Suspected Osteomyelitis, Septic Arthritis, or Soft Tissue Infection (Excluding Spine and Diabetic Foot)
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
1. Connolly SA, Connolly LP, Drubach LA, Zurakowski D, Jaramillo D. MRI for detection of abscess in acute osteomyelitis of the pelvis in children. *AJR Am J Roentgenol*. 2007;189(4):867-872.	Observational-Dx	38 children	The authors analyzed their experience with MRI of pelvic AHO to address the following questions: What does MRI reveal about bone involvement? How often are fluid collections indicative of abscess shown? Are clinical parameters predictive of the cases in which MRI would be more beneficial?	Osteomyelitis involved metaphyseal equivalent sites in every case (n = 38), with single bone involvement in 24 (63%) and contiguous bone involvement in the remaining 14 (37%). Fluid collections indicative of an abscess were seen in 21 cases (55%), and abscess drainage was performed in 10 (26%). Univariate analysis of demographic and clinical variables between patients with and without an abscess indicated no significant differences for any variable except erythrocyte sedimentation rate (74 +/- 19 vs 56 +/- 24 mm/h; $P<0.05$, Student's t test).	3
2. Goergens ED, McEvoy A, Watson M, Barrett IR. Acute osteomyelitis and septic arthritis in children. *J Paediatr Child Health*. 2005;41(1-2):59-62.	Review/Other-Dx	102 cases of AHO and 47 cases of septic arthritis	To review the clinical presentation, clinical management and organisms responsible for AHO and septic arthritis in the post Haemophilus influenza type B vaccine era and to evaluate current Australian antibiotic guidelines for these conditions.	During the 4 1/2-year period 120,511 children were admitted to The Children's Hospital at Westmead. There were 102 cases of AHO and 47 cases of septic arthritis during this time. An organism was identified either by blood culture or tissue biopsy in 45% of children with AHO and 38% with septic arthritis. Staphylococcus aureus was the most common identifiable causative organism accounting for 76% of isolated organisms in AHO and 39% of isolated organisms in septic arthritis. Methicillin-resistant S. aureus was responsible for 9% of AHO and 6% of septic arthritis cases. There were no cases due to Haemophilus influenza or Kingella kingae during the study period. The majority (66%) of children with AHO were managed nonoperatively with intravenous and then oral antibiotics. 35 (34%) children had operative treatment to drain pus. In contrast, 74% of the patients with septic arthritis had 1 or more surgical procedures performed to drain pus from involved joints.	4
3. Jaramillo D. Infection: musculoskeletal. *Pediatr Radiol*. 2011;41 Suppl 1:S127-134.	Review/Other-Dx	N/A	Review imaging approach to osteomyelitis.	MRI has become the advanced imaging modality of choice in osteomyelitis. There is an increasing understanding of the appropriate role for gadolinium enhancement, which is not indicated when the pre-gadolinium images are normal. Other related infections, including pyomyositis, are best imaged with MRI.	4

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
4. Kan JH, Young RS, Yu C, Hernanz-Schulman M. Clinical impact of gadolinium in the MRI diagnosis of musculoskeletal infection in children. *Pediatr Radiol.* 2010;40(7):1197-1205.	Observational-Dx	90 children	To compare diagnostic utility of noncontrast with contrast MRI in the evaluation of pediatric musculoskeletal infections.	Pre- and post-contrast diagnosis of osteomyelitis sensitivity was 89% and 91% (P=1.00) and specificity was 96% and 96% (P=1.00), respectively; septic arthritis sensitivity was 50% and 67% (P=1.00) and specificity was 98% and 98% (P=1.00), respectively; cellulitis/myositis sensitivity was 100% and 100% (P=1.00) and specificity was 84% and 88% (P=0.59), respectively; abscess for the total group was 22 (24.4%) and 42 (46.6%), respectively (P<0.0001). Abscesses identified only on contrast sequences led to intervention in 8 additional children. No child with a final diagnosis of infection had a normal pre-contrast study.	3
5. Learch TJ. Imaging of infectious arthritis. *Semin Musculoskelet Radiol.* 2003;7(2):137-142.	Review/Other-Dx	N/A	Review imaging of patients with acute and chronic septic arthritis.	No results stated in abstract.	4
6. Bohndorf K. Infection of the appendicular skeleton. *Eur Radiol.* 2004;14 Suppl 3:E53-63.	Review/Other-Dx	N/A	To review imaging of acute, subacute and chronic osteomyelitis.	The diagnosis of acute osteomyelitis is often challenging but can best be made by correlating radiography, bone scintigraphy and MRI with clinical information. Radiography should routinely be supplemented by sonography in the newborns and infants, if applicable. Brodie's abscess, which is clinically a subacute form of osteomyelitis, is best diagnosed by the combination of radiography and MRI. Chronic osteomyelitis is divided into primary hematogenous forms and exogenous, mostly post-traumatic, osteomyelitis. In the majority of patients, post-traumatic osteomyelitis is a clinical diagnosis; however, in a number of patients only the correlation of clinical findings, blood tests and imaging reveals the correct diagnosis. Often, MRI and scintigraphic methods, such as scanning with labeled leucocytes, together establish the diagnosis.	4

