Exercise During and After Cancer Treatment

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Disclosures

No Relevant Financial Relationships to Disclose

NON FDA Approved use of drugs or products referenced in this presentation – none

[Jessica Engle, D.O.]
What is Physical Medicine and Rehabilitation?

• Physical medicine and rehabilitation (PM&R), also known as physiatry or rehabilitation medicine, aims to enhance and restore functional ability and quality of life to those with physical impairments or disabilities affecting the brain, spinal cord, nerves, bones, joints, ligaments, muscles, and tendons.

Source www.aapmr.org
What is Physical Medicine and Rehabilitation?

• Unlike other medical specialties that focus on a medical “cure,” the goals of the physiatrist are to maximize patients’ independence in activities of daily living and improve quality of life.

• Physiatrists are experts in designing comprehensive, patient-centered treatment plans, and are integral members of the care team.

• They utilize cutting-edge as well as time-tested treatments to maximize function and quality of life for their patients.
Johns Hopkins Physical Medicine and Rehabilitation

- Acute Hospital Rehabilitation Services (Consults and Acute Inpt Rehab)
- Post-Acute Rehabilitation
- Outpatient Rehabilitation
- 13 Locations (MD & DC)

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Interdisciplinary Approach

- PM&R Physician
- PT, OT, SLP
- Nursing
- Psych
- Oncology
- Supportive Care
- Rad Onc
- PCP
- Surgery
- Nutrition
- Support Services
- Social Work
- Spiritual care
- Ancillary Services

Cancer Patient & Family
Physiatry Toolbox Applied to Impairments in the Cancer Patient
Cancer Stats

• Cancer is associated with aging.
  – American Cancer Society (2015) 1.6 million new cases of cancer in U.S.
  • 589,430 die from cancer
  • 14.5 million cancer survivors in the U.S. in 2015.
    – Earlier detection
    – Improved treatments
    – Improved prognosis
  • 5-year relative survival rate for all cancers diagnosed increased from 49% (1975-1977) to 64% (2004-2010).
    – 78% of all new cancer diagnoses occur in patients over 55 years old

18 Million Cancer Survivors Projected in 2022

The Majority of Cancer Survivors are Older Adults

59% of cancer survivors were ≥65 years old in 2012

Total Cancer Survivors: 13.7 million

Cancer Survivors ≥65 years old: 8+ million

Cancer Stats

Cancer is associated with aging.
– Unique challenges
  • Risk for recurrent or secondary cancers
  • Risk for chronic disease
  • Long term impairments
  • Compromised quality of life

Cancer Rehabilitation

“Cancer rehabilitation is medical care that should be integrated throughout the oncology care continuum and delivered by trained rehabilitation professionals who have it within their scope of practice to diagnose and treat patients’ physical, psychological and cognitive impairments in an effort to maintain or restore function, reduce symptom burden, maximize independence and improve quality of life in this medically complex population.”
Cancer Rehabilitation

- As one of the few fellowship-trained cancer rehabilitation physiatrists in the country, I focus on identifying, diagnosing, and the treatment of cancer-related impairments using a patient-centered and goal-oriented rehabilitation approach.

- I am versed in treating the whole patient and employ a variety of methods including lifestyle modifications, osteopathic treatment techniques, medications, and injections.

- I see patients in East Baltimore (Viragh and Meyer), Columbia, and Sibley.
When Should a Patient Be Referred to Cancer Rehabilitation?

- Patients to should be referred to cancer rehabilitation professionals if you see that there has been a change in function, the patient is having difficulty with ADLs, new impairments arise, old impairments worsen, etc.
There is a great need for rehabilitation!

“Among 530 identified impairments, 484 (92%) required a physical rehabilitation intervention and 469 (88%) required physical therapy (PT) and/or occupational therapy (OT). Only 30% of impairments requiring rehabilitation services and 21% of those requiring PT/OT received treatment. Impairments detected during hospitalization were overwhelmingly more likely to receive a rehabilitation intervention (odds ratio [OR] = 87.9; 95% CI, 28.5 to 271.4), and PT/OT (OR = 558.8; 95% CI, 187.0 to 1,669.6).”
Common Symptoms in Cancer Patients

- **Fatigue**: 42-92%
- **Insomnia**: 41-54%
- **Cognitive Dysfunction**: 17-34%
- **Depression**: 15-30%
- **Anorexia**: 32%
- **Pain**: 36%
- **Constipation**: 27%
- **Dyspnea**: 26%
- **Nausea**: 21%
- **Dry Mouth**: 42%
- **Numbness/Tingling**: 29%
- **Dizziness**: 20%

Borrowed from Dr Jack Fu

Kroenke K. Support Care Cancer. 9/2012.
Which impairments can Cancer Rehabilitation address?
Which impairments can Cancer Rehabilitation address?

