks, botulinum toxin)



Physical & Occupational Therapy

- ✎ Focused on function
- ✎ Goal is to return to normal activity
- ✎ By decreasing:
 - Pain
 - Fatigue
 - Lymphedema
- ✎ By increasing:
 - Activity
 - Strength
 - Range of motion



Speech and Swallow Therapy

- ✎ Speech
 - Evaluate and treat problems with expressive and receptive speech
 - Teach speech with augmentive devices
- ✎ Swallow
 - Evaluate and treat problems with swallowing
 - Prevent malnutrition and dehydration
 - Barium swallow vs FEES
- ✎ Cognition
 - Evaluate and treat memory and executive function



Role of Exercise in Cancer

- ✎ American Cancer Society (ACS) recommends that cancer survivors get 30 to 60 minutes of moderate to vigorous exercise at least five days each week
- ✎ Exercise is safe during and after treatment
- ✎ Can be prescribed and monitored safely and effectively by a physiatrist
- ✎ Benefits of Exercise:
 - Reduces risk of cancer recurrence
 - Increases survival time after diagnosis
 - Improves fatigue
 - Improves sense of quality of life
 - Improves cognition
 - Decreases risk of limb lymphedema
 - Improves mood and self-confidence
 - Decreased sleep disturbance

Klaudia U. Clin Review of physical activity and functional considerations in head and neck cancer patients. Support Care Cancer 2013



When to access Rehabilitation Services

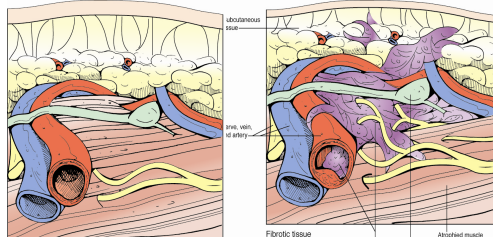


TREATMENTS

- ✎ Radiation therapy
- ✎ Surgery
- ✎ Chemotherapy



Radiation Fibrosis



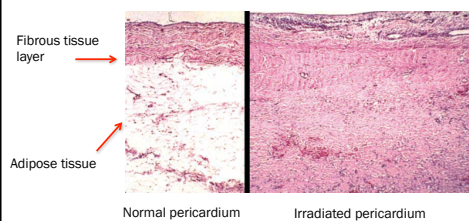
Normal tissue

Fibrosis

Stubblefield and O'Dell. Cancer Rehabilitation.

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Radiation Fibrosis: Effect on Soft Tissue



Normal pericardium Irradiated pericardium

Fajardo, LF. The pathology of ionizing radiation as defined by morphologic patterns. Acta Oncologica. 2006;44:13-22

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Radiation Fibrosis: Effect on Tissues

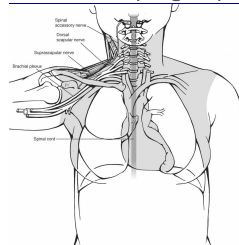
- ☞ Muscle, tendon, ligaments:
 - Fibrosis, shortening, contracture, muscle atrophy
- ☞ Bone:
 - Can become weak/brittle; osteoporosis, fracture
- ☞ Nerve:
 - Demyelination vs axonal loss
 - "Myelo-Radiculo-Plexo-Neuropathy"
- ☞ Lymphatic System:
 - Fibrosis/cording; lymphedema



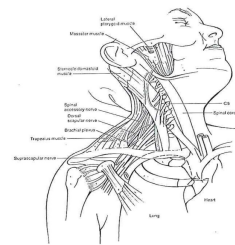
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Structures at Risk with Radiation

Mantle Field (Hodgkin's)



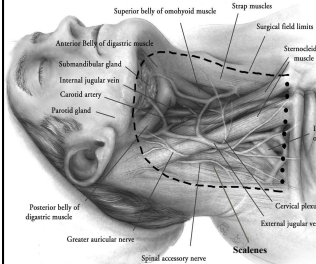
Head and Neck Cancer



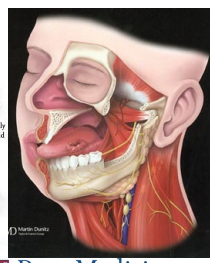
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Structures at Risk with Surgery

