# Soft Tissue Masses: Evaluation and Treatment

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**Soft tissue masses are a common presentation in family physician offices. Although most lesions, including lipomas, fibromas, and epidermal and ganglion cysts, are benign, rare lesions such as soft tissue sarcomas may have serious consequences. Masses that are deep to the fascia, are 5 cm in diameter or larger, grow rapidly, or present suddenly without explanation should prompt further workup. Imaging for concerning lesions may include ultrasonography, radiography, and sometimes magnetic resonance imaging with contrast. Ultrasonography can be used to assess size, depth, solid or cystic nature, and associated vasculature. Magnetic resonance imaging with contrast provides spatial orientation and delineation of soft tissue sarcomas from surrounding tissues such as muscles. Although less commonly used, computed tomography is an alternative in the initial evaluation of concerning masses and can assist with staging of retroperitoneal and visceral sarcomas. Incisional biopsy of a concerning soft tissue mass can also be useful for establishing a diagnosis. Lipomas and epidermal cysts may be excised if they are painful or if there is concern for malignancy. Because of the high mortality rate of soft tissue sarcomas, evaluation of high-risk masses with magnetic resonance imaging with contrast should be expedited with a referral to orthopedic oncology. (*Am Fam Physician*. 2022;105(6):602-612. Copyright © 2022 American Academy of Family Physicians.)**

**Most soft tissue masses** in adults are benign.[1,2] Because benign lipomas and epidermal cysts are less common in children, a greater percentage of these masses in children are malignant and account for nearly 20% of solid malignancies in this population.[3]

Clinical evaluation of soft tissue masses can be challenging because of nonspecific characteristics. The World Health Organization classifies most soft tissue neoplasms according to the tissue of origin. Common neoplasms include angiosarcoma, fibrosarcoma, leiomyosarcoma, liposarcoma, rhabdomyosarcoma, and synoviosarcoma.[4] Other nonneoplastic masses may include ganglion cysts, hematomas, plantar fibromas, and vascular lesions. Cross-sectional imaging with magnetic resonance imaging (MRI), computed tomography (CT), or ultrasonography may be required to differentiate benign and malignant lesions.[5] *Table 1*[1,6-42] *and Table 2*[16,23,34,35,43-52] summarize the most common benign and malignant masses, respectively.

CME This clinical content conforms to AAFP criteria for CME. See CME Quiz on page 582.

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## History and Physical Examination

Malignant masses may grow over weeks to years depending on the aggressiveness of the tumor.[5] Both benign and malignant masses can be painless, but those that present suddenly without explanation or are firm, deep, and adhere to surrounding structures are more concerning for malignancy.[5] Sarcomas do not fluctuate in size, whereas masses such as hemangiomas and ganglion cysts often do.

Based on strong evidence, lesions that are 5 cm in diameter or larger should be evaluated with advanced imaging or the patient referred because of a higher risk of malignancy.[5,52] However, smaller size does not exclude malignancy because approximately 10% of malignant soft tissue masses are smaller than 5 cm when diagnosed.[53] Because of the high mortality rate of soft tissue sarcomas and the potential to miss a small sarcoma, any mass that is not definitively diagnosed should be closely monitored or the patient referred to orthopedic oncology.[5]

Examination includes inspection of the skin and palpation of the mass to assess its depth, mobility, and adherence to deeper structures. Measurement can be difficult, but using a 4- to 5-cm golf ball as a reference can be helpful.

