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Just one weekly session of strength or combined training preserves cellular integrity, cardiorespiratory fitness, and increases neuromuscular strength in women with breast cancer during chemotherapy: a randomized controlled trial

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Objective: To compare the effects of strength training or combined training on cellular integrity, cardiorespiratory fitness, and neuromuscular strength in women with breast cancer undergoing chemotherapy. **Methods:** A randomized controlled clinical trial was conducted (CEP:50717115.4.0000.5083; REBEC:16497). Nineteen volunteers (age 45.1, standard deviation ±2.9 years) were randomized into the following groups: strength training (ST), combined training (CT), or control group (CG). Volunteers in the ST and CT groups (strength and aerobic) underwent 12 weeks of training with one session per week during neoadjuvant chemotherapy with anthracyclines. Cellular integrity, cardiorespiratory fitness, and neuromuscular strength were assessed before the first (baseline) and after the fourth chemotherapy cycle (post-treatment). Cellular integrity was evaluated based on tetrapolar bioimpedance test. Cardiorespiratory fitness was assessed using a treadmill stress test, while neuromuscular strength was measured with an isometric knee extension test. Data are presented as mean and standard deviation. A two-way analysis of variance (ANOVA) test (3x2) was used with Sidak's post hoc test. The significance level was set at $p<0.05$. **Results:** The ST, CT, and CG groups did not differ at baseline in cellular integrity (6.1±0.2; 6.2±0.2; and 5.3±0.4, respectively), cardiorespiratory fitness (22.5±0.3; 22.4±0.9; and 23.2±1.2, respectively), and neuromuscular strength (141.0±20.0; 243.0±49.0; and 101.6±12.1, respectively). However, the CG group showed a reduction in cellular integrity at post-treatment (5.0±0.4; $p=0.01$), while the CT and ST groups had no significant changes (6.4±0.3 and 6.2±0.1, respectively). Cardiorespiratory fitness decreased in the CG group post-treatment (19.9±0.8; $p=0.04$) and was lower than the CT group (25.5±1.4; $p=0.04$). The ST group showed no difference in post-treatment fitness. Neuromuscular strength increased in the ST (258.8±48.2; $p=0.03$) and CT (446.8±59.1; $p=0.00$) groups, with a significant difference compared to CG post-treatment (90.0±7.7; $p=0.01$). **Conclusion:** Just one session per week of ST or CT for three months preserved cellular integrity, cardiorespiratory fitness, and increased neuromuscular strength in women with breast cancer undergoing chemotherapy with anthracyclines.

Keywords: resistance training; neoplasia; endurance training.