American College of Radiology
ACR Appropriateness Criteria®

Chronic Hip Pain

<u>Variant: 1</u> Chronic hip pain. Initial Imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography pelvis	Usually Appropriate	☢☢
Radiography hip	Usually Appropriate	☢☢☢
US hip	Usually Not Appropriate	O
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	Usually Not Appropriate	Varies
MR arthrography hip	Usually Not Appropriate	O
MRI hip without and with IV contrast	Usually Not Appropriate	O
MRI hip without IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT arthrography hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

<u>Variant: 2</u> Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
US hip	Usually Appropriate	O
MRI hip without IV contrast	Usually Appropriate	O
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	May Be Appropriate	Varies
MR arthrography hip	Usually Not Appropriate	O
MRI hip without and with IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT arthrography hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

<u>Variant: 3</u> Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MR arthrography hip	Usually Appropriate	O
MRI hip without IV contrast	Usually Appropriate	O

Radiography hip additional views	May Be Appropriate	☢☢
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	May Be Appropriate	Varies
CT arthrography hip	May Be Appropriate	☢☢☢
CT hip without IV contrast	May Be Appropriate	☢☢☢
US hip	Usually Not Appropriate	O
MRI hip without and with IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

<u>Variant: 4</u> Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MR arthrography hip	Usually Appropriate	O
MRI hip without IV contrast	Usually Appropriate	O
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	May Be Appropriate	Varies
CT arthrography hip	May Be Appropriate	☢☢☢
US hip	Usually Not Appropriate	O
MRI hip without and with IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

<u>Variant: 5</u> Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MR arthrography hip	Usually Appropriate	O
MRI hip without IV contrast	Usually Appropriate	O
CT arthrography hip	May Be Appropriate	☢☢☢
US hip	Usually Not Appropriate	O
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	Usually Not Appropriate	Varies
MRI hip without and with IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

Variant: 6 Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MRI hip without and with IV contrast	Usually Appropriate	O
MRI hip without IV contrast	Usually Appropriate	O
CT arthrography hip	May Be Appropriate	☢☢☢
US hip	Usually Not Appropriate	O
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	Usually Not Appropriate	Varies
Image-guided aspiration hip	Usually Not Appropriate	Varies
MR arthrography hip	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

Variant: 7 Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures	Usually Appropriate	Varies
US hip	Usually Not Appropriate	O
MR arthrography hip	Usually Not Appropriate	O
MRI hip without and with IV contrast	Usually Not Appropriate	O
MRI hip without IV contrast	Usually Not Appropriate	O
Bone scan hip	Usually Not Appropriate	☢☢☢
CT arthrography hip	Usually Not Appropriate	☢☢☢
CT hip with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without and with IV contrast	Usually Not Appropriate	☢☢☢
CT hip without IV contrast	Usually Not Appropriate	☢☢☢
Fluoride PET/CT skull base to mid-thigh	Usually Not Appropriate	☢☢☢☢

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Summary of Literature Review

Introduction/Background

Chronic hip pain is a common chief complaint for patients, reportedly affecting 30% to 40% of adults who play sports [1,2], and 12% to 15% of all adults over 60 [3,4]. A wide variety of pathological entities may cause hip pain, including osseous as well as intra- or extra-articular soft tissue abnormalities [5-7]. Pathology involving the lumbar spine, sacroiliac, or knee joints can also cause hip pain [8], and these etiologies should be investigated as needed. There is limited original research that specifically targets the imaging of chronic hip pain, but imaging of specific conditions is widely discussed in the published literature.

Before imaging, an appropriate assessment of a patient's clinical history and physical examination is essential in trying to pare down the range of possible etiologies for a patient's symptoms. Important historical details include symptom duration, pain patterns (eg, activity or inactivity related, symptomatic worsening at night or in the morning), alleviating or exacerbating factors, and a sensation of locking or snapping. On physical examination, assessing a patient's range of motion, gait, and pain level using a variety of provocative maneuvers is usually performed. Following a history and physical examination, targeted imaging can play a vital role in distinguishing the etiologies of a patient's symptoms, thus allowing appropriate treatment of the patient's underlying condition.

