

Evidence n Action Management of Balance Impairment and Falls in Cancer survivors



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This course reviews cancer pathophysiology, the impact of cancer and its treatment on body systems and functions and focuses on screening, examination and intervention for balance impairment, fall risk, and chemotherapy induced peripheral neuropathy.

Course format includes: Lecture, Labs and Case Study

Introduction Learning Objectives

- Identify the unique and diverse systemic and local effects of cancer and its treatment that impact balance and increase risks of falls.
- Apply evidence-based screening tools and outcome measures within the ICF framework for the management of balance problems, fall risk, and chemotherapy induced peripheral neuropathy in cancer survivors.
- Apply evidence-based treatment strategies while considering physical therapy diagnosis and prognosis to improve balance and reduce fall risks in cancer survivors.

Course Schedule:

- 8:00 - 8:10 Introduction
- 8:10 - 9:10 Cancer Pathophysiology: System and Focal Effects of Cancer and Treatment and Review of Systems
- 9:10 - 9:45 Balance Deficits and Fall Risks in Cancer Survivors
- 9:45 - 10:45 Prospective Surveillance Model in Cancer Rehabilitation: Screening for Balance Deficits and Fall Risks
- 10:45 - 11:00 BREAK
- 11:00 - 12:00 Screening and Case Studies Lab
- 12:00 - 1:00 LUNCH (On Your Own)
- 1:00 - 2:00 Examination
- 2:00 - 3:00 Examination and Case Studies Lab
- 3:00 - 3:15 BREAK
- 3:15 - 4:15 Intervention
- 4:15 - 5:00 Intervention and Case Studies Lab
- 5:00 - 5:30 Q & A

The Team



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Disclosures

I have no relevant financial relationships that pose a potential conflict of interest.

IRB review of SEER – MHOS studies determined to be IRB Exempt

10 Question Quiz From Cancer Review Slide Deck

- ✓What is cancer?
- ✓What causes cancer?
- ✓What are the bone avid cancers?
- ✓What are the 4 most common cancer treatments?
- ✓What are the 3 most common symptom distresses from cancer treatment?
- ✓What are common causes of nerve damage in cancer survivors?
- ✓What cognitive impairments are most commonly seen in cancer survivors?
- ✓What CV side effects increase risk of falls?
- ✓Do cancer survivors fall frequently?
- ✓What does CAUTION stand for?

“To be healthy does not mean to be free of disease; it means that you can function, do what you want to do, and become what you want to become.”

—Rene Jules Dubos, 1901 - 1982

“Cancer rehabilitation was never meant to be an oxymoron”
Susan A. Levi 1992

Oncology/Cancer Rehab vs “Medical Rehab”:
Pt's perception of QOL and its meaning- “It took a cancer diagnosis to give me the wake-up call I needed to take a critical look at the quality of my life. And yet, I am eternally grateful the call came”

Haddan, 1998



Seven Warning Signs of Cancer


1. Change in bowel or bladder habits
2. A sore that does not heal
3. Unusual bleeding or discharge
4. Thickening or lump in breast or elsewhere

5. Indigestion or difficulty swallowing
6. Obvious change in a wart or mole
7. Nagging cough or hoarseness

(ACS, 2016)

Cancer Statistics

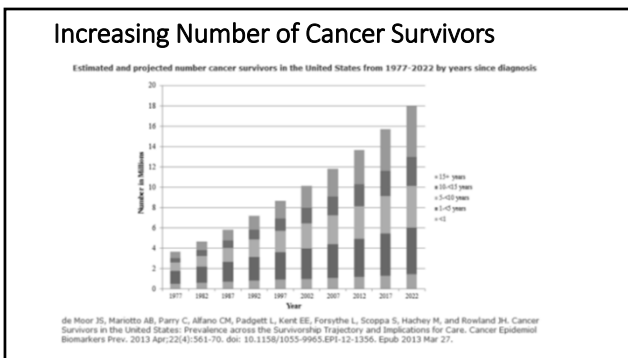
NIH NATIONAL CANCER INSTITUTE



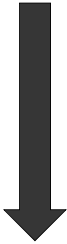
- Estimated 15.5 million cancer survivors alive in 2016
- 55% new cancers are diagnosed ≥ 65 y
- $>55\%$ of 4 major cancers are diagnosed ≥ 65 y
- Number of cancer survivors aged ≥ 65 y is projected to reach 19 million by 2024
- 52% survivors aged ≥ 75 y will live ≥ 5 y after diagnosis
- **Leading cause of morbidity** with many survivors having impairments and dysfunctions.