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
7. Palestro CJ, Love C, Miller TT. Infection and musculoskeletal conditions: Imaging of musculoskeletal infections. *Best Pract Res Clin Rheumatol.* 2006;20(6):1197-1218.	Review/Other-Dx	N/A	To review imaging of musculoskeletal infections.	MRI is sensitive, provides superb anatomic detail, does not use ionizing radiation, and is rapidly completed. This technique is especially valuable for septic arthritis, spinal osteomyelitis, and diabetic foot infections. Among the radionuclide procedures, three-phase bone imaging is readily available, and very accurate in unviolated bone. Labeled leukocyte imaging should be used in cases of 'complicating osteomyelitis' such as prosthetic joint infections. This test is also useful in unsuspected diabetic pedal osteomyelitis and the neuropathic joint. Gallium imaging is a useful adjunct to MRI in spinal infection. FDG-PET will likely play an important role, especially in the evaluation of spinal infection.	4
8. Santiago Restrepo C, Gimenez CR, McCarthy K. Imaging of osteomyelitis and musculoskeletal soft tissue infections: current concepts. *Rheum Dis Clin North Am.* 2003;29(1):89-109.	Review/Other-Dx	N/A	To review imaging of osteomyelitis and musculoskeletal soft tissue infections.	Conventional radiography should always be the first imaging modality. Sonography is most useful in the diagnosis of fluid collections in a joint or in the extra-articular soft tissues but is not useful for evaluating presence of osseous infection. CT scan can be a useful method to detect early osseous erosion and to document the presence of sequestrum, foreign body, or gas formation but generally is less sensitive than other modalities for the detection of bone infection. Nuclear medicine and MRI are the most sensitive and most specific imaging modalities for the detection of osteomyelitis. Nuclear medicine is particularly useful in identifying multifocal involvement, which is common in children. MRI provides more accurate information of the local extent of the soft tissues and possible soft tissue abscess in patients with musculoskeletal infection.	4
9. Harmer JL, Pickard J, Stinchcombe SJ. The role of diagnostic imaging in the evaluation of suspected osteomyelitis in the foot: a critical review. *Foot (Edinb).* 2011;21(3):149-153.	Review/Other-Dx	N/A	To review the advantages and disadvantages of the main imaging techniques used for the evaluation of the foot when osteomyelitis is suspected.	An evidence based algorithm for the selection of appropriate imaging techniques is suggested to aid clinicians in their decision making process.	4