Bone tumors—both malignant and benign—may be identified as part of the initial diagnostic evaluation of a patient presenting with chronic hip pain. A detailed discussion of the appropriate imaging workup of primary bone tumors is covered in the ACR Appropriateness Criteria® topic on "Primary Bone Tumors" [9]. Systemic disease may also manifest as chronic hip pain, and the appropriate imaging workup of patients with chronic joint pain thought to stem from infectious or inflammatory arthritis is covered in the ACR Appropriateness Criteria® topic on "Chronic Extremity Joint Pain-Suspected Inflammatory Arthritis" [10]. Osteonecrosis can also be a cause of chronic hip pain, and the appropriate imaging workup of patients with suspected osteonecrosis is included in the ACR Appropriateness Criteria® topic on "Osteonecrosis" [11].

Initial Imaging Definition

Initial imaging is defined as imaging at the beginning of the care episode for the medical condition defined by the variant. More than one procedure can be considered usually appropriate in the initial imaging evaluation when:

ere are procedures that are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care)

OR

ıere are complementary procedures (ie, more than one procedure is ordered as a set or simultaneously where each procedure provides unique clinical information to effectively manage the patient's care).

Discussion of Procedures by Variant

Variant 1: Chronic hip pain. Initial Imaging.

Variant 1: Chronic hip pain. Initial Imaging.
A. Bone scan hip

There is no relevant literature to support the use of bone scan of the hip in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
B. CT arthrography hip

There is no relevant literature to support the use of CT arthrography of the hip in the initial evaluation of chronic hip pain

Variant 1: Chronic hip pain. Initial Imaging.
C. CT hip with IV contrast

There is no relevant literature to support the use of CT hip with intravenous (IV) contrast in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
D. CT hip without and with IV contrast

There is no relevant literature to support the use of CT hip without and with IV contrast in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
E. CT hip without IV contrast

There is no relevant literature to support the use of CT of the hip without IV contrast in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
F. Fluoride PET/CT skull base to mid-thigh

There is no relevant literature to support the use of fluoride PET/CT skull base to mid-thigh in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

There is no relevant literature to support the use of image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
H. MR arthrography hip

There is no relevant literature to support the use of MR arthrography of the hip in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
I. MRI hip without and with IV contrast

There is no relevant literature to support the use of MRI of the hip without and with IV contrast in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
J. MRI hip without IV contrast

There is no relevant literature to support the use of MRI of the hip without IV contrast in the initial evaluation of chronic hip pain.

Variant 1: Chronic hip pain. Initial Imaging.
K. Radiography hip

The literature indicates that radiography is a first-line screening tool, and hip radiographs are useful in the initial imaging workup of chronic hip pain [12]. Oftentimes a pelvic radiograph, which includes imaging of both hips, may be obtained concurrently with additional dedicated collimated radiograph(s) of the affected hip(s). Findings on hip radiographs can result in an imaging diagnosis such as osteoarthritis or can lead to more advanced workups of less common causes of chronic hip pain such as primary bone tumors. The results of screening hip radiographs can help guide the use of additional imaging studies such as more specialized radiographic views or more advanced modalities such as CT, ultrasound (US), MRI, radionuclide bone scans, and fluoride PET [13-15].

Variant 1: Chronic hip pain. Initial Imaging.
L. Radiography pelvis

The literature indicates that radiography is a first-line screening tool, and pelvic radiographs are useful in the initial imaging workup of chronic hip pain [12]. A pelvic radiograph is an excellent initial examination because it allows for evaluation of both hip joints on a single radiographic image, allowing for comparison of the ipsilateral and contralateral hips. Oftentimes, a pelvic radiograph may be obtained concurrently with additional dedicated radiograph(s) of the affected hip. Findings on pelvic radiographs can result in an imaging diagnosis such as osteoarthritis or may lead to more advanced workups of less common causes of chronic hip pain such as primary bone tumors. The results of the pelvic radiograph can help the clinician for the selection of additional imaging techniques and for comparison with studies such as MRI, CT, radionuclide bone scans, and fluoride PET [13-15].