- 15% dx. 20 or more yr. ago and may be considered cured
 - Have no evidence of cancer and have same life expectancy as a person who never had cancer.
- However, **late physical and psychosocial complications** of disease and Rx. are recognized
- National expenditures for cancer care in the U.S.
 - \$125 billion in 2010
 - \$156 billion in 2020

NCI SEER accessed on 8/18/2016 <http://seer.cancer.gov/faststats/>, DeSantis et al., 2014, American Cancer Society, 2016, www.cancer.org



Cancer Survivorship Continuum / Sequencing of Onc Rehab



- Prevention
- Detection & Diagnosis
- Treatment
- Survivorship
- End of Life

- Pre-treatment- Document function before pending cancer treatments
- Active Care- Address functional disabilities, education, general conditioning
- Maintenance- Specific complaints and general conditioning
- Post-care/ Remission- Specific complaints and general Conditioning
- Palliation- Maximize function, ADL's, safety, adaptive equipment

(Harold P. Freeman) (Stubblefield & O'Dell)

Cancer Pathophysiology by System and System Review for Balance and Falls in Cancer Survivors



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Impairments Contributing to Balance Problems in Breast Cancer Survivors

Chemotherapy side effects

- Nausea/vomiting, myelosuppression, ocular toxicity during chemo
- Ovarian failure causes rapid bone loss within 6 months: fracture risk / fall risk in BC
- Cardiac toxicity (doxorubicin, epirubicin, herceptin): acute onset or months-years later
- Cognitive impairments (?): 20-30%
- Sensory/**motor** neuropathy

(Nair 2012, Osmani 2012, DeSantis 2014, Gewandter 2013, Giannai 2006, Shapiro 2001, Chen 2009, Azim 2011)

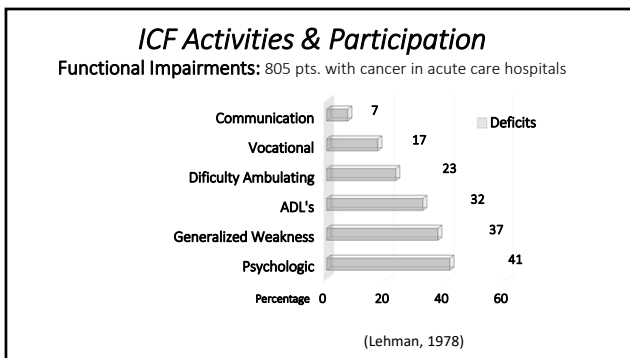
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Cancer treatment & therapy have improved over past 40 years, however-

- Cancer Rx often results in fx. deficits caused by removal of a diseased organ or segmental bone, jt., or limb amputations.
- Many people considered "cured," have physical limitations & **movement dysfunctions** that interfere with their daily lives. Cancer and its treatment is leading cause of morbidity. Late effects may appear more than 20 years after treatment
- Even without complete remission, cancer often may be controlled to provide longer survival time and improved QOL, but these factors are not reflected in survival rates
- Rx. may cause severe disfigurement, i.e., head & neck cancer. Cancer is major cause of amputation in children.

MUSCULOSKELETAL DEFICIT	INTERVENTION					
	SURGERY	CHEMOTHERAPY		RADIATION		IMMUNOTHERAPY
		EARLY	LATE	EARLY	LATE	
Atrophy/weakness	X					X
Contracture/fibrosis	X				X ¹	
Wound problems/ decubitus ulcer	X			X		X
Edema	X	X			X	X
Gait abnormalities (motor/sensory)	X	X ²			X	
Joint stability	X					
Neuropathy(motor/ sensory)	X	X ²	X ²		X	
Decreased endurance (cardiotoxicity)			X ³	X		X
Central nervous system involvement (balance UMN, LMN)	X	X ^{4,5}	X ^{4,5}	X	X	