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
10. Collins MS, Schaar MM, Wenger DE, Mandrekar JN. T1-weighted MRI characteristics of pedal osteomyelitis. *AJR Am J Roentgenol.* 2005;185(2):386-393.	Observational-Dx	80 feet in 80 patients	To directly evaluate the reliability of primary T1 findings in surgically proven cases of pedal osteomyelitis.	Decreased T1 marrow signal in a geographic medullary distribution with a confluent pattern and concordance with fat-suppressed T2- and T1-weighted postcontrast signal abnormality was present in 100% of the surgically proven cases of pedal osteomyelitis. None of the patients with decreased T1 marrow signal in a subcortical distribution or in a hazy, reticulated pattern had surgically proven osteomyelitis regardless of the fat-suppressed T2-weighted or postcontrast T1-weighted findings.	3
11. Johnson PW, Collins MS, Wenger DE. Diagnostic utility of T1-weighted MRI characteristics in evaluation of osteomyelitis of the foot. *AJR Am J Roentgenol.* 2009;192(1):96-100.	Observational-Dx	74 examinations of 73 patients	To evaluate the diagnostic utility of specific characteristics on T1-weighted MRIs in the diagnosis of pedal osteomyelitis.	Images from 74 examinations were evaluated. In 20 cases, osteomyelitis was considered present, and in 54 it was presumed absent. In 19/20 cases (95%) in which osteomyelitis was considered present, marrow T1 signal intensity was decreased, in a medullary distribution, and in a confluent pattern in all cases. In 30/54 cases (56%) in which osteomyelitis was presumed absent, T1 signal intensity was decreased, but only 5 cases (9%) had a medullary distribution and confluent pattern. 23 cases (43%) had a hazy reticulated pattern, and 2 cases (4%) had only subcortical distribution. None of the cases with a subcortical distribution or hazy reticulated pattern of abnormal signal intensity had positive results for osteomyelitis. Confluent decreased T1 marrow signal intensity in a medullary distribution was 95% sensitive in the prediction of osteomyelitis with a specificity of 91%, negative predictive value of 98%, and PPV of 79%.	3
12. Buhne KH, Bohndorf K. Imaging of posttraumatic osteomyelitis. *Semin Musculoskelet Radiol.* 2004;8(3):199-204.	Review/Other-Dx	N/A	To review imaging of post-traumatic osteomyelitis.	Conventional radiography remains the cornerstone of imaging of acute and chronic osteomyelitis, but other modalities such as US, radionuclide studies, CT, and MRI may be necessary.	4

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
13. Fayad LM, Carrino JA, Fishman EK. Musculoskeletal infection: role of CT in the emergency department. *Radiographics*. 2007;27(6):1723-1736.	Review/Other-Dx	1,196 patients: 1,122 had suspected soft-tissue infection, and 74 had suspected bone infection	To examine the role of CT in the evaluation of musculoskeletal infections in the emergency department of a large inner-city hospital.	CT plays an important role in the assessment of potential musculoskeletal infections in the emergency department. CT provides an analysis of compartmental anatomy, thereby helping to distinguish among the various types of musculoskeletal infection and to guide treatment options.	4
14. Filippi L, Schillaci O. Usefulness of hybrid SPECT/CT in 99mTc-HMPAO-labeled leukocyte scintigraphy for bone and joint infections. *J Nucl Med.* 2006;47(12):1908-1913.	Observational-Dx	28 patients	To evaluate the usefulness of SPECT and transmission CT performed simultaneously using a hybrid imaging device for the functional anatomic mapping of bone and joint infections.	(99m)Tc-HMPAO scintigraphy was true-positive for infection in 18/28 patients (for a total of 21 sites of uptake) and true-negative in 10/28 subjects. SPECT/CT provided an accurate anatomic localization of all positive foci. With regard to the final diagnosis, SPECT/CT added a significant clinical contribution in 10/28 patients (35.7%). In fact, SPECT/CT differentiated soft-tissue from bone involvement both in patients with osteomyelitis and in patients with orthopedic implants, allowed correct diagnosis of osteomyelitis in patients with structural alterations after trauma, and identified synovial infection without prosthesis involvement in patients with a knee implant.	3
15. Horger M, Eschmann SM, Pfannenberg C, et al. The value of SPET/CT in chronic osteomyelitis. *Eur J Nucl Med Mol Imaging*. 2003;30(12):1665-1673.	Observational-Dx	27 patients	To evaluate the use of a combined SPECT/CT device to improve detection and anatomical definition of inflammatory bone lesions.	On a lesion-by-lesion basis 19 true positive, 1 false positive and 9 true negative findings were obtained. SPECT/CT correctly identified the location of all positive foci in the appendicular skeleton and that of a cold lesion in the axial skeleton. It also enabled differentiation between soft tissue infection, septic arthritis and osteomyelitis, as well as between cortical, corticomedullary and subperiosteal foci. Sensitivity was identical for SPECT and SPECT/CT (100%), whereas specificity was improved from 78% to 89% by the use of SPECT/CT. Combined SPECT/CT improves the accuracy of immunoscintigraphy by allowing correct differentiation between soft tissue infection and bone involvement.	3

