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PRINCIPLES OF SURGICAL TREATMENT OF SOFT TISSUE SARCOMAS

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Soft tissue sarcomas are rare malignant tumors of mesenchymal origin that differ substantially in histological structure, anatomical localization, biological behavior, and response to treatment. This review summarizes contemporary evidence on the diagnostic and surgical management of soft tissue sarcomas using publications from 2022 to 2026 and current clinical recommendations. The analysis confirms that effective management depends on early referral to specialized centers, high-quality imaging, planned biopsy, multidisciplinary decision-making, and complete tumor resection with histologically negative margins. Modern magnetic resonance imaging, computed tomography, positron emission tomography combined with computed tomography, and image-guided biopsy improve staging, grading, and surgical planning. Limb-preserving surgery is now the preferred approach for most extremity tumors, while amputation is reserved for selected situations in which oncological safety or function cannot be achieved. Individualized postoperative surveillance remains essential for early detection of recurrence and metastasis.

Key words: sarcoma, soft tissues, surgical oncology, magnetic resonance imaging, biopsy, resection margins, recurrence.

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ПРИНЦИПИ ХІРУРГІЧНОГО ЛІКУВАННЯ САРКОМ М'ЯКИХ ТКАНИН

Саркома м'яких тканин – це рідкісна злоякісна пухлина мезенхімального походження, яка значно відрізняється за гістологічною будовою, анатомічною локалізацією, біологічною поведінкою та реакцією на лікування. У огляді узагальнено сучасні дані щодо діагностики та хірургічного лікування сарком м'яких тканин з урахуванням публікацій 2022–2026 років та актуальних клінічних рекомендацій. Аналіз показує, що ефективне ведення пацієнтів залежить від раннього направлення до спеціалізованого центру, якісної візуалізації, планової біопсії, мультидисциплінарного прийняття рішень та повного видалення пухлини з гістологічно негативними краями резекції. Магнітно-резонансна томографія, комп'ютерна томографія, позитронно-емісійна томографія у поєднанні з комп'ютерною томографією та біопсія під візуальним контролем покращують стадіювання, оцінку ступеня злоякісності та планування операції. Органозберігаючі втручання є пріоритетним підходом при більшості пухлин кінцівок, тоді як ампутація застосовується в окремих випадках. Індивідуалізоване післяопераційне спостереження необхідне для своєчасного виявлення рецидивів і метастазів.

Ключові слова: саркома, м'які тканини, хірургічна онкологія, магнітно-резонансна томографія, біопсія, краї резекції, рецидив.

Soft tissue sarcomas (STS) represent a heterogeneous group of malignant tumors arising from mesenchymal tissues. They include numerous histological subtypes that differ in anatomical distribution, biological behavior, tendency for local invasion, risk of distant metastasis, and sensitivity to systemic or local treatment. Although the overall incidence is low compared with epithelial malignancies, STS remain clinically important because delayed diagnosis, unplanned excision, and inadequate staging can compromise both survival and limb function [2, 8, 12].

The rarity and heterogeneity of STS explain why management requires a specialized multidisciplinary approach. Diagnostic evaluation, histological verification, radiological staging, surgical planning, radiotherapy, systemic therapy, reconstruction, rehabilitation, and long-term surveillance are interdependent components of care. Current guidelines emphasize that suspicious soft tissue masses should be evaluated in specialized centers before excision, especially when the lesion is deep, enlarging, painful, larger than five centimeters, recurrent, or has atypical imaging features [14, 24, 29].

Surgical resection remains the cornerstone of treatment for localized disease. The main oncological objective is complete removal of the tumor with histologically negative margins, while the functional objective is preservation of the limb or affected anatomical region whenever this can be achieved without compromising local control. Radiotherapy is used to reduce the risk of local recurrence in selected high-risk patients, and chemotherapy or targeted therapy is considered according to histological subtype, stage, resectability, and general condition [8, 12, 18].

