

## Surgical Techniques in Oncologic Orthopedics

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### Abstract

Surgical intervention remains a fundamental pillar in the management of musculoskeletal tumors, and oncologic orthopedics has witnessed remarkable progress in surgical techniques over the years. These advancements have revolutionized the field, allowing orthopedic surgeons to address bone and soft tissue malignancies with greater precision and improved outcomes. This article provides an overview of some of the key surgical techniques utilized in oncologic orthopedics, highlighting their significance in preserving function, enhancing patient quality of life, and offering hope to those facing challenging oncological conditions.

Limb-sparing surgery, also known as limb-salvage or limb-sparing resection, is a groundbreaking surgical technique that allows oncologic orthopedic surgeons to remove a tumor while preserving the affected limb. In the past, amputation was the primary approach for many bone and soft tissue tumors. However, limb-sparing surgery has become the preferred choice whenever possible, as it offers several advantages, including improved patient mobility, better cosmetic outcomes, and enhanced overall quality of life.

**Keywords:** Musculoskeletal tumors; Orthopedic surgeons; Palliative surgical; Tumors

### Introduction

When tumors affect critical joints, joint-sparing procedures become essential to preserving joint function and maintaining range of motion. Joint-sparing techniques are particularly relevant in patients with cartilage tumors or certain bone tumors that are amenable to preservation without compromising oncological safety. For instance, in cases of certain benign bone tumors, curettage followed by bone grafting may be sufficient to preserve the joint [1]. Moreover, advancements in arthroscopic techniques allow surgeons to access and treat tumors within the joint with minimal invasiveness, reducing recovery time and enhancing patient comfort. Surgical techniques in oncologic orthopedics have come a long way, empowering orthopedic surgeons to address musculoskeletal tumors with unprecedented precision and patient-centric approaches. Limb-sparing surgery and joint-sparing procedures have transformed the landscape of tumor management, enabling patients to maintain functionality and enjoy an improved quality of life. The use of advanced technologies, such as intraoperative navigation, ensures greater surgical accuracy, minimizing the risk of tumor recurrence and complications. Moreover, palliative surgeries offer hope and relief to patients facing advanced-stage tumors, further emphasizing the comprehensive nature of oncologic orthopedics [2].

En bloc resection is a surgical technique used for aggressive or large tumors that cannot be managed with limb-sparing procedures alone. In this technique, the tumor is removed along with the surrounding anatomical structures in one piece. The goal of en bloc resection is to ensure complete removal of the tumor while minimizing the risk of leaving any tumor cells behind. Reconstruction after en bloc resection can be challenging, but advances in surgical planning and the use of patient-specific implants have significantly improved outcomes [3]. During limb-sparing surgery, the tumor is carefully excised along with a margin of healthy tissue surrounding the tumor site. The resected area is then reconstructed using various methods, such as bone allografts, metal implants, or biological materials like bone cement. Advances in 3D printing technology have further augmented this technique, enabling the creation of patient-specific implants that fit precisely, optimizing the restoration of function and reducing the risk of complications [4].

Intraoperative navigation is an advanced technology that enhances

the precision and accuracy of oncologic orthopedic surgeries. Using specialized imaging systems and tracking tools, surgeons can create detailed 3D maps of the tumor and its surrounding structures during the operation. This real-time information allows for more precise tumor removal and better preservation of healthy tissue. In cases where tumors are too advanced for curative treatment, palliative surgery plays a crucial role in enhancing the patient's quality of life. Palliative surgical interventions aim to alleviate pain, restore function, and reduce tumor burden. Procedures such as tumor debunking, internal fixation for pathologic fractures, and nerve decompression can significantly improve the patient's comfort and mobility, allowing them to better manage the challenges of their condition [5].

### Discussion

One of the key elements in the success of surgical interventions in oncologic orthopedics lies in precision and preoperative planning. Accurate tumor mapping through advanced imaging techniques, such as magnetic resonance imaging (MRI), computed tomography (CT) scans, and positron emission tomography (PET) scans, allows surgeons to visualize the tumor's location, size, and involvement with adjacent structures. This detailed information guides surgical decision-making and helps in determining the most appropriate surgical approach. En bloc resection is a surgical technique used for the removal of bone tumors and adjacent involved tissues in a single piece. This approach aims to minimize the risk of tumor seeding during surgery and prevent local recurrence. En bloc resection is commonly employed in the treatment of primary bone tumors, such as osteosarcoma and chondrosarcoma. The surgical team carefully plans and executes the

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procedure to achieve negative surgical margins, which is critical for reducing the risk of tumor recurrence [6].