TABLE 1

## Common Benign Soft Tissue Masses

| Type | History | Examination | Imaging | Treatment |
|---|---|---|---|---|
| Abscess | Progressive, subcutaneous, erythematous swelling with possible drainage[6] | Erythematous mass | Ultrasonography showing focal collection vs. "cobblestoning" with cellulitis[7] | Incision and drainage with ultrasound guidance[7]<br>Consider antibiotics if recurrent or patient is immunocompromised[8-10] |
| Epidermal inclusion cyst | Nodule under the skin[11] | Arise in areas with hair follicles<br>Pain and erythema if inflamed[11]<br>Mobile subcutaneous masses<br>Hallmark feature is central punctate[1,12] | MRI: well-defined T2 hyperintense lesions, may depend on presence of internal debris; ruptured cysts have a more varied appearance[12] | For mildly inflamed epidermal inclusion cysts, incision and drainage with culture[12]<br>Can consider excision if recurrent[11] |
| Ganglion cyst | Arises from joint, ligament, or tendon injuries[13] | Most often on hands, wrists, feet, or ankles[13,14] | Ultrasonography to distinguish between cystic and solid masses, locate adjacent blood vessels, and distinguish between other diagnoses, including a ruptured Baker cyst and deep venous thrombosis | Observation if no functional impairment[15]<br>Consider aspiration, steroid injection, or surgical excision if functional impairment or recurrent[14,15] |
| Hemangiomas/ arteriovenous malformations | Capillary hemangiomas are the most common type[12,16] | Soft, compressible masses; diffuse blue or purple skin discoloration[17] | Radiography and ultrasonography may reveal lesions containing phleboliths and mixed echogenicity<br>MRI can demonstrate depth of the lesion[16] | Conservative treatment can include observation or intravascular sclerotherapy[17]<br>Surgical referral reserved for patients with symptomatic tumors[17]* |
| Hematoma | Rapid onset<br>Should have an explanation (e.g., anticoagulation, trauma) | Fluctuant mass, sometimes with overlying ecchymosis[18] | Ultrasonography and MRI can show extent of the hematoma[19] | Mainly conservative treatment; evaluate if persisting or enlarging for more than one month[20]<br>Consider embolization if progressively expanding[21] |
| Intramuscular myxoma | Rare (0.12% of soft tissue tumors)<br>Typically occurs in large skeletal muscles<br>Most common between 40 and 70 years of age; slightly more common in women | Palpable mass, most common on the thigh and lower limb girdle[22] | MRI: T1 hypointense to muscle, high signal intensity on T2-weighted or fluid-sensitive sequences | Surgical excision in most cases[22] |
| Lipoma | Most common between 40 and 70 years of age and in patients who are obese[16,23]<br>Slightly more common in men[24]<br>Some genetic syndromes cause multiple lipomas | Superficial mass that is freely mobile with a doughy consistency[24]<br>Deep masses may involve muscle and move with muscle contraction[24] | Radiographs may appear normal[24]<br>Ultrasonography: often isoechoic to adjacent subcutaneous fat[24]<br>MRI is required for any deep mass or subcutaneous lesion ≥ 5 cm[24]<br>MRI demonstrates fat signal intensity[24] | Monitoring for asymptomatic lipomas<br>Consider excision for symptomatic or painful masses, or for cosmetic reasons[24] |

*continues*

CT = computed tomography; MRI = magnetic resonance imaging.

*—A summary of American Academy of Pediatrics guidelines for infant hemangiomas published in *AFP* is available at https://www.aafp.org/afp/2019/0801/p186.html.

**TABLE 1** *(continued)*

## Common Benign Soft Tissue Masses

| Type | History | Examination | Imaging | Treatment |
|---|---|---|---|---|
| Lymphangioma: capillary, cavernous, or cystic | Appears at birth or by 2 years of age<br>Pain is uncommon unless infection is present<br>Disfigurement can be significant[25] | Seen on the neck and axilla<br>Soft on palpation<br>Respiratory compromise is the most serious complication[25] | Chest radiography may be useful in identifying mediastinal extension or pleural effusions<br>Ultrasonography: hypoechoic, multilocular cystic masses[25]<br>CT: cystic lymphangioma; thicker septations are delineated | Observation only in the absence of symptoms<br>Excision is the standard treatment<br>Recurrence can be 27% and mortality about 2%[25]<br>Intralesional sclerotherapy is first-line treatment for macrocystic lymphangiomas[26] |
| Morton neuroma (peripheral nerve sheath tumor)[27] | Sensation of a "pebble in the shoe" or burning in toes distal to the neuroma[27] | No visual clues to neuroma<br>Mulder click test (dorsiflexing the foot and squeezing the metatarsals produces a clicking sound) | Radiography to rule out other sources of foot pain<br>Ultrasonography can be used to identify a neuroma and guide injection<br>MRI: neuroma seen on T1 axial slice[28] | Wide toe box shoes<br>Cortisone injections<br>Surgical excision |
| Mucous cyst | Finger swelling, pain, tenderness, decreased range of motion<br>80% occur between 50 and 70 years of age[29]<br>Twice as likely in women than men[29]<br>Approximate prevalence: thumb 18%, second finger 26%, third finger 38%, fourth finger 9%, fifth finger 8%[29] | Nail changes<br>Translucent mass adjacent to the nail bed[30] | Dermoscopic examination has reduced need for ultrasonography and radiography[30] | Surgical excision yielded the highest cure rate (mean of 95%)<br>Second-line: sclerotherapy and cryotherapy<br>Third-line: corticosteroid injections, expression of cyst content[31] |
| Pilar cyst | 90% occur on the scalp[32]<br>Most common after 15 years of age<br>Slightly more common in women[32] | Swelling over the scalp<br>Area of alopecia<br>Well-defined, oval mass<br>Occurs in areas with dense hair follicles[32] | Imaging not usually warranted<br>Ultrasonography: internal echogenic foci with demonstrated calcification, cholesterol crystals, or both; no blood flow in the lesion[33]<br>MRI: homogeneous, isointense signal on T1-weighted images; homogeneous, hyperintense signal on T2-weighted images[32]<br>CT: well-defined, hypodense masses with occasional calcification[34] | If benign, treat with simple local excision<br>If malignant, refer for wide local excision and possible Mohs surgery[32] |
| Plantar fibroma | Mild pain that worsens after walking or standing for longer periods<br>Bilateral in 20% to 50% of cases<br>May have had trauma to the area or family history[35] | Palpable nodule or focal thickening along the plantar fascia | Ultrasonography: fusiform nodules that are hypoechoic to isoechoic without intrinsic vascularity (comb sign)[36]<br>MRI: well-defined mass, isointense to muscle on T1-weighted images; well-defined, broad base at the superficial fascia demonstrates a fascial tail from extension of the tumor along the fascial plane | Can locally recur[35]<br>Orthotics<br>Intralesional corticosteroid injection<br>Consider subtotal fasciectomy with wide excision if conservative therapies are ineffective[36] |

*continues*

CT = computed tomography; MRI = magnetic resonance imaging.

