

Exercise in Cancer Treatment: Current Evidence & Future Directions

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Presentation Goals

- Highlight the research evidence
- Identify the barriers
- Discuss our own research



Overview of the Landscape



The most recent research available shows that there are now more than 24,000 invasive cases diagnosed each year.



More people are living with and surviving cancer than ever before.

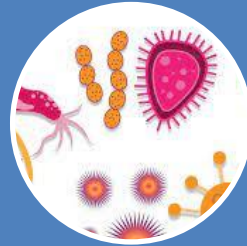


Being physically active helps.

Exercise in Oncology: The Evidence



Cardiac Toxicity



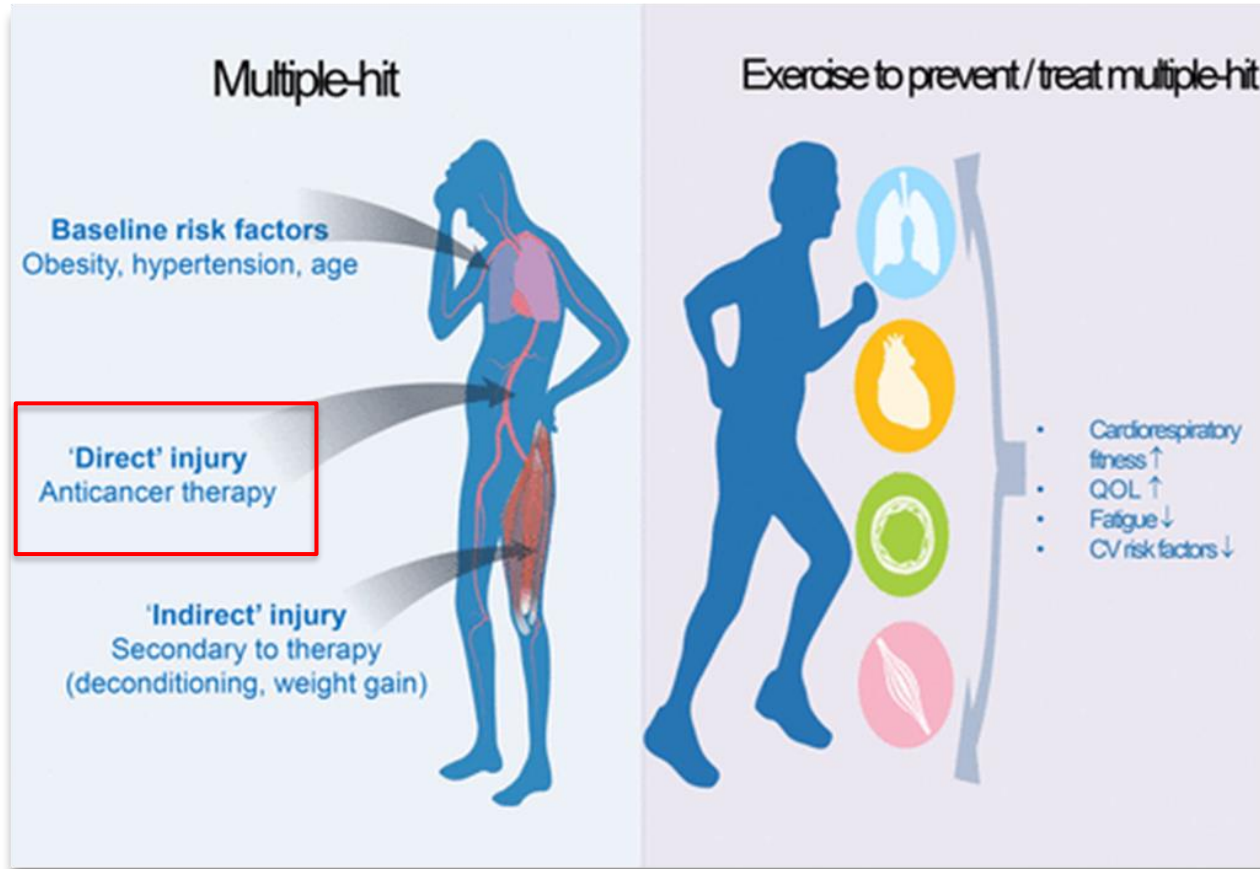
Tumour
Microenvironment



Drug Dose
Tolerability

Supported by Literature Reviews and/or Randomized Controlled Trials

Exercise as a Cardiovascular Protector



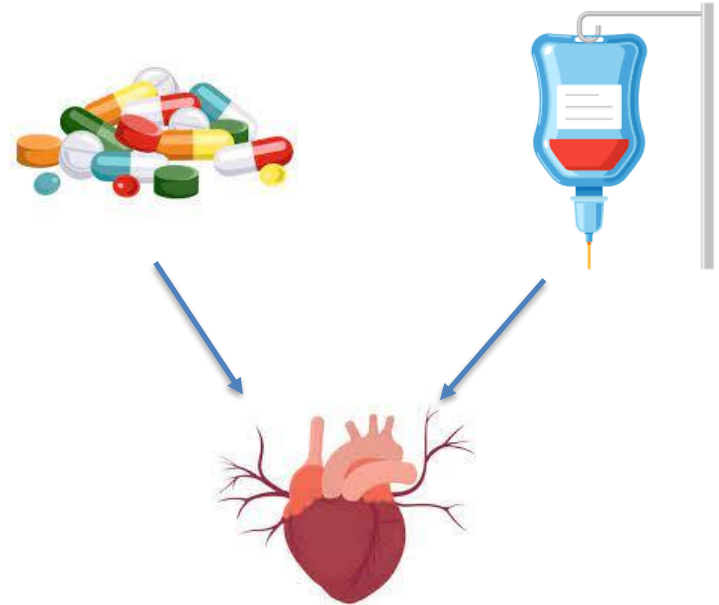
(Gilchrist et al., 2019)

Cardiotoxicity in Cancer Care

Cancer treatment-induced toxicities are an ongoing concern throughout the cancer care continuum from treatment to survivorship.

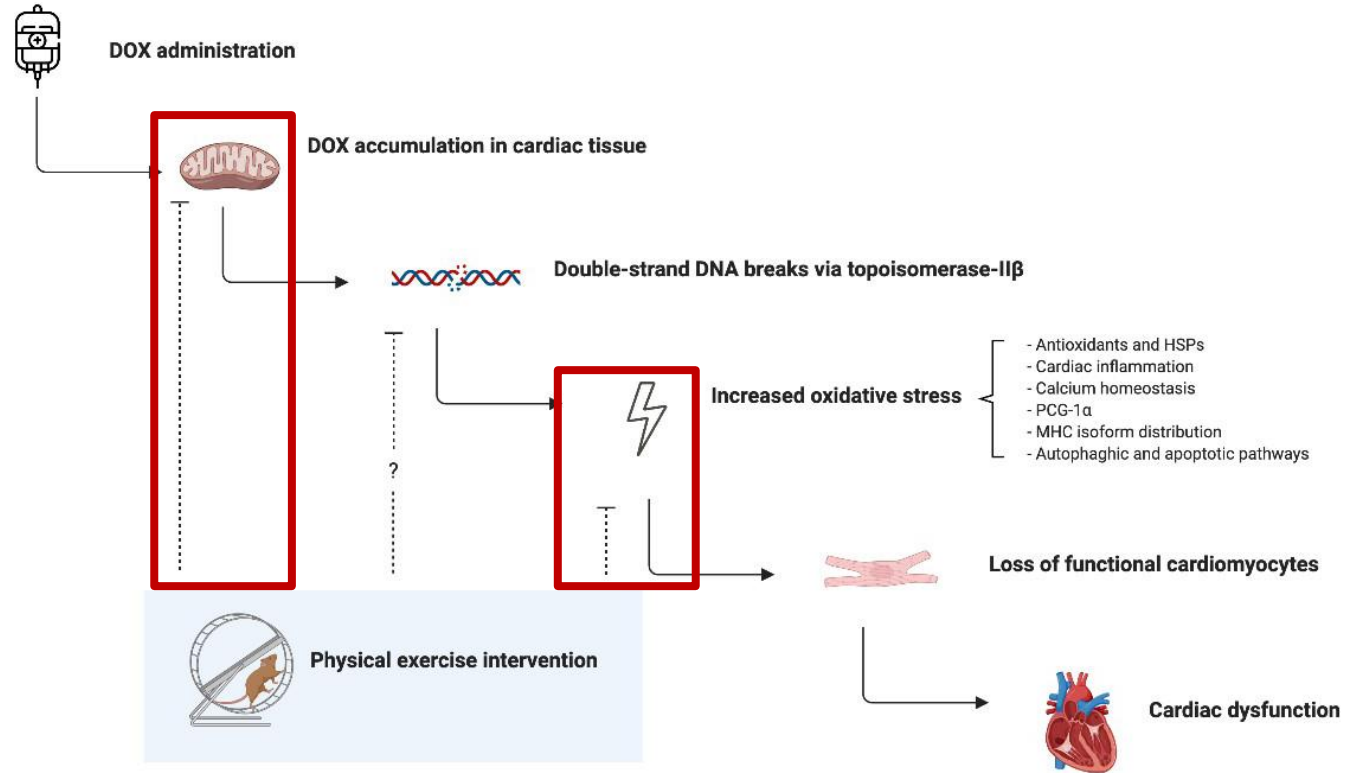
Treatments:

