



Exercise has a positive effect on low-grade inflammation in women with breast cancer

Synopsis

Summary of: Meneses-Echavez JF, Correa-Bautista JE, Gonzalez-Jimenez E, Schmidt Rio-Valle J, Elkins MR, et al. The effect of exercise training on mediators of inflammation in breast cancer survivors: A systematic review with meta-analysis. *Cancer Epidemiol Biomarkers Prev.* 2016;25:1009–1017.

Objective: To review the evidence as to whether exercise training improves mediators of inflammation in breast cancer survivors. **Data sources:** The electronic databases PubMed, Embase, Scopus and Cochrane Central Register of Controlled Trials were searched between 1990 and 2014. This search was supplemented by reviewing reference lists of included studies, and relevant conference abstracts and journals. **Study selection:** Randomised controlled trials were included if they involved breast cancer survivors and exercise training was compared to a control group that completed conventional care only, education only or no intervention. Trials were excluded if the exercise training included a co-intervention such as dietary interventions. Outcome measures were serum levels of inflammatory markers (IL2, IL6, IL8, IL10, CRP and TNF α). **Data extraction:** Three reviewers extracted data, and discrepancies were resolved by discussion. Two reviewers using the PEDro scale assessed methodological quality. **Data synthesis:** Of the 367 trials initially identified by the search, eight trials (nine papers) with a total of 478 patients met the selection criteria and were included in the review. The exercise interventions included yoga, Tai chi, a combination of aerobic and resistance exercise, or aerobic exercise

alone. Two of the eight trials were classified as lower quality (scored 4/10 on PEDro scale). Based on the quantitative pooling of the available data from these trials at the end of training (mean 19 weeks, SD 13), there was a statistically significant difference in IL2, IL6, IL8 and TNF α in favour of exercise training. Data from all eight trials for IL6 favoured exercise training, with a weighted mean difference of -0.55 pg/ml (95% CI -1.02 to -0.09 pg/ml) and data from six trials for TNF α favoured exercise training with a weighted mean difference of -0.64 pg/ml (95% CI -1.21 to -0.06). Significant differences were not found for CRP and IL10. There were insufficient data to conclude if one type of exercise training was more effective than another. **Conclusion:** Exercise training has a positive effect on low-grade inflammation in women with breast cancer. Given the crucial role that chronic inflammation plays in cancer development, progression, risk and survival, this review provides evidence to support the prescription of exercise training for breast cancer survivors.

Provenance: Invited. Not peer reviewed.

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Commentary

There is a large body of evidence supporting exercise training for alleviating treatment effects in cancer survivors. Exercise may also improve survival and prevent cancer recurrence.¹ The mechanisms underlying how exercise influences these health outcomes are not well understood. However, it is hypothesised that exercise may reduce the associated effects of systemic inflammation. Meneses-Echavez and colleagues have presented a comprehensive systematic review supporting this hypothesis in breast cancer survivors.

Exercise for cancer survivors is contentious, given the stress it can place on compromised immune and cardiovascular systems following cancer treatment. Chronic inflammation is a concern for cancer survivors due to its role in carcinogenesis.² The key findings of this review were: significant reductions in potentially harmful pro-inflammatory markers, plus a protective effect of exercise through improvements in IL-2 and IL-10, which up-regulate the immune system and may improve breast cancer survival. This result provides evidence that exercise interventions for this population are safe,³ and is consistent with a recent review that regular exercise does not increase inflammation.⁴

The intensity of exercise may influence levels of systemic inflammation.⁵ A dose-response relationship has been established between moderate-intensity aerobic exercise and fatigue in cancer survivors.⁴ This relationship may be due to the mediating effect of IL-6 on fatigue after exercise. In the current review, no dose-response was found for exercise intensity and IL-6, although it was

established that Tai chi and yoga are effective for reducing IL-6. However, the small number of trials included means that there is still uncertainty about the optimal exercise dose and modality for reducing systemic inflammation.

This research assists clinicians in understanding the mechanisms of how exercise can improve cancer-related symptoms such as fatigue, and how exercise may influence survival. These results should instil confidence in clinicians that exercise is safe for breast cancer survivors and supports the incorporation of exercise as part of standard cancer care.

Provenance: Invited. Not peer reviewed.

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