In recent years, important progress has been achieved in imaging, biopsy techniques, margin assessment, radiomics, artificial intelligence, reconstructive surgery, and individualized follow-up. These developments have not eliminated the central role of surgery but have refined the preoperative and postoperative decision-making process. The present review updates the article according to the revised reference list and excludes statements based on sources that are not included in the current bibliography.

The purpose of the study was to analyze current evidence on the principles of surgical treatment of

soft tissue sarcomas, with emphasis on preoperative evaluation, biopsy, imaging, radiotherapy and chemotherapy in the perioperative setting, margin assessment, limb-preserving surgery, amputation, reconstruction, postoperative surveillance, recurrence, and metastatic disease.

Materials and methods. A literature review was performed using publications included in the updated reference list. The search focused on soft tissue sarcoma diagnosis, preoperative imaging, biopsy, surgical management, margin assessment, limb-sparing surgery, recurrence, metastasis, liposarcoma, myxoid tumors, radiomics, artificial intelligence, and postoperative functional outcomes. The last search was performed on 20 June 2026. The inclusion period was 2022–2026; older publications were excluded unless they were necessary for historical context, but they were not retained in the final reference list.

Database 1: PubMed. Search query: ("soft tissue sarcoma" [Title/Abstract] OR "soft-tissue sarcoma" [Title/Abstract] OR liposarcoma [Title/Abstract]) AND (surgery [Title/Abstract] OR resection [Title/Abstract] OR biopsy [Title/Abstract] OR imaging [Title/Abstract] OR MRI [Title/Abstract] OR recurrence [Title/Abstract] OR metastasis [Title/Abstract]) AND ("2022/01/01"[Date - Publication] : "2026/12/31" [Date - Publication]).

Database 2: Scopus. Search query: TITLE-ABS-KEY("soft tissue sarcoma" OR "soft-tissue sarcoma" OR liposarcoma) AND TITLE-ABS-KEY(surgery OR resection OR biopsy OR imaging OR MRI OR recurrence OR metastasis) AND PUBYEAR > 2021 AND PUBYEAR < 2027.

Database 3: Web of Science. Search query: TS=("soft tissue sarcoma" OR "soft-tissue sarcoma" OR liposarcoma) AND TS=(surgery OR resection OR biopsy OR imaging OR MRI OR recurrence OR metastasis) AND PY=(2022–2026).

After screening and removal of duplicates, 34 sources were included in the final review. The selection process is summarized in Fig. 1.

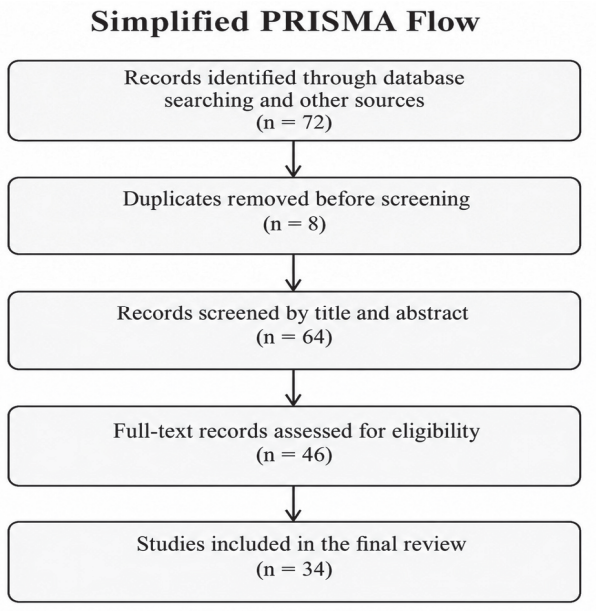

Fig. 1. Simplified PRISMA flow diagram.

