Rehabilitation: Optimizing Function and Quality of Life

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Saturday May 16, 2020

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Creating a Cancer-free World.
One Person, One Discovery at a Time.

James Oncology Rehab Team

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Objectives:

- Benefits of exercise in patients with cancer
- Explore research specific to exercise and patients with gastric and esophageal cancer
- Explain Prehabilitation Model of Care
- Identify ways to overcome barriers to exercise while dealing with cancer
- Review what is being done by The James Oncology Rehabilitation team

- **True or False**

Cancer survivors exercise more following diagnosis compared to prior to diagnosis

FALSE

Reported that less than 25% of cancer survivors meet physical activity guidelines

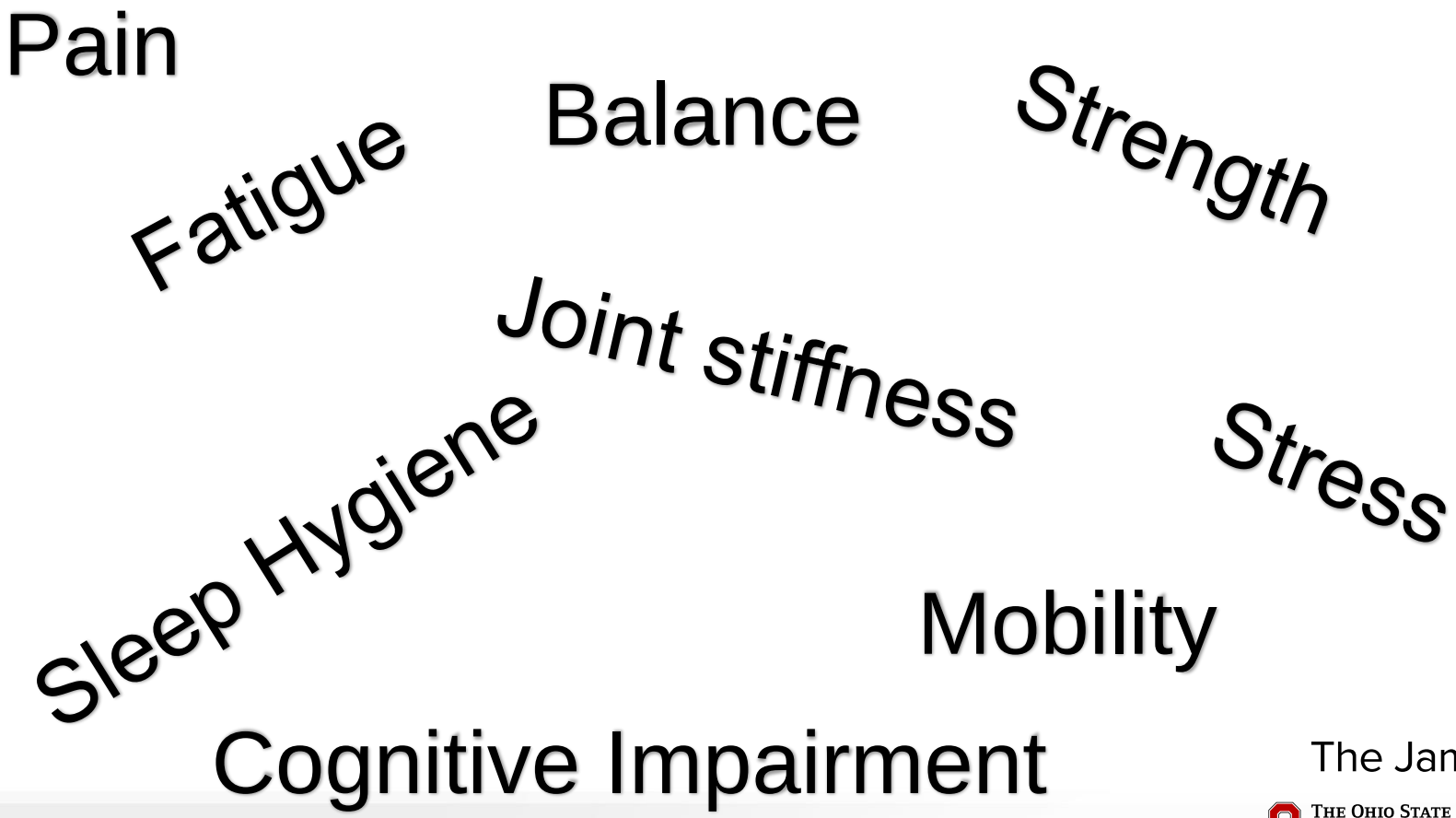
Side Effects of Cancer and Cancer Treatment that can Affect Physical Performance