Variant 1: Chronic hip pain. Initial Imaging.
M. US hip

There is no relevant literature to support the use of US hip in the initial evaluation of chronic hip pain.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
A. Bone scan hip

There is no relevant literature to support the use of bone scan of the hip in the evaluation of extra-articular soft tissue abnormalities.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
B. CT arthrography hip

The instillation of intra-articular contrast may elucidate periarticular soft tissue abnormalities such as labral or capsular pathology [16-18]. However, CT arthrography is limited for evaluating the extra-articular soft tissue pathology because of the inherent poor soft tissue contrast of CT. Within the limitation of CT; however, some extra-articular pathologic entities, such as a large, distended bursa may be evident on CT. Tendinous pathology is not particularly well depicted on CT.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
C. CT hip with IV contrast

There is no relevant literature to support the use of CT hip with IV contrast in the evaluation of tendon or bursal pathology.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
D. CT hip without and with IV contrast

There is no relevant literature to support the use of CT hip without and with IV contrast in the evaluation of tendon or bursal pathology.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as

tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
E. CT hip without IV contrast

CT hip without IV contrast is of limited use in the evaluation of extra-articular soft tissue pathology because of the inherent poor soft tissue contrast of CT [18]. Within the limitation of the contrast resolution of CT, some extra-articular pathologic entities, such as a large, distended bursa may be evident on CT. Tendinous pathology is not well evaluated on CT.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
F. Fluoride PET/CT skull base to mid-thigh

There is no relevant literature to support the use of fluoride PET/CT skull base to mid-thigh in the evaluation of chronic hip pain thought to be due to a noninfectious extra-articular abnormality.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

Fluoroscopic-, CT-, or US-guided anesthetic and/or corticosteroid injections can be a useful tool for the diagnosis of chronic hip pain. In addition to intra-articular injections, selective trochanteric and iliopsoas bursal/peritendinous injections can be performed for diagnostic purposes using anesthetic and/or corticosteroid injectate, respectively. Symptomatic relief following selective injection of particular structure(s) can help to define the etiology of the patient's symptoms and guide future therapy [19-22].

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
H. MR arthrography hip

There is no relevant literature to support the use of MR arthrography in the evaluation of extra-articular soft tissue pathology.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
I. MRI hip without and with IV contrast

There is no relevant literature to support administration of IV contrast (gadolinium chelate agents) for routine MRI of the hip.

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
J. MRI hip without IV contrast

MRI without IV contrast is useful for evaluating soft tissues given its high soft tissue contrast resolution [23]. Numerous studies have demonstrated that MRI is both highly sensitive and specific for evaluation of the articular and periarticular soft tissues [24]. As such, noncontrast MRI should be considered as the next imaging test following radiographic evaluation of the hip joint [25-34]. Trochanteric, iliopsoas, ischial, and subiliacus bursitis are well demonstrated on noncontrast MRI, as are abductor and adductor tendinosis and tears, hamstring injuries, athletic pubalgia, and calcific tendinosis. Large field-of-view images obtained as part of a hip MRI can also sometimes reveal pathology of the spine, sacroiliac joints, or even the knee joint, which could be the source of a patient's chronic hip pain [35-37].

Variant 2: Chronic hip pain. Suspect noninfectious extra-articular abnormality, such as tendonitis or bursitis. Radiographs negative or nondiagnostic. Next imaging study.
K. US hip

The literature indicates that US is useful for the evaluation of extra-articular soft tissues in the region of the hip [23]. US can also nicely demonstrate fluid collections around the hip, such as bursitis and paralabral cysts. Tendon pathology, such as tendinosis, tears, or snapping iliopsoas tendons can also be identified with US [38-41]. US may also be useful for the dynamic evaluation of the iliopsoas tendon, such as in snapping hip syndrome.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

