

# Primary Soft Tissue Masses of the Foot and Ankle

It's important to properly  
diagnose and treat these lesions.

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## Goals and Objectives

- 1) To review and update the diagnosis, treatment and prognosis of primary soft tissue masses of the foot and ankle.
- 2) To provide the podiatrist with a series of guidelines useful in the correct diagnosis, treatment and prognosis of soft tissue masses of the foot and ankle.

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Following this article, an answer sheet and full set of instructions are provided (pg. 140).—Editor

## Introduction

Soft tissue masses (or equivalent soft tissue tumors), in general, make up a diverse and complex group of lesions which may display varying degrees of mesenchymal differentiation and are often not classified by their anatomic location. Most are believed to be sporadic and have no clearly defined etiology. However, a small subset of these lesions may have a genetic predisposition, be found frequently in genetic syndromes, be secondary to trauma, be associated with

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defined etiology.**

some metabolic conditions such as diabetes mellitus or hyperlipidemia, may be associated with localized or indirect trauma, or may be associated with exposure to carcinogens, lymphedema, or previous ra-

diation therapy.<sup>1</sup> They also may be confused with such pathologies as foreign body granulomas, or localized infective processes,<sup>2</sup> and rarely exhibit pathognomonic diagnostic

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clinical findings or imaging signs before biopsy.

Malignant soft tissue sarcomas make up less than 1% of all malignant tumors, while benign mesenchymal soft tissue tumors are 100-fold more prevalent than malignant soft tissue sarcomas.<sup>1</sup> Furthermore, less than 10% of malignant sarcomas of bone and soft tissue arise from the foot and ankle, and benign soft tissue tumors of the foot and ankle are 100 times more prevalent than malignant soft tissue masses of the foot and ankle.<sup>3</sup> It can therefore be inferred that malignant soft tissue tumors of the foot and ankle make up less than 0.1% of all malignancies, and such localized malignancies of the foot and ankle are 100-fold less prevalent than their benign counterparts in the foot and ankle.

Due to their relative scarcity, a foot and ankle practitioner can statistically assume that any soft tissue mass encountered in clinical practice is benign, and therefore can be removed in toto with little regard for the potential for negative sequelae. However, since

### Classification of Soft Tissue Masses

Soft tissue masses are broadly classified as follows:<sup>1</sup>

**a) Benign Tumors:** These tumors do not metastasize and rarely recur, but can usually be cured with

local excision. The lipoma is the most common member of this category. Other benign soft tissue masses include dermal fibromas, myositis ossificans, dermatofibromas, xanthomas, Morton's neuroma, glomus tumors, schwannomas, and solitary neurofibromas

**b) Intermediate (locally aggressive) tumors:** These tumors do not metastasize but can recur if excised, and are associated with a locally infiltrative growth pattern.

It should be noted that this classification is only approximately correct as tumor characteristics often fall along a complex spectrum. The sarcomas are further broadly classified by algorithmic stage (which

## Superficial plantar fibromatosis, desmoid type fibromatosis, and lipofibromatosis are examples of intermediate (locally aggressive) tumors.

includes size at clinical presentation, presence or absence of nodal involvement, presence or absence of distal metastasis, and histological grade of differentiation) and in different ways by many institutions and expert panels.<sup>4,5</sup> Stage usually, but not always, predicts the malignant potential of soft tissue sarcomas. When used with sophisticated histologic evaluation, immunohistochemistry cell markers can often, but not always, help determine the diagnosis and nature of a specific soft tissue mass.<sup>6</sup>

## An MRI is the most useful imaging study to diagnose soft tissue masses of the foot and ankle.

### Clinical Presentation of Soft Tissue Tumors of the Foot and Ankle

The most common clinical complaint relevant to soft tissue masses is pain. However, a patient may complain that the mass, although painless, is unsightly or is worrisome due to its size or abnormal appearance. Subjective pain may be consistent with a benign process, but is by no means definitive.<sup>7</sup>

Historically, malignancy is more common in older individuals. It is more likely if the mass has quickly increased in size or has been present for a long period of time, or if there is first or low degree family history of cancer or specific genetic conditions, such as neurofibromatosis. In the presence of trauma, benign myositis ossificans, localized inflammatory or infective processes, or plantar fibromatosis are all possible.

