

REVIEW ARTICLE

# Nursing Care of Patients with Extremity Sarcomas Postoperatively

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Received: 27 April 2025 Accepted: 12 May 2025 Published: 28 May 2025

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## Abstract

While oncological management of extremity sarcomas has advanced, postoperative recovery remains a critical phase where nursing care plays a pivotal role in ensuring physical, emotional, and psychological recuperation. Nursing care includes a wide range of interventions designed to enhance recovery and reduce complications. This review highlights key aspects of nursing practice, including pain management, wound care, mobility, and psychosocial support, with a particular focus on individualized and nurse-led interventions. Effective pain control is achieved through a multimodal approach, involving pharmacological and non-pharmacological methods, while wound care protocols emphasize sterile techniques and infection surveillance. Early mobilization under nurse guidance and collaboration with physiotherapists helps prevent complications such as deep vein thrombosis, while psychological distress, particularly related to prognosis and physical disfigurement, necessitates proactive support from nurses. In addition, patient education is crucial, with nurses providing essential guidance on home care, activity restrictions, and prosthetic use. Interdisciplinary collaboration involving nurses, physiotherapists, oncologists, and psychologists enhances patient outcomes and satisfaction. Nurse-led care models, including specialized clinics, follow-up programs, and early discharge initiatives, have demonstrated effectiveness in improving patient outcomes, facilitating timely recovery, and reducing healthcare costs. Overall, nurse-led care ensures a holistic, patient-centered approach to postoperative care, improving both clinical outcomes and quality of life for extremity sarcoma patients.

**Keywords:** Extremity Sarcoma, Postoperative Nursing Care, Pain Management, Wound Care, Rehabilitation, Psychosocial Support, Nursing Interventions.

## 1. Introduction

### 1.1 Extremity Sarcomas

Extremity sarcomas encompass a diverse group of rare malignancies affecting bones and soft tissues of the limbs. Surgical resection continues to be the fundamental approach to treatment, typically accompanied by additional therapies. Extremity sarcomas, which include both soft tissue and bone tumors, are rare malignancies that account for less than 1% of all adult cancers [1]. Despite their low incidence, these tumors are clinically significant due to their aggressive biological behavior and the complexity of their treatment, which often involves

wide surgical excision, sometimes accompanied by radiation therapy or chemotherapy [2]. Surgical management may involve limb-sparing procedures or, in more advanced cases, amputation—both of which carry substantial physical and psychological burdens for patients [3]. Postoperative complications such as infections, delayed wound healing, impaired mobility, and chronic or acute pain are common and can significantly delay recovery and reduce quality of life [2,4].

Therefore, the immediate post-surgical period is a critical window requiring comprehensive, multidisciplinary care. Within this care model, nurses

**Citation:** Ioanna Tsatsou. Nursing Care of Patients with Extremity Sarcomas Postoperatively. Archives of Oncology and Cancer Therapy 2025;5(1): 10-18.

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play a central role in patient monitoring, management of emerging complications, delivery of emotional support, and patient education regarding rehabilitation and self-care strategies [3].

## 1.2 Nursing Care

Nursing care in the postoperative management of extremity sarcoma patients extends beyond basic wound care. It encompasses structured pain management strategies, early mobilization protocols, psychosocial support, rehabilitation coordination, and education on prosthetic use or self-care at home [3]. Nurses are often the most consistently present healthcare providers during hospitalization and are therefore pivotal in identifying early signs of complications, reinforcing adherence to treatment plans, addressing patient anxiety and depression and providing emotional support to sarcoma patients [5]. However, the nursing contributions specific to this unique surgical oncology population remain underrepresented in literature, and existing guidance tends to be generalized across cancer types or postoperative care broadly.

The immediate postoperative care and nursing care for patients with extremity sarcomas includes:

-Monitoring: Following surgery, frequent monitoring is essential to detect early complications. Nurses must regularly assess vital signs, perform neurovascular checks (assessing color, warmth, pulses, movement, and sensation), and evaluate wound status for drainage or bleeding [6].

-Pain Management: Effective postoperative pain control is critical. Nurses should administer prescribed analgesics, beginning with intravenous formulations and transitioning to oral medications as tolerated. Pain levels must be assessed regularly to address breakthrough pain, with regional anesthesia considered when appropriate [7].