- Balance issues
- Weight loss
- Decreased range of motion
- Trismus
- Speech/swallow issues
- Impaired community reintegration

-PERFORMANCE STATUS

- Spasticity
- Weakness
- Gait impairment
- Neurogenic bowel/bladder
- Impaired activities of daily living
- Steroid myopathy
- Job specific issues
Which impairments can Cancer Rehabilitation address?

- Fatigue
- Neuropathy
- Cognitive impairment
- Lymphedema
- Limb Loss
- Transfer training
- Tumor side effect mitigation
- Positioning difficulties in XRT
- Spinal cord injury/compression
- Compensatory technique teaching
- Treatment side effect mitigation (Chemo, SERMs, AIs, XRT, surgery, etc)
- Painful neuromas
- Prehab
<table>
<thead>
<tr>
<th>Impairments Addressed by Cancer Rehabilitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Preexisting neuromuscular and/or musculoskeletal conditions (OA, bursitis, tendonitis, myofascial pain, radiculopathy)</td>
</tr>
<tr>
<td>- Torticollis</td>
</tr>
<tr>
<td>- Chronic migraines</td>
</tr>
<tr>
<td>- Vestibular dysfunction</td>
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<tr>
<td>- Radiation Fibrosis</td>
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<tr>
<td>- Paraneoplastic syndromes affecting the nervous system</td>
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<tr>
<td>- Dystonia</td>
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<tr>
<td>- Debility</td>
</tr>
<tr>
<td>- Assist with some end-of-life concerns</td>
</tr>
<tr>
<td>- Family training</td>
</tr>
</tbody>
</table>
Typical patients

- Brain tumor (Dx: weakness, fatigue, cognitive deficits, SIADH, ADL deficits, family training, pain mgmt, and/or gait deficit)
- Spinal cord compression (neurogenic bowel/bladder, family training, transfer training, assistive devices, bracing, pain mgmt, spasticity)
- Post mastectomy syndrome/pain
- Debility after prolonged illness/hospitalization (orthostatic hypotension, steroid myopathy)
- Patients with limb loss (gait training and eventual prosthetic training)
- Pathologic impending fracture/fracture patients (bracing, weight bearing restrictions)
Typical patients

- Head and neck patient with speech/swallow issues, trismus, torticollis, dystonia, migraines etc
- Lymphedema in any part of the body
- “Chemobrain” or cognitive impairment patients requesting help with energy conservation and compensatory techniques
- Neuropathy and compensatory techniques for balance in therapies, assistive devices, possible medication optimization
- PREHABILITATION
- All types of cancer patients who need to be educated in fatigue treatment and need for exercise
- …and many more!
Special precautions

- Neutropenic precautions
- Spinal precautions
- Fall precautions
- Seizure precautions
- Weight bearing restrictions
- Chemotherapy precautions
- etc
Exercise can prevent cancer by:
- promotion of healthy body weight
- hormonal regulation
- decrease processes that allow for malignancy progression and promotion
- controlling angiogenesis via innate immune responses
- down-regulation of pro-inflammatory pathways that promote carcinogenesis
- increasing cellular apoptosis efficiency
- improving cell replication regulation
- altering tumor initiation pathways
- improving reactive oxygen species mitigation
Effect of Low-Intensity Physical Activity and Moderate- to High-Intensity Physical Exercise During Adjuvant Chemotherapy on Physical Fitness, Fatigue, and Chemotherapy Completion Rates: Results of the PACES Randomized Clinical Trial


van Waart et al

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (N = 230)</th>
<th>OnTrack (n = 76)</th>
<th>Onco-Move (n = 77)</th>
<th>Usual Care (n = 77)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients requiring dose adjustments, No. (%)</td>
<td>61 (26)</td>
<td>9 (12)</td>
<td>26 (34)</td>
<td>26 (34)</td>
</tr>
<tr>
<td>Mean prescribed length of chemotherapy, days</td>
<td>118.6</td>
<td>119.2</td>
<td>119.9</td>
<td>116.7</td>
</tr>
<tr>
<td>Reasons for chemotherapy adjustment, No. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuropathy</td>
<td>19 (31)</td>
<td>3</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Myelosuppression</td>
<td>7 (11)</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Febrile neutropenia</td>
<td>7 (11)</td>
<td>0</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>7 (11)</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Pain</td>
<td>6 (10)</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Infection</td>
<td>4 (7)</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>4 (7)</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Edema</td>
<td>3 (5)</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Cardiac signs or symptoms</td>
<td>2 (3)</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Obstipation/diarrhea</td>
<td>2 (3)</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Average % dose reduction*</td>
<td>9.8</td>
<td>9.7</td>
<td>25.2</td>
<td></td>
</tr>
</tbody>
</table>