- Anthracyclines
- Anti HER2 agents
- Novel anti-androgens
- Androgen Deprivation Therapy
- Emerging targeted treatments

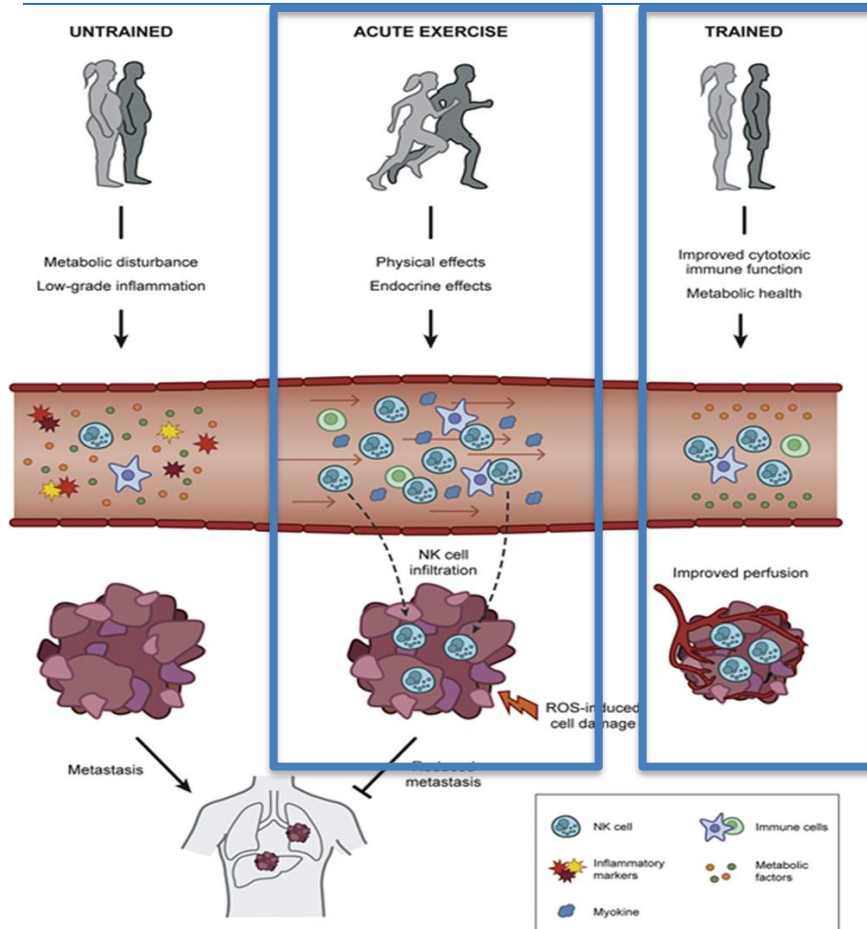


Evidence

Pre-Clinical Studies



Exercise and Immunotherapy: The Micro-Tumour Environment



- Exercise-induced immune cell mobilization and redistribution: Enhanced Immunosurveillance through increased numbers of monocytes, NK cells and neutrophils.
- Favourable effects of exercise on age-related deterioration of the immune system.
- Promotes vascularisation within the tumour
 - Enhanced anti-tumoural immune cell infiltration
 - Enhanced drug delivery.

(Brummer et Al, 2023)

Exercise: Body Composition and Drug Dose Tolerability

Evidence supports that body composition is an important predictor of chemo toxicity in adults with cancer.