-Wound Care: Sterile technique must be maintained during dressing changes to prevent infection. Nurses should monitor for signs of infection such as redness, swelling, warmth, purulent drainage, foul odor, or fever [8].

-Drains: Postoperative drains require careful management. Nurses are responsible for recording output (color and amount), ensuring drain patency, and removing drains according to physician orders [9].

-Positioning: Proper positioning, including elevation of the affected extremity, minimizes swelling and prevents complications. Specific positioning orders must be followed diligently [10].

-Mobility: Early, gradual mobilization under the guidance of physical therapy is important to prevent complications such as deep vein thrombosis (DVT). The use of compression devices, stockings, and anticoagulants should be incorporated as ordered [11].

-Pulmonary care: Postoperative pulmonary hygiene, including deep breathing and coughing exercises, is critical to prevent atelectasis and pneumonia [12].

-Nutrition and hydration: Patients should initially receive intravenous fluids, with advancement to oral intake as tolerated. Proper hydration and nutrition promote wound healing and recovery [13].

-Emotional support: The emotional impact of sarcoma surgery can be profound. Nurses should provide empathetic support and address patient anxiety related to surgery, diagnosis, and hospitalization [14].

Then the later postoperative care and discharge planning include:

-Wound care education: Patients and caregivers should receive detailed instructions on wound care, including recognizing signs of infection and when to seek medical advice [15].

-Pain management at home: Education on home-based pain management strategies, medication regimens, and potential side effects is crucial to ensure effective outpatient pain control [16].

-Activity and mobility: Clear guidance regarding weight-bearing restrictions and use of assistive devices must be provided. Compliance with prescribed physical therapy exercises is vital for regaining strength and function [17].

-Lymphedema precautions: For patients who underwent lymph node dissection, education on recognizing lymphedema symptoms and the appropriate use of compression garments is essential. Referral to specialized lymphedema therapy services may be needed [18].

-Infection prevention: Reinforcement of infection prevention strategies, including wound monitoring and hand hygiene, is key to minimizing postoperative complications [19].

-Nutrition: Patients should be encouraged to maintain a balanced diet rich in protein, vitamins, and minerals to support wound healing and overall recovery [20].

-Follow-up care: Patients must understand the importance of adhering to follow-up appointments with surgical and oncology teams, including the scheduling of imaging and laboratory tests [21].

-Psychological support: Resources addressing psychological adjustment, coping strategies, and support for changes in body image (particularly following amputations) should be offered [5,22]

-Home support: Assessment of home care needs, durable medical equipment, and support services (e.g., home health nursing, physical therapy) should be completed prior to discharge [23].

Potential postoperative complications and nursing interventions are the following:

-The possible infections nurses must maintain sterile technique and monitor for infection, initiating antibiotics and notifying physicians when necessary [24].

-Hemorrhage: Monitoring for excessive wound bleeding and unstable vital signs is critical. Immediate action, including applying pressure and notifying the surgical team, is required in the event of hemorrhage [25].

-Deep Vein Thrombosis or pulmonary embolism: Prophylactic measures such as anticoagulation therapy and early mobilization are essential. Nurses must educate patients on recognizing symptoms of DVT and pulmonary embolism [26].

-Wound dehiscence or delayed healing: Optimizing patient nutrition and adhering to meticulous wound care protocols can reduce the risk of wound dehiscence [27].

-Pain management: A multimodal approach, including pharmacologic and non-pharmacologic methods (e.g., guided imagery, relaxation techniques), should be utilized for managing acute, chronic, and phantom limb pain [28].

-Lymphedema: Early identification and management with compression therapy and specialist referral can mitigate the impact of lymphedema [29].

-Neurovascular compromise: Frequent neurovascular assessments and immediate reporting of changes are essential to prevent permanent damage [30].

-Impaired mobility: Close collaboration with physical therapy teams and consistent patient education on safe use of assistive devices is crucial [31].

-Body image issues and psychological distress: Nurses should provide compassionate support and referrals to counseling and support groups as needed to address psychological distress and body image concerns [32].