*Average dose reductions per group among participants needing a dose adjustment.
The Physical Exercise During Adjuvant Chemotherapy Effectiveness Study (PACES)- Patients with breast or colon cancer receiving adjuvant therapy enrolled in multicenter RCT of usual care group (n=77), light to moderate intensity home-based exercise group (Onco-Move n=77), moderate to high intensity supervised exercise group (OnTrack n=76). [ended up recruiting only a few colon cancer pt thus reported results on breast cancer pt]

- Overall, there was a decreased need for chemotherapy dose reduction in the patients participating in exercise!
- “A significantly smaller percentage of OnTrack (12%) required dose adjustments in the prescribed chemotherapy regimen than UC (34%) or Onco-Move (34%; odds ratio [OR], 0.26; P .002), indicating about a fourfold lower likelihood of dose adjustment; 95% CI, 0.11 to 0.61 for both comparisons). “

- Subset of over 121,000 women from Nurses’ Health Study
- Breast cancer patients who gain weight may have adverse effect on treatment due to hormonal interplay
- Looked at physical activity in terms of MET
- Results yielded that walking 3-5 hours a week may reduce risk of death from disease
- Determined that physical activity may reduce risk of death
Exercise after diagnosis

- [https://www.hopkinsmedicine.org/kimmel_cancer_center/centers/breast_cancer_program/treatment_and_services/exercise_and_breast_cancer.html](https://www.hopkinsmedicine.org/kimmel_cancer_center/centers/breast_cancer_program/treatment_and_services/exercise_and_breast_cancer.html)

- Those who exercise have fewer side effects during and after treatment, improved sleep
  - Increased stamina
  - Improved mood
  - Overall wellness and health are better
  - Decreased risk of recurrence
Exercise after diagnosis
(American Cancer Society)

• Lower risk of blood clots and increase blood flow to legs
• Decrease risk of heart disease
• Prevent Muscle wasting
• Decrease nausea
• Better quality of life
Exercise after diagnosis (American Cancer Society)

- Physical abilities can be improved or maintained
- Lower risk of osteoporosis
- Decrease fall risk, lower risk of broken bones
- Control weight
- Lower risk of depression

- Increase your ability to be more independent
- Allow you to keep social contacts
- Decrease fatigue
- Lower risk of anxiety
- Self esteem may improve
- **ALWAYS** check with your healthcare professional prior to engaging in an exercise program

- Stretching should **NOT** cause pain!

- **Take time off** if there is skin breakdown, pain, fragility with treatment.

- Ask your healthcare professional if lymphedema garments are appropriate for you

- Precautions for neuropathy, osteoporosis, and/or bone mets

- These are **guidelines** and care needs to individualized for each patient
Ability to Exercise

• Your type of cancer and location(s)
• Restrictions due to radiation, drains, wounds, incisions, bone lesions, etc.
• Treatment of cancer
• Fitness and endurance levels and strength
• If you have new pain, report new bone pain to your healthcare professional!
Precautions

- Blood counts (platelets, white blood cells, hemoglobin [anemia], electrolyte levels)
- May need to avoid public gyms/pools for low white blood cell counts (neutropenia)
- Talk to doctor first!
- Drink plenty of fluids if able
- Go slow
- Report all new pain, concerning symptoms, and see healthcare professional
Precautions

- Watch for bleeding (especially if on blood thinners)
- Avoid resistance exercises in area of line/tube
- Neuropathy may cause difficulty with certain exercises and is best treated with healthcare supervision (avoid scooters!)
- Avoid uneven surfaces
- Talk to your surgeon about precautions!

- Avoid chlorine (swimming pools) during radiation
- Report all leg swelling, shortness of breath to doctor at once
- Try to do light exercise in lieu of NONE
- Avoid weight lifting of that area if you have disease in the bone
Osteoporosis/Osteopenia

- Increased risk of osteopenia and osteoporosis in some cancer patients
- Screen for osteoporosis/osteopenia
- Resistance exercises including weight lifting are important at least twice a week
- Talk to your doctor!
Recommendations

- Stretching (before and after radiation)
- Posture
- Balance
- Avoid tight bands/ropes
- Aerobic exercise optimal is 300 minutes a week!
- **150 minutes** a week is sufficient of moderate cardiorespiratory exercise
- Can talk but not sing during activity
Recommendations