**TABLE 1** *(continued)*

**Common Benign Soft Tissue Masses**

| Type | History | Examination | Imaging | Treatment |
|---|---|---|---|---|
| Myositis ossificans | Common after trauma[37] | Painful, rock-like mass<br>Commonly affects quadriceps femoris and brachialis muscles<br>Organized calcification within the muscle[38] | MRI: classic hyperintense mass, calcifications may appear on T2-weighted images<br>Radiography or CT: early detection with typical peripheral zonal ossification[37] | Self-limiting with prolonged resolution common<br>Consider referral for debilitating cases |
| Schwannoma in the foot | Swelling along the flexor surface<br>Most common between 30 and 40 years of age<br>Men and women affected equally[39]<br>Account for 5% of benign soft tissue tumors[40]<br>May present similarly to Morton neuroma | Clinical presentation depends on tumor size and location[41]<br>Motor or sensory disturbances along the flexor surface | Radiograph findings are often negative<br>MRI shows lesions along a neurovascular bundle; a nerve may enter or exit a mass | Small asymptomatic tumors may be followed clinically<br>If symptomatic, patient should be referred for biopsy with histologic examination and surgical excision[41] |
| Tenosynovial giant cell tumor | Swelling most often in hands or feet<br>Common between 30 and 50 years of age<br>Slightly more common in women<br>Second finger is most often affected[42] | Rounded or lobulated mass appears to encase the surface of a tendon | Radiography: bony erosions<br>Ultrasonography: small tumor with blood flow that does not attach to tendon<br>MRI: lesion has low signal compared with muscle on T1-weighted images; hemosiderin deposition on T2-weighted images[41] | Surgical resection<br>Recurrence rate as high as 15%[40] |

CT = computed tomography; MRI = magnetic resonance imaging.

*Information from references 1 and 6-42.*

Familiarity with the specific features that can differentiate soft tissue masses can be useful for diagnosis and avoiding unnecessary treatment. When the diagnosis is uncertain, family physicians should refer patients to a multidisciplinary treatment center. *Table 3* lists coding resources for the use of point-of-care ultrasonography and other skin procedures in the evaluation of soft tissue masses. *Figure 1* is an algorithm for the evaluation of soft tissue masses.

## Imaging Studies

### ULTRASONOGRAPHY

A detailed ultrasound examination of soft tissue masses often uses a high-resolution (9 to 17 MHz) linear transducer. Ultrasonography can assist in evaluating tumor characteristics such as size, margins, vascularity, cystic nature, and encroachment into surrounding tissues.[2,54] Advantages of using traditional or point-of-care ultrasonography include low cost, no radiation exposure, and the ability to evaluate compressibility and assess real-time blood flow. Point-of-care ultrasonography can be used for follow-up in the clinic to evaluate changes.

### RADIOGRAPHY

The accuracy of plain radiography for diagnosing soft tissue tumors is limited. Radiography should be considered before advanced imaging to evaluate for bony involvement and intratumoral calcifications in osteogenic or synoviosarcomas.[55]

### MAGNETIC RESONANCE IMAGING

MRI is the most accurate modality for diagnosing soft tissue masses because it can provide further information regarding adjacent anatomic structures, presence of necrosis, border definition, signal intensity, and penetration of fascial planes.[2,35] Although an initial MRI scan can be performed without contrast, noting any concern for malignancy in the description of the imaging order helps the radiologist to select the most appropriate modality.[24]

### COMPUTED TOMOGRAPHY

Although less commonly used, CT can help identify lesion density, bony reactive changes, calcifications, and vascular involvement.[56] CT is especially helpful when a patient has a medical device that is incompatible with MRI, large body