## 2. Specific Issues

### 2.1 Pain Management

Effective postoperative pain control is one of the

most frequently discussed and prioritized issues in the perioperative management of surgical patients, particularly those undergoing major procedures such as sarcoma resections. The literature overwhelmingly supports a multimodal analgesic approach, combining different classes of analgesics and interventions to achieve superior pain control and minimize side effects. Most studies advocate for the integration of opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), regional nerve blocks (such as epidural or peripheral nerve catheters), and non-pharmacological techniques like cold therapy, guided breathing exercises, and cognitive behavioral interventions [33,34]. This multimodal strategy not only addresses the complex nature of postoperative pain but also facilitates faster functional recovery and reduces opioid consumption, thereby lowering the risk of dependence and adverse effects [28, 35].

In addition to pharmacological management, nurse-patient communication has been consistently identified as a critical factor in optimizing pain control. Patients who receive structured, nurse-led pain education sessions before and after surgery report significantly better pain outcomes, higher satisfaction levels, and reduced anxiety [36, 37]. These sessions often focus on setting realistic expectations about postoperative pain, explaining the rationale for multimodal regimens, teaching self-reporting of pain using validated scales, and encouraging patients to actively participate in their pain management plans [38]. Furthermore, nurses play a pivotal role in ongoing pain assessment and regimen adjustment, advocating for timely interventions when patients experience breakthrough pain or side effects. Frequent communication fosters a therapeutic alliance, enhances patient empowerment, and allows for more individualized, responsive pain management strategies [39]. As such, embedding nurse-led education and communication practices into standard postoperative protocols is strongly recommended to achieve optimal pain control and improve overall patient outcomes [40].

### 2.2 Mobility and Physical Rehabilitation

Rehabilitation during the early postoperative period is critical. Early mobilization protocols, often nurse-led, are essential to improving functional recovery, reducing postoperative complications such as deep vein thrombosis, and enhancing overall patient outcomes. Nurses play a pivotal role in initiating and supervising mobilization activities in collaboration with physiotherapists, ensuring that movement was introduced safely and progressively based on



surgical restrictions and patient tolerance. Techniques such as proper limb elevation, when combined with early ambulation strategies, are referred as effective measures to reduce edema and promote circulatory health [11,17,31].

Importantly, attention is also brought to the psychological barriers to mobilization faced by patients in the immediate postoperative phase. Fear of pain, anxiety about re injury, and feelings of vulnerability often contribute to hesitancy in engaging with rehabilitation activities. In this context, the nursing role extended beyond physical support to include substantial emotional and psychological encouragement. Nurses were often responsible for providing reassurance, setting realistic expectations, and fostering motivation, thereby empowering patients to participate actively in their recovery process. Tailored emotional support is shown to significantly improve adherence to mobilization regimens and contributed to a more positive rehabilitation experience. Thus, early postoperative rehabilitation for extremity sarcoma patients must be understood as a holistic process, integrating both physical interventions and compassionate psychological care, with nurses positioned as key facilitators at the intersection of both dimensions [41,42].

### 2.3 Wound Management

Postoperative wound care, particularly for sarcoma patients with extensive surgical margins, pose significant challenges for nursing teams. Management of these complex wounds often required meticulous attention, strict adherence to sterile technique, and early identification of complications. Studies highlight the benefits of implementing standardized wound care protocols, which improve consistency, reduce infection rates, and support better overall healing outcomes. The use of wound classification systems was emphasized as a critical tool in clinical practice, enabling nurses to systematically assess healing progress and stratify infection risks [8,15].

Moreover, nurse-led infection surveillance programs, particularly those based on standardized criteria such as the Centers for Disease Control and Prevention (CDC) surgical site infection guidelines, are highly effective in detecting early signs of wound complications. In resource-limited or rural settings, telehealth-facilitated wound consultations, often managed by trained nursing staff, emerge as a promising strategy to ensure continuity of care and timely intervention following hospital discharge [43,44].

### 2.4 Psychosocial Support

Psychological distress, particularly related to anxiety about prognosis and physical disfigurement, emerged as a prevalent concern among sarcoma patients in the postoperative period. Nurses have a significant role in addressing these psychological challenges through psychosocial care. Nurses are not only essential for providing immediate emotional support but also served as key advocates in connecting patients with specialized mental health services when needed. Given the emotional burden of a sarcoma diagnosis, including fears related to recurrence, amputation, or changes in body image, the psychological care provided by nurses was crucial in helping patients navigate the emotional complexities of recovery [5,14,22,32].