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
16. Horger M, Eschmann SM, Pfannenberg C, et al. Added value of SPECT/CT in patients suspected of having bone infection: preliminary results. *Arch Orthop Trauma Surg.* 2007;127(3):211-221.	Observational-Dx	31 patients	To evaluate the contribution of SPECT/CT as an adjunct to combined three-phase bone scintigraphy (planar and SPECT) for diagnosing and localizing bone infection. Subsequently, the diagnostic performance of SPECT/CT was compared to visual fusion of SPECT with data of additional CT, X-ray, or MRI studies (SPECT + CT/X-ray/MRI).	Three-phase bone scan (incl. SPECT) correctly classified 7 lesions as positive and 11 lesions as negative for osteomyelitis. 6 scans were interpreted false positive, 2 false negative, and 5 as equivocal. Rating the latter as positive for osteomyelitis, sensitivity of bone scan was (78%), specificity (50%). SPECT/CT was true positive in 7 patients, and true negative in 19. There were 2 false positive and 2 false negative findings, 1 scan was equivocal (sensitivity 78%, specificity 86%). Definition of anatomical localization of inflammatory foci was much easier by SPECT/CT due to better depiction of underlying anatomical details. SPECT + CT/X-ray/MRI yielded the highest sensitivity (100% compared to 78% of SPECT/CT), if equivocal findings (5/31 compared to 1/31 for SPECT/CT) are rated as true positive for osteomyelitis. Among radiological techniques, MRI (2 x false positive) and CT (2 x false negative) proved equal and expectedly superior to X-ray in delivering the correct diagnosis.	3

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
17. van der Bruggen W, Bleeker-Rovers CP, Boerman OC, Gotthardt M, Oyen WJ. PET and SPECT in osteomyelitis and prosthetic bone and joint infections: a systematic review. *Semin Nucl Med.* 2010;40(1):3-15.	Review/Other-Dx	44 original articles; 1,634 patients (580 patients SPECT, 1,054 patients FDG-PET)	To review the literature on diagnostic accuracy and clinical value of SPECT and PET for imaging of bone and joint infections.	In 44 original articles (15 for SPECT and 29 for FDG-PET) on osteomyelitis and prosthetic bone and joint infection, 1,634 patients were included (580 patients SPECT, 1,054 patients FDG-PET). Level of evidence (Oxford criteria) was 2-3b. For SPECT, the highest diagnostic accuracy of 95% for diagnosis of bone and joint infections is achieved with combined (111)In-WBC and (99m)Tc-sulfur colloid. Acceptable diagnostic accuracy was also obtained with (99m)Tc-WBC or (111)In-WBC combined with (99m)Tc-methylene diphosphonate. FDG-PET is useful for diagnosis of osteomyelitis with a sensitivity and specificity generally over 95%. In patients with orthopedic implant infections, sensitivity varies widely from 28% to 91% and specificity from 9% to 97%. This variation in FDG-PET performance in orthopedic implant infections depends largely on the (use of different) criteria to diagnose infection. Determination of the best criteria is still a matter of debate.	4
18. Chacko TK, Zhuang H, Nakhoda KZ, Moussavian B, Alavi A. Applications of fluorodeoxyglucose positron emission tomography in the diagnosis of infection. *Nucl Med Commun.* 2003;24(6):615-624.	Observational-Dx	167 scans to evaluate 175 potential sites of infection	To assess the accuracy of FDG-PET in diagnosing infection in a large population of patients and in a variety of clinical circumstances where the performance of conventional imaging modalities has been questioned.	The overall accuracy of FDG-PET in evaluating orthopedic hardware was 96.2% for hip prosthesis, 81% for knee prosthesis, and 100% in 15 patients with other orthopedic devices. Among the patients in the sample suspected of having chronic osteomyelitis, the accuracy was 91.2%. FDG-PET was inaccurate in 3 cases of fever of unknown origin and accurate in all vascular graft and soft tissue infections. In 49 patients with a clinically apparent soft-tissue infection, FDG-PET was able to detect or exclude underlying osteomyelitis with an accuracy of 92.3%. Among the 23 patients who had recent orthopedic procedures, FDG-PET imaging was accurate in 87% of cases.	4