¹ Especially when more than 6000 cGy are administered
² Vinorelbine and cisplatin
³ Doxorubicin
⁴ Intrathecal methotrexate
⁵ Cytarabine
⁶ UMN = upper motor neuron lesion; LMN = lower motor neuron lesion
 Gerber, C. and C. McQuarney; Chapter VII. Supportive Care and Rehabilitation, In: Manual of Oncologic Therapeutics, 3rd Edition, Eds. JS Macdonald, DG Haller, and BJ Mayer, J.B. Lippincott Co., Philadelphia, p. 669, 1995



Frequent Impairments in Older Persons with Cancer

- Endurance/Fatigue
- Balance
- UE and LE strength
- Gait
- Psychological status

(Yancik, 2001)

Persistent Changes Resulting from Cancer Therapies

Changes \ Treatment	Surgery	Chemo	Radiation	Hormonal
Fatigue	✓	✓	✓	✓
Pain	✓	✓	✓	✓
Cardiovascular		✓	✓	✓
Pulmonary	✓	✓	✓	
Peripheral neuropathy		✓		
Cognitive changes	✓	✓	✓	✓
Fat mass increases	✓	✓		✓
Lean mass losses	✓	✓		✓
Worsened bone health		✓	✓	✓
Musculoskeletal soft tissues	✓		✓	✓
Lymphedema	✓		✓	
Impaired immune/anemia		✓	✓	✓

• Other impairments: Cachexia and muscle weakness/wasting

(Adapted from 2010 ACSM Guideline)

What does a patient with cancer referred to outpatient PT clinic look like (FL)?

Cancer diagnostic group	N (% total sample)
Genitourinary	169 (40.4)
Breast	90 (21.5)
Head/neck	43 (10.3)
Soft tissue	39 (9.3)
CNS	20 (4.8)
Respiratory	13 (3.1)
Blood	12 (2.9)
Bone/joint	11 (2.6)
Digestive	11 (2.6)
Skin	10 (2.4)



(Alappattu 2015)

What does a patient with cancer referred to outpatient PT in FL look like?

Cancer	Chemotherapy (%)	Radiation therapy (%)	Surgical resection (%)	Hormone therapy (%)
Blood	100	8.3	-	-
Bone/joint	18.2	100	63.6	-
Breast	61.1	93.3	92.2	12.2
CNS	60	85	70	-
Digestive	63.6	72.7	81.8	-
Head/neck	46.5	100	62.8	-
Genitourinary	10.7	43.8	82.7	10.7
Respiratory	53.8	92.3	84.6	-
Skin	10	80	-	-
Soft tissue	10.3	94.9	89.5	-
ALL	33	70.6	80.3	6.9

(Alappattu 2015)

What does a patient with cancer referred to FL outpatient PT look like?

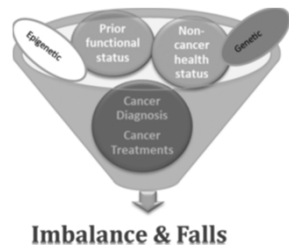
Cancer type	Most common physical impairments
Genitourinary	Incontinence, urgency, strength, soft tissue
Breast	ROM, lymphedema, posture, soft tissue, strength, pain
Head/neck	ROM, posture, pain, soft tissue, fatigue
Soft tissue	ROM, soft tissue, strength, pain, gait, fatigue

(Alappattu 2015)

**Take home Messages
Inherent in cancer treatment...**



- Cancer is primarily an age related disease
- Known cancer treatment sequelae that have a deleterious impact on function, impacting a majority of patients
- An aggregate burden of impairment from treatment and comorbidities
- Short and long term impact on function (ADLS) and QOL
- Risk for impairment and recurrent disease
 - Low risk today ≠ Low risk tomorrow
- Patients want and need information to help them stay functional and active across the continuum of care

Older adults and cancer: A combination cocktail for imbalance and falls




(Hile 2015)

**Cancer Treatment Adverse Effects
Relevant to Imbalance and Falls**

Adverse Effect	Agents With Potential Toxicity
 <p>Cardiotoxicity</p>	<ul style="list-style-type: none"> • Antitumor antibiotics (doxorubicin, daunorubicin) • Monoclonal antibodies (trastuzumab)
<p>Hypotension</p>	<ul style="list-style-type: none"> • Radiation therapy encompassing the mediastinum • Immunomodulator (thalidomide, lenalidomide) • Proteasome inhibitors (bortezomib)
 <p>Loss of bone density</p>	<ul style="list-style-type: none"> • Aromatase inhibitors (anastrozole, exemestane, letrozole) • Anti-androgens (flutamide, bicalutamide, nilutamide, enzalutamide) • LHRH analogs (leuprolide, goserelin, triptorelin, histrelin, abiraterone) • Radiation therapy