Upon clinical examination, soft

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there are no reliable clinical or imaging signs for specific tumor diagnoses, excisional biopsy without regard to pathological examination can lead to disastrous consequences for the patient if the lesion is later found to be malignant. Malignant tumors and tumors that rarely metastasize are best managed by a surgical oncologist who has the ability to provide appropriate margins of excision or amputation and coordinate necessary chemotherapy, radiotherapy, and revisional surgery.

Metastatic tumors to the foot and ankle will not be considered in this review.

Superficial plantar fibromatosis, desmoid type fibromatosis, and lipofibromatosis are examples of this type.

**c) Intermediate (rarely metastasizing) tumors:** These tumors are locally aggressive but can occasionally give rise to distant metastasis. One example is Kaposi's sarcoma.

**d) Malignant tumors (soft tissue sarcomas):** The tumors are most likely to metastasize, and are locally invasive and can recur if excised, and are prone to develop into more aggressive tumors. Examples of these include synovial sarcoma, extra-skel-

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and homogenous consistency, pain upon palpation, superficial location relative to fascial structures, and irregular but well demarcated shape may be consistent with a benign lesion.<sup>7</sup> Larger size, heterogeneous consistency, induration or incomplete induration, or deep location relative to fascial structures may be consistent with a malignant lesion. However, the depth of any soft tissue mass may be less predictive of malignancy than size at clinical presentation.<sup>8</sup>

In the foot or ankle, the amount of soft tissue, exclusive of that seen plantarly, is minimal, and cortical bone is comparatively thin and porous. Therefore, the depth of the mass is less predictive of malignancy than bony invasion, which is possible with a true sarcoma in the foot or ankle.<sup>1</sup>

#### **Laboratory Studies of Soft Tissue Masses of the Foot and Ankle**

The complete blood count, electrolytes, and coagulation profile are of limited use in non-malignant processes.<sup>7</sup> However they may be of some help in the consideration of hematologic pathology found with

breakdown may indicate a malignant sarcoma. Radial dystrophic calcification that progresses from the periphery to the center is most consistent with benign myositis ossificans especially in the presence of recent trauma.<sup>7</sup> A homogenous well demarcated shadow may be more consistent with a benign process.<sup>1</sup> However, negative findings on an

tion for specific diagnosis.

Magnetic resonance imaging provides the best means to determine the type of tissue or tissues making up the soft tissue mass. The T1, T2, proton density, STIR and FLAIR pulse sequences, with or without contrast, can help determine the specific type of tissue that makes up the foot or ankle mass, its extent,

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### **The safest and most useful surgical technique used to help diagnose a soft tissue mass is incisional biopsy.**

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x-ray, although more consistent with a benign process, do not rule out the presence of a sarcoma.

Diagnostic ultrasound is a relatively inexpensive imaging technique that can help one gain some insight into the structure of the soft tissue mass. It can determine the relative homogeneity of the lesion and give information as to its density and the presence or absence of fluid, blood, or blood products. It can pinpoint the size and depth of the lesion and locate it in relation

often its inflammatory, infective, or fatty nature, and its location relative to other soft tissue structures.<sup>8</sup> MRI can and does provide the most information in determining the nature, location, and extent of the mass before any biopsy techniques are employed, but cannot be fully relied on for diagnosis or prognosis in any particular clinical situation. Heterogeneous MRI findings are, however, suggestive of malignancy.<sup>8</sup>

FDG-PET by itself or in co-registration with CT for localization can determine the relative metabolic activity of the mass when compared with surrounding structures.<sup>7</sup> Its use as a screening tool is limited and is best used after other imaging modalities, including biopsy, indicate that the mass may be truly a sarcoma or other metabolically active lesion.

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### **The most pathognomonic feature of a ganglion is change in consistency and size with change in ambient temperature.**

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some sarcomatous malignancies. Inflammatory markers such as the erythrocyte sedimentation rate or C-reactive protein may be helpful in delineating inflammatory processes. Specific tests such as acid phosphatase or alkaline phosphatase may be helpful in the management of specific sarcomatous malignancies.

#### **The Use of Imaging Studies in the Diagnosis of Soft Tissue Masses**

X-rays of the foot and ankle may be helpful in describing a malignant sarcoma. Signs of dystrophic (ectopic) calcification or cortical bony

to other soft tissue structures which may provide clues to its histological makeup.<sup>7</sup> Unfortunately, the differential echogenicity is not specific enough to provide unambiguous diagnostic information.

