Keep moving! The Benefits of Exercise for Cancer Patients

physical activity and exercise

• World Health Organisation defines physical activity as “any bodily movement produced by skeletal muscles that requires energy expenditure”.
• WHO is explicit that the term “physical activity” should not be used interchangeably with “exercise”.

physical activity and exercise & the cancer control framework

exercise

• Exercise, is a subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness (capacity, structure, function, homeostasis) is the objective.

exercise medicine

• “Exercise medicine” is the physical assessment and prescription of exercise specifically for the prevention or treatment of injury or illness.
• Specific exercise drives endogenous “medicine”
  – Hormones and cytokines
• Direct structural adaptation and repair
• Facilitates other therapies

physically inactive - nearly twice as likely to develop colon cancer
• Active - 30% reduction in the risk of women of all ages developing breast cancer
• Reduces prostate cancer incidence of advanced forms and in older men - 70% reduction if >3 hours vigorous per week
• 20 % reduction in risk of Lung cancer

By June 2004 – 26 trials; majority of studies with breast cancer using cardiovascular exercise

- Overwhelmingly positive effects despite quite sub-optimal exercise prescription
- Researchers and clinicians not drawing on vast knowledge of exercise and human performance

Survival!

Cancer Survival: Time to Get Moving? Data Accumulate Suggesting a Link Between Physical Activity and Cancer Survival


EXERCISE FOR BREAST CANCER SURVIVAL

Holmes MD, Chen WY, Feskanich D, Kroenke CH, Colditz GA. Physical activity and survival after breast cancer diagnosis. JAMA. 293(20):2479-86. 2005

EXERCISE AND BREAST CANCER SURVIVAL

- 2987 female nurses who were diagnosed with breast cancer
- RR of death 0.5 to 0.6 < 3 MET-hours per week compared 9 or more.
- One MET-hour is equivalent to approximately 20 minutes walking at a normal pace (4 kph).
- 9 Met-hours = 3 hours walking or 77 mins jogging

EXERCISE AND PROSTATE CANCER SURVIVAL

- Men with ≥ 3 hours per week of vigorous activity had a 49% lower risk of all-cause mortality.
- 61% lower risk of PCa death

Holmes MD, Chen WY, Feskanich D, Kroenke CH, Colditz GA. Physical activity and survival after breast cancer diagnosis. JAMA. 293(20):2479-86. 2005


EXERCISE FOR BREAST CANCER SURVIVAL

- Colorectal cancer patients <3 MET-hours per week of PA compared to 18+
- Adjusted hazard ratio for disease-free survival 0.51 to 0.55.
- Benefit not influenced by sex, BMI, age, or chemotherapy received.
- “physical activity appears to reduce the risk of cancer recurrence and mortality”.

Compared to Chemotherapy

Data from these studies suggest a reduced risk of recurrence or death of 50% to 60%.

Exercise is NOT an alternative to chemotherapy but a critical synergistic medicine.

Evidence for Breast Cancer

During chemotherapy or radiation
Results from 22 RCTs

- Evidence category A – Safety
- Evidence category A – Aerobic Fitness
- Evidence category A – Muscle Strength
- Evidence category B – Body Size/Composition
- Evidence category B – Quality of Life
- Evidence category B – Fatigue
- Evidence category B – Anxiety

Evidence for Breast Cancer

Following treatment Results from 32 RCTs

- Evidence category A – Safety
- Evidence category A – Aerobic Fitness
- Evidence category A – Muscle Strength
- Evidence category A – Flexibility
- Evidence category A – Physical Function
- Evidence category A – Safety Lymphedema Onset or Worsening
- Evidence category B – Body Size/Composition
- Evidence category B – Quality of Life
- Evidence category B – Fatigue/Energy/Vitality
- Evidence category B – Depression/Anxiety
- Evidence category B – Body Image
- Evidence category C - Symptoms/Adverse Effects and Pain

Evidence category A

- Safety
- Aerobic Fitness
- Muscle Strength
- Flexibility
- Physical Function
- Safety Lymphedema Onset or Worsening

Evidence category B

- Body Size/Composition
- Quality of Life
- Fatigue/Energy/Vitality
- Depression/Anxiety
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Evidence category C

- Symptoms/Adverse Effects and Pain


Evidence for Breast Cancer

Focus on adult cancers and sites with the most evidence

Evaluation of Evidence A-D*

Breast, Prostate, Colon, Hematological, Gynecological

A - overwhelming data from RCTs
B - few RCTs exist
C - uncontrolled, nonrandomized and/or observational studies
D - insufficient for categories A-C


IMPACT EXERCISE FOR BONE HEALTH

- Greater effectiveness and compliance with targeted exercise medicine
- 86% of Australian men with PCa do not meet guidelines
- However – greater effectiveness and compliance with targeted exercise medicine


*National Heart Lung and Blood Institute

LUMBAR SPINE BMD (% CHANGE OVER 6 MONTHS)

Change in Lumbar BMD over 6 months of AST
Comparison of base exercise programs to usual care