(Hile 2015)

**Cancer Treatment Adverse Effects
Relevant to Imbalance and Falls**

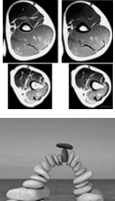
Adverse Effect	Agents With Potential Toxicity
 <p>Myalgia/arthralgia</p>	<ul style="list-style-type: none"> • Antimetabolite (methotrexate, cytarabine) • Aromatase inhibitors (anastrozole, exemestane, letrozole) • Kinase inhibitors (imatinib) • Monoclonal antibodies (bevacizumab, denosumab, rituximab, trastuzumab) • Proteasome inhibitors (bortezomib) • SERMs (raloxifene, tamoxifen) • Taxane-based plant alkaloid (paclitaxel, docetaxel) • Vinca alkaloids (vincristine, vinorelbine, vinblastine)

Hile 2015

**ICF Body Structure/Function:
Signs of Musculoskeletal Dysfunction**

• Joint pain	• Contractures
• Muscle atrophy and weakness	• Postural changes i.e. kyphosis
• Fatigue	• Incontinence
• Crepitus	• Abnormal gait
• Signs of inflammation	• Abnormal balance and falls
• Reduced ROM	

Cancer Treatment Adverse Effects Relevant to Imbalance and Falls

Adverse Effect	Agents With Potential Toxicity
 <p>Sarcopenia</p>	<ul style="list-style-type: none"> • Anti-androgens (flutamide, bicalutamide, nilutamide, enzalutamide) • Corticosteroids (dexamethasone, prednisone) • LHRH analogs (leuprolide, goserelin, triptorelin, histrelin, abiraterone)
<p>Vestibulotoxicity</p>	<ul style="list-style-type: none"> • Platinum-based alkylating agent (cisplatin) • Vinca alkaloid (vincristine, vinblastine, anthracycline)

(Hile 2015)

Age-Related Sarcopenia, Prevalence, Pathophysiologic link to Bone Health, Cachexia & Frailty

<ul style="list-style-type: none"> • Generally ~1/5-1/3 of older adults • Depends on criteria used • May increase with age <small>(Cruz-Jentoft 2014, Roubenoff 2003, 2004)</small> • Decreased myofiber size, number • Denervation (loss of motor neurons) • Infiltration by Fibrous & Fat tissues • Fewer Calcium Release Units • Mitochondrial changes <small>(Boncompagni 2006, Verdijk 2007, Pietrangelo 2015, Herbst 2007)</small> 	<ul style="list-style-type: none"> • Decreased Strength, Mobility, Function • Increased Fatigue, Risk of Metabolic Disorders • Increased Risk of Falls, Fracture, Death <small>(Lang 2010, Baumgartner 1998, Roubenoff 2003, 2004, Puthoff 2007)</small> • Sarcopenia compounds osteoporosis falls/fracture risk <small>(Illich 2016, Illich 2015)</small>
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Cancer-Related Sarcopenia

<p>Prevalence</p> <ul style="list-style-type: none"> • 30-70% of individuals with cancer • Pancreatic, colorectal, head/neck, lung • Most are overweight or obese, age 60+ <p style="text-align: center; font-size: x-small;">(Tangvik 2015)</p>	<p>Mechanisms</p> <ul style="list-style-type: none"> • Tumor-related • Treatment-related • Host response <ul style="list-style-type: none"> • Lipolysis • Survivor response
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Evidence of Impairments in BC



Acute

- **Strength**
 - Elevation strength: up to 20% deficit compared to contralateral limb
 - Strength deficits up to 27% compared to age-matched controls
- **Muscular Endurance**
 - In a progressive resistance lifting task, involved limb showed a 20% deficit in muscular endurance compared to the contralateral limb

Long Term

- **Strength**
 - 8% loss in shoulder abduction strength compared to pre-op status
 - 7-18% for shoulder elevation strength deficits
- **Muscular Endurance**
 - 40% of BCS demonstrated less endurance in involved limb compared to contralateral limb