- Fatigue
- Deconditioning
- Stress/anxiety
- Change in diet/eating patterns
- Poor sleep hygiene
- Balance/Mobility issues
- Numbness hands/feet
- Arthralgias/myalgias (joint/muscle achiness/pain)
- Cognitive Dysfunction (memory/concentration issues)

Decreased physical functioning /capacity

What do we know about exercise and cancer?

Exercise can positively impact many of the physical functioning side effects of cancer



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Cancer and Exercise studies

- MacVicar/Winningham study (1986) first study to demonstrate that patients undergoing chemotherapy can benefit from exercise.
  - study showed reduced nausea/vomiting
  - first studies to show benefit from support group type setting
  - study conducted at Ohio State

- Studies showing that exercise translated to improved immune system health (Campbell/Turner, 2018)

HOLMES STUDY: JAMA 2005

- Prospective observational study based on self-report
- 2987 nurses participated as part of the Nurses' Health Study: stage I, II, III breast cancer
- Main outcome measure: breast cancer mortality risk according to physical activity

MET hours per week	Correspondence to walking at an average pace (hrs / wk)
< 3	Less than 1 hour
3-8.9	1-2 hours
9-14.9	3-4 hours
15 – 23.9	5-7 hours
>/= 24	8 or more hours

3 MET- hours is equivalent to walking at average pace of 2-2.9 mph for 1 hour

Other Studies

- **Fatigue (Mustian et al, 2017)**

  Meta-analysis comparing interventions for cancer related fatigue

  - 17,000+ references/ 113 studies

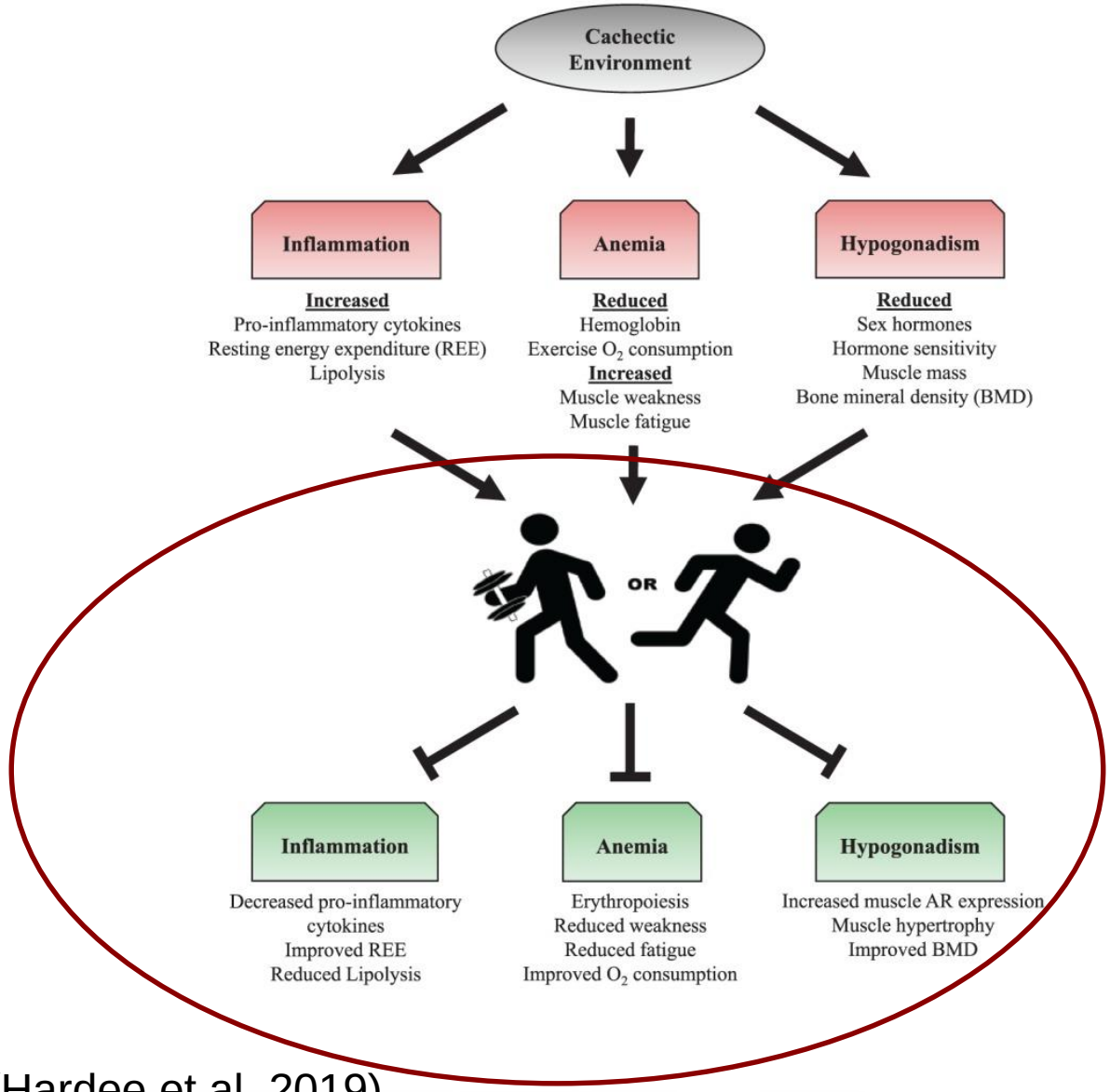
  - Best intervention: EXERCISE

  2nd place: psychological interventions

- **Muscle mass (Hardee et al, 2019)**

  Primary objective review the role of exercise for the prevention and treatment of muscle wasting.