The inclusion criteria were: articles published from 2022 to 2026; full-text publications in English; clinical guidelines, reviews, systematic reviews, cohort studies, diagnostic studies, case reports with relevant surgical or diagnostic information, and studies addressing perioperative management of soft tissue sarcoma; publications directly relevant to adult or pediatric soft tissue sarcoma, lipomatous tumors, biopsy, imaging, recurrence, metastasis, or functional outcome. The exclusion criteria were: duplicate publications; conference abstracts without full text; articles outside the selected time interval; studies not focused on soft tissue sarcoma; publications without sufficient relevance to diagnosis, treatment, or postoperative care; and sources whose findings could not be integrated into the clinical narrative of the review.

Results of the study and their discussion. Preoperative evaluation and diagnostic strategy. Preoperative evaluation is decisive for the prognosis of STS because the first intervention often determines the quality of local control. Inadequate imaging, excision without biopsy, and violation of oncological principles may increase the risk of residual disease, complicated re-resection, local recurrence, and functional impairment. Therefore, a suspicious soft tissue mass should not be treated as a benign lesion until appropriate imaging and tissue diagnosis have been completed [23, 29, 32].

The initial clinical assessment should determine tumor size, depth, growth rate, pain, relation to fascia, previous interventions, neurovascular symptoms, and functional limitation. Superficial and small lesions may still be malignant, and recent discussions on superficial soft tissue tumors indicate that traditional size-based thresholds may not be sufficient to exclude malignancy in all cases [29]. Therefore, the diagnostic algorithm should combine clinical suspicion with imaging findings rather than relying on a single criterion.

Magnetic resonance imaging is the preferred modality for local assessment of most extremity and trunk lesions because it provides high soft tissue contrast, multiplanar visualization, and accurate assessment of tumor relationship to muscle compartments, fascia, bone, joints, vessels, and nerves. Morphological magnetic resonance imaging features may support differentiation between low-grade and high-grade tumors, while baseline measurements can be used for staging, surgical planning, and later response assessment [4, 7, 31].

Computed tomography is particularly important in retroperitoneal, visceral, and intrathoracic disease, and it is also used when magnetic resonance imaging is contraindicated. Contrast-enhanced computed tomography helps determine tumor extent, relationship to organs and vessels, and feasibility of complete resection. In retroperitoneal sarcoma, preoperative computed tomography-guided biopsy is an important diagnostic tool and can support histological confirmation before treatment planning [1, 14, 34].

Adipocytic tumors require careful diagnostic evaluation because benign lipoma, atypical lipomatous tumor, well-differentiated liposarcoma, dedifferentiated liposarcoma, and myxoid liposarcoma may have

overlapping clinical features. [15, 21, 22]. Consensus recommendations and imaging-pathology correlation studies emphasize the importance of tumor size, deep location, thick septa, nodular non-fatty components, enhancement pattern, and histological verification when malignancy is suspected [27, 30, 34].

Radiomics and artificial intelligence are emerging adjunctive tools in the diagnostic work-up of soft tissue tumors. Radiomics may improve differentiation between lipoma and liposarcoma and between benign and malignant myxoid soft tissue tumors, while artificial intelligence systems based on contrast-enhanced magnetic resonance imaging have shown potential for distinguishing malignant from benign lesions. These approaches remain complementary and should not replace multidisciplinary interpretation by radiologists, pathologists, and sarcoma surgeons [16, 20, 31].

Staging should be adapted to histological subtype and anatomical localization. Chest imaging is required because the lungs are the most frequent site of distant spread. Positron emission tomography combined with computed tomography may be used as an adjunctive method for selected cases, especially when assessment of treatment response, nodal disease, bone metastases, or occult distant lesions may change management [5, 14, 25]. Brain metastases are rare but may occur in selected sarcoma subtypes, and their assessment should be individualized according to clinical presentation and histology [17].

Biopsy and histological verification. Biopsy is a key stage of preoperative management. Its purpose is to establish histological diagnosis, determine tumor grade, when possible, guide the need for neoadjuvant therapy, and prevent inappropriate excision. Biopsy should be planned after imaging and performed along a trajectory that can be removed during definitive surgery. Poorly planned biopsy may contaminate compartments and complicate later resection [23, 32, 33].

