



WELLSPRING

CANCER
EXERCISE

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Cancer Exercise and Rehabilitation: Evidence and Practice

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Agenda

- Wellspring Cancer Support Network as a model for community-based exercise intervention
- Why Exercise & Cancer?
- Exercise Across the Cancer Continuum
- Exercise Guidelines
- Barriers & Facilitators to Exercise Participation

Wellspring Cancer Support Network

- Network of community-based cancer support centres
- Mandate to provide support care interventions, at no charge and without referral
- 4 centres in GTA, with regional expansion to London, Niagara, Calgary, Edmonton and Halifax
- 50 different programs and services available; Cancer Exercise example of evidence-based rehab intervention



Wellspring Cancer Exercise

- 558 clients have taken part in Wellspring's Cancer Exercise program (less than a two year period, Feb 2009 to Dec 2010)
- Most highly accessed program at Wellspring out of over 50 programs at four different sites
- 30% of clients accessed the program because of the desire to exercise and 38% were direct medical referrals



Wellspring Cancer Exercise

- All types of cancers (51% breast, 6.5% colorectal cancer, 6% gynaecological, 6% blood disorders)
- 17% completed all sessions and 78% completed almost all sessions
- 97% of clients were either agreed or strongly agreed when asked if they were satisfied with the program



Exercise Improves:

- Weight / Body Composition
- Fatigue
- Bone Strength
- Muscle Loss
- Loss of Appetite
- Depression
- Anxiety
- Hormone-regulation
- Quality of Life
- **Survival**

**Cancer and Treatment
make all of these worse**

Exercise as Treatment, Not Just Lifestyle

Goal: “To make cancer rehabilitation and exercise a standard of practice in the treatment of cancer.”

Exercise Prescription Guidelines for...

Cardiovascular disease (CHF/CAD/CVA/transplant/etc),
diabetes, spinal cord injuries, obesity, osteoporosis,
pulmonary disease, neurological disorders, etc.... **AND
CANCER**

Pre-habilitation

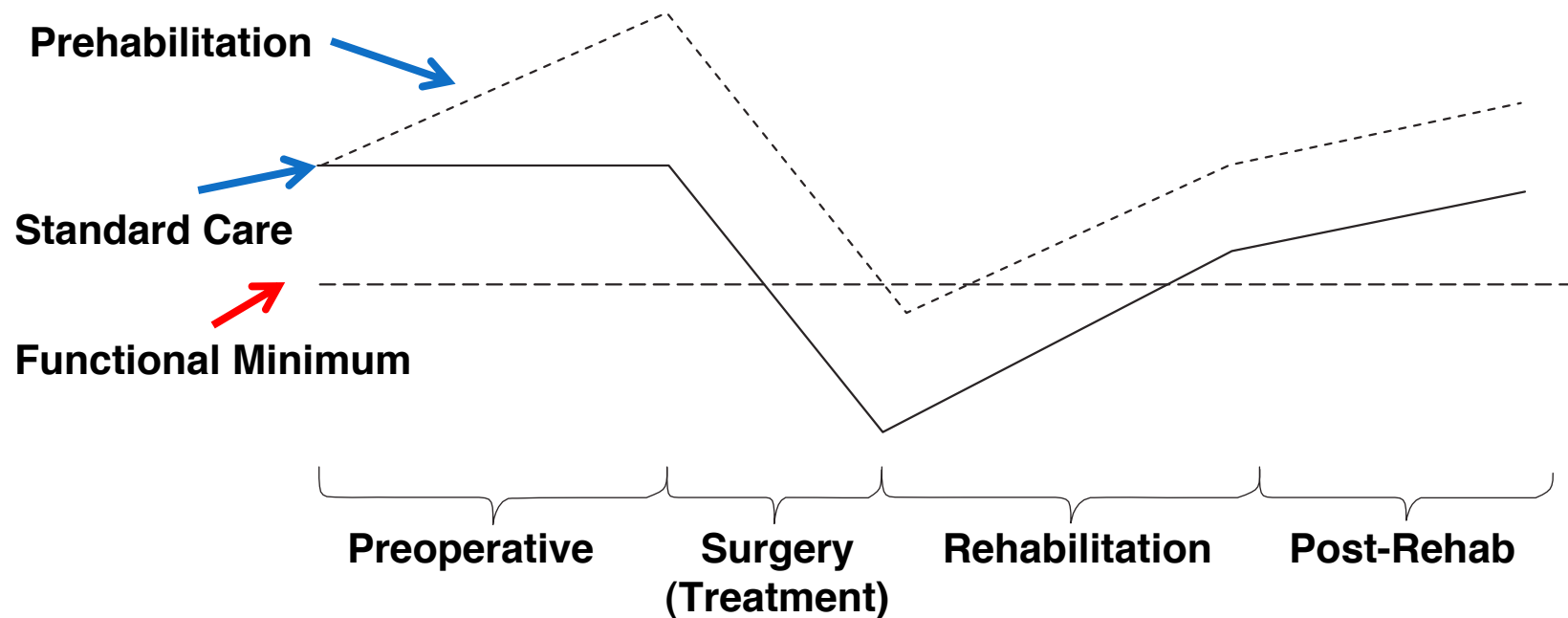
- Pre-Treatment
- During Treatment
- Post-Treatment