  - suggested link between physical exercise and improvement in muscle mass/function for muscle wasting conditions



(Hardee et al, 2019)

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A Systematic Review of Exercise Systematic Reviews in the Cancer Literature (2005-2017)

(Stout et al, 2017)

Conclusions:

- Exercise is beneficial before, during and after cancer treatment
- Exercise is beneficial across all cancer types AND for a variety of impairments
- Moderate to vigorous level of exercise is best to:
  - -Improve function and mitigate cancer related impairments
  - Enhance tolerance to cancer treatment
  - Improve survival outcomes (Evidence is growing)

Why a person with cancer should exercise?

- Reduce fatigue
- Improve bone density
- Improve balance (reduce fall risk)
- Improve/maintain mobility
- Enhance mental clarity
- Improve sleep pattern
- Improve appetite
- _____(add your reason here)

The BIG QUESTIONS are….

How much exercise?

What kind of exercise?

Effects of Exercise on Health-Related Outcomes in Those with Cancer

What can exercise do?

- Prevention of 7 common cancers*
  Dose: 2018 Physical Activity Guidelines for Americans: 150-300 min/week moderate or 75-150 min/week vigorous aerobic exercise
- Survival of 3 common cancers**
  Dose: Exact dose of physical activity needed to reduce cancer-specific or all-cause mortality is not yet known; Overall more activity appears to lead to better risk reduction

*Bladder, breast, colon, endometrial, esophageal, kidney and stomach cancers
**Breast, colon and prostate cancers

Overall, avoid inactivity, and to improve general health, aim to achieve the current physical activity guidelines for health (150 min/week aerobic exercise and 2x/week strength training).