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
19. Crymes WB, Jr., Demos H, Gordon L. Detection of musculoskeletal infection with 18F-FDG PET: review of the current literature. *J Nucl Med Technol.* 2004;32(1):12-15.	Review/Other-Dx	7 articles; 273 cases of suspected musculoskeletal infection	Literature search was performed to determine the effectiveness of FDG-PET in the evaluation of musculoskeletal infection.	The current literature suggests that FDG-PET is a highly accurate method to detect musculoskeletal infection.	4
20. Wang GL, Zhao K, Liu ZF, Dong MJ, Yang SY. A meta-analysis of fluorodeoxyglucose-positron emission tomography versus scintigraphy in the evaluation of suspected osteomyelitis. *Nucl Med Commun.* 2011;32(12):1134-1142.	Meta-analysis	23 studies representing 851 examinations	To perform a meta-analysis to obtain a reliable estimate of the diagnostic performance of FDG-PET, three-phase bone scintigraphy, leukocyte scintigraphy, and monoclonal antigranulocyte antibody scintigraphy in the assessment of suspected osteomyelitis and to perform pairwise comparisons of the diagnostic accuracy between these different imaging modalities.	The FDG-PET had a pooled sensitivity of 0.923, specificity of 0.920, and AUC of 0.9666, whereas for bone scintigraphy, the corresponding values were 0.827, 0.446, and 0.6514, respectively, for leukocyte scintigraphy, the corresponding values were 0.742, 0.881, and 0.9139, respectively, and for monoclonal antigranulocyte antibody, the corresponding values were 0.883, 0.705, and 0.8897, respectively. The meta-analysis did not find statistically significant differences in the sensitivity, specificity, AUC, and Q* index between FDG-PET and leukocyte scintigraphy.	M
21. Bancroft LW. MR imaging of infectious processes of the knee. *Radiol Clin North Am.* 2007;45(6):931-941, v.	Review/Other-Dx	N/A	To review MRI of infectious processes of the knee.	MRI is useful in identifying cellulitis, abscess, septic arthritis, and osteomyelitis. The inherent tissue contrast provided by MRI allows for the delineation of soft-tissue infection and osteomyelitis. Therefore, MRI is a useful tool in evaluating the extent of infection, and in facilitating adequate debridement and drainage. MRI is particularly useful in the setting of chronic post-traumatic osteomyelitis and in prior surgical procedures, such as arthroscopy, anterior cruciate ligament reconstruction, and amputation.	4
22. Turecki MB, Taljanovic MS, Stubbs AY, et al. Imaging of musculoskeletal soft tissue infections. *Skeletal Radiol.* 2010;39(10):957-971.	Review/Other-Dx	N/A	To illustrate representative images of superficial and deep soft tissue infections such as infectious cellulitis, superficial and deep fasciitis, including the necrotizing fasciitis, pyomyositis/soft tissue abscess, septic bursitis and tenosynovitis on different imaging modalities, with emphasis on MRI. Typical histopathologic findings of soft tissue infections are also presented.	MRI is the imaging modality of choice in the evaluation of soft tissue infections. CT, US, radiography and nuclear medicine studies are considered ancillary.	4

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
23. Wilson DJ. Soft tissue and joint infection. *Eur Radiol.* 2004;14 Suppl 3:E64-71.	Review/Other-Dx	N/A	To review imaging of soft tissue infection.	US offers the best method of detecting early joint effusion and synovial thickening, but aspiration is usually required for diagnosis. In more advanced stages, CT is valuable for revealing destructive changes and MRI for documenting intra-articular changes and detecting inflammation in surrounding bone.	4
24. Yu JS, Habib P. MR imaging of urgent inflammatory and infectious conditions affecting the soft tissues of the musculoskeletal system. *Emerg Radiol.* 2009;16(4):267-276.	Review/Other-Dx	N/A	To review soft tissue infections and inflammatory conditions of the musculoskeletal system. The characteristic imaging findings of cellulitis, abscess formation, necrotizing fasciitis, pyomyositis, diabetic ischemic infarction, acute and exertional compartment syndromes, and rhabdomyolysis are emphasized as well as imaging factors that can help to differentiate these disorders.	MRI is currently the best imaging modality to evaluate these conditions.	4
25. Robben SG. Ultrasonography of musculoskeletal infections in children. *Eur Radiol.* 2004;14 Suppl 4:L65-77.	Review/Other-Dx	N/A	To emphasize the role of US in the diagnosis of various diseases in childhood, including cellulitis, subcutaneous abscess, necrotizing fasciitis, pyomyositis, infectious bursitis and arthritis, osteomyelitis, foreign bodies and infectious lymphadenitis.	Along with conventional radiography, US is a very valuable modality for early diagnosis and follow-up of musculoskeletal infections in children.	4
26. Jarraya M, Hayashi D, de Villiers RV, et al. Multimodality imaging of foreign bodies of the musculoskeletal system. *AJR Am J Roentgenol.* 2014;203(1):W92-102.	Review/Other-Dx	N/A	To clarify the most relevant points in managing suspected foreign bodies of the musculoskeletal system on the basis of a literature review and published reports with cases to illustrate each type on different imaging modalities.	Foreign bodies of the musculoskeletal system are a common problem in emergency departments, with more than a third missed in the initial clinical evaluation. These retained objects may result in various complications and also offer fertile ground for litigation.	4
27. Karchevsky M, Schweitzer ME, Morrison WB, Parellada JA. MRI findings of septic arthritis and associated osteomyelitis in adults. *AJR Am J Roentgenol.* 2004;182(1):119-122.	Observational-Dx	50 consecutive cases of septic arthritis in 38 patients	To describe the soft-tissue, synovial, and osseous MRI findings of septic arthritis.	The frequency of MRI findings in septic joints was as follows: synovial enhancement (98%), perisynovial edema (84%), joint effusions (70%), fluid outpouching (53%), fluid enhancement (30%), and synovial thickening (22%). The marrow showed bare area changes (86%), abnormal T2 signal (84%), abnormal gadolinium enhancement (81%), and abnormal T1 signal (66%). Associated osteomyelitis more often showed T1 signal abnormalities and was diffuse.	3