Pre-habilitation

Definition:

- *Improve physical and psychosocial resiliency and reduce frailty prior to treatment*



(Carli & Zavorsky, 2005, Current Opinion in Clinical Nutrition and Metabolic Care)

Pre-Treatment Exercise & Physical Fitness

- Improves treatment tolerance
- Improves coping ability
- Prepares client's physically for surgery, radiation and chemo
- Improves recovery time
- Improved adherence to postoperative exercise/rehab
- **Reduced treatment & post-treatment side-effects**

(Santa Mina et al, 2010, CUAJ; Courneya & Friedenreich, 2007, Sem Oncol Nursing)

Physical Activity and QOL after Radical Prostatectomy

Santa Mina et al, 2010, Can Urol Assoc J.

Purpose

- Examined physical fitness and physical activity volume over lifetime and year prior to radical prostatectomy for prostate cancer

Results

- Past year total and occupational PA was associated with better QOL after surgery ($p=0.037$; $p=0.089$, respectively)

Implications

- Suggests preoperative fitness prior to surgery may improve psychosocial recovery
- Improved confidence about recovery; Return-to-work goals

Physical Activity During Treatment

- Pre-Treatment
- During Treatment
- Post-Treatment



Physical Activity During Treatment

- Improves fatigue
- Improves physical function
- Improves body composition
- Improves immune system function
- Improves cardio-pulmonary function
- Improves quality of life
- Reduces depression & anxiety
- Regulates bowel movements
- Improves appetite
- Improves sleep
- Improves bone health
- Reduces length of stay

(Systematic Reviews: Galvao & Newton, 2005; Schmitz et al, 2005; Knols et al, 2008)

Fatigue

- Fatigue is the primary side effect of cancer and affects 70-100% of patients undergoing treatment

(Mock et al, 2001, Cancer Practice)

- Fatigue is the **most** distressing treatment-related symptom
- 94% of oncologists treat pain; only 5% treat fatigue

(National Cancer Institute 2007)

- May cause patients to discontinue/reduce treatment
- NCCN recommends exercise/physical activity for treatment of fatigue

(National Comprehensive Cancer Network , 2005, Clinical Practice Guidelines in Oncology)

Exercise for the Management of Cancer-Related Fatigue in Adults (A Cochrane Review)

Cramp & Daniel, 2008, Cochrane Reviews

28 RCTs studies (2083 adult cancer patients/survivors)

- 16 studies in breast cancer (1172 patients)
 - Colorectal, prostate, lymphoma, MM
- 13 studies were home-based vs. 16 facility-based
- Aerobic, resistance, and seated exercises, and Yoga
- 3-32 wk programs
- FACT-F, POMS, VAS, Piper's, BFI, EORTC QLQ C-30
- Meta-analysis:
 - Reduced fatigue in exercise intervention participants compared to controls

Effects of Physical Activity on Fatigue and Psychological Status of Cancer Patients During Chemotherapy

Dimeo et al, 1999, Cancer

- N=62 solid tumour or lymphoma patients undergoing high-dose chemo were assigned to exercise or control
- 30 mins of training/day
 - 1:1 interval on supine bike
 - 50% of HR Reserve
- Fatigue worsened in controls only ($p < 0.02$)
- Improvements in anxiety and psychological distress in the exercise group ($p < 0.02$)



Functional Capacity & Physical Fitness

Physical Fitness:

A set of physical attributes that people have or achieve to perform physical activity

(Caspersen et al, 1985)

Functional Capacity:

Is the ability to comfortably complete most ADLs and basic leisure-related activities

Patients lose <25% of their functional capacity over 8 weeks while sedentary and undergoing treatment

(Schwartz, 2001)

Exercise Training on Physical Fitness & Functional Capacity in Cancer Patients *Undergoing Treatment*

