



### The Effect of Exercise on Inflammatory Factors in Breast Cancer Patients: A Meta-analysis

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**Objective** Breast cancer is one of the most common malignant tumors that threaten the physical and mental health and even life-threatening of women worldwide. Chronic inflammation plays a key role in the occurrence, progression and recurrence of cancer. Several sources of evidence indicate that exercise during and after breast cancer could positively modulate the tumor microenvironment. The purpose of this meta-analysis is to determine the impact of exercise training on inflammatory factors in breast cancer patients.

**Methods** We systematically searched the relevant randomized controlled trials published from January 1990 to June 2017 and analyzed them by Pubmed、 Embase、 Web of Science and Cochrane Library. The combination of Breast Cancer and Exercise is used for retrieval. The search term used for Pub Med is: ( Exercise[Me SH] OR Physical Activity[Text Word] OR Training [Text Word] OR Activity [Text Word] OR Sport[Text Word] AND Breast Cancer[Text Word] OR Breast Tumor [Text Word] OR Breast Neoplasm [Text Word] OR Mammary Cancer [Text Word] OR Malignant Neoplasm of Breast [Text Word] OR Breast Carcinoma [Text Word] AND Interleukins [Text Word] OR IL [Text Word] ) .And manually check the references in the article to identify additional articles. Examination of titles and abstracts of papers based on pre-set inclusion criteria. Eleven high-quality trials were included.

**Results** Pooled analyses revealed compared with the control group, the exercise group significantly improved the serum concentration of IL-8( $Z=0.07$ ,  $SMD=-0.02$ ,  $95\%CI: [-0.47, -0.44]$ ,  $p=0.946$ ) and  $TNF-\alpha$  ( $Z=2.10$ ,  $SMD=-0.60$ ,  $95\%CI: [-1.16, -0.04]$ ,  $p=0.036$ ). No significant differences were found in the serum concentrations of IL-2 ( $Z=1.96$ ,  $SMD=-0.69$ ,  $95\%CI: [-1.37, 0.00]$ ,  $p=0.05$ ), IL-6 ( $Z=0.40$ ,  $SMD=-0.12$ ,  $95\%CI: [-0.69, 0.45]$ ,  $p=0.686$ ), IL-10 ( $Z=1.73$ ,  $SMD=-0.45$ ,  $95\%CI: [-0.95, 0.06]$ ,  $p=0.084$ ) or C-reactive protein ( $Z=0.18$ ,  $SMD=-0.03$ ,  $95\%CI: [-0.35, 0.41]$ ,  $p=0.861$ ).

**Conclusions** Exercise training can effectively improve some inflammatory factors in breast cancer patients and may affect tumor microenvironment. These findings provide a theoretical basis for the promotion of sports in this population.