Outcome	Aerobic Only	Resistance Only	Combination (Aerobic + Resistance)
Strong Evidence	Dose	Dose	Dose
Cancer-related fatigue	3x/week for 30 min per session of moderate intensity	2x/week of 2 sets of 12-15 reps for major muscle groups at moderate intensity	3x/week for 30 min per session of moderate aerobic exercise, plus 2x/week of resistance training 2 sets of 12-15 reps for major muscle groups at moderate intensity
Health-related quality of life	2-3x/week for 30-60 min per session of moderate to vigorous	2x/week of 2 sets of 8-15 reps for major muscle groups at a moderate to vigorous intensity	2-3x/week for 20-30 min per session of moderate aerobic exercise plus 2x/week of resistance training 2 sets of 8-15 reps for major muscle groups at moderate to vigorous intensity
Physical Function	3x/week for 30-60 min per session of moderate to vigorous	2-3x/week of 2 sets of 8-12 reps for major muscle groups at moderate to vigorous intensity	3x/week for 20-40 min per session of moderate to vigorous aerobic exercise, plus 2-3x/week of resistance training 2 sets of 8-12 reps for major muscle group at moderate to vigorous intensity
Anxiety	3x/week for 30-60 min per session of moderate to vigorous	Insufficient evidence	2-3x/week for 20-40 min of moderate to vigorous aerobic exercise plus 2x/week of resistance training of 2 sets, 8-12 reps for major muscle groups at moderate to vigorous intensity
Depression	3x/week for 30-60 min per session of moderate to vigorous	Insufficient evidence	2-3x/week for 20-40 min of moderate to vigorous aerobic exercise plus 2x/week of resistance training of 2 sets, 8-12 reps for major muscle groups at moderate to vigorous intensity
Lymphedema	Insufficient evidence	2-3x/week of progressive, supervised, program for major muscle groups does not exacerbate lymphedema	Insufficient evidence
Moderate Evidence			
Bone health	Insufficient evidence	2-3x/week of moderate to vigorous resistance training plus high impact training (sufficient to generate ground reaction force of 3-4 time body weight) for at least 12 months	Insufficient evidence
Sleep	3-4x/week for 30-40 min per session of moderate intensity	Insufficient evidence	Insufficient evidence

Citation: bit.ly/cancer_exercise_guidelines

Moderate intensity (40%-59% heart rate reserve or VO_2R) to vigorous intensity (60%-89% heart rate reserve or VO_2R) is recommended.

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Exercise Recommendation for Cancer Survivors

- 150 minutes of moderate activity /week
- Moderate is different for everyone
- Example of moderate: 2.5-2.9 mph treadmill

RPE Scale (Rate of Perceived Exertion)	
1	**Very Light Activity** (anything other than complete rest)
2-3	**Light activity** (feels like you can maintain for hours, easy to breath and carry on a conversation)
4-5	**Moderate Activity** (feel like you can exercise for long periods of time, able to talk and hold short conversations)
6-7	**Vigorous Activity** (on the verge of becoming uncomfortable, short of breath, can speak a sentence)
8-9	**Very Hard Activity** (difficult to maintain exercise intensity, hard to speak more than a single word)
10	**Max Effort** (feels impossible to continue, completely out of breath, unable to talk)

Exercise specific to patients with GI cancer

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Physio-therapy led multidisciplinary rehabilitative intervention after oesophago-gastric cancer

(Bennett et al, 2018)

- N=21; 23.5 months post-surgery w/ suboptimal fitness level
- Intervention: 12 weeks supervised exercise + home exercise that included:
  - Aerobic warm up
  - Resistance training
  - Cool down program
- Results: Improved physical functioning and improved mental outlook

"They said the exercise would help and it was hard to believe, because you think it'll make you more tired, but it didn't. It actually worked and the fatigue really lifted".