Limb-sparing surgeries, also known as limb salvage procedures, have revolutionized the treatment of localized bone tumors, allowing patients to retain their affected limb while effectively removing the tumor [7]. These procedures aim to achieve the delicate balance between oncological control and functional preservation. Advances in surgical techniques, imaging, and prosthesis design have significantly improved the success rates of limb-sparing surgeries. The use of 3D-printed patient-specific implants and computer-assisted navigation has enhanced surgical precision and implant integration, enabling better long-term outcomes for patients. Minimally invasive techniques have found their place in the field of oncologic orthopedics, especially for certain cases of benign bone tumors, palliative interventions, and select metastatic lesions. Image-guided percutaneous techniques, radiofrequency ablation (RFA), and cryoablation offer less invasive alternatives for tumor treatment. These procedures are associated with reduced surgical trauma, shorter hospital stays, and faster recovery times, making them valuable options for patients with advanced-stage cancers or limited treatment options [8].

Metastatic bone lesions often present unique challenges due to their potential to weaken the bone structure and cause fractures. Surgical interventions for metastatic lesions focus on pain relief, stabilization of the affected bone, and restoration of function. Procedures like intramedullary nailing, cement augmentation and percutaneous fixation are commonly employed to address metastatic bone disease [9]. Additionally, surgical interventions in conjunction with radiation therapy can effectively alleviate pain and improve the patient's quality of life. Soft tissue tumors, such as sarcomas, can present complex surgical challenges due to their location and potential involvement of vital structures. Surgical techniques for soft tissue tumor resections involve meticulous dissection and careful preservation of neurovascular structures to achieve wide surgical margins. Advances in microsurgical techniques and reconstructive procedures have improved functional outcomes and reduced postoperative complications, enabling better limb function and cosmetics for patients [10].

## Conclusion

Surgical techniques in oncologic orthopedics have evolved significantly, allowing for more precise and effective management of bone and soft tissue tumors. From en bloc resections to limb-sparing surgeries and minimally invasive procedures, each approach is tailored to the specific needs of the patient and the characteristics of the tumor. Multidisciplinary collaboration, technological innovations, and advancements in imaging have all contributed to the success of these surgical interventions. As research and technology continue to progress, oncologic orthopedic surgeons remain at the forefront of

adopting novel techniques to improve patient outcomes and enhance the quality of life for individuals facing musculoskeletal malignancies. The dedication and expertise of these specialized surgical teams play a crucial role in offering hope and a better future for patients battling bone and soft tissue tumors.

As technology continues to advance and research progresses, the future of surgical techniques in oncologic orthopedics holds immense promise. Collaborative efforts among surgeons, researchers, and medical professionals will continue to drive innovation, improving patient outcomes, and ultimately reshaping the landscape of musculoskeletal tumor management. Surgical techniques in oncologic orthopedics have undergone remarkable advancements over the years, transforming the landscape of treating bone and soft tissue tumors. These specialized surgical interventions play a pivotal role in the management of localized musculoskeletal malignancies and metastatic lesions. This article explores the various surgical approaches and innovations that have emerged, providing insights into how oncologic orthopedic surgeons are improving patient outcomes and preserving functionality while effectively combating cancer.

## References

1. Cranshaw I, Gikas P, Fisher C (2009) Clinical outcomes of extra- thoracic solitary fibrous tumours. *Eur J Surg Oncol* 35: 994-998.
2. Kaim AH, Hugli R, Bonél HM, Jundt G (2002) Chondroblastoma and clear cell chondrosarcoma: radiological and MRI characteristics with histopathological correlation. *Skeletal Radiol* 31:88-95.
3. Nathalie L, Sun J, Gondara L, Diocee R, Speers C et al. (2020) Impact of pathologic complete response on survival after neoadjuvant chemotherapy in early-stage breast cancer: a population-based analysis. *J Canc Res Clin Oncol* 146: 529-536.
4. Hangaard H, Gögenur M, Tvilling M, Gögenur I (2018) The effect of time from diagnosis to surgery on oncological outcomes in patients undergoing surgery for colon cancer: a systematic review. *Eur J Surg Oncol* 44: 1479-1485.
5. Gold JS, Antonescu CR, Hajdu C (2002) Clinicopathologic correlates of solitary fibrous tumors. *Cancer* 94: 1057-1068.
6. Choi H, Charnsangavej C, Faria SC (2007) Correlation of computed tomography and positron emission tomography in patients with metastatic gastrointestinal stromal tumor treated at a single institution with imatinib mesylate: proposal of new computed tomography response criteria. *J Clin Oncol* 25: 1753-1759.
7. Song HJ, Xue YL, Xu YH, Qiu ZL, Luo QY, et al. (2011) Rare metastases of differentiated thyroid carcinoma: pictorial review. *Endocr Relat Cancer* 18: 165-174.
8. Jong-Ryool O, Byeong-Cheol A (2012) False-positive uptake on radioiodine whole-body scintigraphy: physiologic and pathologic variants unrelated to thyroid cancer. *J Nucl Med Mol Imaging* 2: 367-390.
9. Orita Y, Sugitani I, Matsuura M (2010) Prognostic factors and the therapeutic strategy for patients with bone metastasis from differentiated thyroid carcinoma. *Surgery* 147: 424-431.
10. Chai JW, Hong SH, Choi JY (2010) Radiologic Diagnosis of Osteoid Osteoma: From Simple to Challenging Findings. *Radio Graphics* 30: 737-749.