

**Evidence Table**  
**Cancer Related Fatigue**  
**PHYT 860**  
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**Clinical Question:** In patients over the age of 18 with active or recent cancer, is a structured exercise program better than rest to reduce the effects of cancer related fatigue?

**Key Words:** Cancer, fatigue, exercise

**Databases Searched:** APTA’s Hooked on Evidence, Pubmed

These two databases were searched in the following sequences:

Hooked on Evidence: **Cancer** – 21

Pubmed: **Cancer** - 1,849,260; **Cancer AND fatigue AND exercise** – 69; Limits of English, adults, posted in the last 10 years, and clinical trials, RCT’s, or meta-analysis – 28.

**Introduction:**

As medical knowledge and surgical techniques continue to progress, cancer is becoming a chronic disease with impairments and functional limitations that affect survivors long after the disease itself is considered treated. The American Cancer Society’s website reports that in 2002, 10,146,000 people in the United States were living with cancer<sup>1</sup>. They also note that men stand a 45% lifetime chance of developing cancer, while women stand a 38% chance of developing cancer<sup>1</sup>. With the improved rates of survival, many more people are now dealing with the residual effects of both the cancer, and the cancer treatments. One side effect of both active cancer and several forms of cancer treatments is cancer related fatigue (CRF). This symptom is estimated to affect up to 70% of patients during chemotherapy and radiation. Rest used to be the standard advice to treat CRF, but recently the medical community has begun to show through research that the opposite, in fact, is a more effective option.

<b>Citation, Design</b>	<b>Purpose of Document</b>	<b>Participants</b>	<b>Cancer Types Addressed</b>	<b>Intervention</b>	<b>Outcome Measures</b>	<b>Main Results</b>	<b>Conclusions</b>
Dimeo, Tilmann Bertz, Kanz, Keul, and Mertelsmann. 1997, <i>Blood</i> Non-randomized Control Design	Does an aerobic exercise program improve the physical status of patients after HDC and stem cell transplantation?	36 patients aged 19-64 who received HDC with stem cell transplantation during the study period.	Solid tumors (breast, lung, sarcoma, seminoma) or non-Hodgkin’s lymphoma	With a HR monitor, the patients walked progressively from 5x3min per day on a treadmill to 30min continuous by week 6	<ul style="list-style-type: none"> <li>- Treadmill stress test</li> <li>- Hemoglobin levels</li> </ul>	Improved stress test results and hemoglobin levels in test group vs. control. Subjective decreased fatigue levels.	Increased aerobic activity is safe during chemo treatments and can lead to improved physical status.
Dimeo, Stieglitz, Novelli-Fischer, Fetscher, Keul	Does an aerobic exercise program improve the	59 patients (27 test/ 32 control) aged 18 – 60	Cancer types included breast,	The treatment group received 30 min of exercise per	<ul style="list-style-type: none"> <li>- POMS</li> <li>- Symptom Checklist (SCL-</li> </ul>	Decreased OCD traits, anxiety, interpersonal	Aerobic exercise during HDC can improve

1999, <i>Cancer</i> RCT	psychological status of patients during HDC and stem cell transplantation?	with active cancer undergoing HDC.	metastatic breast, seminoma, sarcoma, lung cancer, Hodgkin disease, and Non-Hodgkin lymphoma	day on an ergometer at 50% cardiac reserve (1min on, 1min off), and the control group received no treatment.	90-R)	sensitivity, and phobic anxiety (SCL-90-R) in test subjects; significant increase in fatigue and somatization, reduction in vigor in control group	psychological state of cancer patients and prevent development of fatigue symptoms.
Schwartz, Mori, Gao, Nail, King 2001; <i>Med Sci Sports Exerc.</i> Cohort	Does aerobic exercise impact the daily fatigue level in women with breast cancer undergoing chemo?	61 women aged 18+ with stage I to III breast cancer	Breast	Aerobic exercise (of choice) 15 to 30min 3-4 days/wk with an accelerometer	<ul style="list-style-type: none"> <li>- 12-minute walk test</li> <li>- Self-report of calories via acceler.</li> <li>- Fatigue level via VAS</li> </ul>	Those who exercised had increased functional mobility and decreased fatigue levels inversely proportionate to the amount of exercise	Aerobic exercise (low- to moderate-intensity) can decrease CRF in women with breast cancer undergoing chemo.
Burnham, Wilcox 2002; <i>Med Sci Sports Exerc.</i> RCT	Does aerobic exercise impact both physical and psychological state in cancer survivors?	21 patients at least 2 months post cancer treatment	Breast and colon	Aerobic exercise with bike, treadmill, and stair-climber at pre-set %heart rate reserve 3x/wk x 10 wks.	<ul style="list-style-type: none"> <li>- Peak aerobic capacity via treadmill</li> <li>- Skinfold</li> <li>- Sit and reach</li> <li>- Quality of Life Index for Cancer patients</li> <li>- Linear Analogue Self-Assessment</li> </ul>	Both low- and moderate-intensity exercise groups improved in aerobic capacity, body composition, flexibility, fatigue, and anxiety.	Aerobic exercise is a safe and effective means to improve physical and psych status of cancer survivors.
Courneya, Mackey, Bell, Lee, Field, Fairey 2003; <i>Journal of Clinical Oncology</i> RCT	Does aerobic exercise affect cardiopulm. function and QOL in postmenopausal breast cancer survivors?	56 breast cancer survivors who have completed all cancer treatments.	Breast	Aerobic exercise 3x/wk x 15wks via recumbent or upright bikes at 70-75% max O <sub>2</sub> progressing from 15 to 35 minutes.	<ul style="list-style-type: none"> <li>- Pulmonary function</li> <li>- Functional Assess of Cancer Therapy – Breast</li> <li>- Electronic scale</li> <li>- BMI</li> <li>- Skinfold</li> </ul>	Overall treatment groups improved in O <sub>2</sub> consumption, QOL, happiness, self-esteem and fatigue versus control. No signif changes in body weight, BMI	Aerobic exercise enough to cause cardio changes should be implemented in the study population as soon after treatment as possible.
Windsor, Nicol, Potter 2004; <i>Cancer</i> RCT	Does aerobic exercise during radiation Rx decrease incidence of CRF and prevent physical deterioration?	65 men 52 – 82 undergoing radiation treatment for prostate cancer	Prostate	Walking 30min at least 3x/wk during radiation Rx at 60-70% of HR max.	<ul style="list-style-type: none"> <li>- Brief fatigue inventory (BFI)</li> <li>- Resting heart rate</li> <li>- Modified shuttle test</li> <li>- Exercise heart rate</li> </ul>	Control with significant increase in BFI, no change in BFI in Rx group; increase in shuttle score control, not significant decrease in Rx group	An increase in aerobic activity over norm is needed to prevent fatigue during radiation Rx
Pinto, Frierson, Rabin, Trunzo,	Does a home-based physical activity	86 breast cancer patients mean	Breast	Physical activity instruction with	<ul style="list-style-type: none"> <li>- 7-day physical activity recall</li> </ul>	Rx group with lower mood disturbances,	A home-based physical activity