Modified Neck Dissection



Oral & Facial Surgery



Gavilan J. Modified Neck Dissection. Operative Techniques in General Surgery. Vol 6 (2), June 2004, 83-94

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CHEMOTHERAPY

- ☞ Nerve: motor or sensory nerve injury
- ☞ Bone: osteopenia, arthralgia
- ☞ Skin/mucosa: Mucositis
- ☞ Muscle: myalgia



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Common Late Musculoskeletal Complications

- ✎ Myofascial Pain
- ✎ Trismus
- ✎ Cervical Dystonia
- ✎ Myelo- Radiculo- Plexo- Neuro-pathy
- ✎ Spinal Accessory Nerve Palsy
- ✎ Peripheral neuropathy
- ✎ Dropped Head Syndrome
- ✎ Chronic Headaches
- ✎ Lymphedema
- ✎ Fatigue



Prevalence of Pain in Head & Neck Cancer

- ✎ Prevalence >50% in all cancer types
- ✎ Prevalence in Head and Neck Cancer
 - 50% have pain prior to treatment
 - 81% have pain during treatment
 - 70% have pain after treatment
 - 36% have pain 6 months after treatment
 - ~1/3 have pain after 6 months
 - **More severe than pre-treatment cancer induced pain**

Epstein, J et al. Supportive Care Cancer 2010



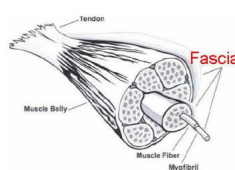
Sources of Pain

- ✎ Etiology
 - **Myofascial pain**
 - Muscle spasm
 - Nerve injury
 - Fibrosis
 - Inflammation
 - Muscle overuse due to other weakened muscles (mechanical)



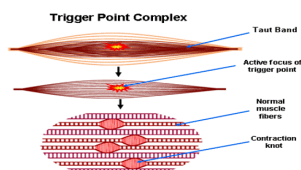
Myofascial Pain

- ✎ Definition: muscle pain caused by "trigger points"
- ✎ Myo = Muscle
- ✎ Fascia = connective tissue



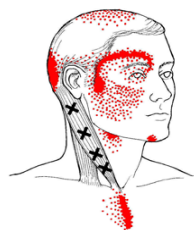
What is a TRIGGER POINT?

- ✎ A taut band of muscle which may radiate pain when pushed

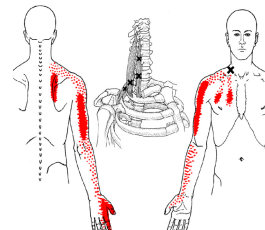


Referral Pain Patterns of Trigger Points

Sternocleidomastoid



Scalenes






Treatment

- ↳ **Physiatry**
 - Medications
 - Trigger point injection
- ↳ **Physical Therapy**
 - Myofascial release –deep pressure therapeutic massage
 - Stretching
 - Ultrasound/moist heat/ice
 - Electrical stimulation (may desensitize)
 - Address aggravating factors(stress) and ergonomics



Treatment: **MEDICATIONS**


- ↳ **NSAIDS**
- ↳ Acetaminophen
- ↳ Muscle relaxants
- ↳ Anti-depressants (TCA's, SNRI's)
- ↳ Nerve stabilizing agents (Lyrica, Cymbalta, Neurontin)
- ↳ **Topicals** (lidoderm patch, voltaren gel, compounds)



Topical Pain Medications for Head & Neck Cancer Patients


- ↳ Few studies
- ↳ RCT of 118 participants with neuropathic pain
 - Topical amitriptyline/ketamine vs placebo
 - **Mean reduction in pain score 3.22 vs 2.16 (p=0.026)**
- ↳ Advantages:
 - Patients may have difficulty with pills
 - Safe due to minimal absorption
 - Minimal risk of interactions with other meds
 - Improved patient compliance
 - Fast acting
 - Treat multiple pain etiologies
 - Superficial nature of pain lends well to this mode of treatment

De Leon-Casasola. Multimodal Approaches to the management of neuropathic pain: the role of topical analgesia. J Pain Sym Man 2007;33(3)




Topical Pain Medications

- ↳ Compounding Agents:
 - Muscle relaxers
 - Cyclobenzaprine
 - Baclofen
 - Nerve stabilizers
 - Gabapentin
 - Amitriptyline
 - Ketamine
 - Inflammation
 - Diclofenac




Trismus



Definition


- ↳ A tonic contraction of the muscles of mastication or TMJ dysfunction causing impaired mouth opening.