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
28. Zalavras CG, Rigopoulos N, Lee J, Learch T, Patzakis MJ. Magnetic resonance imaging findings in hematogenous osteomyelitis of the hip in adults. *Clin Orthop Relat Res.* 2009;467(7):1688-1692.	Review/Other-Dx	11 adult patients (12 hips)	To determine the extent of bone involvement and the presence of adjacent soft tissue abscesses in adults with hip osteomyelitis.	MRI revealed osteomyelitis distal to the femoral head in 7/12 hips with extension into the medullary canal in 3 of these 7. Femoral head erosions were present in 10 hips, acetabulum osteomyelitis in 11, and acetabular erosions in 6 hips. Infection extended into adjacent soft tissues in 8/12 hips. MRI demonstrated that the infection may extend distal to the femoral head or into the adjacent soft tissues. MRI may be useful for preoperative planning so that all regions affected by the infection can be treated.	4
29. Hauptfleisch J, Meagher TM, Hughes RJ, Singh JP, Graham A, Lopez de Heredia L. Interobserver agreement of magnetic resonance imaging signs of osteomyelitis in pelvic pressure ulcers in patients with spinal cord injury. *Arch Phys Med Rehabil.* 2013;94(6):1107-1111.	Observational-Dx	37 patients	To examine the interobserver reliability of MRI signs of osteomyelitis in complex chronic pressure ulcers in patients with spinal cord injury.	37 patients underwent 41 MRI scans. Concordance for marrow edema was 71% on both short tau inversion recovery and T1-weighted sequences, and for cortical erosion was 85%.	4
30. Kapoor A, Page S, Lavalley M, Gale DR, Felson DT. Magnetic resonance imaging for diagnosing foot osteomyelitis: a meta-analysis. *Arch Intern Med.* 2007;167(2):125-132.	Meta-analysis	16 studies	Meta-analysis was performed to determine the diagnostic test performance of MRI for osteomyelitis of the foot and compare this performance with that of Tc-99m bone scanning, plain radiography, and WBC studies.	In all studies combined, the diagnostic odds ratio for MRI was 42.1 (95% CI, 14.8–119.9), and the specificity at a 90% sensitivity cut point was 82.5%. The diagnostic odds ratio did not vary greatly among subsets of studies. In studies in which a direct comparison could be made with other technologies, the diagnostic odds ratio for MRI was consistently better than that for bone scanning (7 studies-149.9 vs 3.6), plain radiography (9 studies-81.5 vs 3.3), and WBC studies (3 studies-120.3 vs 3.4).	M
31. Schweitzer ME, Morrison WB. MR imaging of the diabetic foot. *Radiol Clin North Am.* 2004;42(1):61-71, vi.	Review/Other-Dx	N/A	To review MRI of the diabetic foot.	Recognition of these MRI patterns is important for formulation of an appropriate treatment plan.	4
32. Ertugrul MB, Baktiroglu S, Salman S, et al. The diagnosis of osteomyelitis of the foot in diabetes: microbiological examination vs. magnetic resonance imaging and labelled leucocyte scanning. *Diabet Med.* 2006;23(6):649-653.	Observational-Dx	31 patients	To determine the role of labelled leucocyte scanning, MRI and microbiological procedures in the diagnosis of osteomyelitis of the foot in diabetic patients.	Bone specimens were obtained for histopathological examination. Microbiology had a sensitivity of 92% and specificity of 60%. Labelled leucocyte scanning had a sensitivity of 91%, specificity of 67%, and MRI a sensitivity of 78%, specificity of 60%.	4