• Start with low weights at low repetitions
• Set short term goals (start for at least 10 minutes at a time)
• Take frequent rest breaks after short periods of exercise
• Try to work on large muscle groups
• Warm up first and cool down after exercise
• Do things that you like!
Recommendations

• Be active when you have the most energy
• Fresh air may be beneficial
• Avoid exercises close to bed time to optimize bed time rituals and sleep
• Exercise may be easier if symptoms are controlled
• Gradually increase activity
• Try something new!
2010
• At least 150 minutes of aerobic activity each week, 2 or more days resistance training
• Daily stretching

NOW
"Moderate-intensity aerobic training at least three times per week, for at least 30 min, for at least 8 to 12 wk. The addition of resistance training to aerobic training, at least two times per week, using at least two sets of 8 to 15 repetitions at least 60% of one repetition maximum, appears to results in similar benefits"
Exercise For Cancer Prevention and Treatment

For all adults, exercise is important for cancer prevention and specifically lowers risk of seven common types of cancer:

- colon cancer
- breast cancer
- stomach cancer
- endometrial cancer
- esophageal cancer
- kidney cancer
- bladder cancer

Exercising during and after cancer treatment:
- decreases fatigue, anxiety and depression
- improves physical function and quality of life
- does NOT exacerbate lymphedema


For cancer survivors, incorporate exercise to improve survival after a diagnosis of breast, colon and prostate cancer.
Cancer Prehabilitation


- “A process on the continuum of care that occurs between the time of cancer diagnosis and the beginning of acute treatment, includes physical and psychological assessments that establish a baseline functional level, identifies impairments, and provides targeted interventions that improve a patient's health to reduce the incidence and the severity of current and future impairments.

- The primary goal of prehabilitation is to prevent or reduce the severity of anticipated treatment-related impairments that may cause significant disability.”
Cancer Prehabilitation


• “Prehabilitation is the beginning of the rehabilitation care continuum during which there may be an opportunity to obtain a baseline status, identify pretreatment impairments, improve physical and emotional health before treatment, reduce treatment-related morbidity and/or mortality, decrease length of hospital stay and/or readmissions, increase available treatment options for patients who would not otherwise be candidates, and quickly facilitate return of patients to the highest level of function possible.”

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Cancer-related Fatigue

- NCCN Version 1.2019 Guidelines:
  “Cancer-related fatigue is a distressing, persistent, subjective sense of physical, emotional, and/or cognitive tiredness or exhaustion related to cancer treatment that is not proportional to recent activity and interferes with usual functioning.”

“I feel like I am already tired tomorrow”
- Unknown
Cancer-related fatigue

- Under reported
- Under diagnosed
- Under treated
- COMMON symptom in patients (maybe over 80% in patients receiving treatment)

- May persist months to years after treatment
- Can alter quality of life
- Can cause distress
National Lymphedema Action Network Position

- Lower risk of lymphedema if healthy weight is maintained through exercise and diet
- Avoid inactivity (prolonged sitting or standing)
- Rest frequently during activity to allow for recovery
- Monitor at-risk area(s) for change in texture, shape, or size of tissue, soreness, firmness, heaviness, skin breakdown/pain and/or lymphedema
- Activity or exercise should increase at a gradual increase of intensity and duration
- Avoid extreme heat/cold (i.e.-Hot yoga)
Impact of Ipsilateral Blood Draws, Injections, Blood Pressure Measurements, and Air Travel on the Risk of Lymphedema for Patients Treated for Breast Cancer

Chantal M. Ferguson, Meyha N. Swaroop, Nora Horick, Melissa N. Skolny, Cynthia L. Miller, Lauren S. Jammallo, Cheryl Brunelle, Jean A. O’Toole, Laura Salama, Michelle C. Specht, and Alphonse G. Taghian

RESULTS
In 3,041 measurements, there was no significant association between relative volume change or weight-adjusted change increase and undergoing one or more blood draws ($P = .62$), injections ($P = .77$), number of flights (one or two [$P = .77$] and three or more [$P = .91$] v none), or duration of flights (1 to 12 hours [$P = .43$] and 12 hours or more [$P = .54$] v none). By multivariate analysis, factors significantly associated with increases in arm volume included body mass index $\geq 25$ ($P = .0236$), axillary lymph node dissection ($P < .001$), regional lymph node irradiation ($P = .0364$), and cellulitis ($P < .001$).

Conclusion
This study suggests that although cellulitis increases risk of lymphedema, ipsilateral blood draws, injections, blood pressure readings, and air travel may not be associated with arm volume increases. The results may help to educate clinicians and patients on posttreatment risk, prevention, and management of lymphedema.
THANK YOU!
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