Reduced aperture of the mouth due to trismus




- ↳ Can be caused by surgery and/or radiation.
- ↳ Can be a cause of pain

Attempt to open mouth with physiotherapy, in a case of trismus




Trismus: Cause?




FATHER TRISMUS

Blinds your jaws closed while you sleep.




Trismus: Etiology

- ✎ **Fibrosis** of muscles of mastication (masseters, temporalis, pterygoids)
- ✎ **Ectopic firing** of trigeminal nerve affecting these muscles
→ leading to **spasm**
- ✎ **Contracture** of ligaments, tendons, and soft tissues of the jaw
- ✎ Temporomandibular Joint dysfunction
- ✎ Tumor invasion of muscles of mastication




Trismus: Epidemiology

- ✎ Prevalence: 5-38% in head/neck cancer patients.
 - 5% Intensity-Modulated Radiation Therapy (IMRT)
 - 25% Conventional Radiation Therapy
 - 30% Chemo-radiation
- ✎ Latency: <2 years





• Dijkstra PU, Kalk W, Roodenburg JL. Trismus in head and neck oncology: A systematic review. Oral Oncol 2004;40:879-889
• Louise Kent M, Brennan MT, et al. Radiation-induced trismus in head and neck cancer patients. Support Care Cancer 2008;16:305-309.



Trismus: Diagnosis

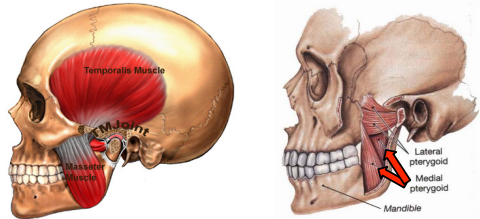

- ✎ Maximal Incisor Distance(MID) <20-40mm
- ✎ 3 Finger Test
- ✎ **Functional deficits** (speech, swallow, dental hygiene)

Placing two or three fingers into the mouth

Muscles of Mastication


Temporalis: Elevates and retracts mandible	Masseter: Elevates mandible	Medial Pterygoid: Elevates and protracts mandible, Moves jaw side-to-side
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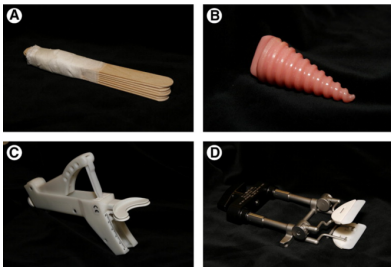
Trismus Treatments: Multimodal

- ✎ Pain Control- neuropathic, anti-spasticity, muscle relaxants, injections (corticosteroid, botulinum)
- ✎ Physical Therapy
 - Daily home exercise starting **BEFORE** RT and continues **indefinitely**
 - Pain is an indicator to **STOP** exercise
- ✎ Speech Therapy
- ✎ Meticulous Dental care to prevent cavities


• Grand G. A mobilization regimen to prevent mandibular hypomobility in irradiated patients: an analysis and comparison of two techniques. Med Oral Patol Oral Cir Buccal. 2007.
• Melchers L. Exercise adherence in patients with trismus due to head and neck oncology: a qualitative study into use of the Therabite. Int J Oral Maxillofac. 2009.
• Shulman DH. Treating trismus with dynamic splinting: a cohort, case series. Adv Ther. 2008



Trismus Treatments



Avoid use of devices during radiation



Cervical Dystonia



SYMPTOMS

- ✎ Pain- neck & shoulder
- ✎ Spasms, stiffness
- ✎ Neck postural change eventually leading to contracture
 - Contralateral head rotation (SCM) & ipsilateral head tilt (Scalenes)