A. Bone scan hip

There is no relevant literature to support to the use of bone scan of the hip in the evaluation of suspected hip impingement.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

B. CT arthrography hip

Pathology associated with femoracetabular impingement (FAI) may be both intra- and extra-articular. CT is often used for preoperative assessment of bony anatomy in the setting of FAI and hip dysplasia [42-44]. CT arthrography has been shown to be sensitive for detection of acetabular labral tears [17], which may be associated with FAI. CT arthrography has also been shown to be more helpful in identifying chondral lesions [16] when compared to MRI. However, arthrography does not offer an advantage over noncontrast CT for the detection of extra-articular impingement (eg, ischiopelvic, ischiotrochanteric, subspinous, and femoropelvic).

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

C. CT hip with IV contrast

CT without IV contrast is often used for preoperative assessment of bony anatomy in the setting of FAI and hip dysplasia [42-44]. However, IV contrast administration does not confer an additional advantage for evaluation of hip impingement.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

D. CT hip without and with IV contrast

Noncontrast CT is often used for preoperative assessment of bony anatomy in the setting of FAI and hip dysplasia [42-44]. IV contrast administration is not warranted for evaluation of hip impingement.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.

E. CT hip without IV contrast

FAI is associated with both intra- and extra-articular pathology. Noncontrast CT is often used for preoperative assessment of bony anatomy in the setting of FAI and hip dysplasia [42-44]. CT without IV contrast is not; however, helpful in the assessment of the articular cartilage or labral status. Volume rendered 3-D reconstructions generated from noncontrast CT data are useful for quantifying the femoral head-neck morphology and providing a noninvasive assessment of hips at risk of FAI [62]. Some centers evaluate the shape and contours of the femoral neck by employing radial imaging or radial reconstructions. Software programs can use CT data to generate virtual models of the hip that can detect the presence of impingement throughout a hip's range of motion. CT can also be helpful in identifying extra-articular impingement (ischiopelvic, ischiotrochanteric, subspinous, and femoropelvic) [45,46]. Measurements can be performed on radiography, CT, and MRI [42-44,47,48]. Sometimes limited images of the knees may be obtained as part of the hip CT to evaluate for femoral version; occasionally knee pathology may be identified on these images as a possible cause of the patient's hip pain [49].

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
F. Fluoride PET/CT skull base to mid-thigh

One study demonstrated the potential use of fluoride PET to demonstrate increased bone turnover in the setting of chronic hip pain and FAI [50]. One other study demonstrated that fluoride PET can demonstrate acetabular contrecoup injuries in patients with FAI [51]. However, increased radiotracer uptake is a nonspecific finding, and, overall, there is insufficient literature to support the use of fluoride PET/CT skull base to mid-thigh in the evaluation of chronic hip pain thought to be due to hip impingement and/or dysplasia.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

Fluoroscopic-, CT-, or US-guided anesthetic and/or corticosteroid injections can be a useful tool for clarifying the source of a patient's chronic hip pain. In addition to intra-articular injections, selective trochanteric and iliopsoas bursal/peritendinous injections can be performed for both diagnostic or therapeutic purposes using anesthetic and/or corticosteroid injectate, respectively. Symptomatic relief following selective injection of particular structure(s) can help to define the etiology of the patient's symptoms and can guide future therapy [19-22].

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
H. MR arthrography hip

Direct MR arthrography, performed following the intra-articular injection of a 1:200 solution of gadolinium chelate in saline, is useful for diagnosing acetabular labral tears [65-70] that are frequently associated with FAI [71,72] and/or hip dysplasia. MR arthrography has been shown to have a sensitivity of 94.5% and a specificity of 100% for the detection of labral tears [52], which may be associated with FAI. Some authors have shown that MRI without IV contrast and MR arthrography are similarly accurate and sensitive for detecting labral tears in the setting of FAI [53], and other authors have shown that MR arthrography is superior to conventional MRI [54,55]. Several publications show that MR arthrography is superior to CT arthrography and noncontrast MRI for evaluation of labral tears [18,56], but there are other publications that demonstrate that CT arthrography and noncontrast MRI are superior [16,57-59]. MR arthrography may also nicely demonstrate acetabular chondral delamination [60]. Although MR arthrography can be useful for demonstrating labral and chondral pathology associated with impingement, the presence of intra-articular contrast offers no advantage over noncontrast MRI for the detection of extra-articular abnormalities associated with impingement.