Bennett et al, 2018

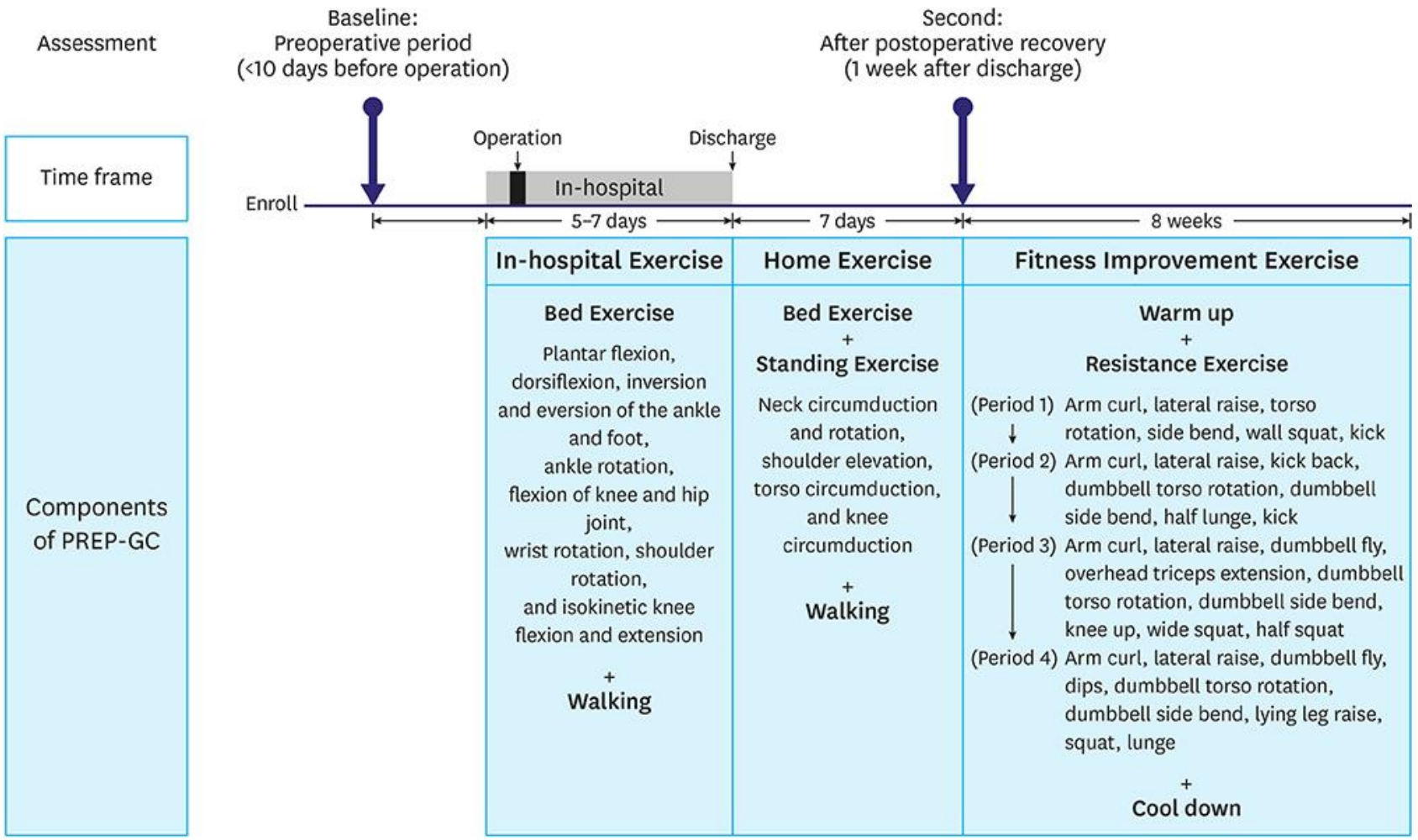
Feasibility and Effects of a Post operative Recovery Exercise program specific to GI cancer (Cho et al, 2018)

- N= 24; minimally invasive gastrectomy
- 3 phase exercise program

  In Hospital (1 week)

  Home Exercise (1 week)

  Fitness Improvement Exercise (8 weeks)
- Results:
  - Safe and feasible (79.4% adherence; 99.4% compliance)
  - Restored cardiopulmonary function, muscular strength and muscular endurance and flexibility



(Cho et al, 2018)

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Prehab: New Model of Care

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Prehabilitation: Model of Care

What is prehabilitation?