TABLE 2

## Common Malignant Soft Tissue Masses

| Type | History | Examination | Imaging | Treatment |
|---|---|---|---|---|
| Dermatofibrosarcoma protuberans | Median age of presentation is 20 to 59 years<br>Equally common in men and women[43]<br>Lesion is slow-growing and present for years<br>Account for 1% of all soft tissue sarcomas | Pink plaque[44]<br>Approximate prevalence of nodules: trunk 50% to 60%, upper limbs 25%, head and neck 10% to 15%[44]<br>Untreated lesions may ulcerate or bleed | Ultrasonography shows tentacle-like projections, hypervascularity[45]<br>MRI or CT is useful for recurrent disease or large and atypical primary lesions[45] | Referral to orthopedic oncology for core needle biopsy and excision<br>Wide excision with negative margins<br>Mohs surgery for lesions that have wide margins or for cosmetic reasons[43,44] |
| Leiomyosarcoma[46,47] | Patients may report abdominal or back pain<br>More common in adults older than 55 years<br>In younger age groups, leiomyosarcoma is more common than liposarcoma | Enlarging mass on the limbs but can also occur on the head, neck, and retroperitoneum<br>Palpable abdominal mass or symptoms of bowel obstruction[46] | CT with contrast shows heterogeneous mass<br>MRI can be used for patients with contrast allergies or for further investigation of muscle or bone involvement if equivocal on CT | Referral to orthopedic oncology for core needle biopsy and surgery[46] |
| Liposarcoma | Accounts for about 17% of all soft tissue sarcomas[48]<br>Painless, rapidly enlarging soft tissue mass<br>Most common between 50 and 60 years of age<br>Equally common in men and women[49]<br>Rare in children; in young children, more likely to be lipoblastoma[50] | Fullness or asymmetry, mobile unless attached to bone, nontender<br>Lymph node examination is required | Radiography shows fat-attenuation or soft-tissue masses; calcifications or ossification in 10% to 32% of cases[23]<br>MRI findings can vary significantly depending on subtype and grade[50,51]<br>Large tumor size with thick septa and nodular or patchy nonadipose components are indicative of well-differentiated liposacromas[51] | Referral to orthopedic oncology for core needle biopsy and resection |
| Rhabdomyosarcoma | Painful cervical mass<br>Commonly seen in children younger than 10 years<br>Rare in adults[52] | Approximate prevalence: head and neck region near orbit 40%, urinary or reproductive organs 30%, extremities 15%, other locations 15%[47] | Ultrasonography is the first-line imaging study for investigating soft tissue masses in children[34]<br>Imaging findings vary depending on location | Referral to orthopedic oncology |
| Synoviosarcoma | Slow growing<br>Most common in adults 30 to 40 years of age[16,47] | Mass size typically between 3 cm and 10 cm<br>May be painful | Radiography shows calcification in 33% of cases[35]<br>Ultrasonography: heterogeneous mass with areas of necrosis and eccentric calcifications with variable vascularity[47]<br>MRI: well-demarcated mass, isointense to muscle on T1-weighted images[47]<br>Extrinsic bone erosion in 11% to 20% of cases | Diagnosis can be delayed because of slow growth<br>Referral to orthopedic oncology for core needle biopsy and resection |

CT = computed tomography; MRI = magnetic resonance imaging.

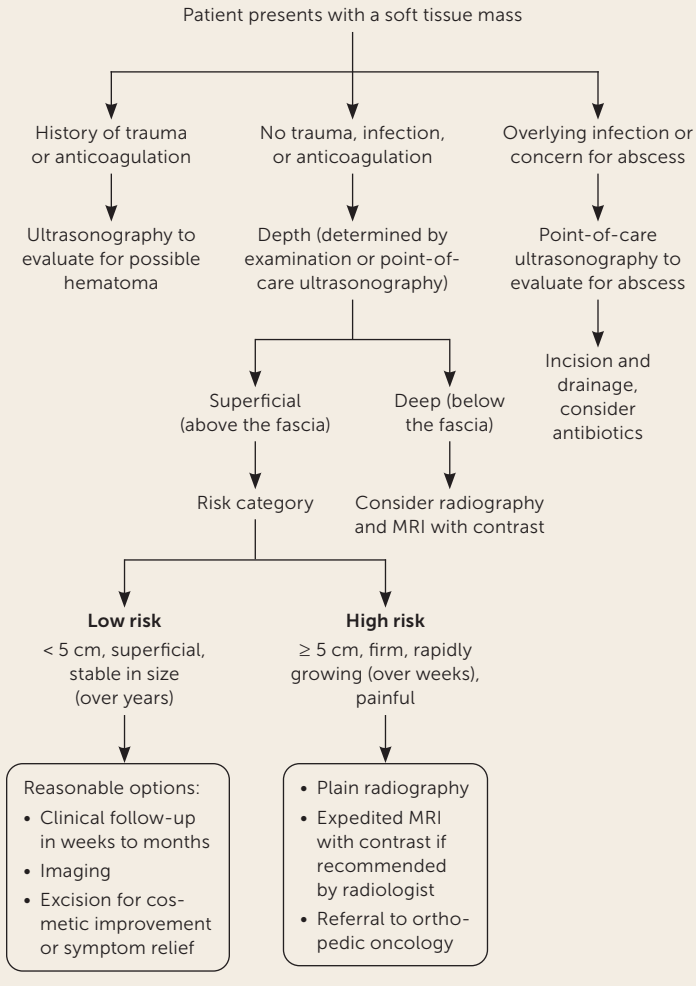
*Information from references 16, 23, 34, 35, and 43-52.*

TABLE 3

**Common Procedures in the Evaluation of Soft Tissue Masses: Coding Resources**

| |
|---|
| Biopsy<br>https://www.aafp.org/fpm/2019/0300/p15.html |
| Ganglion cyst aspiration<br>https://www.aafp.org/afp/2003/0215/p745.html |
| Point-of-care ultrasonography<br>https://www.aafp.org/fpm/2020/1100/p33.html |

FIGURE 1




MRI = magnetic resonance imaging.