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
I. MRI hip without and with IV contrast

Indirect arthrography is a technique that falls under the category of MRI hip with contrast. When administered intravenously, gadolinium chelate contrast can diffuse into the joint space via the synovium, and this results in indirect arthrography. There is limited literature supporting the use of indirect arthrography instead of direct MR arthrography for evaluating intra-articular disorders [34,61-63]. IV, rather than intra-articular, injection of contrast is faster and easier to perform and does not require image guidance, but indirect arthrography does not distend the joint capsule and results in less consistent enhancement of the joint space. The accuracy of indirect arthrography for evaluation of the acetabular labrum and articular cartilage remains uncertain. Because the literature supporting indirect arthrography is scant, it is a technique that is not often used clinically.

MRI without IV contrast is useful for evaluating the labrum and articular cartilage in the setting of FAI and/or dysplasia. It can even be used for the detailed assessment of osseous anatomy, such as the shape and contour of the femoral neck. A noncontrast MRI can demonstrate findings of extra-articular impingement as well. At times, indirect arthrography may be performed following noncontrast image acquisition in order to obtain a complementary assessment of the hip and its synovium.

Quantitative ultrastructural cartilage imaging may be helpful in determining a patient's suitability for and the potential timing of surgical intervention [64,65]. One of the techniques for ultrastructural cartilage imaging, delayed gadolinium-enhanced MRI of cartilage, is performed by administering IV contrast, having the patient exercise, and then scanning the patient after the contrast agent has localized in the articular cartilage [66,67].

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
J. MRI hip without IV contrast

FAI and dysplasia are associated with both intra- and extra-articular abnormalities, both osseous and soft tissue. The literature demonstrates that a noncontrast MRI is useful in the assessment of labral and cartilage lesions in the setting of hip impingement. Investigators have demonstrated success in detecting labral and articular cartilage lesions with high-resolution MRI of the hip at 1.5T without intra-articular contrast [58,68]. Additional literature has shown that high-resolution 3T MRI without IV contrast can further improve the visualization of the acetabular labrum and the articular cartilage of the femoral head and acetabulum [69,70].

Quantitative cartilage imaging may be helpful in determining a patient's suitability for and the potential timing of surgical intervention [64,65].

Evaluation of cortical bone is more difficult with conventional MRI than it is with CT, but the use of isotropic MR sequences has been shown to be effective in the evaluation of FAI [71]. Some centers routinely evaluate the shape and contours of the femoral neck by utilizing radial imaging or radial reconstructions. Additional research has shown that the zero-echo time pulse sequence offers excellent visualization of cortical bone on MRI without the need for contrast, and it has been shown to be an effective sequence for evaluating osseous hip morphology [72].

MRI can also be useful in detecting extra-articular impingements (ischiopelvic, ischiotrochanteric, subspinous, and femoropelvic) [45,46].

Although there is a paucity of supportive data, some surgeons may use both MRI and CT in order to define the soft tissues (labrum and articular cartilage) and the bone, respectively. Measurements can be performed on radiography, CT, and MRI [42-44,47,48].

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
K. Radiography hip additional views

For further evaluation of disorders such as dysplasia or FAI, specialized views such as the false profile or elongated femoral neck lateral (Dunn) views can provide more detailed evaluation of the anatomy of the femoral head and neck and the degree of acetabular coverage of the femoral head [47].