- preoperative program to optimize function and functional capacity with the goal of improving post surgical outcomes.

Single modality but typically is multi-modal

- Exercise/physical performance
- Nutrition
- Stress/anxiety reduction intervention
- Smoking Cessation

Prehab programs look different for different procedures or diseases

(Bolshinsky et al, 2018, Marker et al, 2018)

Prehabilitation: Model of Care

Why “prehab” for patients with gastric/esophageal cancer?

- Surgical procedures have advanced and are safer and more accessible for patients with GI cancers
- Age of onset for gastric and esophageal cancer is in the 5^{th}-6^{th} decade of life.
- When diagnosed likely have other co-morbidities
- Lessons learned from other cancer disease groups that addressing functional issues early can lead to better outcomes later.

Prehab studies

- Colorectal study (Li et al, 2013) only 40% of patients receiving standard of care had returned to preoperative walking capacity at 8 weeks post surgery **vs 81% of prehab group.**
- Pancreatic cancer study (Marker et al, 2018) demonstrated pre-operative exercise program during neoadjuvant chemotherapy may be effective in maintaining or improving muscle mass and physical fitness.
- Colorectal study (McLennan et al, 2019) reported that patients unable to walk 2 flights of stair prior to surgery had increased risk of post operative complications.

Prehab studies: Gastric/esophageal Cancers

- Lau et al (2019) Meta-analysis of prehab in GI cancer patients

  - Exercise intervention typically was moderate aerobic and resistance training

  -Improvement in 6 Minute Walk Test prior to and following surgery compared to controls

  -Conversely, no change in rates of postoperative complications, surgical site infections, LOS or 30 day readmission between groups noted.

Limitations to the study: heterogeneity of the groups studies; cancer stage, co-morbidities

More research is needed.

Prehab studies: Gastric/esophageal Cancers

Vermillion et al (2018) Preoperative exercise therapy for GI cancer patients: systematic review

- Reviewed 9 studies (534 patients)
- All interventions included aerobic training but at varied duration/intensity/frequency

- Conclusions:

  * Pre operative exercise was associated with a more rapid recovery to baseline function after surgery.

Barriers to Exercise

- Potential for short time between diagnosis and surgery
- Time of increased stress and anxiety
- Difficult to prioritize exercise with multitude of medical appointments and family responsibilities
- May be tired or not feeling well.

…….many more

This is an area for future research and study to find the most effective and efficient exercise intervention.

James Oncology Rehabilitation Department

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Oncology Rehabilitation Department at The James

- Physical and occupational therapists specialized in the treatment of people with cancer
- 3 Oncology Rehabilitation Clinics
  - Spielman Comprehensive Breast Center
  - Morehouse Tower 6th Floor: Cancer Supportive Care Services
  - James Tower 5th Floor
  - Coming in Summer 2020: JamesCare Grove City
- Main phone number: 614-293-0043

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Department Projects/Programs

- James Exercise Program
  - Individualized exercise plan based on patient's specific needs
  - 1x/week x 4 weeks
  - Modified for any activity level
- Prehab programs
  - Breast
  - Bone Marrow Transplant
  - Sarcoma
  - HIPEC Surgery (Hyperthermic Intraperitoneal Chemotherapy)

Department Projects/Programs

Research

- CIPN Home Intervention Study
- Radiation/Shoulder Mobility Study
- Radiation/Exercise Study
- Epiphany Study (CIPN/chemotherapy)
- Pending: Prehab/Exercise study for pancreatic, liver or gastric cancer surgery

