

PEDIATRIC CANCER SURVIVORS AND LIFE-LONG REHABILITATION CARE

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Introduction Cancer is the leading cause of disease-related mortality among children and adolescents. In 2022, an estimated 14,000 children and adolescents (0-14 years old) in Europe were diagnosed with cancer, and 2,000 die annually. Although more than 81% survive, many live with long-term physical and psychological effects. Leukemia, lymphomas, and brain tumors are the most common types. The causes of most childhood cancers remain unclear, and there are regional variations in incidence¹.

Over 80% of children with cancer now survive into adulthood due to advances in multimodal therapies and supportive care since 1970. Yet, many experience persistent physical, cognitive, and psychosocial issues. Rehabilitation is critical in addressing these late effects and maintaining quality of life through a multidisciplinary, lifelong approach. The Childhood Cancer Survivor Study (CCSS), the largest cohort of 5-year survivors in North America, shows that most long-term care is provided by primary care physicians. However, follow-up visits decline over time. While pediatricians play a key role, Physical Medicine and Rehabilitation (PM&R) physicians are uniquely equipped to manage late effects through comprehensive, multidisciplinary rehabilitation, helping survivors achieve optimal function and well-being² and so they are equally essential. **Long-Term Effects of Paediatric Cancer Treatment** In recent decades, numerous sizable cohorts of childhood cancer survivors have been established in Europe and North America to support studies on long-term health outcomes. Survivors often experience various physical and mental health issues, including endocrine abnormalities, musculoskeletal impairments, cardiovascular dysfunction, and neuromuscular deficiencies. Cognitive effects such as learning difficulties, memory loss, and poor concentration are especially common among those exposed to high-dose chemotherapy or cranial radiation. Psychosocial challenges, including anxiety, depression, PTSD, and problems with social reintegration, may also impact long-term well-being³.

Rehabilitation Strategies Comprehensive PRM rehabilitation is vital for minimizing complications and enhancing survivors' long-term function. Strategies include physical, occupational, cognitive, speech, psychological, and lifestyle interventions. **1. Physical & Occupational Rehabilitation** Physical limitations may arise due to tumor location, immobility, chemotherapy-induced neuropathy, or treatment-related deformities. Physiotherapy addresses fatigue, gait issues, and weakness. Occupational therapy supports daily activities. Strength training, balance exercises, and assistive devices (orthotics, prosthetics) improve mobility. Cardiac and pulmonary rehab is essential for those at risk of cardiotoxicity or pulmonary fibrosis⁴. **2. Cognitive and Educational Rehabilitation** Neurocognitive impairments often require specialized therapies. Cognitive remediation enhances executive function, attention, and memory. Individualized Education Plans (IEPs) and classroom accommodations—extra test time, note-taking

aids, assistive tech—support academic performance⁵. 3. Psychosocial Rehabilitation Cancer treatment can disrupt emotional development and social connection. Cognitive Behavioral Therapy (CBT) reduces emotional distress. Peer support groups and mentorships build resilience and social skills. Family-focused interventions, foster emotional support and adaptive coping⁶. 4.

Lifestyle and Wellness Rehabilitation Survivors face elevated risks of obesity, metabolic syndrome, and secondary malignancies. Nutritional counseling promotes healthy eating; structured exercise improves cardiovascular health and reduces fatigue. Behavioral support aids in smoking cessation and limiting alcohol intake—key to preventing late complications. Transitioning to adult healthcare is crucial as survivors mature. Conclusion: Pediatric cancer survivors need interdisciplinary rehabilitation for the rest of their lives. Combining an Individual Rehabilitation plan with all therapies needed to improve their general independence and well-being. Future developments in rehabilitation techniques will keep enhancing survivors' quality of life and long-term health results.

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