**Algorithm for evaluation of a soft tissue mass.**

habitus, deep retroperitoneal mass, or a high-risk metallic foreign body.[56,57]

## Biopsy

If there is a concern for malignancy, biopsy should be performed by the orthopedic oncologist who would manage the potential diagnosis and possible seeding of the biopsy site.[5,24] The location of the biopsy and possible local spread of the malignancy can affect management.[5] If there is confidence in the diagnosis, benign masses such as epidermal inclusion cysts and lipomas can be removed en bloc by the family physician.[58,59] Tissue from a removed mass should be sent to pathology to confirm the diagnosis. If the diagnosis is in question, imaging should be considered before a procedure.

## Laboratory Studies

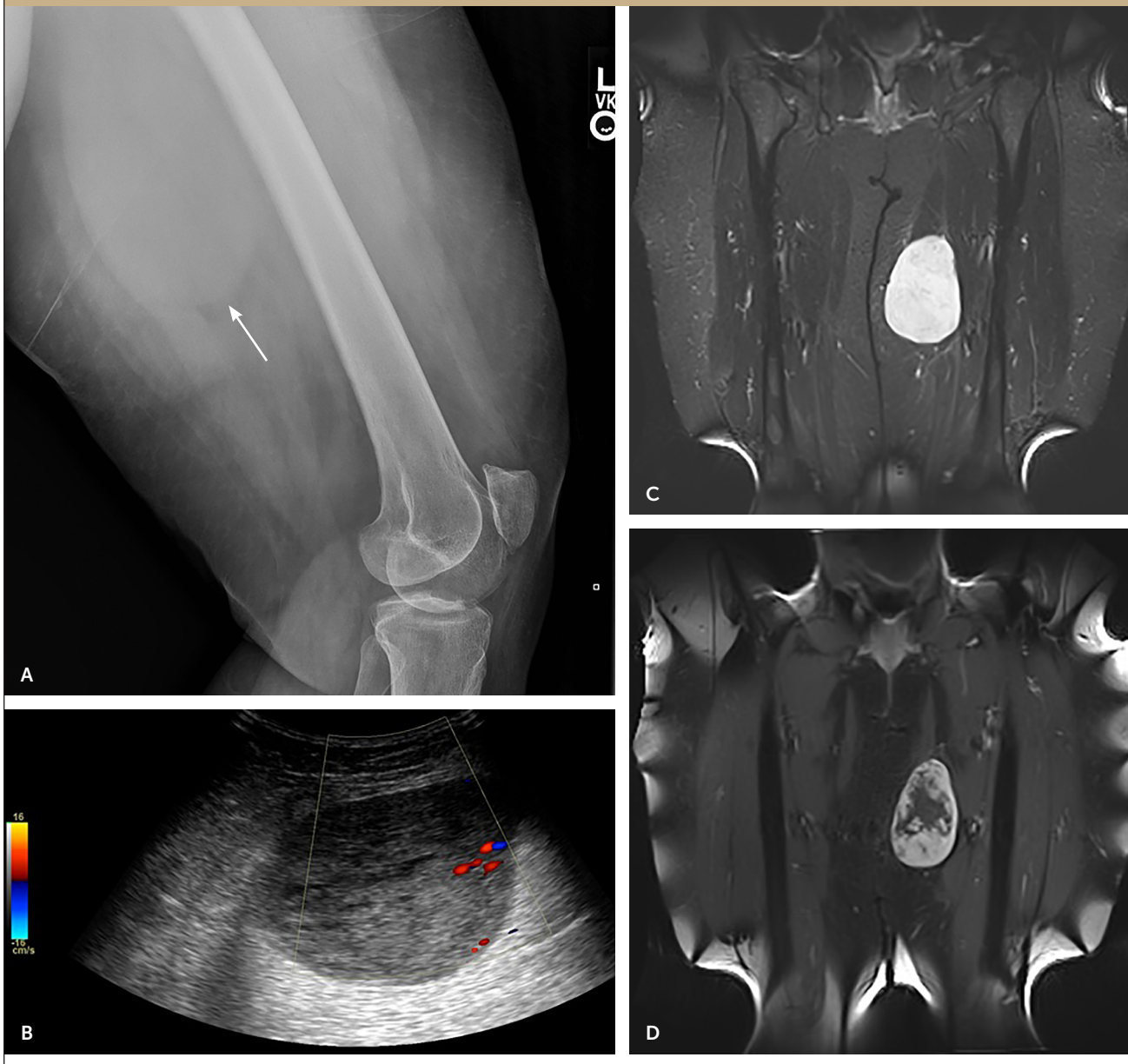
Although a tissue biopsy may establish a diagnosis, there are no recommended laboratory studies to evaluate a soft tissue mass.[56]

