

Pediatric Orthopedic Oncology: Managing Tumors in Young Patients

Dannie Rebelled*

University of Sao Paulo, School of Medicine, University of Sao Paulo, Department of Orthopedics and Traumatology, Brazil

Abstract

on a combination of advanced imaging modalities, including MRI, CT scans, and PET scans, to accurately diagnose and stage tumors in young patients. These imaging techniques help determine the extent of tumor involvement, identify any metastases, and facilitate precise surgical planning. Biopsies are carefully performed to confirm the tumor type, grade, and genetic characteristics, providing valuable information for tailored treatment [7].

The management of pediatric bone and soft tissue tumors demands a multidisciplinary team approach involving orthopedic surgeons, pediatric oncologists, radiation oncologists, radiologists, pathologists, physical therapists, and psychosocial support staff. This collaboration ensures comprehensive evaluation and personalized treatment plans that take into account the child's unique needs and circumstances [8]. Limb-sparing surgeries are the gold standard for treating localized pediatric bone tumors while preserving limb function and growth. Innovative surgical techniques, including the use of expandable prostheses, 3D-printed implants, and biological reconstructions, have revolutionized limb-salvage procedures. The goal is to remove the tumor while avoiding damage to growth plates, enabling the child's limb to continue growing alongside their healthy peers [9].

Chemotherapy plays a central role in the treatment of pediatric bone and soft tissue tumors. It is often administered before and after surgery to shrink the tumor and prevent the spread of cancer cells. In recent years, targeted therapies have shown promise in pediatric oncology by specifically targeting molecules involved in tumor growth, reducing side effects, and improving treatment efficacy. Radiation therapy is selectively used in pediatric orthopedic oncology, especially for tumors that are not amenable to surgical resection or as an adjuvant treatment after surgery. The unique vulnerability of growing tissues in children requires careful planning to minimize long-term effects on bone development and growth [10].

Conclusion

Pediatric orthopedic oncology represents a unique and challenging area of medicine, requiring a compassionate, multidisciplinary approach. Through advances in imaging, surgical techniques, chemotherapy, targeted therapies, and psychosocial support, the field has made significant strides in managing tumors in young patients. Despite the complexities involved, the dedication and expertise of healthcare providers continue to offer hope and optimism to these young warriors and their families, ensuring that they receive the best possible care and support throughout their journey to recovery and beyond. Pediatric orthopedic oncology represents a delicate balance between aggressive tumor management and preserving the functional

outcomes and quality of life of young patients. Early detection, multidisciplinary collaboration, and advancements in treatment modalities have significantly improved the

Pediatric orthopedic oncology is a highly specialized branch of medicine dedicated to the diagnosis, treatment, and management of bone and soft tissue tumors in children and adolescents. Managing tumors in young patients requires a delicate balance between providing curative therapies and preserving their physical and emotional well-being. This article delves into the unique challenges faced by healthcare providers in pediatric orthopedic oncology and highlights the multidisciplinary approach and advancements that have significantly improved outcomes for these young warriors.

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