CT scans can provide a means to differentially image any calcified mass found in the soft tissues of the foot and ankle and can delineate the extent, if any, of bony invasion of the mass into the normal bony architecture. Note that this modality rarely provides more information than a standard series of x-rays<sup>1</sup> and again does not give enough informa-

#### **Management of Soft Tissue Masses of the Foot and Ankle**

As with all other clinical pathology, after careful history, physical examination, imaging, and laboratory studies, a provisional diagnosis and differential diagnosis is obtained. In the case of soft tissue masses, the clinician would most likely only be able to entertain a series of benign or at most intermediate locally aggressive tumors. Intermediate rarely metastasizing sarcomas, being less common and difficult to characterize, fall at the bottom of any differential diagnosis. However, since there are no specif-

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ic clinical or other characteristic features specific for tumors of the foot and ankle, malignancy should always be entertained. If, however, the physical examination and diagnostic work-up point to a malignant lesion, referral to a surgical oncologist should always be done before biopsy.

The patient should be apprised of the clinical and imaging findings and advised that the removal of the mass, even if benign, may lead to recurrence or to a painful scar. He should also be advised that the specific diagnosis of the mass requires a biopsy, and if the mass is malignant or a rarely metastasizing lesion, this may lead to further often disfiguring surgeries and medical follow-up under the direction of a surgical oncologist.<sup>1</sup> It is most prudent for the foot and ankle surgeon to seek the advice and consultation of a surgical oncologist before any surgical treatment of any soft tissue mass is considered. Often, the surgical oncologist, suspecting a benign or intermediate locally aggressive tumor, will recommend the appropriate course of treatment to be provided entirely by the foot and ankle surgeon. Alternately, (s)he

a diagnosis. Disadvantages of this technique are loss of architecture of the mass and limited sampling, both of which will degrade histological accuracy and make immunohistochemistry and similar tests impossible to perform.

**2) Core needle biopsy:** This technique again can be performed in an office setting, does preserve tissue architecture, but often suffers from

limited sampling error in a heterogeneous mass, which may compromise diagnostic accuracy.

**3) Open incisional biopsy:** This technique provides the best representative sample of tissue for histological and other pathology tests. It is best performed in the plane that will have to be excised should wide margins be required in order to limit loss of overlying skin. Dissection of overlying tissue should be avoided. This type of biopsy also lends itself to use of

### Commonly Encountered Soft Tissue Masses or Confounding Lesions Found in the Foot and Ankle

**Lipomas:** the most common soft tissue masses overall, they are commonly found in the foot and ankle, and are usually found in the subcutaneous tissue.<sup>1</sup> They are usually soft, painless, slowly growing, solitary, well demarcated and lobulated le-

## Immunohistochemistry is a technique in diagnosing specific malignant tumors with the help of pathology examination.

sions containing fat cells and invested by a fibrous capsule. They are easily imaged by MRI. They show high intensity on a T1 pulse sequence and rarely recur after excision.<sup>1,8</sup>

**Xanthoma:** A collection of lipid laden histiocytes, seen in diseases associated with hyperlipidemia. They are generally cutaneous or subcutaneous, but may rarely be found in deep soft tissues. They are reactive lesions to a specific metabolic state, namely hyperlipidemia and therefore of a benign nature.<sup>1</sup>

**Fibroma:** A poorly defined fibrous lesion in the skin or soft tissue of a benign nature that is easily treated by simple excision.<sup>1</sup>

**Ganglions (ganglionic cyst) and other cystic lesions:** A series of common lesions often confused with true soft tissue masses. These include synovial cysts, ganglionic cysts, and bursae. Both synovial cysts and ganglia arise close to joints or tendons and contain mucinous fluid. The synovial cyst is lined with a synovial membrane and may communicate with adjacent structures. The ganglion, often large and of changeable volume due to changes in ambient temperature, is lined with flattened pseudosynovial cells and may not communicate with the adjacent structures. Both ganglions

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## Lipomas are the most common soft tissue masses found in the foot and ankle.

may recommend taking over the case after the foot and ankle surgeon has performed an initial biopsy, or the oncologist may recommend providing all surgical or medical care for the patient.