There are also disparities in the availability of mental health support across institutions. In some settings, formal systems for nurse-initiated psychological referrals were either underdeveloped or absent, limiting patients' access to timely mental health resources. This lack of structured pathways meant that many patients struggled to receive the mental health care they needed, further exacerbating feelings of isolation and distress. Therefore, the literature underscores the importance of integrating psychosocial support into routine postoperative care, ensuring that nurses are equipped to both provide direct emotional support and facilitate appropriate referrals to mental health professionals when required [45].

### 2.5 Patient Education

Patient education regarding home care, signs of infection, activity levels, and prosthetic is a critical component of postoperative care in extremity sarcoma patients. Patient education is of major importance in these areas to ensure optimal recovery and prevent complications after discharge. Nurses play an essential role in providing this education, emphasizing key aspects such as wound care, infection prevention, and the proper use of prosthetics for patients who underwent amputation or limb reconstruction. Understanding how to identify early signs of infection, such as redness, swelling, or fever, was crucial in reducing the risk of complications and facilitating timely interventions [3,23].

Moreover, educating patients about activity restrictions and the gradual resumption of physical activity is noted. Nurses help patients understand weight-bearing limitations, the importance of mobility exercises, and physical therapy protocols to

ensure that recovery is not hindered by improper use of the affected limb. The role of nurses in discharge teaching helps patients transition from the hospital to home care. Nurses provide personalized education, ensuring that patients and caregivers understand how to manage postoperative care at home and how to use assistive devices or prosthetics effectively. Patient education is key to empowering patients to take an active role in their recovery and promote long-term health outcomes [46].

### 3. Integration of Care and Interdisciplinary Collaboration

An emerging trend is the integration of nursing care within a broader interdisciplinary team, highlighting the importance of collaboration in optimizing patient outcomes for extremity sarcoma patients. The multifaceted nature of sarcoma treatment and recovery necessitates a coordinated approach that goes beyond traditional nursing roles. The interdisciplinary team, incorporating oncologists, nurses, physiotherapists, psychologists, and social workers, all of whom contribute critical expertise at different stages of the recovery process [47,48].

Nurses, as part of this collaborative framework, are central to ensuring that communication between team members is seamless, fostering holistic patient care. By working closely with physiotherapists, nurses can help design personalized rehabilitation programs that promote early mobilization and minimize the risk of complications such as deep vein thrombosis. Collaboration with oncologists ensures that pain management and treatment regimens are continuously adjusted based on patient progress, while partnerships with psychologists and social workers address emotional and psychosocial challenges that arise from the diagnosis and surgery. This interdisciplinary approach not only enhances the efficiency of care delivery but also improves patient satisfaction and promotes better long-term outcomes, supporting both physical and emotional recovery. Such integrated care models are becoming increasingly vital in modern postoperative sarcoma care [48,49].

#### 3.1 Importance of Nurse Led Care

Nurse-led care plays a pivotal role in enhancing the postoperative period for sarcoma patients, offering numerous benefits that significantly improve patient outcomes and quality of life. Research consistently demonstrates that nurse-led interventions lead to reduced hospital stays, fewer complications such as nausea, vomiting, and pain, and even decreased

mortality rates. By addressing both physical and psychosocial needs, nurses are able to provide comprehensive care that improves emotional well-being, reduces distress, and leads to a better overall quality of life for patients. In particular, patients report higher satisfaction with nurse-led care due to the personalized attention they receive, the holistic approach to care, and improved communication between the healthcare team and the patient [50].

Nurses are also experts in symptom management, effectively handling post-surgical symptoms like pain, fatigue, and side effects from treatments. Nurse-led care goes beyond the physical aspects, focusing on the emotional, social, and informational needs of patients. This comprehensive approach often contrasts with traditional physician-led models that prioritize recurrence detection. Additionally, nurse-led interventions have been shown to facilitate early discharge programs without compromising patient outcomes or satisfaction, which can also lead to cost reductions in healthcare settings [50,51].