Blomqvist Acta Oncol 2004, Harrington J Ca Surviv 2011, Hayes Br Ca Res Treat 2005, Rietman, Cancer, 2003, Hayes, Health QOL, 2010)

Classification of Sarcopenia: EWGSOP

- **Muscle Mass**
 - Baumgartner: Appendicular Skeletal Muscle Mass (ASM)/ht² <5.45kg/m²
- **Muscle Strength**
 - Grip strength: Low = Women: 16-20 kg; Men: 26-32 kg
 - Repeated Chair Stands
 - SPPB version differs from 5XSTS and 30 sec timed version
 - Consider use of arms
- **Physical Performance**
 - Gait speed < 0.8 m/s
- **Biochemical Markers of Muscle Metabolism**


(Beaudart 2016, Fragala 2016, Alley 2014, Rantanen 2003, Guralnik 1994, Guralnik 2000)

Strength or Power?

- Peak power relates most to 6MWT, gait speed, LLFDI functional limitation
- Power at high relative intensity relates to SPPB summary score, sit to/from stand.

(Puthoff 2007)

Cancer Treatment Adverse Effects Relevant to Imbalance and Falls

Adverse Effect	Agents With Potential Toxicity
Peripheral neuropathy 	<ul style="list-style-type: none"> Antimetabolites (methotrexate, capecitabine, cytarabine, fluorouracil) Epothilones (ixabepilone) Monoclonal antibodies (bevacizumab) Nitrogen mustard alkylating agent (ifosfami, decyclophosphamide,) Platinum-based alkylating agent (oxaliplatin, cisplatin, carboplatin) Podophyllotoxins (etoposide, teniposide) Proteasome inhibitors (bortezomib) Taxane-based plant alkaloids (paclitaxel, docetaxel, nab-paclitaxel) TNF immunomodulators (thalidomide, lenalidomide) Vinca alkaloids (vincristine, vinorelbine, vinblastine) (Hile 2015)

Chemotherapy-Induced Peripheral Neuropathy (CIPN)


Damage to peripheral nerves after exposure to one or more chemotherapy agents

- Sensory**
 - Stocking and gloving sensory loss
 - Proprioceptive deficits
 - Paresthesia (Numbness, tingling), and pain in the extremities
 - Distal - May or may not be **PAINFUL** (Wolf, 2012)
- Motor**
 - Distal muscle weakness
 - Footdrop
 - Loss of Achilles TR
- Autonomic**
 - Balance and mobility deficits, altered gait
 - Deficits persistent 2.5 years after chemo (Kolb 2016)



CIPN Transcends Cancer Type: Treatment received is more predictive than cancer site

Drug Class	Common Drugs	Cancers Treated	Incidence	Dose
Taxanes	Docetaxel (Taxotere®) Paclitaxel (Taxol®) , Abraxane®	Breast, ovarian, lung	'Strong assoc.' 'Strong assoc.' 33% Grade 3/4	371 mg/m ² 1000 mg/m ² 250 mg/m ²
Platinums	Cisplatin, Carboplatin Oxaliplatin	Breast, ovarian, lung, testicular, bladder, GI, colorectal, H&N	Strong 65-98%; 100%	>300, >400mg/m ²
Epothilones	Ixabepilone (Ixempra®)	Breast	30% Grade 3/4	
Vinca alkaloid	Vinorelbine (Navelbine®) Vincristine	Breast, testicular, lymphomas, leukemias, sarcomas	Early signs	>4 mg/m ²

Evidence of Impairment in Breast Cancer: Toxicity depends on Drug & Dose (coasting, synergistic action [ACT-Adriamycin, Cytosan, Taxol]) 

(Argyriou 2008, Lee 2006, Quasthoff 2002)

Evidence of Neuropathic Impairment in Breast Cancer

- 17% in Maryland cohort (n=123) were **dose-reduced** for CIPN
- Most common descriptions in Penn qualitative study (n=14) 'numb', 'tingling,' 'painful'
- **No woman (n=14) reported in hands only**
- Impacts activities, functions, behaviors at home and work
- Sleeping, driving, **standing, walking, stairs, balance, exercise, socializing**
- **Self-management includes movement for symptom reduction**
- One survivor hid hands under table at work to rub for pain reduction