### Surgical Biopsy

Surgical biopsy takes the form of four basic techniques.<sup>1</sup>

**1) Fine needle aspiration of the mass:** This technique is the easiest to perform, can be done in an office setting, and can often determine the nature of the tumor when seeking

the frozen section, which is accurate for determining whether a lesion is benign or malignant, but not for determining a definitive diagnosis of a malignant lesion.<sup>4</sup>

**4) Total excision of a virgin lesion:** This technique gives the most accurate diagnosis of a mass of the foot or ankle, especially in heterogeneous lesions; however, it does not allow the surgical oncologist to determine appropriate surgical margins of resection should wide resection be required for a malignant lesion.



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and synovial cysts are associated with microtrauma to their adjacent synovial structures.

Bursae are synovial lined structures found between bony surfaces and ligaments or tendons and normally contain small amounts of fluid that will increase when inflamed either due to mechanical friction, infection, or inflammatory arthropathy. All these cystic lesions tend to be well-defined and are usually homogenous on CT, MRI, and diagnostic ultrasound. On diagnostic ultrasound, they are hypoechoic. On CT, they exhibit a water density reconstruction. On MRI, they have low signal intensity on T1 pulse sequence and high signal intensity on T2 pulse sequence.<sup>10</sup>

**Hematoma:** Hematomas are subcutaneous blood filled fluid collections consistent with acute or subacute local trauma and are sometimes confused with true soft tissue masses.

Acute hematomas tend to be ill-defined and hyperechoic, while chronic lesions tend to be better de-

and ultrasound can be used to document findings between the early and chronic stages.<sup>10</sup>

**Infection:** Localized soft tissue infection is often confused with a true soft tissue mass.<sup>2,10</sup> The localized soft tissue infection is often in the form

Lesions are bilateral in 20% to 50% of cases. The typical patient presents with one or more subcutaneous nodules that most frequently arise in the medial plantar fascia and often extend to the skin or deep structures of the foot. Although some masses are painless, they can

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to be malignant on frozen section, it is best  
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refer the patient to surgical oncology.**

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of an abscess. Abscesses are composed of necrotic material, inflammatory cells, and usually bacteria, and are surrounded with a vascular rim associated with surrounding soft tissue edema. Diagnostic ultrasound can have differential echoic properties depending on the nature of the abscess contents, which also may include proteinaceous material. CT usually reflects low attenuation of the abscess. MRI is the modality of

be painful when limited to the plantar fascia or when they invade other soft tissue structures such as muscles, tendons, or neurovascular structures. These lesions rarely produce contraction deformities of the foot.

Treatment consists of footwear modifications. Surgical removal may be necessary if the lesion is large or refractory to conservative care. Surgery results in high rates of recurrence (20% to 40%) often within the first post-operative year. X-rays are frequently normal. Diagnostic ultrasound, in most cases, reveals a well-defined fusiform mass in the soft tissues adjacent to the plantar fascia; while in less than half the cases, the mass is poorly defined. The mass may be isoechoic or hypoechoic on ultrasound. CT images reveal a non-specific soft tissue mass adjacent to the plantar fascia with attenuation equal or higher than skeletal muscle. MRI gives the most information for clinical planning and typically indicates a heterogeneous signal which is hypo or isointense to skeletal muscle on both T1 and T2 pulse sequences. The T2 sequence may be more intense with less collagen and increased cellularity of the lesion. MRI with contrast often exhibits a frequent finding of a linear tail of extension on a T1 fat saturation sequence. The differential diagnosis of plantar fibroma may include pedal mycetoma, or isolated fibroma.<sup>2</sup>

Deep (desmoid type) fibromatosis are fibroblastic proliferations

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**A calcified lesion  
such as a mature myositis ossificans will be  
most visible on a CT scan.**

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finer and hyperechoic. MRI shows variable intensity on different pulse sequences depending on the age of the hematoma. Acutely, T1 is isointense and T2 is hypointense. In the chronic phase, both T1 and T2 are hypointense.<sup>10</sup>

**Myositis Ossificans:** Myositis ossificans is a benign soft tissue, and is the most common bone-forming lesion of soft tissue. While this lesion has no clear cause, trauma is often suspected. Initially the lesion is a non-specific, painful, inflammatory mass that slowly ossifies from the periphery to the center over the course of a few months. CT can best visualize the stages of ossification, but MRI

choice and in most cases will exhibit high signal intensity on T2 and low signal intensity on T1.<sup>10</sup>