## Sarcomas

Soft tissue sarcomas are a broad and heterogenous group of tumors that are most common in adults older than 55 years, although they can occur at any age.[60] Malignancy in children is rare; however, sarcomas represent up to 15% of childhood malignancies, 60% of which occur in the extremities.[61] Family physicians should be vigilant because patients with sarcomas have a high mortality rate and often do not seek care right away. Nearly one-half of patients diagnosed with sarcomas wait at least one month from recognition of the mass to see a health care professional.[61]

Most soft tissue sarcomas begin as a gradually enlarging painless mass without constitutional symptoms such as fever or weight loss. Paresthesia can be present if the mass causes nerve compression. A soft tissue sarcoma should be considered if an apparent hematoma lasts more than one month.[19,20] Although survival has markedly improved, the overall five-year survival rate is only about 60%.[61,62] Signs that suggest malignancy include tumor size of 5 cm (about the size of a golf ball) or larger, location on or below the fascia, matted to surrounding structures, rapid growth, or recurrence of a mass after prior excision[63,64] *(Figure 2).* When a worrisome mass is found, initial radiography followed by an expedited MRI with contrast are recommended

FIGURE 2




**Liposarcoma. A patient presents with a rapidly growing thigh mass due to a myxoid sarcoma. *(A)* Radiography shows an elliptical mass-like area concerning for possible hematoma or neoplasm. *(B)* Doppler ultrasonography shows a large well-circumscribed hyperechoic mass with blood flow. *(C)* Magnetic resonance imaging without contrast shows a T2 hyperintense mass. *(D)* Magnetic resonance imaging with contrast shows a heterogeneous mass concerning for malignancy.**

pending radiology recommendation and referral to an orthopedic oncologist.[5,19,65]

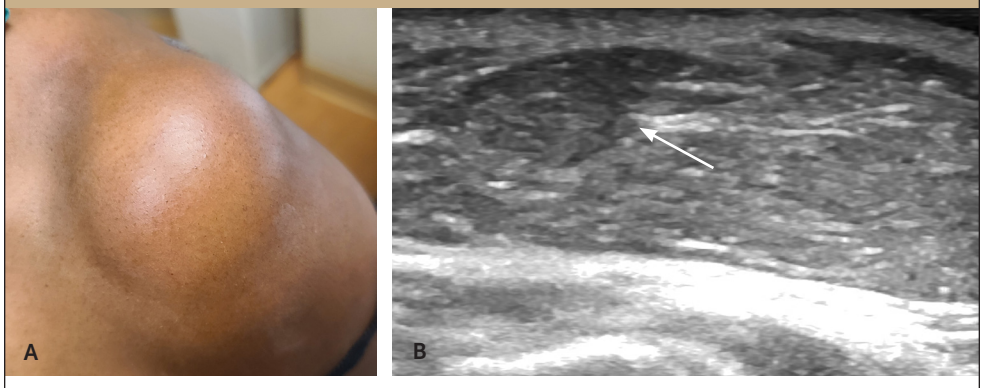
## Common Soft Tissue Masses

### ABSCESS

Skin and soft tissue abscesses are common, with increasing incidence.[66] They can present anywhere on the body but are more often found at sites of skin damage.[66] Risk factors for progression from cellulitis to abscess include delay in treatment, male sex, smoking, and alcoholism.[6] Point-of-care ultrasonography is more accurate than clinical examination for diagnosing abscesses and can assess exact size, depth, and presence of loculi within the abscess.[7] In addition to characterizing an abscess, ultrasonography can guide incision and drainage procedures.[67]

Treatment includes incision and drainage, and concurrent antibiotic therapy can reduce treatment failure.[8,9] Cultures are not recommended for simple, uncomplicated abscesses

FIGURE 3




**Lipoma. A patient presents with an enlarging mass on her shoulder. *(A)* Examination reveals a painless mass on the superior left shoulder that measures more than 5 cm in diameter. *(B)* Ultrasonography shows an encapsulated mass isoechoic to the subcutaneous fat, suggesting a lipoma. Magnetic resonance imaging confirms a lipoma, and she is referred for surgical removal.**

but can be useful for individuals who are immunocompromised or have recurrent abscesses.[10]

## LIPOMA

Lipomas are soft, fatty deposits *(Figure 3)* that account for approximately one-half of benign soft tissue masses.[1,16,23,50,68-70] Lipomas can develop at any age, with a predilection for the trunk and proximal extremities, although they are most common in patients who are 40 to 70 years of age or obese.[16,23] Presentation in children is often varied and nonspecific, and lesions can grow rapidly during periods of weight gain.[50] Patients who have family members with multiple lipomas may have a genetic condition called familial multiple lipomatosis, which presents with multiple benign lipomas on the extremities or trunk.[23] Because some lipomas are deep to the fascia, they can be larger than what is felt on palpation.