Core needle biopsy is currently preferred for most soft tissue tumors because it provides adequate tissue with lower morbidity than open incisional biopsy. Image guidance increases accuracy by targeting viable solid tumor areas and avoiding necrotic, hemorrhagic, or cystic regions. Multiple cores are usually needed because sarcomas are heterogeneous, and sampling error may lead to underestimation of grade or incorrect subtype classification [19, 33].

Ultrasound-guided core needle biopsy is valuable for superficial and accessible lesions, while computed tomography guidance is used for deep, pelvic, retroperitoneal, or visceral masses. Diagnostic failures may result from inadequate sampling, small tissue volume, tumor heterogeneity, necrosis, hemorrhage, or technical limitations. Close communication between radiologist, pathologist, and surgeon is therefore essential [1, 33].

The histological report should include tumor subtype, grade, mitotic activity, necrosis, and immunohistochemical or molecular findings when indicated. The Fédération Nationale des Centres de Lutte Contre le Cancer grading system remains clinically relevant because grade is associated with metastatic risk, local recurrence, and treatment selection. Recent studies also examine the relationship between multiparametric magnetic resonance imaging, grade, and proliferation markers such as Ki-67, supporting the integration of radiological and pathological information [9, 31].

Perioperative radiotherapy and chemotherapy. Radiotherapy is an important component of local treatment for selected patients with STS, particularly for high-grade, deep, large, recurrent, or margin-threatened tumors of the extremities and trunk. Its principal role is to improve local control. The decision to use radiotherapy must be individualized according to tumor size, grade, anatomical site, histological subtype, expected margins, wound-healing risk, and reconstructive plan [14, 18, 28].

Preoperative radiotherapy may reduce the required radiation field and dose and may improve surgical planning by defining the tumor bed before resection. However, it is associated with a higher risk of acute wound complications, especially in large tumors of the lower extremity. Postoperative radiotherapy is usually considered when final pathology reveals close or positive margins or other adverse factors, but it may increase the risk of fibrosis, edema, stiffness, fracture, and long-term functional impairment [12, 18, 24].

Chemotherapy has a more selective role than surgery and radiotherapy. It is considered in metastatic disease, unresectable tumors, high-risk localized disease, and histological subtypes known to be more chemosensitive. The choice of regimen depends on subtype, stage, previous treatment, performance status, and expected toxicity. Doxorubicin-based therapy remains an important systemic option, while newer agents and targeted approaches may be used in selected settings [8, 26].

Transarterial chemoembolization, isolated limb perfusion, infusion techniques, targeted therapy, and other regional or systemic approaches may be considered in selected recurrent, unresectable, or metastatic cases. Evidence remains heterogeneous, and these methods should be applied only after multidisciplinary discussion in centers with relevant expertise [6, 28].

Surgical treatment and resection margins. Wide surgical resection is the standard treatment for localized STS when the tumor is resectable. The operation should aim to remove the tumor en bloc with the biopsy tract and a cuff of healthy tissue or a reliable anatomical barrier. The three main objectives are long-term survival, prevention of local recurrence, and preservation of function with minimal postoperative morbidity [10, 14].

The concept of a negative margin is not limited to a fixed distance in millimeters. Margin adequacy depends on histological subtype, tumor biology, presence of a capsule or infiltrative growth, anatomical barriers such as fascia or periosteum, proximity to nerves and vessels, and the use of radiotherapy. International guidelines recommend reporting the measured distance between tumor and margin because

a simple positive-negative classification may not fully reflect recurrence risk [12, 24].

Infiltrative subtypes, including myxofibrosarcoma and some dermatofibrosarcoma-like patterns, may spread microscopically along fascial planes and subcutaneous tissues. In these tumors, a macroscopically clear margin may still be inadequate, and magnetic resonance imaging findings such as peritumoral enhancement or a tail-like extension should influence the planned resection field [4, 7].