**Superficial (plantar) fibromatosis and deep fibromatosis:** Superficial fibromatosis are fibroblastic fascial proliferations found at the palmar, plantar, penile, or knuckle pad locations. Plantar fibromatosis is also known as Ledderhose disease and is most likely associated with clinical trauma. It may have a genetic (genomic) component or be associated with diabetes mellitus, epilepsy, keloids, or alcoholism with liver disease. The lesion is rarely found in children but becomes more prevalent with advancing age. Men are affected twice as often as women.

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that arise in the deep soft tissues, are very rare, and exhibit infiltrative growth and local recurrence, but like the superficial fibromatoses, do not metastasize. Involvement of adjacent structures can lead to significant local pain and morbidity (requiring amputation) if found in the extremities, or can lead to death if they involve adjacent vital structures, particularly in the neck and chest wall. The cause of these desmoid lesions can be genetic or endocrine, but most are idiopathic. Even though these tumors are classified as non-malignant since they don't metastasize, they can invade bone or progress along fascial planes. Diagnostic ultrasound, X-rays, nuclear medicine, CT, MRI, and PET all have a place in helping to find and follow the progression of these tumors.<sup>11,12</sup>

**Neurofibromas:** These are small, solitary, slow growing benign cutaneous or subcutaneous nodules that usually arise in the third decade of

ankle are benign, primary malignant or rarely metastasizing tumors are also found. Rarely metastasizing or malignant tumors often have a grave prognosis. The classification of tumors is not perfect and often does not completely reflect the clinical course of

mas of the Extremities. BUMC Proceedings, 16:285-290, 2003.

<sup>5</sup> American Joint Committee on Cancer Staging Manual 7th edition, Springer Verlag, Chicago, 2010.

<sup>6</sup> Miettinen, Markku, Immunohistochemistry of Soft Tissue Tumours-Review with Emphasis on 10 Markers, Histopa-

## Soft tissue masses

**of the foot and ankle are rarely life-threatening since the prevalence of malignant soft tissue masses of the foot and ankle is extremely low.**

each and every soft tissue tumor.

The foot and ankle surgeon must not be lulled into a false sense of security when confronted with a soft tissue mass of the foot or ankle. (S)he must perform an extensive history and physical examination and avail herself/himself of every relevant diagnostic modality to adequately diagnose and

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<sup>7</sup> Colman, Mathew et al., Non-Neoplastic Soft Tissue Masses That Mimic Sarcoma, Orthop Clin N Am, 45:245-255, 2014.

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<sup>9</sup> Kap Jung Kim, et al., Treatment of Tumours and Tumour-like Lesions in the Foot and Ankle—A Single Institution Analysis, International Journal of Bioscience and Biotechnology, 6:1, p 165-174, 2014.

<sup>10</sup> McKenzie G, et al., Non-Neoplastic Soft Tissue Masses (Pictorial Review), The British Journal of Radiology, 82:775-785, 2009.

<sup>11</sup> Walker, Eric A., et al., Imaging Features in Superficial and Deep Fibromatoses in the Adult Population (Review Article), Sarcoma, p 1-17, 2012.

<sup>12</sup> English, Colette et al., Plantar and Palmer Fibromatoses Characteristic Imaging Features and Role of MRI in Clinical Management (Letter to the Editor pp:1-2), Rheumatology, 2012.

<sup>13</sup> Neurofibroma, Radiopaedia.org, UMB Medica Network, 2015.

## Xanthomas

**are usually found in deep tissues of the lower extremity.**

life. They grow from cutaneous or larger nerves, contain spindle-shaped cells in a myxoid stroma, and contain collagen fibers. When they occur in larger nerves, they expand into a well-defined fusiform mass, often extend into soft tissue, and are painful. When multiple, they are associated with the genetic condition neurofibromas type 1 (von Recklinghausen disease), which as a separate entity has a more grave prognosis.<sup>1</sup> The solitary neurofibromas are hypodense on CT. They are hypointense on T1 MRI pulse sequence, and exhibit a hyperintense rim on a T2 pulses sequence with a central low signal (non-pathognomonic target sign corresponding to a collagenous center).<sup>13</sup>