Common lipoma characteristics visible on ultrasonography include an elongated and well-circumscribed solid mass that may contain a fibrous capsule *(Figure 3B)*. Approximately one-third of benign lipomas may also contain fatty necrosis with calcifications, making a benign lipoma difficult to differentiate from the rare liposarcoma.[69,71]

Lipomas are usually benign and can be treated with monitoring. Lipomas that are 5 cm or larger in diameter or have atypical features on MRI, such as septations thicker than 2 mm or nodular soft tissue changes, should be evaluated for surgical excision.[35] Excision can be considered for lipomas that are painful or fast growing and for cosmetic reasons. Lipomas have a low rate of recurrence after excision, but possible complications include adhesions, scarring, muscle injury, and permanent nerve damage.[37,58]

## EPIDERMAL INCLUSION CYST/PILAR CYST

Epidermal inclusion cysts, also called epidermoid cysts and formerly called sebaceous cysts, are dome-shaped masses that arise in areas with hair follicles. These masses contain keratin debris and are encapsulated by a wall of stratified squamous epithelium, with a hallmark central punctum on the skin.[1,12] Epidermal inclusion cysts can present as mobile subcutaneous masses that are as small as a few millimeters to 5 cm in diameter.[1] Multiple epidermal inclusion cysts can be associated with Gardner syndrome.[59]

A rapidly growing epidermal inclusion cyst or recurrence after surgical excision warrants further investigation for malignancy. Epidermal inclusion cysts should be removed en bloc because they can recur if not completely removed. Ruptured cysts may become infected and often require antibiotic treatment.[15,59]

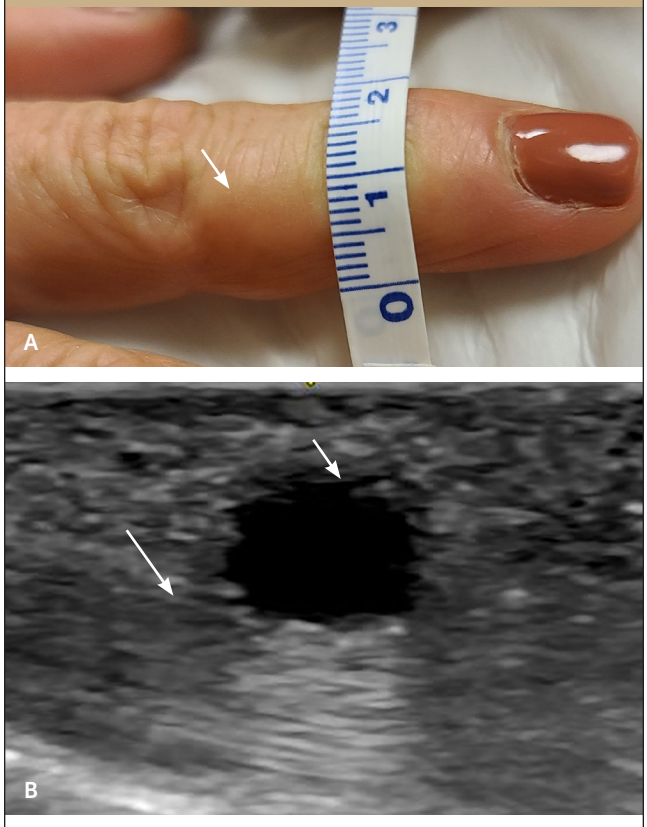
The most common scalp cyst, known as a pilar cyst or trichilemmal cyst, arises from the outer root sheath and occurs in areas with dense hair follicles.[32] Imaging with ultrasonography or MRI is rarely indicated. Treatment for benign pilar cysts can be simple local excision.

## GANGLION CYST

Ganglion cysts *(Figure 4)* arise from joint, ligament, or tendon injuries. The capsule contains hyaluronic acid and mucopolysaccharides, which are highly viscous.[14] Symptoms can include pain, swelling, and stiffness of the joint.[13,14] Common sites include hands, wrists, feet, and ankles.[72]