Nurses are central to improving care coordination, ensuring continuity between hospital and home settings, and empowering patients through education and self-management. Various nurse-led care models are employed in the postoperative setting, including specialized nurse-led clinics, nurse-led follow-up programs, and nurse navigation programs. These models offer ongoing support, symptom management, and facilitate safe discharge processes, whether through in-person or virtual means [52]. Ultimately, nurse-led care in the postoperative setting offers a patient-centered approach that not only improves outcomes but also enhances the patient's quality of life while optimizing healthcare resources.

### 4. Discussion

This review illustrates the essential role nurses play in promoting physical recovery, managing pain, supporting emotional well-being, and coordinating long-term rehabilitation. Targeted nursing interventions significantly improve patient outcomes.

#### 4.1 Clinical Implications of Nursing Roles

Nurses are central to the delivery of postoperative care in extremity sarcoma patients due to the complexity of these cases, which often involve extensive surgeries, functional impairments, and long-term monitoring. This review identifies five key domains of care:

- Pain management: The integration of multimodal analgesia and nurse-led pain assessment tools is

consistently associated with better pain control and faster recovery.

- Mobility and rehabilitation: Early and structured mobilization, especially when facilitated through nurse-physiotherapy collaboration, is associated with reduced complications. Nurses play a unique motivational role, often bridging the gap between physical therapy plans and real-life patient adherence.
- Wound care: The importance of surveillance for early signs of infection is emphasized, suggesting the need for competency-based wound care training specific to oncology nurses.
- Psychosocial support: Structured psychological support, even if delivered informally by nurses, improves patient mental health, reduced hospital readmissions, and enhanced perceived quality of care. This highlights the importance of incorporating emotional intelligence and psychological first aid training into nursing education programs.
- Patient education: Discharge readiness and ongoing self-care is greatly improved when nurses provided comprehensive, individualized education.

#### 4.2 Future Directions for Research and Practice

Despite the encouraging findings, several gaps remain. These are the lack of high-quality interventional studies and randomized controlled trials (RCTs), the inconsistent reporting of nursing-specific interventions and the limited geographic diversity (low- and middle-income nations are underrepresented). To advance the quality and consistency of postoperative nursing care in extremity sarcoma patients, several strategies are recommended:

- Development of standardized nursing protocols: Institutions should create and implement evidence-based guidelines specific to this patient population, including pain management, wound care, mobility goals, and psychosocial support.
- Investment in nurse-led research: More interventional studies, particularly nurse-led RCTs, are needed to test the effectiveness of specific nursing practices.
- Enhanced training and education: Oncology-specific continuing education programs for nurses should include modules on sarcoma-specific surgical care, emotional trauma, and long-term rehabilitation strategies.
- Integration of telehealth follow-up: Nursing follow-up using digital tools can support patients beyond

the inpatient setting, offering education, triage, and emotional support during home recovery.

- Global equity initiatives: Partnerships should be established to examine and improve postoperative nursing care in lower-resource settings, ensuring that best practices are adapted and shared globally.

### 5. Conclusion

This review highlights the critical role of nursing care in the postoperative recovery of patients with extremity sarcomas. Across pain management, mobility support, wound care, psychosocial well-being, and patient education, nurses serve as both frontline responders and long-term advocates for patient recovery. When nurses are empowered with structured protocols, supported through interdisciplinary collaboration, and engaged in continuous education, patient outcomes improve significantly in both clinical and psychosocial domains.

Moving forward, there is a pressing need to establish standardized, evidence-based postoperative care pathways specifically tailored to extremity sarcoma patients, and to formally recognize the role of nurses within those pathways. Further investment in nursing education, research, and leadership within sarcoma care is essential to advance the field. Innovative models such as tele-nursing, nurse-led rehabilitation programs, and integrated mental health support should be explored and rigorously evaluated. By doing so, healthcare systems can optimize recovery, reduce complications, and improve the overall quality of life for this unique and vulnerable patient population.

In conclusion, nursing care is not only essential but transformative in the postoperative management of extremity sarcoma patients. Emphasizing nurse-led initiatives and expanding the evidence base will be key to meeting the complex needs of this population and ensuring equitable, high-quality care across settings.

Conflicts of Interest: None

Funding: None

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