### Conclusions

While almost all primary soft tissue masses found in the foot and

treat these tumors. As imaging and pathology techniques are constantly being refined, the successful diagnosis and treatment of these tumors will be improved. Finally, a surgical oncologist should be consulted, ideally in all cases, before definitive, usually surgical, treatment is rendered. **PM**

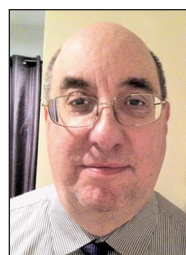
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<sup>2</sup> Abdulkareem, I H, et al., Pedal Mycetoma Mimicking Planter Fibroma, Orthop Muscul Syst., 2:1, p 1-3, 2013.

<sup>3</sup> Salipas, Andrew, et al., "Beware the Lump in the Foot" Predictors of Recurrence and Survival in Bone and Soft Tissue Sarcomas of the Foot and Ankle, ANZ J Surg, 84:533-538, 2014.

<sup>4</sup> Morrison, B.A., Soft Tissue Sarco-



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**SEE ANSWER SHEET ON PAGE 141.**

- 1) The most useful imaging study to diagnose soft tissue masses of the foot and ankle is \_\_\_\_\_.  
A) ultrasound  
B) CT  
C) MRI  
D) X-ray
- 2) A plantar fibromatosis is best classified as \_\_\_\_\_.  
A) a benign tumor  
B) an intermediate (locally aggressive) tumor  
C) an intermediate (rarely metastasizing) tumor  
D) a malignant tumor
- 3) Reliable diagnostic signs helpful in diagnosing a rarely metastasizing or malignant soft tissue mass include all of the following except \_\_\_\_\_.  
A) an elderly patient  
B) a history of rapid increase in size of the mass  
C) evidence of cortical erosion on x-rays  
D) all of the above
- 4) The most pathognomonic feature of a ganglion is \_\_\_\_\_.  
A) homogenous appearance on T2 MRI pulse sequence  
B) change in consistency and size with change in ambient temperature  
C) lack of induration upon examination  
D) radiolucency on x-rays
- 5) The safest and most useful surgical technique used to help diagnose a soft tissue mass is \_\_\_\_\_.  
A) fine needle aspiration  
B) core biopsy  
C) incisional biopsy  
D) excisional biopsy
- 6) Of the following, the most common soft tissue mass found in the foot and ankle is \_\_\_\_\_.  
A) lipoma  
B) synovial cyst  
C) synovial sarcoma  
D) abscess
- 7) Immunohistochemistry is a technique \_\_\_\_\_.  
A) useful in diagnosing benign tumors  
B) useful as a stand-alone technique in diagnosing types of malignant tumors  
C) is useful in diagnosing specific malignant tumors with the help of pathology examination  
D) is of no use in diagnosing tumors
- 8) When excising soft tissue masses, the use of frozen section in surgery will often \_\_\_\_\_.  
A) be useful in distinguishing a benign from a malignant lesion  
B) give no reliable information in addition to clinical presentation  
C) be most likely subject to selection bias when taken from one site  
D) be of no use in distinguishing a benign from a malignant process
- 9) Which of the following will be most visible on a CT scan?  
A) desmoid tumor  
B) mycetoma  
C) plantar fibromatosis  
D) mature myositis ossificans
- 10) Based on the relative scarcity of primary malignant tumors of the foot and ankle, one can be confident that \_\_\_\_\_.  
A) in the absence of a positive family history for malignancy, all small soft tissue masses of this area are benign  
B) in the absence of a positive family history for malignancy, all soft tissue masses are locally aggressive  
C) excisional biopsy is always the best course of treatment  
D) malignancy is always a real possibility
- 11) If a practitioner suspects that a foot or ankle mass is malignant based on frozen section biopsy, (s)he should \_\_\_\_\_.  
A) excise the mass and observe the mass for recurrence  
B) immediately refer the patient to surgical oncology for further management  
C) continue to treat the patient in consultation with surgical oncology  
D) excise the mass and discharge the patient from your care since the mass is no longer present
- 12) Which of the following historical parameters will most suggest that soft tissue mass of the foot or ankle is benign?  
A) a negative family history of cancer of any type  
B) the mass is not painful  
C) the mass has been unchanging in appearance for years  
D) recent local trauma
- 13) When a mass is reported to be malignant on frozen section, it is best to \_\_\_\_\_.  
A) excise the mass in total and then refer the patient to surgical oncology  
B) close the skin and immediately refer the patient to surgical oncology  
C) excise the mass in total and observe the patient with serial local imaging  
D) close the skin immediately and observe the patient with local serial imaging studies
- 14) When presented with a virgin localized soft tissue mass of the foot or ankle, surgical oncologists will most often \_\_\_\_\_.  
A) incise the mass for pathologic and immunohistochemical evaluation, and if the mass is found to be malignant, plan removal of an appropriate margin of tissue, or plan an amputation as necessary  
B) routinely excise the mass and observe the patient with se-

