Higher-Intensity Exercise Results in More Sustainable Improvements for VO_{2peak} for Breast and Prostate Cancer Survivors

Eric A. Martin, PhD, Claudio L. Battaglini, PhD, Beth Hands, PhD, and Fiona Naumann, PhD

Purpose/Objectives: To examine peak volume of oxygen consumption (VO_{2peak}) changes after a high- or low-intensity exercise intervention.

Design: Experimental trial comparing two randomized intervention groups with control.

Setting: An exercise clinic at a university in Australia.

Sample: 87 prostate cancer survivors (aged 47–80 years) and 72 breast cancer survivors (aged 34–76 years).

Methods: Participants enrolled in an eight-week exercise intervention (n = 84) or control (n = 75) group. Intervention participants were randomized to low-intensity (n = 44, 60%–65% VO_{2peak}, 50%–65% of one repetition maximum [1RM]) or high-intensity (n = 40, 75%–80% VO_{2peak}, 65%–80% 1RM) exercise groups. Participants in the control group continued usual routines. All participants were assessed at weeks 1 and 10. The intervention groups were reassessed four months postintervention for sustainability.

Main Research Variables: VO_{2peak} and self-reported physical activity.

Findings: Intervention groups improved VO_{2peak} similarly ($p = 0.083$), and both more than controls ($p < 0.001$). The high-intensity group maintained VO_{2peak} at follow-up, whereas the low-intensity group regressed ($p = 0.021$). The low-intensity group minimally changed from baseline to follow-up by 0.5 ml/kg per minute, whereas the high-intensity group significantly improved by 2.2 ml/kg per minute ($p = 0.01$). Intervention groups always reported similar physical activity levels.

Conclusions: Higher-intensity exercise provided more sustainable cardiorespiratory benefits than lower-intensity exercise.

Implications for Nursing: Survivors need guidance on exercise intensity, because a high volume of low-intensity exercise may not provide sustained health benefits.

Key Words: exercise oncology; cardiorespiratory exercise test; aerobic exercise; breast neoplasms; prostate neoplasms

ONF, 42(3), 241–249. doi: 10.1188/15.ONF.42-03AP

Survivors often significantly reduce their physical activity levels after treatment and do not return to prediagnosis levels (Blanchard, Courneya, & Stein, 2008). As many as 70% of survivors do not engage in sufficient exercise to achieve health guideline recommendations (Peeters et al., 2009). Low levels of physical activity and associated losses of cardiovascular fitness increase the survivors' risks of all-cause and disease-specific mortality (Hamer, Stamatakis, & Saxton, 2009; Irwin et al., 2008; Laukkanen, Rauramaa, Mäkikallio, Toriola, & Kurl, 2011). In addition, survivors are at higher risk of cardiovascular disease after treatment (Lakoski et al., 2013; Viale & Yamamoto, 2008). Even asymptomatic breast cancer survivors exhibit impaired cardiorespiratory fitness seven years post-treatment (Lakoski et al., 2013). However, improvements in cardiorespiratory fitness, as measured by peak volume of oxygen consumption (VO_{2peak}), have been associated with a decrease in mortality (Blair et al., 1996; Kodama et al., 2009; Laukkanen et al., 2011) and better quality of life among breast cancer survivors (Tolentino et al., 2010). VO_{2peak} is considered the best practical surrogate for predicting survival in any adult population (Blair et al., 1996), with reduced mortality risks seen when adults reach greater than 27.7 ml/kg per minute (Kodama et al., 2009). For context within the populations studied in the current article, research indicates that breast and prostate cancer survivors have mean VO_{2peak} of 25.4 ml/kg per minute (Burnett, Kluding, Porter, Fabian, & Klemp, 2013) and 28.1 ml/kg per minute (Scott et al., 2015), respectively, both of which would be rated as poor in healthy adults (American College of Sports Medicine [ACSM], 2009).

In 2010, the ACSM called for researchers to examine whether different exercise intensities affected targeted health outcomes among survivors (Schmitz et al., 2010). Some studies have shown the potential for higher-intensity exercise to make larger improvements in VO_{2peak} among survivors (Adamsen et al., 2009; De Backer et al., 2007; Quist et al., 2006). However, those studies also identified potential risks of high-intensity exercise in some populations, such as those diagnosed