Galvao & Newton, 2007, JCO

- 11 of 13 studies found improvements in physical fitness or functional capacity for cancer patients
Galvao & Newton, 2007, JCO
- Reversal of muscle loss, muscle strength, and 6MWT with AET & RET in an RCT of 57 PCa pts on androgen deprivation therapy (ADT)
Galvao et al, 2010, JCO
- 6wk high-intensity exercise program for mixed-cancer population (n=23) receiving outpatient chemotherapy showed increases in 1RM, VO₂max, and PA volume
 - 4d/wk, Exercise + Massage + Relaxation
 - 5-8 reps of 85-95% of 1RM + 10 min of interval training at 60-100% of VO₂max
Adamsen, 2003, Supp Care Cancer

Body Composition: Fat

Obesity increases risk for several cancers

- Colon, breast (post-menopause), endometrial, kidney, esophageal

Obesity negatively affects:

- Cancer progression
- Comorbidities (CVD, DM2, HT)
- Joint pain / dysfunction
- Treatment administration / Surgical risk
- **Mortality**

Exercise Improves Body Composition in Cancer Patients Receiving Therapy

Improved

- Weight/BMI
- Waist Circumference
- Muscle mass
- Fat %
- Hormonal Regulation



Improved

- Fatigue
- Functional Capacity
- QOL
- Body Image
- Risk profile for co-morbidities

Cancer-Related Osteopenia & Osteoporosis

Due to:

- The tumour itself (osteosarcoma, metastatic lesions)
- Cancer-treatment induced bone loss
- Calcium and Vit D absorbency dysfunction
- Resultant sedentary lifestyle from fatigue & malaise associated with cancer and disease

Exercise and Bone Density in Cancer

- To date, there is inconclusive evidence to suggest that exercise can improve cancer-treatment induced bone loss
- Research consistently demonstrates maintained BMD throughout exercise intervention
- Exercise may add to the benefits of bisphosphonates

(Waltman, 2010)

Lymphedema

- Pain
- Loss of Function
- Increase Risk of Infection
- Leakage: Lymphorrhea
- Cosmetic Problems
- Depression
- Ulcers
- Decreased PA



Effectiveness of Early Physiotherapy to Prevent Lymphoedema After Surgery for Breast Cancer: Randomized, Single Blinded, Clinical Trial Lacomba M, et. al. BMJ 2010;340

- 116 women with Breast Cancer Surgery + lymph node dissection
- Intervention: Manual lymph drainage, scar massage, shoulder exercises and AWS treatment + lymphatic education (control as well)