For retroperitoneal and visceral sarcomas, complete macroscopic resection is often technically difficult because tumors may surround or displace major vessels and organs. In selected cases, multivisceral resection is required to achieve oncological clearance. Case-based literature on giant retroperitoneal dedifferentiated liposarcoma illustrates the complexity of surgical exposure, organ preservation, reconstruction, and postoperative management in such tumors [1, 34].

The final pathology report should document tumor size, grade, subtype, necrosis, treatment effect after neoadjuvant therapy, lymphovascular invasion if present, and margin status. When margins are positive or unexpectedly close, management should be discussed by a multidisciplinary team. Options include re-resection, postoperative radiotherapy, systemic therapy, or close observation in selected cases where additional surgery would cause disproportionate morbidity [24, 28].

Limb-sparing surgery and amputation. Limb-sparing surgery has replaced amputation as the preferred approach for most extremity STS. This change reflects improvements in imaging, radiotherapy, vascular surgery, plastic reconstruction, anesthesia, rehabilitation, and multidisciplinary planning. The goal is to maintain limb function without compromising oncological control [3, 10, 18].

The feasibility of limb preservation depends on whether complete resection can be achieved while maintaining a useful extremity. Tumor contact with major vessels, nerves, bone, or joint does not automatically require amputation, but it demands careful planning. Vascular reconstruction, nerve preservation, nerve grafting, tendon transfer, bone stabilization, and flap coverage may allow limb preservation in cases that previously would have required radical surgery [10, 12].

Amputation remains appropriate in a limited group of patients. The main indications include inability to achieve negative margins without leaving a nonfunctional limb, extensive multicompartmental involvement, major neurovascular invasion with unacceptable functional loss, uncontrolled infection or ischemia after previous surgery, repeated unresectable recurrence, and palliative symptom control. The decision should include oncological, functional, psychological, and rehabilitative considerations [3, 14].

Functional outcome after amputation or limb-preserving surgery should be assessed not only by survival and recurrence but also by mobility, pain, self-care, social participation, return to work, and quality of life. The International Classification of Functioning, Disability and Health provides a useful framework for evaluating physical functioning and rehabilitation needs after sarcoma-related amputation [3].

Reconstructive and additional surgical considerations. Surgical treatment of STS often requires cooperation between oncological, orthopedic, vascular, plastic, thoracic, abdominal, and rehabilitation specialists. Reconstruction should be planned before resection when skin, muscle, vessels, nerves, or bone are expected to be removed. The reconstructive strategy must not compromise oncological margins and should facilitate timely wound healing and adjuvant therapy [10, 12, 14].

When the tumor is adjacent to bone, the periosteum may serve as an anatomical barrier, but if it is invaded or cannot be safely preserved, periosteal resection may be necessary. Bone exposure and radiotherapy increase the risk of delayed healing and fracture. Therefore, the need for bone protection, fixation, or flap coverage should be considered during planning [18].

Major nerve preservation is desirable when it does not compromise tumor clearance. Epineural dissection may be acceptable when the tumor abuts but does not invade the nerve. Complete nerve resection is reserved for direct invasion or situations in which preservation would leave positive margins. Functional consequences differ according to the nerve involved, and preoperative counseling is essential. Major vessel resection may be necessary to obtain adequate margins. Arterial reconstruction is usually required to prevent limb ischemia, whereas venous reconstruction is individualized. Autologous or synthetic grafts can be used depending on anatomy, infection risk, radiotherapy plan, and available conduit. Vascular reconstruction increases operative complexity but may allow limb preservation in selected patients [10, 12, 14].

Soft tissue defect closure is a critical determinant of complications. Rotational and free flaps provide vascularized tissue, protect exposed bone or vessels, and may reduce wound complications compared with closure under tension. The orthoplastic approach is especially important when preoperative radiotherapy has been used or when postoperative radiotherapy is planned [10, 18].

Postoperative surveillance. Postoperative surveillance aims to detect local recurrence, distant metastasis, new primary tumors, and treatment-related complications. Because STS are heterogeneous, follow-up should be individualized according to tumor grade, size, depth, subtype, resection margins, anatomical site, and previous treatment [24, 28].