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rial imaging studies

- C) incise the mass for biopsy, and then refer the patient to another surgeon, such as a podiatrist, general surgeon, or orthopedic surgeon for continued observation and further surgical management
- D) observe the mass and do nothing definitive if the imaging studies show signs of a benign process

15) The many staging systems of malignant soft tissue masses (sarcoma) of the extremities:

- A) usually include histological grade
- B) usually include the TMN system
- C) are periodically modified to be consistent with new data
- D) all of the above

16) Plantar fibromatoses have been postulated to be associated with \_\_\_\_\_

- A) a genetic or familial predisposition
- B) repetitive or long-standing subclinical trauma
- C) metabolic abnormalities seen with diabetes mellitus or alcoholism
- D) all of the above

17) Xanthomas are \_\_\_\_\_.

- A) associated with hyperlipidemia
- B) malignant
- C) found exclusively in the foot or ankle
- D) usually found in deep tissues of the lower extremity

18) Desmoid tumors are \_\_\_\_\_

- A) deep fibromatoses
- B) infiltrative and recurrent
- C) sometimes fatal
- D) all of the above

19) Imaging findings that may indicate a malignant soft tissue mass in the foot and ankle include:

- A) dystrophic calcification in the absence of trauma
- B) inhomogeneous signal on all MRI pulse sequences
- C) cortical bony erosion
- D) All of the above

20) Soft tissue masses of the foot and ankle are rarely life-threatening since \_\_\_\_\_

- A) even if malignant, they rarely metastasize and can safely be ignored if not painful
- B) the prevalence of malignant soft tissue masses of the foot and ankle is extremely low
- C) their excision is always curative
- D) if x-rays or other imaging modalities show signs consistent with a benign process, no further work-up or referral is required

**SEE ANSWER SHEET ON PAGE 141.**

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Please call (631) 563-1604 if you have any questions. A personal operator will be happy to assist you.

Each of the 10 lessons will count as 1.5 credits; thus a maximum of 15 CME credits may be earned during any 12-month period. You may select any 10 in a 24-month period.

**The Podiatry Management Magazine CME program is approved by the Council on Podiatric Education in all states where credits in instructional media are accepted. This article is approved for 1.5 Continuing Education Contact Hours (or 0.15 CEU's) for each examination successfully completed.**

**Home Study CME credits now  
accepted in Pennsylvania**



# Enrollment/Testing Information and Answer Sheet

Continuing  
Medical Education

**Note:** If you are mailing your answer sheet, you must complete all info. on the front and back of this page and mail with your credit card information to: **Podiatry Management, P.O. Box 490, East Islip, NY 11730.**

## TESTING, GRADING AND PAYMENT INSTRUCTIONS

(1) Each participant achieving a passing grade of 70% or higher on any examination will receive an official computer form stating the number of CE credits earned. This form should be safeguarded and may be used as documentation of credits earned.

(2) Participants receiving a failing grade on any exam will be notified and permitted to take one re-examination at no extra cost.

(3) All answers should be recorded on the answer form below. For each question, decide which choice is the best answer, and circle the letter representing your choice.

(4) Complete all other information on the front and back of this page.

(5) Choose one out of the 3 options for testgrading: mail-in, fax, or phone. To select the type of service that best suits your needs, please read the following section, "Test Grading Options".

