

Imaging soft-tissue masses of the foot and ankle

Quek ST
National University Hospital System
Singapore

WHO classification of soft tissue tumours

ADIPOCYTIC TUMOURS		
Benign		
Lipoma	8850/0	Calciolytic angiolipoma
Lipomatosis	8850/5	Angiosarcoma
Lipomatosis of nerve	8850/7	Cellular angiolipoma
Liposarcoma / Liposarcomatosis	8850/8	Nuchal-type fibroma
Angiolipoma	8850/9	Cellular leiomyoma
Myxoma	8851/0	Cellular leiomyosarcoma
Chondroid lipoma	8852/0	Calciolytic fibrous tumour
Chondroid angiolipoma	8852/1	Clear cell angiosarcoma
Extra-adrenal myeloid lipoma	8853/0	
Spindle cell	8853/1	
Phenochytic lipoma	8854/0	
Hibernoma	8860/0	
Intermediate (locally aggressive)		
Atypical lipomatous tumour	8851/1	
Well differentiated liposarcoma	8851/2	
Malignant		
Dedifferentiated liposarcoma	8852/3	
Myxoid liposarcoma	8852/4	
Round cell liposarcoma	8852/5	
Phenochytic liposarcoma	8854/1	
Mixed-type liposarcoma	8855/0	
Liposarcoma, not otherwise specified	8850/3	
FIBROBLASTIC / MYOFIBROBLASTIC TUMOURS		
Benign		
Nodular fasciitis		
Proliferative fasciitis		
Myofasciitis		
Myofascioma		
Myofascioma of digit		
Ischaemic fasciitis		
Elastofibroma	8820/0	
Fibrous hamartoma of infancy		
Fibroma / Myofibromatosis	8824/0	
Fibromatosis coli		
Inclusion body fibromatosis		
Inclusion body fibromatosis	8810/0	
Fibroma of tendon sheath	8810/1	
Dermatofibrosarcoma	8825/0	
Mammary-type myofibromatosis		
Intermediate (rarely metastasizing)		
Angiolipoid fibrous histiocytoma	8830/1	
Cystic fibromyxoid tumour	8842/0	
(incl. atypical / malignant)		
Mixed tumour	8840/1	
Myoepithelioma /	8862/1	
Fibrochondroma	8873/1	
Malignant		
Synovial sarcoma	9040/3	
Epithelioid sarcoma	8804/3	
Alveolar soft part sarcoma	9081/3	
Clear cell sarcoma of soft tissue	9044/3	
Extraskeletal myxoid chondrosarcoma	9231/3	
(chondroid type)		
PNET / Extraskeletal Ewing tumour		
PNET	3604/3	
Extraskeletal Ewing tumour	9205/3	
Desmoplastic small round cell tumour	8805/3	
Extra-renal rhabdoid tumour	8863/3	
Malignant mesenchymoma	8990/3	
Necrobiosis with perivascular epithelioid cell differentiation (PEComa)		
clear cell myxoid sarcoma	8800/3	
Intimal sarcoma		
SO-CALLED FIBROHISTIOCYTIC TUMOURS		
Benign		
Giant cell tumour of tendon sheath	9253/0	
Diffuse-type giant cell tumour	9251/0	
Deep benign fibrous histiocytoma	8830/0	
Intermediate (rarely metastasizing)		
Plexiform fibrohistiocytic tumour	8835/1	
Giant cell tumour of soft tissue	9251/1	
Malignant		
Phenochytic MFH / Undifferentiated pleomorphic sarcoma	8830/3	
Giant cell MFH / Undifferentiated pleomorphic sarcoma		
with giant cells		
Inflammatory MFH / Undifferentiated pleomorphic sarcoma with prominent inflammation	8830/3	