References

- Bennett AR, O'Neil L, Connolly D, Guian EM, Boland L, Doyle SL, O'Sullivan J, Reynolds JV, Hussey J. Patient Experiences of a physiotherapy-led multidisciplinary rehabilitative intervention after successful treatment of oesophago-gastric cancer. Supp Care Cancer (2018)26:2615-2623.
- Boshinsky V, Li MH, Ismail H, Burbury K, Riedel B, Heriot A. Multimodal Prehabilitation Programs as a Bundle of care in Gastrointestinal Cancer Surgery: A Systematic Review. Disease of the Colon & Rectum (2018)61:1.
- Campbell JP, Turner JE. Debunking the Myth of Exercise-Induced Immune Suppressin: Redefining the Impact of Exercise on Immunological Health Across the Lifespan. Frontiers in Immunology (2018)April Vol 9.
- Cho I, Son Y, Song S, Bae YJ, Kim YN, Kim H, Lee DT, Hyung WJ. Feasibility and Effects of a Postoperative Recovery Exercise Program Developed Specifically for Gastric Cancer Patients (PREP-GC) Undergoing Minimally Invasive Gastrectomy. J Gastric Cancer. 2018 Jun18(2):1180133.
- Hardee JP, Counts BR, Carson JA. Understanding the Role of Exercise in Cancer Cachexia Therapy. Am J Lifestyle Med Jan/Feb 2019:46-60.

References

- Lau CS, Chamberlain RS. Prehabilitation Programs Improve Exercise Capacity Before and After Surgery in Gastrointestinal Cancer Surgery Patients: A Meta-analysis. J Gastrointest Surg 2019:25Nov.
- Chao L, Carli F, Lee L, Charlebois P, Stein B, Liberman AS, Kaneva P, Augustin B, Wongyingsinn M, Gamsa A, Kim DJ, Vassillou MC, Feldman, LS. Impact of a trimodal prehabilitation program on functional recovery after colorectal cancer surgery: a pilot study. Surg Endosc(2013) 27:1072-1082.
- Marker RJ, Peters JC, Purcell WT, Jankowski CA. Effects of Preoperative Exercise on Physical Fitness and Body Composition in Pancreatic Cancer Survivors Receiving Neoadjuvant Therapy: A Case Series. Rehab Onc 2018;36:E1-E9.
- Matthews CE, Moore SC, Arem H, Cook MB, Trabert B, Hakansson N, Larsson SC, Wolk A, Gapstur SM, Lynch BM, Milne RL, Freedman ND, Huang W, de Gonzalez AB, Kitahara CM, Linet MS, Shiroma EJ, Sandin S, Patel AV, Lee I. Amount and Intensity of Leisure-Time Physical Activity and Lower Cancer Risk. J Clin Oncol 2019;36:686-697.

References

- McLennan E, Oliphant R, Moug SJ. Limited preoperative physical capacity continues to be associated with poor postoperative outcomes within colorectal programme. Ann R Coll Surg Engl. 2019 Jan 15:1-8.
- Mustian KM, Alfano CM, Heckler C, Kleckner AS, Kleckner IR, Leach CR, Mohr D, Palesh OG, Peppone LJ, Piper BF, Scarpato J, Smith T, Sprod LK, Miller SM. Comparison of Pharmaceutical, Psychological, and Exercise Treatments for Cancer-Related Fatigue: A Meta-analysis. JAMA Oncol 2017;3(7):961-968.
- Segal R, Zwaal C, Green E, Tomasone JR, Loblaw A, Petrella T, and the Exercise for People with Cancer Guideline Development Group. Exercise for people with cancer: a systematic review. Curr Oncol. 2017 Aug;2494):e290-e315.
- Stout NL, Baima J, Swisher A, Winters-Stone KM, Welsh JW. A Systematic Review of Exercise Systematic Reviews in the Cancer Literature (2005-2017). PM R 2017 Sept;9(9 Suppl 2): S347-S384.

References

- Vermillion SA, James A, Dorrell RD, Brubaker P, Milhalko SL, Hill AR, Clark CJ. Preoperative Exercise Therapy for Gastrointestinal Cancer Patients: A Systematic Review. BMC (2018) 7:103.
- Effects of Exercise on Health-Related Outcomes in Those with Cancer (Infographic). https://www.exerciseismedicine.org/assets/page_documents/exercise-guidelines-cancer-infographic.pdf (Copy and paste into your browser).

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