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33. Melkun ET, Lewis VL, Jr. Evaluation of (111) indium-labeled autologous leukocyte scintigraphy for the diagnosis of chronic osteomyelitis in patients with grade IV pressure ulcers, as compared with a standard diagnostic protocol. *Ann Plast Surg.* 2005;54(6):633-636.	Observational-Dx	11 patients	To evaluate the efficacy of indium scanning in the diagnosis of chronic osteomyelitis in spinal-cord-injury patients with grade IV pressure ulcers. The goal was to estimate the sensitivity and specificity of indium scanning as compared with diagnostic modalities previously evaluated by the principal investigator.	The sensitivity and specificity were 100% and 50%, respectively. Indium scanning appears to be more sensitive than specific. These data suggest that the value of indium scanning may primarily be to rule out osteomyelitis and not as a primary diagnostic modality.	4
34. Palestro CJ. FDG-PET in musculoskeletal infections. *Semin Nucl Med.* 2013;43(5):367-376.	Review/Other-Dx	N/A	To review role of FDG-PET in musculoskeletal infections.	FDG-PET (PET/CT) is assuming an increasingly important role in the diagnostic workup of musculoskeletal infection. FDG offers advantages over conventional radionuclide techniques.	4
35. Hartmann A, Eid K, Dora C, Trentz O, von Schulthess GK, Stumpe KD. Diagnostic value of 18F-FDG PET/CT in trauma patients with suspected chronic osteomyelitis. *Eur J Nucl Med Mol Imaging.* 2007;34(5):704-714.	Observational-Dx	33 patients	To retrospectively evaluate the diagnostic value of FDG-PET/CT in trauma patients with suspected chronic osteomyelitis.	Of 33 PET/CT scans, 17 were true positive, 13 true negative, 2 false positive and 1 false negative. 18 patients had chronic osteomyelitis and 15 had no osseous infection according to the reference standard. Sensitivity, specificity and accuracy for FDG-PET/CT was 94%, 87% and 91% for the whole group, 88%, 100% and 90% for the axial skeleton and 100%, 85% and 91% for the appendicular skeleton, respectively.	3

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
36. Termaat MF, Raijmakers PG, Scholten HJ, Bakker FC, Patka P, Haarman HJ. The accuracy of diagnostic imaging for the assessment of chronic osteomyelitis: a systematic review and meta-analysis. *J Bone Joint Surg Am.* 2005;87(11):2464-2471.	Meta-analysis	23 studies	To determine the accuracy of current imaging modalities in the diagnosis of chronic osteomyelitis.	Pooled sensitivity demonstrated that FDG-PET was the most sensitive technique, with a sensitivity of 96% (95% CI, 88% to 99%) compared with 82% (95% CI, 70% to 89%) for bone scintigraphy, 61% (95% CI, 43% to 76%) for leukocyte scintigraphy, 78% (95% CI, 72% to 83%) for combined bone and leukocyte scintigraphy, and 84% (95% CI, 69% to 92%) for MRI. Pooled specificity demonstrated that bone scintigraphy had the lowest specificity, with a specificity of 25% (95% CI, 16% to 36%) compared with 60% (95% CI, 38% to 78%) for MRI, 77% (95% CI, 63% to 87%) for leukocyte scintigraphy, 84% (95% CI, 75% to 90%) for combined bone and leukocyte scintigraphy, and 91% (95% CI, 81% to 95%) for FDG-PET. The sensitivity of leukocyte scintigraphy in detecting chronic osteomyelitis in the peripheral skeleton was 84% (95% CI, 72% to 91%) compared with 21% (95% CI, 11% to 38%) for its detection of chronic osteomyelitis in the axial skeleton. The specificity of leukocyte scintigraphy in the axial skeleton was 60% (95% CI, 39% to 78%) compared with 80% (95% CI, 61% to 91%) for the peripheral skeleton.	M
37. Balanika AP, Papakonstantinou O, Kontopoulou CJ, et al. Gray-scale and color Doppler ultrasonographic evaluation of reactivated post-traumatic/postoperative chronic osteomyelitis. *Skeletal Radiol.* 2009;38(4):363-369.	Observational-Dx	40 patients	To carry out a systematic assessment of gray-scale and color Doppler US findings of reactivated post-traumatic/postoperative chronic osteomyelitis in adults.	Statistically significant differences between patients with and without reactivated chronic osteomyelitis were found for fistulous tracts ($P<0.0001$), juxtacortical fluid collections ($P<0.001$) periosteal thickening ($P<0.01$), distension of pseudocapsule ($P<0.05$), and periosteal vascularity ($P<0.0001$). Low-resistance arterial flow of periosteal vessels presented the highest sensitivity (92%), specificity, and PPV (100%), yielding only 2 false negative results in 2 obese patients. Among gray-scale findings, the presence of a fistulous tract yielded the highest specificity and PPV (100%), whereas periosteal thickening was the most sensitive (92%), though not specific, finding (specificity 50%).	3