(Bhatnagar 2014, Speck 2012)

The Association of Chemotherapy-Induced Peripheral Neuropathy Symptoms and the Risk of Falling

Noah A. Kolb, MD, A, Gordon Smith, MD, J. Robinson Singleton, MD, Susan L. Beck, PhD, APRN, AOCN; Gregory J. Stoddard, MS; Summer Brown, MD; Kathi Mooney, PhD, RN



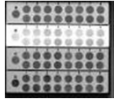
- A prospective study
- N=116 (age=55.5±11.9 y)
 - Breast, ovarian, or lung cancer
 - Receiving chemotherapy with a taxane or platinum agent
- Daily phone calls to a automated telephone system
 - CIPN questions to track symptoms on 0-10 scale
 - +symptoms: >3 for at least 10 days
 - A questionnaire about falls

- Survivors + CIPN symptoms were **2.5 times** more likely to have a fall than those without after controlling for age, sex, and length of follow-up
 - Hazard Ratio=2.67 (95% CI=1.62-4.41) (P<.001)
- Survivors + CIPN symptoms were more likely than those without to seek medical attention for a fall
 - 18.8.% vs 9.5% (P=.01)
- Most common site of medical care for a fall
 - **Oncologist's office** (50.0% in each group)

(Kolb 2016)

Cancer Treatment Adverse Effects Relevant to Imbalance and Falls

Adverse Effect	Agents With Potential Toxicity
Vision changes	<ul style="list-style-type: none"> Antimetabolites (methotrexate, capecitabine) Kinase inhibitors (imatinib) Monoclonal antibodies (rituximab) Nitrogen mustard alkylating agent (cyclophosphamide, ifosfamide) Platinum-based alkylating agent (oxaliplatin, cisplatin, carboplatin) Proteasome inhibitors (bortezomib) SERMs (tamoxifen) Taxane-based plant alkaloid (paclitaxel)



Abbreviations: LHRH, luteinizing hormone-releasing hormone; SERM, selective estrogen receptor modulator.

(Hile 2015)

Cancer-Specific History: Interview Topics and Rehabilitation Implications



Topic	Details to Obtain	Rehabilitation Implication
Cancer Diagnosis	Date(s) Site(s): Primary and secondary Stage at diagnosis (and now if relevant)/number of positive nodes How diagnosed? Signs/symptoms at diagnosis	<ul style="list-style-type: none"> Directs evaluation Predict cancer treatment and prognosis Select tests and measures Estimate recurrence risk for potential etiologies of current symptoms Evaluate for resolution vs persistence of symptoms & signs Impairments/restrictions that led to diagnosis may persist and impact mobility

Hile 2015

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Cancer-Specific History: Interview Topics and Rehabilitation Implications




Topic	Details to Obtain	Rehabilitation Implication
Cancer Treatment	Dates —especially most recent date for each treatment modality Surgical procedure: is operative report available? Anatomic structures removed, damaged, or spared; consider both resection and reconstructions	<ul style="list-style-type: none"> Directs evaluation Relevant precautions during examination Informs prognosis Consider natural history of recovery (when known) from adverse effects of the corresponding treatment (surgery, chemo- or radiation) Directs evaluation Relevant postoperative precautions, screen for anticipated deficits based on surgery received Informs prognosis Neuropraxia from surgical position vs complete intraoperative transection

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**Cancer-Specific History:
Interview Topics and Rehabilitation Implications**

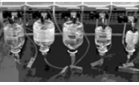
Topic	Details to Obtain	Rehabilitation Implication
Cancer Treatment	Radiation therapy: Tele- vs brachytherapy; field(s)/exposed structures, total dose, response especially holds/delays	<ul style="list-style-type: none"> Directs evaluation Screen survivor for known adverse effects given exposure fields and patient-reported treatment response; cardiopulmonary toxicity, potential soft tissue/lymph node fibrosis, bone demineralization Informs prognosis Anticipate different tissue response in irradiated area (eg, to manual therapy)



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**Cancer-Specific History:
Interview Topics and Rehabilitation Implications**