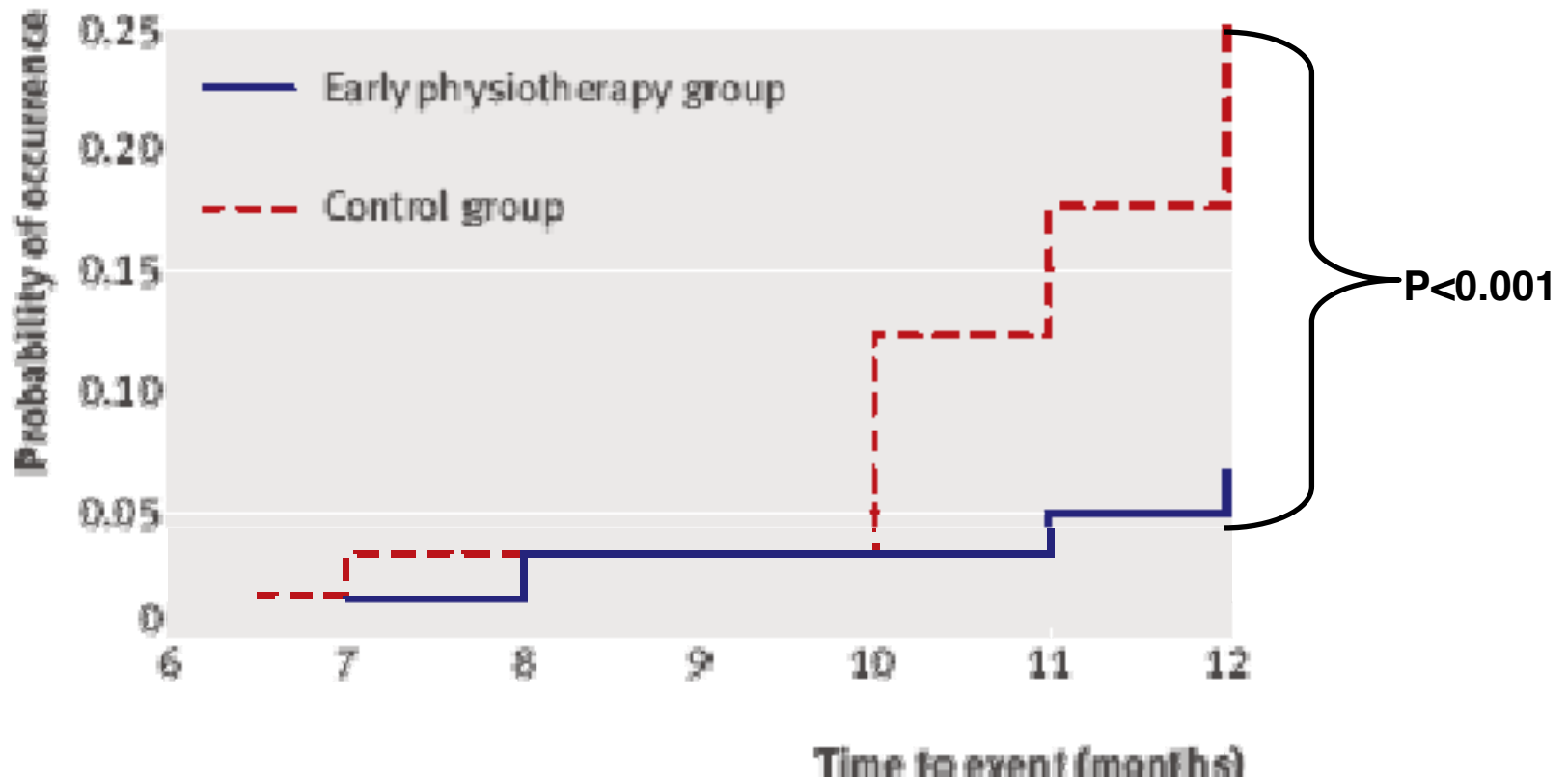


Fig 4 | Failure time for development of secondary lymphoedema by group

Exercise & Lymphedema in Cancer Patients

- Concern regarding the exacerbation of lymphedema with exercise in breast cancer patients

- ++ Research shows that exercise, including dragon boating, does not exacerbate arm lymphedema

(Schmitz, 2010, NEJM, Harris, 2000, J Surg Onc; McKenzie & Kalda, 2003, JCO, Ahmed et al, 2006, JCO)

- Lower extremity lymphedema and exercise is less understood
 - Katz et al (2010) found n=2/10 participants with LE lymphedema developed cellulitis

Exercise and Immune Function in Cancer Patients

Dimeo, F., et. al. 1997. Effects of aerobic exercise on the physical performance and incidence of treatment-related complications after high dose chemotherapy. *Blood* 90:3390-3394.

- Exercise group; interval exercise for 30 minutes per day.

Results:

- Duration of neutropenia and thrombopenia were reduced in the exercise group.
- Non exercise group decreased 27% in physical performance.

Physical Activity and Quality of Life: Cross-sectional and Observational Designs

Positive association between PA volume and QOL in:

- 156 Multiple Myeloma Patients (Jones et al, 2004)
- 386 Endometrial Cancer Patients (Courneya et al, 2005)
- 25 Bone Marrow Transplant Patients (Courneya et al, 2000)
- 53 Colorectal Cancer Patients (Courneya et al, 1999)
- 167 Breast Cancer Patients (Courneya et al, 1997)
- 438 NHL patients (Vallance et al, 2005)

Physical Activity Post-Treatment

- Pre-Treatment
- During Treatment
- Post-Treatment



Physical Activity Post-Treatment

Continued Benefits

- Cardiovascular & musculoskeletal fitness
- Vigor
- Mental Clarity
- Lymphedema
- Physical functioning
- Fatigue
- Bone mineral density
- Body composition
- Joint mobility
- Immune factors
- Quality of Life
- Reduced Risk of comorbidities
- Reduced chronic treatment-related side-effects
- Improved body image and self-esteem

(Schmitz et al, 2005, Ca Epi, Bio, Prev; Galvao et al, 2006, JCO)

Exercise and Breast Cancer Survival

Holmes et al, 2005, JAMA

- Prospective, observational trial of 2987 women with stage I-III BrCa in the Nurses' Health Study
- Followed participants diagnosed with BrCa between 1984-1998 to 2002

Results:

- Increased survival by 20-50% with any PA volume greater than 3 met-hrs/wk
- Decreased rate of BrCa Recurrence by 20-40%
- 3-5 met-hrs/wk was most protective (50% decrease in mortality)
- Exercise is most protective in ER+ BrCa