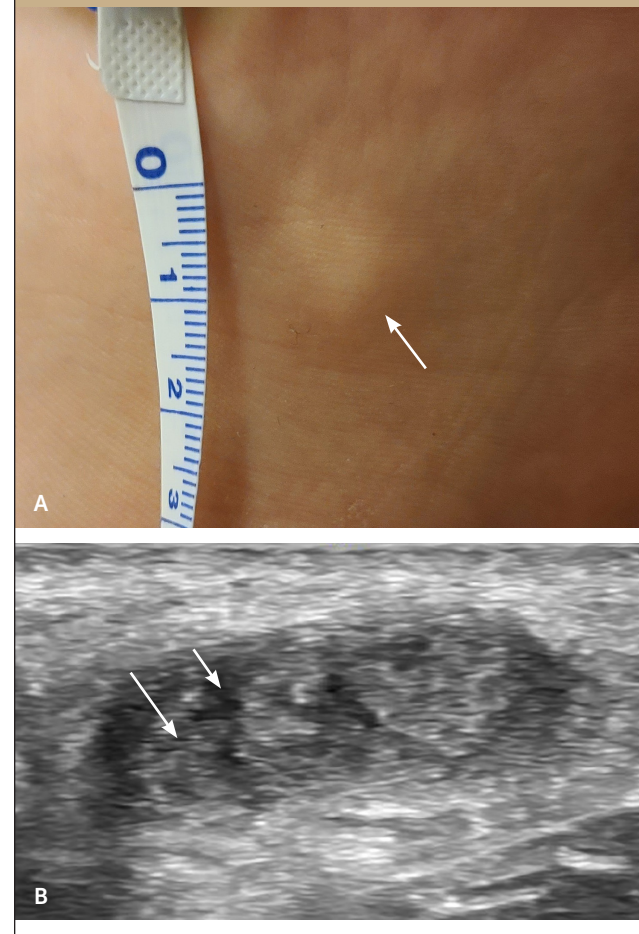
Observation is recommended for mildly symptomatic or asymptomatic cysts that do not cause functional impairment.[14] Aspiration requires a large 18-gauge needle to remove the thick gelatinous fluid, and recurrence is common.[72] Aspiration should be avoided when neurovascular structures surround the cyst such as with radial-sided volar wrist cysts. Open or arthroscopic excision is suggested if initial conservative therapy is ineffective, and the cyst remains bothersome.[14]

FIGURE 4




Ganglion cyst of the distal finger. *(A)* Examination reveals regular swelling that is firm on palpation and measures approximately 1 cm in diameter. *(B)* Ultrasonography shows a cyst *(short arrow)* that appears to be attached to the underlying tendon *(long arrow)*.

FIGURE 5




Plantar fibroma. *(A)* Examination demonstrates firm nodular thickening of the midportion of the medial plantar fascia. *(B)* Ultrasonography shows the comb sign with hypoechoic *(short arrow)* and isoechoic *(long arrow)* areas of the nodular mass.

## BAKER CYST

A Baker cyst is a ganglion cyst of the posterior knee that is located between the semimembranosus and medial gastrocnemius muscles.[73] These cysts can be more pronounced during a flare-up of knee arthritis. They may be found incidentally on MRI or ultrasonography. Treatment includes monitoring, aspiration, corticosteroid injection, aspiration with ultrasound-guided fenestration of cyst walls, and arthroscopic cystectomy.[73]

## PLANTAR FIBROMA

Plantar fibromas *(Figure 5)* are nodular masses arising in the plantar aponeurosis of the foot. They are the second most common type of soft tissue mass in the foot and ankle after ganglion cysts.[35] Although the etiology is unclear, past trauma to the foot, Dupuytren contracture, Peyronie disease, and family history increase the risk of plantar fibroma.[35,74]

Patients often present with a painful nodular lesion in the midsubstance or superficial aspect of the plantar fascia that is worsened with walking or standing. Plantar fibromas are bilateral in 20% to 50% of cases.[35] Examination may reveal a focal thickening along the plantar fascia or a palpable nodule.[36] On ultrasonography, plantar fibromas appear as fusiform nodules that are hypoechoic to isoechoic without intrinsic vascularity (comb sign).[5,36]

Treatment rarely requires excision, and many plantar fibromas can be managed conservatively with shoe padding or modifications. Corticosteroid injections (under

## SORT: KEY RECOMMENDATIONS FOR PRACTICE

| Clinical recommendation | Evidence rating | Comments |
|---|---|---|
| Signs that increase the risk of malignancy include tumor size of 5 cm or larger, location on or below the fascia, masses matted to surrounding structures, and rapid growth.[5] | C | Case series of patients referred with sarcoma |
| Point-of-care ultrasonography can be used to diagnosis abscesses.[7] | A | Systematic review and meta-analysis |
| Consider initial imaging with radiography before more advanced imaging to evaluate for bony involvement and intratumoral calcifications in osteogenic or synoviosarcomas.[55] | C | American College of Radiology guidelines |
| When a worrisome mass is found, initial radiography followed by an expedited MRI with contrast are recommended pending radiology recommendation and referral to an orthopedic oncologist.[5,19,65] | B | Systematic review |

**A** = consistent, good-quality patient-oriented evidence; **B** = inconsistent or limited-quality patient-oriented evidence; **C** = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to https://www.aafp.org/afpsort.

ultrasound guidance if possible) can relieve pain and decrease the size of the fibroma.[36,72] If orthotics and intralesional corticosteroid injections are ineffective, a subtotal fasciectomy with wide excision can be considered.[36]

**Data Sources:** Essential Evidence Plus, PubMed, the Cochrane database, and Scopus were searched using the terms soft tissue masses, sarcoma, cyst, ganglion cyst, plantar fibroma, vascular lesions, epidermal cyst, and pilar cyst. Search dates: February 2021 to March 2022.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