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Study Quality
38. Brown TL, Spencer HJ, Beenken KE, et al. Evaluation of dynamic [18F]-FDG-PET imaging for the detection of acute post-surgical bone infection. *PLoS One.* 2012;7(7):e41863.	Observational-Dx	36 rabbits	An established rabbit model was used to comprehensively compare alternative methods for the acquisition and analysis of FDG-PET data with a specific emphasis on distinguishing between infection and normal recuperative post-surgical inflammation during the therapeutically critical acute phase of infection.	Imaging was done 7 and 14 days after surgery with continuous data acquisition for a 90-minute period after administration of tracer. Results were evaluated based on both single and dual time point data analysis. The results suggest that the diagnostic utility of FDG-PET is likely limited to well-defined clinical circumstances.	2
39. Meller J, Sahlmann CO, Liersch T, Hao Tang P, Alavi A. Nonprosthesis orthopedic applications of (18)F fluoro-2-deoxy-D-glucose PET in the detection of osteomyelitis. *Radiol Clin North Am.* 2007;45(4):719-733, vii-viii.	Review/Other-Dx	N/A	To describe the impact of FDG-PET in the diagnosis of non-prosthesis-related orthopedic infections and inflammation.	FDG-PET has an excellent sensitivity in the detection of osteomyelitis. Early data indicate that FDG-PET may be more specific than MRI in diagnosing osteomyelitis. Early data from studies in rheumatoid arthritis indicate that FDG-PET is highly accurate in early diagnosis and that it provides results comparable to the most advanced conventional techniques.	4
40. Shiroff AM, Herlitz GN, Gracias VH. Necrotizing soft tissue infections. *J Intensive Care Med.* 2014;29(3):138-144.	Review/Other-Dx	N/A	To review imaging and management of necrotizing soft tissue infection.	Suspected cases should undergo early surgical exploration for diagnosis, which may be performed at bedside through a small incision. Most imaging techniques are not sufficiently specific to warrant a delay in surgical exploration. The Laboratory Risk Indicator for Necrotising Fasciitis (LRINEC) shows promise as a tool for excluding suspected cases. Successful outcomes in cases of necrotizing soft tissue infection require early and aggressive serial debridement and a multidisciplinary critical care approach.	4
41. Mirowitz SA. Fast scanning and fat-suppression MR imaging of musculoskeletal disorders. *AJR Am J Roentgenol.* 1993;161(6):1147-1157.	Review/Other-Dx	N/A	To review the most widely available techniques for performing rapid imaging and fat suppression and summarizes current clinical applications in musculoskeletal imaging.	No results stated in abstract.	4

Evidence Table Key

Study Quality Category Definitions

- *Category 1* The study is well-designed and accounts for common biases.
- *Category 2* The study is moderately well-designed and accounts for most common biases.
- *Category 3* There are important study design limitations.
- *Category 4* The study is not useful as primary evidence. The article may not be a clinical study or the study design is invalid, or conclusions are based on expert consensus. For example:
  a) the study does not meet the criteria for or is not a hypothesis-based clinical study (e.g., a book chapter or case report or case series description);
  b) the study may synthesize and draw conclusions about several studies such as a literature review article or book chapter but is not primary evidence;
  c) the study is an expert opinion or consensus document.
- M = Meta-analysis

Dx = Diagnostic

Tx = Treatment

Abbreviations Key

AHO = Acute hematogenous osteomyelitis

AUC = Area under the receiver operating characteristic curve

CI = Confidence interval

CT = Computed tomography

FDG-PET = Fluorine-18-2-fluoro-2-deoxy-D-glucose-positron emission tomography

MRI = Magnetic resonance imaging

PPV = Positive predictive value

SPECT = Single-photon-emission computed tomography

US = Ultrasound

WBC = White blood cell