Intermediate- and high-grade tumors require more intensive surveillance during the first years after treatment because most recurrences occur early. Low-grade tumors may recur later and therefore require long-term follow-up. Clinical examination should assess the surgical site, limb function, pain, edema, neurological symptoms, and complications related to radiotherapy, chemotherapy, or reconstruction. Local

imaging is usually performed with magnetic resonance imaging when the primary tumor was in the extremity, trunk, or pelvis. Ultrasonography may be useful for selected superficial sites and high-risk short-term follow-up. Chest radiography or computed tomography is used for pulmonary surveillance, with computed tomography preferred in high-risk tumors or when symptoms or equivocal findings are present [14, 28].

Postoperative rehabilitation is part of surveillance because functional decline may be caused by surgery, radiotherapy, nerve injury, vascular reconstruction, pain, fibrosis, or amputation. Monitoring should include physical function, participation, psychological adaptation, and need for assistive devices or further reconstructive procedures [3]. The key principles of postoperative surveillance were concluded in Table 1.

Table 1

Risk-adapted postoperative surveillance principles

Risk group	Surveillance focus	Typical investigations
Low-grade tumors	Late local recurrence and functional complications	Clinical examination, local imaging when indicated, chest imaging according to risk.
Intermediate- and high-grade tumors	Early local recurrence and pulmonary metastases	Clinical examination, local magnetic resonance imaging, and chest computed tomography or radiography at shorter intervals.
Recurrent disease	Further recurrence, metastatic spread, and treatment morbidity	Individualized imaging, biopsy when diagnosis is uncertain, multidisciplinary reassessment.
After amputation or major reconstruction	Function, pain, rehabilitation, prosthesis use, wound and vascular status	Functional assessment, rehabilitation review, local evaluation, and imaging according to oncological risk.

Unplanned excision and residual disease. Unplanned excision is the removal of a malignant soft tissue tumor without appropriate imaging, biopsy, staging, and oncological planning. It is often performed when a superficial or small lesion is assumed to be benign. Such procedures can contaminate tissue planes, obscure anatomical landmarks, leave residual tumor, and increase the need for wider re-resection or complex reconstruction [23, 29, 32].

Management after unplanned excision should begin with review of the operative report, pathology, imaging of the surgical bed, staging for metastasis, and multidisciplinary discussion. Re-excision of the tumor bed is commonly recommended when residual disease cannot be excluded, especially in high-grade lesions or when margins were positive or not assessable [23, 28].

The extent of re-excision should include the previous scar, biopsy or surgical tract, and potentially contaminated tissues. Reconstruction may be required more frequently than after planned surgery because the previous operation can disrupt normal tissue planes and increase defect size. Radiotherapy may be considered according to margin status, grade, recurrence risk, and reconstructive feasibility [32].

Local recurrence and distant metastases. Local recurrence remains one of the most difficult clinical situations in STS. The risk is higher after positive margins, unplanned excision, high-grade tumors, large tumors, infiltrative subtypes, and inadequate local therapy. Recurrent disease should be restaged and reassessed for resectability, because previous surgery and radiotherapy may limit further treatment options [11, 12].

When local recurrence is resectable, wide repeat excision is the principal treatment. The operation should be planned with current magnetic resonance imaging and, when appropriate, biopsy confirmation. Radiotherapy, systemic therapy, regional therapy, or reconstructive procedures may be added according to previous treatment, anatomical constraints, and patient condition. Unresectable local recurrence requires individualized management. Options include systemic therapy, radiotherapy when feasible, regional limb-based therapies, embolization techniques in selected cases, palliative surgery, pain management, and supportive care. The therapeutic objective may shift from cure to durable local control, symptom relief, preservation of function, or prevention of complications [6, 11, 14].

