

Musculoskeletal

<b>Disease / Medical Condition</b>	<b>Biomarker</b>	<b>Imaging Technique</b>	<b>Investigators</b>	<b>Comments</b>	<b>Disease Category</b>
Abscess	Leukocyte accumulation	SPECT	Fischman AJ	Tc-99m HMPAO improvement over Tl-201 and Ga-67	Neurological Inflammatory Musculoskeletal Genitourinary Infectious disease Gastrointestinal
AIDS wasting syndrome	Body fat composition	CT	Rosenthal DI		Endocrine Metabolic Musculoskeletal Infectious disease Gastrointestinal
AIDS wasting syndrome / lipodystrophy	Increased abdominal visceral fat associated with decreased bone mineral density	Quantitative CT Dual energy X-ray absorptiometry (DEXA)	Rosenthal DI		Endocrine Metabolic Musculoskeletal Infectious disease Gastrointestinal
Amyloid arthropathy / crystalline disease	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory Metabolic
Ankle injury	Ligament tears	MR arthrography	Palmer WE	Predicts sensitivity for ankle impingement syndromes	Musculoskeletal
Arthritis	Joint space narrowing	Plain radiographs	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Articular cartilage thickness	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Increased synovial glucose metabolism	PET	Fischman AJ Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / inflammatory	Synovial thickening	MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / rheumatoid	Articular cartilage thickness	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Arthritis / septic	Cyst composition / tissue characterization	PET	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Arthritis / septic	Increased synovial glucose metabolism	MRI	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Arthritis / septic	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal
Arthritis / septic	Synovial thickening	Plain radiographs MRI	Palmer W Rosenthal DI		Infectious disease Musculoskeletal Inflammatory
Bone fracture	Cortical surface disruption Negative defect	Plain radiographs	Palmer W Rosenthal DI		Musculoskeletal
Bone fracture	Marrow edema Water content	MRI -T1 Diffusion weighted imaging / Apparent diffusion constant	Palmer WE	Impact fractures demonstrate prominent edema, distraction fractures exhibit minimal edema	Musculoskeletal
Bone fracture / healing	Osseous bridging	Plain radiographs MRI CT	Palmer W Rosenthal DI		Musculoskeletal Metabolic
Bone fracture / healing	Osteoblastic activity	Nuclear medicine	Fischman AJ		Musculoskeletal Metabolic

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Bone fracture / healing, distraction osteogenesis wounds	Bone fill score and penetration depth	US	O'Neill MJ	Animal study Bone healing assessed by increased fill and decreased penetration depth	Musculoskeletal Metabolic
Cartilage abnormalities	Articular cartilage and subchondral bone thickness	MRI	Palmer WE	MR using fat-suppressed SPGR images	Musculoskeletal
Dyskinesia (PNKD)	Dopa decarboxylase activity	PET	Fischman A		Neurological Musculoskeletal
Elbow injury / collateral ligament	Partial thickness and full thickness tears	MR arthrography	Palmer WE	Distinguishes thickness of tears	Musculoskeletal
Ganglion cyst	Cyst composition / tissue characterization	US CT MRI	Rosenthal DI		Musculoskeletal Inflammatory
Joint injury / general	Osteochondral lesions	MR arthrography	Palmer WE	Assesses the stability of lesions	Musculoskeletal
Joint injury / hip and knee	Spatial cartilage thickness Articular cartilage volume	Co-planar MRI	Palmer WE Rosenberg AE Rosenthal DI	MR using fat-saturated 3D spoiled gradient-echo images (SPGR)	Musculoskeletal
Neoplasm / primary and secondary	Change in local tissue density or contrast enhancement	CT MRI	Palmer WE Rosenthal DI	Multicenter Trial with 367 patients - CT and MRI equally reliable for diagnosis	Musculoskeletal Oncology / Neoplasm
Neoplasm / primary and secondary	Local uptake of specific tumor avid radiotracers	Nuclear medicine	Fischman AJ		Musculoskeletal Oncology / Neoplasm
Obesity	Body fat composition	Quantitative CT MRI US	Rosenthal DI		Endocrine Metabolic Musculoskeletal Gastrointestinal
Osseous neoplasm / primary and secondary	Glucose metabolism	PET	Fischman A		Musculoskeletal Oncology / Neoplasm
Osseous neoplasm / primary and secondary	Osteoblastic activity	Nuclear medicine	Fischman A		Musculoskeletal Oncology / Neoplasm
Osseous neoplasm / primary and secondary	Tissue characterization	CT MRI	Rosenthal D		Musculoskeletal Oncology / Neoplasm
Osteoarthritis	Articular cartilage thickness	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal
Osteoarthritis	Cartilage thickness Fibrillations Fibrosis	Intra-articular Optical coherence topography	Palmer WE		Musculoskeletal
Osteoarthritis	Osteoblastic activity	Nuclear medicine	Fischman AJ		Musculoskeletal
Osteoarticular allograft imaging	Increasing periosteal and endosteal enhancement	MRI	Palmer WE Rosenthal DI	3-4 months post allograft / represents vascular ingrowth and early skeletal repair	Musculoskeletal

