

## Effective Strength Training for Breast Cancer Patients (Literature Review)

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**Introduction.** Breast cancer (BC) patients experience complex health and psychosocial challenges. Cancer and cancer treatment accompanied with an inactive life style may further impair muscle strength and muscle force development characteristics. As a counter measure, exercise training has been increasingly implemented into the oncology setting over the last three decades. Strength training can optimally target muscles, and increased muscle strength may contribute to participation in daily life and improve quality of life. However, the optimal type, intensity and frequency of strength training, as part of the treatment that will most enhance muscle strength, is yet unknown.

**Aim, Materials and Methods.** Thus, the purpose of this review is twofold: (I) review the literature with regards to how strength training can be used as part of BC treatment and (II) determine key factor that contributes to effective strength training. Published literature search was conducted in PubMed/MEDLINE database between January 2016 and February 2017. Total of 50 articles were included in the current review, using key words (breast neoplasms, physical activity, strength training).

**Results.** Christensen et al. (2014) examined newly diagnosed cancer patients with mixed diagnoses (lung, gastric, colorectal, breast and pancreas cancer); these patients had 0.9 kg lower muscle mass compared with healthy controls before the initiation of cancer treatment. Moreover, during the course of adjuvant chemotherapy, early-stage BC patients lost 1.3 kg lean body mass (LBM), and continued to lose LBM after therapy was completed. BC survivors evaluated after completion of primary therapy displayed consistently 20–30% lower muscle strength compared with healthy individuals (Harrington, Padua et al. 2011). It has been concluded that intensity 66% of one repetition maximum (1RM) is the minimum to induce changes in muscle strength (McDonagh et al., 1984). Most physical activity interventions that have been used in BC studies combine endurance training with strength training and relaxation therapies (Baumann et al., 2013), thus making it difficult to assess the effect of the training type. There has been a limited amount of studies on BC patients that include higher intensity strength trainings.

**Conclusions.** General consensus on strength training interventions for cancer patients was that training programs were well tolerated, safe and feasible and showed strength improvements that led to improved physical function and improved quality of life (Segal et al., 2003; De Backer et al., 2007; Battaglini et al., 2014). Recognizing that training intensity during strength training is a key factor to increase maximal muscular strength and rate of force development (RFD), strength training with an intensity higher than the adaptive threshold of 66–70% of 1RM may have been preferable to induce great physiological adaptations, thus enhancing faster recovery from a specific cancer treatment.