Distant metastasis occurs most commonly in the lungs, although extrapulmonary metastases may occur in selected subtypes such as myxoid liposarcoma. Musculoskeletal, visceral, lymph node, and brain metastases are less frequent but clinically relevant when symptoms or subtype-specific risks are present. Selected patients with oligometastatic disease may benefit from local treatment of metastases, including metastasectomy, stereotactic radiotherapy, or ablative procedures. Favorable factors include limited number of metastases, complete resectability, controlled primary tumor, long disease-free interval, and good performance status. Disseminated or rapidly progressive metastatic disease is generally treated with systemic therapy and supportive care [13, 17, 25].

Special considerations in lipomatous and myxoid tumors. Lipomatous tumors constitute a broad diagnostic spectrum from benign lipoma to aggressive dedifferentiated liposarcoma. Imaging-pathology correlation is essential because clinical appearance alone may be misleading [15, 21, 22]. Deep location, large size, thick septations, nodular non-adipose components, and enhancement increase suspicion and should prompt specialist evaluation [27, 34].

Myxoid liposarcoma has distinctive biological and radiological features. It may arise in the extremities, including, less common locations such as the popliteal fossa, and may show extrapulmonary metastatic patterns. Magnetic resonance imaging is central for local staging, while abdominal, pelvic, and

sometimes whole-body assessment may be considered according to clinical context [20, 30].

Dedifferentiated liposarcoma, particularly in the retroperitoneum, often requires complex surgical planning because of tumor size, proximity to organs, and risk of recurrence. Complete resection remains the main curative option, but the balance between radicality and morbidity is especially challenging [1, 34].

The main factors of treatment effectiveness are presented in Table 2.

Table 2

Main components of perioperative management of soft tissue sarcoma

Component	Main objective	Practical implication
Imaging	Define local extent and stage disease	Magnetic resonance imaging for most extremity and trunk lesions; computed tomography for retroperitoneal or visceral tumors.
Biopsy	Establish histology before definitive treatment	Image-guided core needle biopsy after imaging; biopsy tract planned for later excision.
Multidisciplinary planning	Integrate diagnosis, surgery, radiotherapy, systemic therapy, and reconstruction	Treatment decisions should be made in a specialized sarcoma team.
Surgery	Remove tumor with adequate margins while preserving function	En bloc resection with attention to anatomical barriers and critical structures.
Adjuvant treatment	Reduce recurrence risk in selected patients	Radiotherapy and systemic therapy individualized according to grade, subtype, margins, and stage.

Summary of practical clinical principles. The revised literature supports several practical principles. First, suspicious soft tissue tumors should be evaluated before excision. Second, imaging must precede biopsy, and biopsy must be planned so that the tract can be removed during definitive surgery. Third, treatment should be discussed by a multidisciplinary sarcoma team. Fourth, complete resection with negative margins remains the foundation of curative therapy. Fifth, limb preservation is preferred when oncologically safe and functionally meaningful. Sixth, follow-up should be risk-adapted and prolonged because recurrence patterns vary by grade and subtype [23, 24, 32].

Conclusion

The management of soft tissue sarcomas is a complex multidisciplinary process that integrates modern imaging, biopsy, histopathological assessment, surgery, radiotherapy, systemic therapy, reconstruction, rehabilitation, and long-term surveillance. The updated literature confirms that preoperative assessment and planned treatment in specialized centers are central to improving outcomes.

Surgical resection with negative margins remains the cornerstone of treatment for localized disease. However, the definition of an adequate margin depends on tumor biology, anatomical barriers, histological subtype, planned adjuvant therapy, and functional consequences. Limb-sparing surgery is preferred for most extremity tumors, while amputation is reserved for selected cases in which oncological safety or useful function cannot be achieved.

Radiotherapy and chemotherapy have adjunctive roles and should be selected according to recurrence risk, histological subtype, tumor stage, and patient factors. Postoperative surveillance must be individualized to detect local recurrence, distant metastasis, complications, and functional impairment.

Prospects for further research include prospective multicenter studies integrating radiomics, artificial intelligence, molecular markers, standardized margin assessment, and patient-reported functional outcomes to refine individualized treatment strategies for soft tissue sarcoma.

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