Newton et al 2013 World Prostate Cancer Congress

SAFETY

- Adverse events during the exercise sessions: 0
- Attendance (out of 24 sessions): 20.2 ± 7.6
- Compliance (% of successfully completed sessions): 20.2 ± 7.6
- Perceived tolerance of the exercise sessions (0 = intolerable; 7 = highly tolerable): 6.1 ± 0.7
- Perceived exercise intensity (session RPE): 13.8 ± 1.5
- Severity of bone pain at the start of each session (average of all sessions; 0 = no pain; 10 = very severe pain): 0.6 ± 0.7
- Incidence of bone pain negatively affecting the ability to undertake ADL between exercise sessions: 0

- No between-group difference in bone pain (p = 0.602)
- No change in use of pain medication throughout 12 weeks

SAFE AND EFFECTIVE

- World first for ECU

EFFICACY

Adjusted Group Difference in Mean Change Over 12 weeks*

EFFICACY

Adjusted Group Difference in Mean Change Over 12 weeks*

- Between group change by ANCOVA adjusted for baseline values
- Includes adjustment for use of pain medication

DELIBERATE LOADING OF BONE METS?

“Mechanical loading dramatically reduced osteolysis and tumor formation and increased tibial cancellous mass due to trabecular thickening”

Basis of a new Exercise Trial in Breast Cancer led by Dr Nicole Hart
EXERCISE FOR LYMPHOEDEMA

- Lymphoedema: Neither Heavy nor Light Load Resistance Exercise Acutely Exacerbates
- Historically Lymphoedema in Breast Cancer Survivor women who
  exacerbates

Impact of Regular Exercise on Lymphoedema

OUTCOMES TO DATE

- 176 consultations completed
- 74 patients have commenced an exercise program
- 35 patients completed pre & post-testing
- Average program length: 4-6 weeks
- Preliminary outcomes:
  - balance +7.08%
  - chest press +13.4%
  - leg press +36.4%
  - seated row +8.15%
  - aerobic fitness +3.53%
  - lean mass -1.11%
  - %fat -0.24% (change in average body fat percentage)
  - systolic BP -1.23%
  - normal walk speed +4.17% and fast walk +1.78%
- During a treatment phase expected to severely negatively impact health and fitness!

EXERCISE FOR LYMPHOEDEMA

Is it safe and efficacious for women with lymphedema secondary to breast cancer to lift heavy weights during exercise: a randomised controlled trial

EXERCISE MECHANISMS: SURVIVAL AND TUMOUR BIOLOGY

- Tailored exercise prescription for patients during radiation and/or chemotherapy
- Assessment and prescription by our Accredited Exercise Physiologists – trained and experienced in exercise oncology
- Implementing latest research from our clinical trials into best practice patient support
- World first in terms of proximity to therapy
- Convenience, stress reduction, acute exercise effects
- Efficacy, tolerance, effectiveness pilot trial

CHEMO COMPLETION

GENESIS CANCER CARE: EXERCISE CLINIC

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EXERCISE SUPPRESSION OF CANCER CELL GROWTH

• 10 male individuals - 60 minutes cycling
• Serum pre+post
• Prostate cancer cell line LNCaP exposed
• 9 out of 10 individuals growth inhibition
• Pooled exercise serum 31% inhibition

EXERCISE IS NOT A SINGLE MEDICINE

• Mode, dosage, recovery, periodisation, nutrition
• Create large contrasts in acute responses and chronic adaptations of the body systems
• Are we prescribing antibiotics for contraception?
• Expand and utilize the endogenous pharmacy

EXERCISE IS MEDICINE

• Referral to appropriate allied health professional is critical
• Accredited Exercise Physiologists are minimum 4 year university educated including extensive clinical experience
• Accredited by: Exercise and Sport Science Australia (ESSA)

Accredited Exercise Physiologist

• AEP’s are recognized by the “Australian General Practice Network” and “Royal Australian College of General Practitioners” as the most appropriate allied health professionals for:
  • Exercise Prescription and Management
  • Prevention and Wellness
  • Secondary Management of Chronic Disease including cancer
Rebates for Exercise Physiology Services
- MBS Chronic Disease Management – GP Services includes referral to AEPs
- Up to 5 consults per calendar year
- Many private health insurers now cover AEP services

**CURRENT TRIALS**

Title - target N, months intervention, trial sites
1. Exercise, Sexual health and PCa – 240/6/8
2. Exercise and chemotherapy-induced cognitive-impairment - 60/4/5
3. Exercise during adjuvant-treatment of high-grade glioma - 30/1/6
4. Exercise as medicine for mesothelioma – 20/3/6
5. Exercise, PCa and bone metastases - 30/3/5
6. Lifeflow for cancer survivors – an RCT 100/3/15
7. Breast cancer and bone metastases - 20/15
8. Exercise therapy and pancreatic cancer - 20/4/5
9. Exercise medicine during radiation and chemo therapy – The Genesis Study – 50/3/1
10. Movember GAP4 – CRPC International Trial – 900/24/25

**EXERCISE MEDICINE RESEARCH INSTITUTE**

www.exercisemedicine.org.au

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