Cervical Dystonia: Etiology

- ✎ **Fibrosis** of neck muscles: scalenes, SCM, traps
- ✎ **Spasms** due to **ectopic firing** of motor nerves such as the spinal accessory nerve, nerve roots, and brachial plexus as a result of damage from radiation or surgery
- ✎ Direct muscle damage from radiation (ex: **myopathy/myalgia**)



Treatment

- ✎ Nerve stabilizers
- ✎ Muscle relaxants- poor pain reliever
- ✎ Anti-spasticity medications
- ✎ Trigger point injections- temporary pain relief
- ✎ **Botulinum Toxin**- improves pain long term and ROM
- ✎ **Physical Therapy**- myofascial release, stretching, soft tissue mobilization



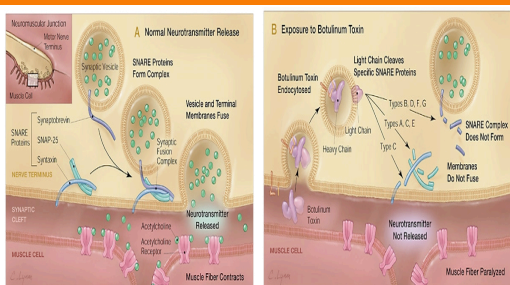
Cervical Dystonia: Botulinum Toxin Evidence

- ✎ Cochrane Review 2009
 - "Virtually all trials suggested that **BtA is effective and safe for cervical dystonia** and that further injection cycles continue to work. The adverse effects are transient and rarely severe."
 - Greatest benefit is in **pain management**
 - Benefits and adverse events dose related
- ✎ Radiation Fibrosis Syndrome
 - Cohort of 23 subjects (73 procedures) with tumors involving head and neck who received radiation complicated by **cervical dystonia** (78%), **trismus** (30%), trigeminal neuralgia (43%), and **migraines** (30%) treated with BtA; total 73 procedures
 - **87% self reported benefit**

• Costa J. Botulinum toxin A therapy for cervical dystonia (review) 2009
• Stubbelfield M. The Role of Botulinum Toxin Type A in the Radiation Fibrosis Syndrome: A Preliminary Report. Archives of Physical Medicine and Rehabilitation. 2008;89(3):417-421.



Mechanism of Action of Botulinum Toxin




Cervical Dystonia: Botulinum Toxin Safety


- ✎ Adverse effects 2-33%
 - **Dysphagia**
 - Neck weakness
 - Local injection site pain
 - Flu-like illness
 - Headache
 - Voice change
- ✎ Effects are Temporary
 - lasts 3-4 months



Botulinum Toxin Injection Technique





Target: Sternocleidomastoid and Scalenes

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Effects of Botulinum Toxin

Before Injection → After Injection




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Botulinum Toxin for Neuropathic Pain After Neck Dissection

- Botulinum toxin injected **subcutaneously** over painful area significantly decreased pain at day 28 ($p < 0.05$)
- No difference in pain reduction between low-dose (100 units) and high-dose (200 units)
- No serious adverse effects observed


Wittekindt C, Liu W, Preuss S, Guntinas-Lichius O. Botulinum Toxin A for Neuropathic Pain After Neck Dissection: A Dose-Finding Study. Laryngoscope 116: July 2006.

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Botulinum Toxin for Chronic Pain After Neck Dissection


- Botulinum toxin injected **intramuscularly** to the trapezius and SCM decreased pain significantly at day 28
- 80-320 units botulinum toxin A per patient depending on number of trigger points
- Significant reduction in chronic pain and shooting pain ($p = 0.005$, $p = 0.005$)


Vasan CW. Botulinum Toxin Type A for the treatment of chronic neck pain after neck dissection. Head Neck. 2004; 26(1):39-45

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Myelo-Radiculo-Plexopathy

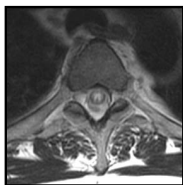
From Mantle Field Radiation from Hodgkin's




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Myelopathy

- Incidence: 15% MF radiation
- Latency: 14mo
- Sx:
 - Ascending weakness to level of XRT
 - Brown-Sequard Syndrome
 - Painful paresthesias in dermatomal level of irradiation
 - Sensory abnormalities in lower extremities
 - Hyperreflexia, Babinski's, Hoffman's
 - L'hermitte's sign
 - Bowel & Bladder changes