Topic	Details to Obtain	Rehabilitation Implication
Cancer Treatment	Chemo-, immuno-, hormonal therapies: Agent name(s), schedule (especially holds/ delays or dose reductions, early discontinuation)/ total dose, response	<ul style="list-style-type: none"> Directs evaluation Screen survivor based on known adverse effects with attention to patient-reported treatment response; neuropathy, myopathy, arthralgia's, osteoporosis Informs prognosis CIPN if no further exposure to toxic agent vs peripheral neuropathy in poorly controlled diabetes



Hile 2015 44

**Imbalance and Falls in Older Cancer Survivors:
Interviewing for Potential Contributors**

Contributor	Interview Considerations
Pain	<ul style="list-style-type: none"> Specify worst/best/average if asking for a period other than "now" Widen description to include "discomfort," "joint stiffness," "sensory changes such as numbness or tingling" Assess number of sites (for "widespread" distribution) and chronicity Myalgias/arthralgias—consider onset relative to medication start dates Ask about interference/influence of pain on activities & participation



Hile 2015

Imbalance and Falls in Older Cancer Survivors: Interviewing for Potential Contributors

Contributor	Interview Considerations
Dizziness	<ul style="list-style-type: none"> Distinguish true vertigo from lightheadedness or unsteadiness
Fatigue	<ul style="list-style-type: none"> Obtain ratings; consider both severity and interference Ask if balance or gait change when tired Specify worst/best/average if asking for a period other than "now" Investigate sleep: Hours per night, reason for and length of any interruptions, time to fall asleep or return to sleep, use of sleep aides; compare to pre-cancer treatment



Hile 2015

Imbalance and Falls in Older Cancer Survivors: Interviewing for Potential Contributors

Contributor	Interview Considerations
Cognition/ depression	<ul style="list-style-type: none"> Changes may be subtle—Do not rely on your impression Directly ask survivor about changes in thinking and memory for higher-level activities (work, hobbies, organization of home and community activities) Focus on attention, concentration, memory, language, processing speed, ability to multitask Also consider depressive symptoms



Hile 2015

Imbalance and Falls in Older Cancer Survivors: Interviewing for Potential Contributors

Contributor	Interview Considerations
Previous falls, History of falls	<ul style="list-style-type: none"> Specify timeframe for recall and provide definition of "fall" Include near falls/losses of balance/trips/slips Obtain description of fall(s) to inform examination and intervention Ask about injuries
Balance confidence	<ul style="list-style-type: none"> Ask survivor about any change in balance Attention to restricted activities and participation ABC, ABC-6

Hile 2015

ABC Scale

Instructions to Participants: For each of the following activities, please indicate your level of confidence in doing the activity without losing your balance or becoming unsteady from choosing one of the percentage points on the scale from 0% to 100%. If you do not currently do the activity in question, try and imagine how confident you would be if you had to do the activity. If you normally use a walking aid to do the activity or hold onto someone, rate your confidence as if you were using these supports.

0% 10 20 30 40 50 60 70 80 90 100%
No Confidence Completely Confident

How confident are you that you will **not** lose your balance or become unsteady when you...

1. ...walk around the house? ____%
2. ...walk up or down stairs? ____%
3. ...bend over and pick up a slipper from the front of a closet floor? ____%
4. ...reach for a small can off a shelf at eye level? ____%
5. ...stand on your tip toes and reach for something above your head? ____%
6. ...stand on a chair and reach for something? ____%
7. ...sweep the floor? ____%
8. ...walk outside the house to a car parked in the driveway? ____%
9. ...get into or out of a car? ____%
10. ...walk across a parking lot to the mall? ____%
11. ...walk up or down a ramp? ____%
12. ...walk in a crowded mall where people rapidly walk past you? ____%
13. ...are bumped into by people as you walk through the mall? ____%
14. ...step onto or off of an escalator while you are holding onto a railing? ____%
15. ...step onto or off an escalator while holding onto parents such that you cannot hold onto the railing? ____%
16. ...walk outside on icy sidewalks? ____%

*Powell LE & Myers AM. The Activities-specific Balance Confidence (ABC) Scale. Journal of Gerontology Med Sci 1995; 50(11):628-31.