Exercise and Colorectal Cancer Survival

Meyerhardt et al, 2006, JCO

- Prospective, observational trial of 573 women with stage I-III colorectal cancer in the Nurses' Health Study
- Followed participants diagnosed with CRCa between 1986-2002 to 2004

Results:

- Increased survival by 61% with PA volume 18 met-hrs/wk compared to <3 met-hrs/wk
- Pre-diagnosis PA was not predictive of mortality
- Increasing PA from pre- to post-diagnosis decreased CRCa mortality by ~50%

Exercise and Prostate Cancer Survival

Kenfield et al, 2011, JCO

- Prospective, observational trial of 2705 men non-metastatic prostate cancer in Health-Professionals Follow-up Study
- Followed participants diagnosed with PCa between 1990 and 2008

Results:

- 49% reduction in all-cause mortality with >3hrs/wk vs. < 1hr/wk of vigorous PA
- 61% reduction in PCa-specific mortality with \geq 3hrs/wk vs. < 1hr/wk vigorous PA
- Going from low to high volume of vigorous PA may also improve all-cause and PCa-specific survival

Medicine & Science in Sports & Exercise (2010)

American College of Sports Medicine Roundtable on Exercise Guidelines for Cancer Survivors



EXPERT PANEL

Kathryn H. Schmitz, PhD, MPH, FACSM

Kerry S. Courneya, PhD

Charles Matthews, PhD, FACSM

Wendy Demark-Wahnefried, PhD

Daniel A. Galvão, PhD

Bernardine M. Pinto, PhD

Melinda L. Irwin, PhD, FACSM

Kathleen Y. Wolin, ScD, FACSM

Roanne J. Segal, MD, FRCP

Alejandro Lucia, MD, PhD

Carole M. Schneider, PhD, FACSM

Vivian E. von Gruenigen, MD

Anna L. Schwartz, PhD, FAAN

ACSM Roundtable on Exercise Guidelines

- Goals
- Exercise Testing
- Contraindications and Cautions to Exercise
- Exercise & PA Recommendations

General Exercise Prescription for Cancer Patients

FREQUENCY	At least 3-5 times/week
INTENSITY	<ul style="list-style-type: none">•50-70% HRR•60-80% MHR•11-14 RPE (Borg Scale)
TIME	<ul style="list-style-type: none">•At least 20-30 min continuous•Deconditioned patients may need short intervals (e.g. 3-5 min) with rest intervals
TYPE	Combination of strength and resistance training

Courneya K.S, and J.R. Mackey and L.W. Jones. 2000 Coping with cancer: Can exercise help? The Physicians and Sports Medicine. 28(5):49-59.

Barriers

- Emotional factors (depression)
- Psychosocial factors (body image, feeling sick)
- Fatigue
- Nausea and vomiting
- Time (return to work, medical appointments)
- Time since treatment
- Co-morbidities
- **Belief in one's ability**

Strategies to Facilitate Adherence

- Providing home-based equipment
- Reimbursement for parking/travel costs
- Physician follow-up
- Group Exercise & Exercise Support Groups
- Exercise Manuals / Educational Documents
- Routine telephone calls from exercise facilitators
- Booster Sessions:
 - 60 minute group exercise + 30 minute discussion

(Culos-Reed et al, 2007 & 2009; Alibhai et al, in progress;
Santa Mina et al, in progress; Moonsammy et al in progress)

Patient Preferences

- Cancer Survivors want to exercise
- Cancer survivors prefer exercise in community settings
- Cancer survivors prefer working with physiotherapists who have an understanding of the disease and its treatments

(Jones L, 2002 and Courneya K, 2008)

Programs

- More available programs
- Certifications/Courses in Cancer-Exercise
 - Wellspring's Rehab Techniques in Oncology (introductory and advanced)
 - CSEP online cancer exercise training
- Better trained professionals that understand cancer

Oncologist Recommendations

Jones L, et. al. Ann Behav Med 2004, 28(2):105-113. (ONCORE trial)

- Effects of an oncologist's Recommendation to Exercise on Self-Reported Exercise Behaviour in Newly Diagnosed Breast Cancer Survivors: A Single-Blind, Randomized Controlled Trial

Purpose:

- Examine the effects of an oncologist's recommendation to exercise on self reported exercise behaviour in newly diagnosed breast cancer survivors attending their first adjuvant therapy consultation.

Results:

- Significant difference in the total exercise in favour of the recommendation –only group over the usual care group.



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