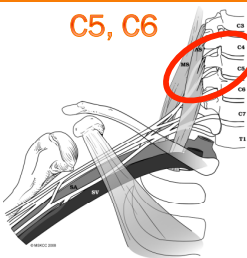


Cross NE, Glantz MJ. Neurologic complications of radiation therapy. Neurol Clin N Am 2003;21:249-277.
 Johansson S. Radiation induced brachial plexopathies. Acta Oncologica.2006;45:253-267

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Radiculopathy

C5, C6



Incidence: unclear

Symptoms:

- Dermatomal pain or sensory deficits
- Myotomal weakness, cramping or spasm
- Upper cervical (**C5, C6**) nerve roots commonly and severely affected (innervate rotator cuff)



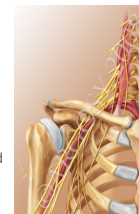
Plexopathy

Incidence: 1%

Latency: 14mo

Symptoms:

- Diffuse sensory deficits
- Diffuse weakness, cramping or spasm
- Myokymia on EMG
- Upper trunk most commonly and severely affected (supraspinatus, infraspinatus, biceps)



Johansson S. Radiation induced brachial plexopathies. Acta Oncologica. 2006; 45:253-267



Neuropathy

Examples:

- **Accessory Nerve Palsy**, Trigeminal Neuralgia, Recurrent Laryngeal N., Phrenic N., Sciatic N.

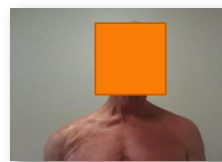
Etiology:

- Surgery: +/- Nerve sparing procedures
- Radiation

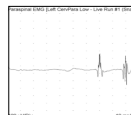
Johansson S. Radiation induced brachial plexopathies. Acta Oncologica. 2006; 45:253-267
 Cappiello J. The spinal accessory nerve in head and neck surgery. Current Opinion in Otolaryngology & Head and Neck Surgery. 2007;15(2): 107-111
 McGarvey KC. Physiotherapy for accessory nerve shoulder dysfunction following neck dissection surgery: a literature review. Head Neck. 2011;33(2):274-280



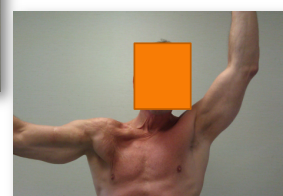
Accessory Nerve Palsy



Depressed and protracted shoulder at rest from muscular imbalance



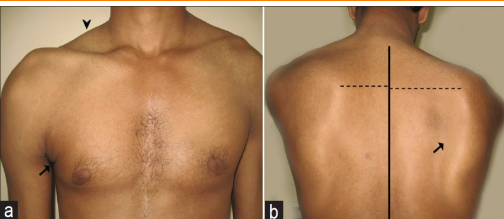
Myokymia



Inability to raise arm above head secondary to **scapular instability**



Accessory Nerve Palsy: Lateral Winging



- (a) Scapular hump (arrow head) and extra-axillary fold (arrow)
 (b) Upward and lateral displacement of spine of scapula on right side as compared to left (Comparison of distance between left and right from midline) with winging of right scapula (arrow)



Accessory Nerve Palsy: Lateral Winging

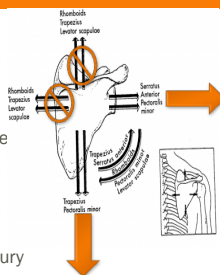


Shoulder Dynamics

- ✎ Muscle imbalance:
 - Weak trapezius (Access N damage)
 - Strong Pectoralis (Radiation shield)

- ✎ Rehab Goal: restore muscular balance
 - Stretch tight muscles: Pectoralis
 - Strengthen compensatory muscles:
 - Rhomboids & Levator Scapulae

- ✎ Increased risk for further shoulder injury



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Accessory Nerve Palsy: Treatment

✎ Physical Therapy: Refer EARLY

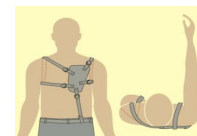
- Scapular stabilization, Proprioceptive Neuromuscular Facilitation
- Strengthen compensatory muscles (rhomboids, levator scapula)
- Stretch overactive muscles (Pectoralis)
- Modalities: Biofeedback, TENS, kinesiotape