Marcus 2005 <i>Journal of Clinical Oncology</i> RCT	program positively affect physical and emotional state of breast cancer patients	age 53.14 years		heart rate monitors at set increases in frequency and duration	<ul style="list-style-type: none"> <li>- Rockport 1mile test</li> <li>- Accelerometer</li> <li>- Stage of Emotional Readiness for PA</li> <li>- POMS</li> <li>- Linear analogue scale for fatigue</li> <li>- Body esteem scale</li> </ul>	increased vigor, lower fatigue, improved body esteem, improved POMS	program supported by weekly phone calls from clinician can improve physical and emotional status.
Ohira, Schmitz, Ahme, Yee 2006 <i>Cancer</i> RCT	Can anaerobic (weight training) exercise positively affect QOL and depressive symptoms in breast cancer patients?	86 breast cancer survivors (4 – 36 months)	Breast	Strength training 2x/wk for 6 months (3 with supervision)	<ul style="list-style-type: none"> <li>- CARE-SF</li> <li>- Body composition</li> <li>- 1 rep max leg press</li> <li>- 1 rep max bench press</li> </ul>	Rx group showed improvements in QOL, body composition, and upper body strength scores	Anaerobic exercise (primarily upper body) can benefit breast cancer survivors' QOL physically and psychologically.

### Conclusion:

Cancer related fatigue (CRF) is a debilitating side effect both of cancer and cancer treatments. Research is available to support the use of both anaerobic and aerobic exercise, both in a structured and home-based environment, to positively affect the development of CRF. The American Cancer Society lists possible descriptors for CRF:

- Feeling tired, weary or exhausted even after sleeping
- Lacking energy to do your regular activities
- Having trouble concentrating, thinking clearly, or remembering
- Feeling negative, irritable, impatient, or unmotivated
- Lacking interest in normal day-to-day activities
- Spending less attention on personal appearance
- Spending more time in bed or sleeping<sup>10</sup>

While the ACS also notes that many of these symptoms are shared with other diagnoses, such as depression, infection, or cancer-related pain, being aware of CRF as possibly being responsible is the first step to treating the problem. Conventional medical wisdom used to suggest increased bedrest, avoidance of physical activity, and reduction of exercise as the appropriate treatment method for CRF. However, the current research supports the use of exercise to prevent and/or treat cancer-related fatigue.

The research listed here primarily focused on aerobic exercise in a structured environment using heart rate-based exercise parameters. The intervention was typically performed 3x/week, ranging from 15 to 30 minutes at a time. The most well researched type of cancer with regards to CRF is breast, although several studies generalized to solid tumors, which included breast cancer and other types. Outcomes measurements varied across the board. There were two studies that used the POMS as an outcomes measurement for mood, and three used body composition to track results related to

physical improvements. Fatigue was measured as part of a larger quality of life measurement (i.e. POMS or CARE-SF) or in isolation with the BFI or on a visual analogue scale.

The answer to the research question is that there is evidence to support the use of exercise, either aerobic or anaerobic, to prevent and treat cancer-related fatigue.

#### Works Cited:

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