SMOOTH MUSCLE TUMOURS		
Angiosarcoma	8894/0	Composite haemangioperithelioma
Deep leiomyoma	8895/0	Kaposi sarcoma
Genital leiomyoma	8895/0	
Leiomyosarcoma (excluding skin)	8895/3	Malignant
		Epithelioid haemangioperithelioma
		Angiosarcoma of soft tissue
PERICYTIC (PERIVASCULAR) TUMOURS		
Glioma tumour (and variants)	8711/0	
malignant glioma tumour	8711/3	
Mycopericytoma	8713/1	
CHONDRIO-OSSEOUS TUMOURS		
		Soft tissue chondroma
		Mesenchymal chondrosarcoma
		Extraskeletal osteosarcoma
		9180/3
SKELTAL MUSCLE TUMOURS		
Benign		
Rhabdomyoma	8900/0	
adult type	8904/0	
fetal type	8903/0	
perithelial type	9005/0	
Malignant		
Embryonal rhabdomyosarcoma	8910/3	
(incl. spindle cell, botryoid, anaplastic)	8912/3	
Alveolar rhabdomyosarcoma	8910/3	
(incl. solid, anaplastic)	8920/3	
Pleomorphic rhabdomyosarcoma	8901/3	
VASCULAR TUMOURS		
Benign		
Haemangiomas of subcutaneous soft tissue:		
capillary	9120/0	
cavernous	9121/0	
arteriovenous	9123/0	
venous	9125/0	
intramuscular	9120/0	
synovial	9120/0	
Epithelioid haemangioma	9125/0	
Angiomatosis		
Lymphangioma	9170/0	
Intermediate (locally aggressive)		
Kaposiform haemangioperithelioma	9130/1	
Intermediate (rarely metastasizing)		
Tufted angioma	9135/1	
Papillary intralymphatic angioendothelioma	9135/1	
		Composite haemangioperithelioma
		9130/1
		Kaposi sarcoma
		9130/3
		Malignant
		Epithelioid haemangioperithelioma
		9130/3
		Angiosarcoma of soft tissue
		8850/3
		Epithelioid sarcoma
		8804/3
		Alveolar soft part sarcoma
		9081/3
		Clear cell sarcoma of soft tissue
		9044/3
		Extraskeletal myxoid chondrosarcoma
		9231/3
		(chondroid type)
		PNET / Extraskeletal Ewing tumour
		PNET
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		Desmoplastic small round cell tumour
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		Extra-renal rhabdoid tumour
		8863/3
		Malignant mesenchymoma
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		Necrobiosis with perivascular epithelioid cell differentiation (PEComa)
		clear cell myxoid sarcoma
		8800/3
		Intimal sarcoma

Scope

- Approach
- Review of conditions
- Conclusion



Imaging characteristics

- Cystic/solid
- Location
- Appearance

Cystic mass

- Ganglion/synovial cyst
- Bursitis
- Tenosynovitis
- Cystic neurogenic tumour

Ganglion

- Uni/multi-loculated cystic lesion - round, oval, lobulated or septated mass
- May communicate with fibrous tendon sheaths or joint capsule
- Occur most frequently in the hand and wrist
- Clinical presentation - swelling or pain

Bursitis

- Bursa
 - Fluid-filled sac
 - Allow for smooth movement
- Normally not visualised unless distended with fluid
- Inflammation of bursa
- Excessive pressure or repetitive movement



Imaging characteristics

- Cystic/solid
- Location
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Plantar fibromatosis

- M>F
- Nodular thickening of plantar fascia - medial (60%) or mid-portion (40%) of fascia
- Several nodules may co-exist in same fascia.
~ 1/3 are bilateral
- Majority located within mid-substance or plantar aspect of plantar fascia

Morton's neuroma

- Not true neuroma
- Related to repetitive trauma
- Most commonly 3rd inter-metatarsal space
- Young women, athletes
- Clinical presentation



Gout

- Asymmetric distribution
- Erosions
 - Para-articular
 - Sharp sclerotic margins and overhanging edge
- Osteopenia – usu absent
- Joint space narrowing - not usually present

Imaging characteristics

- Cystic/solid
- Location
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Lesion appearance

- Lipoma, neurogenic
- Vascular tumours
- Synovial chondromatosis
- PVNS
- GCT tendon sheath

Haemangiomas

- Most frequent benign foot tumors of vascular origin
- Can be superficial or deep-seated
- XR
 - Phleboliths
- MRI
 - T1W – look for fat signal
 - T2W – high SI, multilobulated, septated
 - Phleboliths
 - Contrast-enhancement

Synovial chondromatosis

- Benign condition involving synovial lining of joints, bursae or tendon sheaths
- Synovium undergoes metaplasia, forms cartilaginous loose bodies (may ossify)
- Monoarticular
- Knee, elbow, shoulder and hip
- MR – variable signal

PVNS

- Benign proliferative disorder of synovium
- Joint, tendon sheath & bursa
- Diffuse or nodular (localised)
- C/F
 - swelling +/- pain
 - 3-4th decade



GCT tendon sheath

- Benign synovial proliferation within tendon sheath
- Lobulated soft tissue mass immediately adjacent to tendon
- May or may not be painful
- Features :
 - soft-tissue mass adjacent to tendon
 - ~ 20% of cases show cortical erosion
 - MRI – low to intermediate T1W, T2W
 - +/- blooming

Conclusion

- Common cause for referral for imaging
- Imaging useful for
 - Confirmation
 - Assessment – extent and characterization
- Approach
- Benign neoplasms constitute the majority of soft-tissues masses around ankle and foot