

# Clinical Exercise Interventions in Pediatric Oncology: Can they Reduce Late Toxicities?

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## DESCRIPTION

Advances in the treatment of pediatric malignancies have resulted in combined survival rates for all sites in excess of 80%. With improved cancer outcomes and a growing population of pediatric cancer survivors, efforts to reduce long term treatment toxicities are becoming increasingly important. Radiation Therapy (RT), although a key component in many treatment protocols, has significant long term side effects which can impact quality of life. Exercise, yoga and other physical therapies are potential strategies to mitigate late RT side effects and improve functional outcomes.

Exercise has been shown to have a number of benefits for pediatric oncology patients, from improving physical function to reducing anxiety and depression. In this article, we'll explore some of the key benefits of exercise for pediatric oncology patients.

### Improved physical function

One of the most obvious benefits of exercise for pediatric oncology patients is improved physical function. Children who undergo cancer treatment can experience a range of physical side effects, including fatigue, muscle weakness, and reduced endurance. Exercise can help mitigate these side effects and improve overall physical function. In one study published in the journal *Supportive Care in Cancer*, researchers looked at the effects of a structured exercise program on pediatric oncology patients. The program consisted of supervised exercise sessions three times per week for eight weeks. The results showed significant improvements in muscle strength and endurance, as well as a reduction in fatigue.

### Reduced anxiety and depression

Exercise has also been shown to have a positive impact on mental health, particularly in terms of reducing anxiety and depression. Children with cancer may experience a range of emotional challenges, from fear and uncertainty to feelings of isolation and sadness. Exercise can help counteract these

emotions by releasing endorphins, the body's natural feel-good chemicals. In a study published in the *Journal of Pediatric Oncology Nursing*, researchers looked at the effects of a yoga program on pediatric oncology patients. The program consisted of weekly yoga classes for six weeks. The results showed a significant reduction in anxiety and depression among the participants.

### Improved quality of life

Another benefit of exercise for pediatric oncology patients is improved quality of life. Children with cancer may experience a range of physical and emotional challenges that can impact their overall well-being. Exercise can help improve physical function, reduce anxiety and depression, and boost self-esteem, all of which can contribute to a better quality of life. In a study published in the journal *Pediatric Blood and Cancer*, researchers looked at the effects of a home-based exercise program on pediatric oncology patients. The program consisted of exercises designed to improve muscle strength, endurance, and flexibility, and participants were asked to complete the program three times per week for 12 weeks. The results showed a significant improvement in quality of life among the participants.

Several recent trials of short-term exercise interventions in pediatric oncology patients have reported improvements in motor function, functional mobility, and health-related quality of life. In a population where emotional and attentional deficits may exist as side effects of treatment, the relaxation and meditation techniques provided through yoga may provide additional benefits. Recent reviews of yoga in adult oncology patients have suggested improvements in mood, fatigue, and sleep. Several small randomized controlled trials have investigated the effects of exercise programs in pediatric oncology patients. A crossover randomized trial of 30 pediatric oncology inpatients investigated health-related quality of life measures in patients who underwent a tri-weekly, 30 min physical activity program during their hospital admission and found improvements in physical functioning, self-esteem, mental health, and behavior. Similarly, a 12 week, bi-weekly yoga

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intervention in outpatients found significant improvements in health-related quality of life and functional mobility.

## CONCLUSION

The benefits of exercise in the adult population of cancer patients have been better studied and consensus guidelines exist. Several challenges exist to developing evidence-based pediatric

exercise recommendations, however. There is still a relative paucity of data in the pediatric group. Many studies have a cohort design where the confounding factors of increased social interaction implicit with an exercise intervention make definitive attribution of beneficial effects to exercise difficult. Further, response bias in voluntary programs may inflate estimates of feasibility and attendance rates.