Imbalance and Falls in Older Cancer Survivors: Interviewing for Potential Contributors

Contributor	Interview Considerations
Physical activity	<ul style="list-style-type: none"> • Consider activity levels before cancer diagnosis, during treatment, after treatment/ current • Do changes reflect onset of mobility difficulty or decline in confidence? • Determine if patient meets guidelines for recommended activity—if not, can barriers be overcome? (150 min per wk. moderate activity or 75 min per wk. vigorous activity) • If never, is the survivor ready to begin? Educate on potential cancer-specific benefits beyond general wellness(reduce recurrence risk)

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Older Cancer Survivors With Imbalance and Falls: Contributing Factors, Symptom, and Assessments


Musculoskeletal

Patient Report	Performance
Functional weakness for daily activity or work/leisure 	Posture <ul style="list-style-type: none"> • Standing and walking MMT: <ul style="list-style-type: none"> • LE screen (hip, knee, ankle, toe); • Consider dynamometer or 1-rep max Functional strength/mobility tests <ul style="list-style-type: none"> • Timed chair stands, stair climbs ROM/flexibility <ul style="list-style-type: none"> • Trunk and LE, esp. hips, knees, ankles

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Older Cancer Survivors With Imbalance and Falls: Contributing Factors, Symptom, and Assessments
Gait


Patient Report	Performance
Self-reported changes in gait Self-imposed restriction <ul style="list-style-type: none"> Activity or environment Falls, slips, trips	Self-selected gait speed Change in speed with challenge condition <ul style="list-style-type: none"> Secondary motor or cognitive task) Spatiotemporal parameters and variability Step time, step length, step width, double support Observe gait changes from start to end of 6 Minute Walk Test



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Older Cancer Survivors With Imbalance and Falls: Contributing Factors, Symptom, and Assessments
Balance

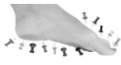
Patient Report	Performance
Self-rated balance <ul style="list-style-type: none"> Current balance or change with cancer treatment Self-reported falls, near falls/losses of balance Balance confidence scales <ul style="list-style-type: none"> Activities-specific Balance Confidence Scale 	Timed balance stands <ul style="list-style-type: none"> MCTSIB conditions, tandem, single limb stance In Short Physical Performance Battery (SPPB) Other balance screening tests <ul style="list-style-type: none"> TUG/FABS (Wampller 2007) Mini-Best Test (Huang 2016) Individualize battery based on interview findings and anticipated challenge, but standardize the test administration



Hile 2015
 Hile 2015, Huang 2015, Huang 2016

Older Cancer Survivors With Imbalance and Falls: Contributing Factors, Symptom, and Assessments
Peripheral nerve (somato-sensory, neuromotor, autonomic)

Patient Report	Performance
Sensory loss or changes <ul style="list-style-type: none"> Tingling, buzzing, constriction Feet are "louder" when walking <ul style="list-style-type: none"> Scuffing, tripping, slapping Lightheaded with change to more upright position Symptoms/Signs <ul style="list-style-type: none"> Better, same, or worse since onset (and relative to chemo) 	Quantify vibratory threshold of ankle/toe bilaterally <ul style="list-style-type: none"> Semiquantitative tuning fork, biothesiometer) Strength testing of ankle/foot/hallux bilaterally <ul style="list-style-type: none"> Max hold, but also fatigue with repetition); Consider dynamometry if tracking over time Assess for postural hypotension



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**Older Cancer Survivors With Imbalance and Falls:
Contributing Factors, Symptom, and Assessments**

Contributor	Patient Report	Performance
Visual	<ul style="list-style-type: none"> History of deficits and current/past/ planned surgical or non-surgical correction 	<ul style="list-style-type: none"> Contrast sensitivity, low contrast acuity
Vestibular	<ul style="list-style-type: none"> History of abnormality with no therapy or incomplete resolution Vertigo 	<ul style="list-style-type: none"> SOT/MCTSIB vestibular conditions VOR, head impulse testing, dynamic visual acuity Vestibular symptoms (vertigo) or signs (nystagmus) with head or body motion

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Given cancer overview and significance

Key info to screen and examine individuals for

- Signs and Sx of Cancer
- Appropriateness and benefit of therapeutic intervention, i.e. Modality?
- To ID **indications, contraindications and precautions**, and Intervention i.e. **Modality -- Dysvascular or insensate area/tissue**
- ↑ risk of adverse response to intervention
 - CP system, Integement, or NM system
 - e.g. poor circulation/Qc, skin/tissue integrity, poor balance

Oncology Section
American Physical Therapy Association