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Osteomyelitis	Leukocyte accumulation	Nuclear medicine	Fischman AJ		Musculoskeletal Infectious disease
Osteomyelitis	Osteoblastic activity	Nuclear medicine	Fischman AJ	Uptake of bone-seeking radio-pharmaceuticals	Musculoskeletal Infectious disease
Osteopenia	Bone mineral density	Plain radiographs Dual energy X-ray absorptiometry (DEXA) MRI Quantitative CT	Rosenthal DI	Must establish bone strength as well as density	Musculoskeletal Metabolic
Osteoporosis	Bone mineral density	Plain radiographs Dual energy X-ray absorptiometry (DEXA) MRI Quantitative CT	Rosenthal DI	Must establish bone strength as well as density	Musculoskeletal
Osteoporosis	Micro-architecture deterioration	Digital radiographs 3D microMRI 3D microCT	Rosenthal DI	Fine element modeling (FEM) to predict mechanical properties	Musculoskeletal Metabolic
Osteoporosis	Trabecular pore size	MRI	Rosenthal DI		Musculoskeletal Metabolic
Pain	Cortical activity	fMRI PET SPECT MEG	Fischman A Halgren E Rosen B Sorensen AG Stuffelbeam SM		Neurological Musculoskeletal
Pigmented villonodular synovitis	Increased synovial glucose metabolism	PET	Fischman AJ Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Pigmented villonodular synovitis	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Pigmented villonodular synovitis	Synovial thickening	MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Rotator cuff injury	Distribution and leakage of intra-articular administered contrast media	MR arthrography	Palmer WE	Distinguishes full from partial thickness tears	Musculoskeletal
Simple renal cysts	Cyst composition / tissue characterization Soft tissue inflammation	US CT MRI	Mueller PR		Oncology / Neoplasm Genitourinary Musculoskeletal
Skeletal muscle injury and repair	Musculoskeletal blood flow	PET	Alpert NM Fischman AJ	Animal study Use of H2(15)O to study muscle metabolism	Musculoskeletal
SLAP lesions of the shoulder	Articular labrum fraying	MR arthrography	Bencardino JT Palmer WE		Musculoskeletal
SLAP lesions of the shoulder	Bicep anchor avulsion	MR arthrography	Bencardino JT Palmer WE		Musculoskeletal
Soft tissue infection	Leukocyte accumulation	Nuclear medicine	Fischman AJ		Musculoskeletal
Soft tissue infection	Osteoblastic activity	Nuclear medicine	Fischman AJ		Infectious disease Musculoskeletal Inflammatory
Soft tissue infection	Soft tissue inflammation	MRI	Palmer W Rosenthal DI		Musculoskeletal
Soft tissue neoplasm / primary and secondary	Glucose metabolism	PET	Fischman AJ	Non-specific marker with wide variety of applications	Oncology / Neoplasm Musculoskeletal
Synovial cell sarcoma	Cystic architecture / tissue characterization	US CT MRI	Rosenthal DI		Musculoskeletal Oncology / Neoplasm

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Synovial chondromatosis	Periarticular erosion	Plain radiographs MRI	Palmer W Rosenthal DI		Musculoskeletal Oncology / Neoplasm
Synovial cyst	Cystic architecture / tissue characterization	US CT MRI	Palmer W Rosenthal DI		Musculoskeletal
Trauma	Edema / change in signal intensity and apparent diffusion constant	MRI Diffusion weighted imaging	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Trauma	Soft tissue inflammation	MRI	Palmer W Rosenthal DI		Musculoskeletal Inflammatory
Trauma	Soft tissue inflammation	Nuclear medicine	Fischman AJ		Musculoskeletal Inflammatory
Trauma	Soft tissue uptake of radiotracers	Nuclear medicine	Fischman AJ		Musculoskeletal Inflammatory