## TEST GRADING OPTIONS

### Mail-In Grading

To receive your CME certificate, complete all information and mail with your credit card information to:

**Podiatry Management**

**P.O. Box 490, East Islip, NY 11730**

**PLEASE DO NOT SEND WITH SIGNATURE REQUIRED, AS THESE WILL NOT BE ACCEPTED.**

There is **no charge** for the mail-in service if you have already en-

rolled in the annual exam CME program, and we receive this exam during your current enrollment period. If you are not enrolled, please send \$25.00 per exam, or \$195 to cover all 10 exams (thus saving \$55 over the cost of 10 individual exam fees).

### Facsimile Grading

To receive your CME certificate, complete all information and fax 24 hours a day to 1-631-563-1907. Your CME certificate will be dated and mailed within 48 hours. This service is available for \$2.50 per exam if you are currently enrolled in the annual 10-exam CME program (and this exam falls within your enrollment period), and can be charged to your Visa, MasterCard, or American Express.

If you are *not* enrolled in the annual 10-exam CME program, the fee is \$25 per exam.

### Phone-In Grading

You may also complete your exam by using the toll-free service. Call 1-800-232-4422 from 10 a.m. to 5 p.m. EST, Monday through Friday. Your CME certificate will be dated the same day you call and mailed within 48 hours. There is a \$2.50 charge for this service if you are currently enrolled in the annual 10-exam CME program (and this exam falls within your enrollment period), and this fee can be charged to your Visa, Mastercard, American Express, or Discover. If you are not currently enrolled, the fee is \$25 per exam. When you call, please have ready:

1. Program number (Month and Year)
2. The answers to the test
3. Your social security number
4. Credit card information

In the event you require additional CME information, please contact PMS, Inc., at **1-631-563-1604**.

## ENROLLMENT FORM & ANSWER SHEET

*Please print clearly...Certificate will be issued from information below.*

Name \_\_\_\_\_ Soc. Sec. # \_\_\_\_\_

Please Print: FIRST MI LAST

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Charge to: ☐ Visa ☐ MasterCard ☐ American Express

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

**Note: Credit card is the only method of payment. Checks are no longer accepted.**

Signature \_\_\_\_\_ Soc. Sec. # \_\_\_\_\_ Daytime Phone \_\_\_\_\_

State License(s) \_\_\_\_\_ Is this a new address? Yes ☐ No ☐

**Check one:** ☐ I am currently enrolled. (If faxing or phoning in your answer form please note that \$2.50 will be charged to your credit card.)

☐ I am not enrolled. Enclosed is my credit card information. Please charge my credit card \$25.00 for each exam submitted. (plus \$2.50 for each exam if submitting by fax or phone).

☐ I am not enrolled and I wish to enroll for 10 courses at \$195.00 (thus saving me \$55 over the cost of 10 individual exam fees). I understand there will be an additional fee of \$2.50 for any exam I wish to submit via fax or phone.

**EXAM #8/15**  
**Primary Soft Tissue Masses**  
**of the Foot and Ankle**  
**(Goldberg)**

**Circle:**

- |             |             |
|-------------|-------------|
| 1. A B C D  | 11. A B C D |
| 2. A B C D  | 12. A B C D |
| 3. A B C D  | 13. A B C D |
| 4. A B C D  | 14. A B C D |
| 5. A B C D  | 15. A B C D |
| 6. A B C D  | 16. A B C D |
| 7. A B C D  | 17. A B C D |
| 8. A B C D  | 18. A B C D |
| 9. A B C D  | 19. A B C D |
| 10. A B C D | 20. A B C D |

**Medical Education Lesson Evaluation**

|                          |              |                |                 |                             |
|--------------------------|--------------|----------------|-----------------|-----------------------------|
| Strongly<br>agree<br>[5] | Agree<br>[4] | Neutral<br>[3] | Disagree<br>[2] | Strongly<br>disagree<br>[1] |
|--------------------------|--------------|----------------|-----------------|-----------------------------|

- 1) This CME lesson was helpful to my practice \_\_\_\_
- 2) The educational objectives were accomplished \_\_\_\_
- 3) I will apply the knowledge I learned from this lesson \_\_\_\_
- 4) I will make changes in my practice behavior based on this lesson \_\_\_\_
- 5) This lesson presented quality information with adequate current references \_\_\_\_
- 6) What overall grade would you assign this lesson?  
A B C D

How long did it take you to complete this lesson?  
\_\_\_\_ hour \_\_\_\_ minutes

What topics would you like to see in future CME lessons ?  
Please list :

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