Decreased muscle mass is associated with an increased risk of:

- Grade 3-4 toxicities
- Chemotherapy dose reductions
- Poor prognosis

Muscle mass is an important consideration

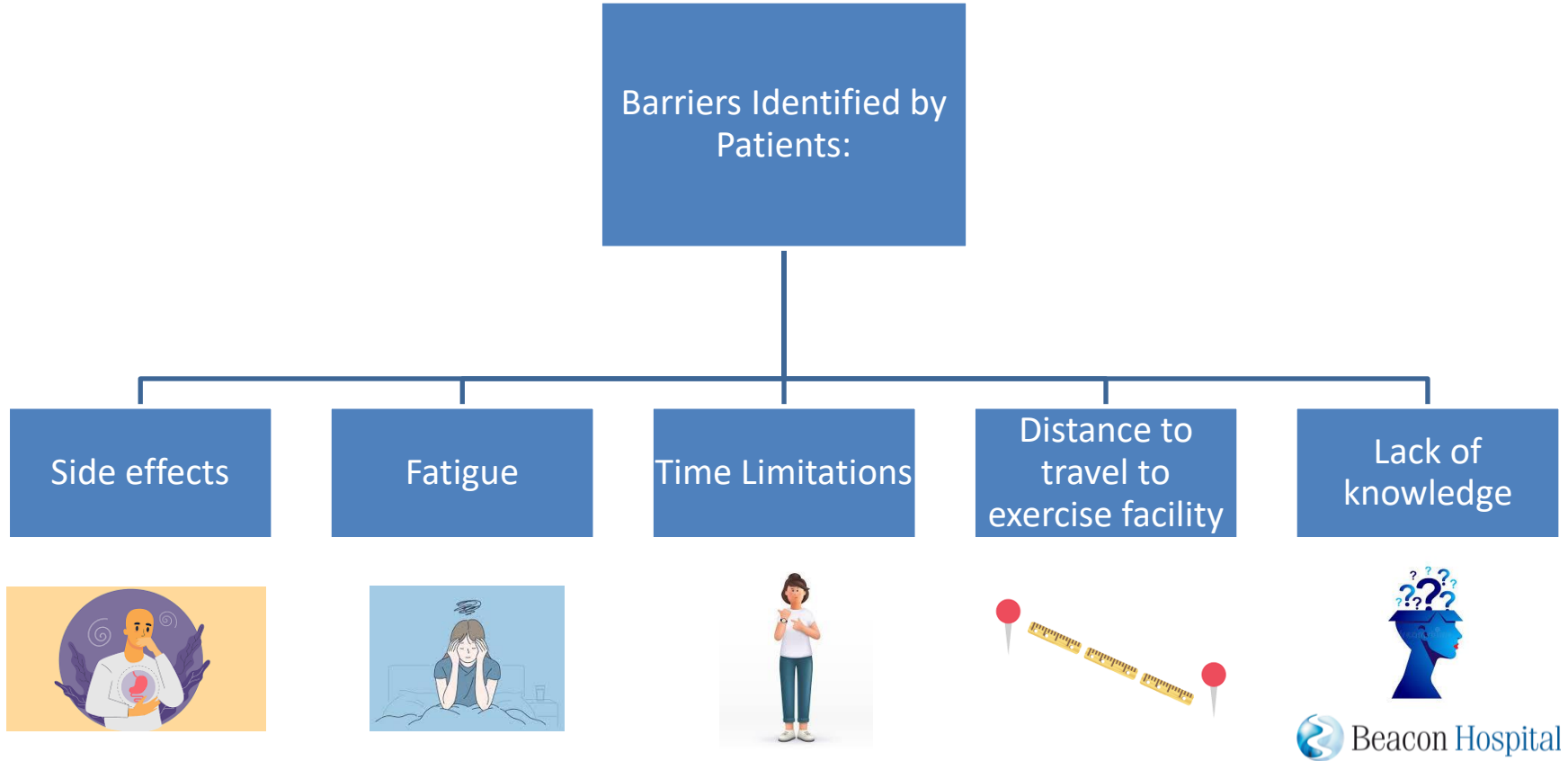
(Malverio et Al, 2023;



And Yet...

- Cardiorespiratory fitness has been shown to decrease over the duration of treatment.
- These changes can persist long after treatment has completed.





Questions

Is the introduction of an exercise intervention immediately prior to chemotherapy feasible and safe within our oncology day unit?

Does partaking in supervised moderate intensity exercise immediately prior to infusion therapy session help to improve/maintain cardiorespiratory fitness more than education on the benefits of exercise only?

Can we measure the impact of the intervention on cancer type and disease response?

Aiming to assess the impact of a moderate intensity exercise prescription at different time points during a patient's cancer treatment

Pilot Study

To measure the safety and feasibility of introducing an exercise intervention immediately prior to infusion of chemotherapy

RCT

To assess whether performing supervised moderate intensity aerobic exercise directly before infusion therapy increases/maintains cardiorespiratory fitness in cancer patients greater than education alone

Future Research

To measure the impact of exercise on the cancer itself

The Future?



Thank you

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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

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