✎ Orthotics:

- Scapula stabilizing brace

✎ Surgery:

- Scapulothoracic fusion/Scapulopexy
- Muscle transfer



Orthopaedics and Trauma Volume 26, Issue 6
2012 385 - 390

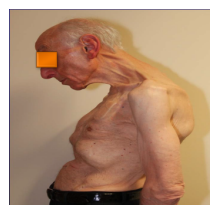
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Results of EARLY Physical Therapy

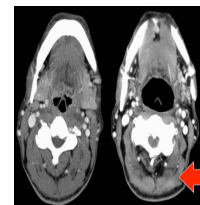


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Dropped Head Syndrome



Attempt at neck extension



HCT: Baseline vs 5.5yrs later
40Gy in 22 fractions
25Gy boost

Hashimoto Y. Dropped Head Syndrome Induced by Chemoradiotherapy for nasopharyngeal Carcinoma: A Case Report. Jpn J Clin Oncol 2012

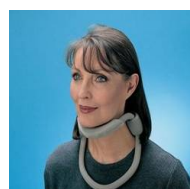
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Dropped Head Syndrome

- ✎ Dreaded complication
- ✎ Latency: ~19.7yrs (5-30yrs)
- ✎ Etiology: not clear
 - Neurologic injury
 - Myopathy
- ✎ Symptoms:
 - Severe atrophy of cervicofascial paraspinals and shoulder girdle
 - Limited ability to maintain head upright
 - Neck pain

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Dropped Head Syndrome Treatment



- ✎ Neuropathic pain medications
- ✎ Physical Therapy: Strengthening
- ✎ Orthosis: Headmaster brace


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Chronic Headaches

- Timing: began or worsened after cancer therapy
- Treatment:
 - anti-inflammatories
 - opioids
 - muscle relaxants
 - nerve stabilizing agents
 - physical therapy
 - trigger point injections
 - Good efficacy with Botulinum toxin injections**




Stubblefield M. The Role of Botulinum Toxin Type A in the Radiation Fibrosis Syndrome: A Preliminary Report. Archives of Physical Medicine and Rehabilitation. 2008





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Botulinum Toxin Injection Technique

Head & Neck Lymphedema





Lymph Nodes of the Head and Neck




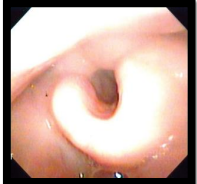
Why Do People Develop Lymphedema?

- **Blockage or damage** to the lymph nodes or vessels
 - Surgical removal of the lymph nodes
 - Radiation induced injury
- **Protein** build up in the tissues underneath the skin
 - Protein attracts water
 - Diuretics only moves water, not protein




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Internal Lymphphedema



Normal	Lymphedema
	

London S. Lymphedema Common After Head and Neck Cancer: Am Co Surgeons. 2011

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Lymphedema Management

- Lymphedema Therapy
 - Manual Lymphatic Drainage
- Compression Mask – nocturnal use only
- Sleep with wedge- to avoid dependent position
- Oral corticosteroid- for internal lymphedema



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Head and Neck Cancer Management Team

- **Physiatry** – overall coordination of therapeutic care
 - Medications – pain, spasm (topical/oral)
 - Injections – corticosteroids, Botulinum toxin
- **Speech therapy** – speech, swallowing, cognition
- **Physical therapy** – trismus, dystonia, lymphedema, MSK
- **Nutrition** – maintain healthy weight
- **Dentist**
- **Social Work**
- **Psychology/Psychiatry**
- **Surveillance** – Oncologist, Surgeons



SUMMARY

- 5yr survival rates continue to rise as death rates decline
- **Cancer** is now being defined as a '**chronic disease**' associated with disability during or after the course of the illness
- **Survivorship Care** will become a **new focus** of research, care directives and education



SUMMARY

- Rehabilitation improves function and quality of life
- Can treat multitude of symptoms associated with cancer
 - Pain, swelling, numbness/tingling, weakness, loss of function
- Treat through **every stage of survivorship**- even decades later
- Can treat MSK symptoms **NOT** associated with cancer



Questions??



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Thank you