Variant 3: Chronic hip pain. Suspect impingement or dysplasia. Radiographs negative or nondiagnostic. Next imaging study.
L. US hip

In general, US is limited in its use for evaluating osseous structures. However, there is limited literature that demonstrates that US can be used to evaluate osseous features of FAI such as the alpha-angle [73]. However, US is not able to adequately evaluate osseous abnormalities deep to the cortex. One of the advantages of US is its ability to dynamically evaluate for extra-articular soft tissue impingement. US is not as sensitive as MRI or CT arthrography for the detection of labral tears [17], but it can be useful for the detection and localization of paralabral cysts for aspiration and injection [39,41].

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
A. Bone scan hip

There is no relevant literature to support the use of bone scan of the hip for the workup of an acetabular labral tear in a patient with chronic hip pain.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
B. CT arthrography hip

Some authors have shown that CT arthrography can be useful in the detection of acetabular labral tears [17,74], which may be associated with FAI, but other authors have shown that CT arthrography is not very good for the detection of labral tears [18].

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
C. CT hip with IV contrast

There is no relevant literature to support the use of CT hip with IV contrast for the workup of an acetabular labral tear in a patient with chronic hip pain.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
D. CT hip without and with IV contrast

There is no relevant literature to support the use of CT hip without and with IV contrast for the workup of an acetabular labral tear in a patient with chronic hip pain.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
E. CT hip without IV contrast

Because of its inherent poor contrast resolution, there is no relevant literature supporting the use of CT hip without IV contrast for the workup of an acetabular labral tear in a patient with chronic hip pain.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
F. Fluoride PET/CT skull base to mid-thigh

There is no relevant literature to support the use of fluoride PET/CT skull base to mid-thigh in the evaluation of chronic hip pain thought to be due to a labral tear.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

Diagnostic joint injections are safe and useful tools for confirming the etiology of pain, such as a labral tear or symptomatic paralabral cyst [20-22].

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
H. MR arthrography hip

Direct MR arthrography, with the intraarticular injection of a 1:200 solution of gadolinium chelate in saline, has been established as a reliable technique for diagnosing acetabular labral tears [75-80] that are frequently associated with FAI [81,82]. MR arthrography has been shown to have a sensitivity of 94.5% and a specificity of 100% for the detection of labral tears [52]. Within some of the published literature, MR arthrography has often been demonstrated to be superior to CT arthrography and noncontrast MRI for evaluation of labral tears [18,56]. However, in other articles, CT arthrography and noncontrast MRI fare better [16,57-59].

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
I. MRI hip without and with IV contrast

Indirect arthrography is a technique that falls under the category of MRI hip with contrast. For performance of indirect MR arthrography, gadolinium chelate contrast is administered by IV injection and diffuses into the joint space through the synovium. This technique has been proposed as an alternative to direct MR arthrography for detecting intra-articular disorders [34,61-63] because it is faster and easier to perform than direct arthrography and does not require image guidance. However, indirect arthrography offers less consistent enhancement of the joint space and cannot distend the joint capsule. Although the literature is scant, there are a few small studies suggesting that indirect MR arthrography may be helpful in detecting labral pathology [83,84]. However, as the literature supporting indirect arthrography is very limited, it is a technique that is not often used clinically.

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
J. MRI hip without IV contrast

MRI is currently the reference standard for evaluation of labral pathology [85]. For evaluating labral tears, MRI with or without arthrography can be used [76-79]. Several investigators suggest that high-resolution 3T MRI may improve the visualization of the acetabular labrum and the hyaline articular cartilage [69,70], which may obviate the need for intra-articular contrast [86]. Other investigators have obtained satisfactory results in detecting labral and hyaline cartilage lesions with high-resolution MRI of the hip at 1.5T without intra-articular contrast [58,68].

Variant 4: Chronic hip pain. Suspect labral tear. Radiographs negative or nondiagnostic. Next imaging study.
K. US hip

Although not as commonly used as MRI for the detection of labral pathology, US has been able to document the presence of labral tears in patients with hip pain [87,88]. However, it is not as sensitive as other modalities for detecting labral tears [17]. US can also be used to localize paralabral cysts for aspiration and injection [39,41].

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
A. Bone scan hip

There is no relevant literature to support the use of bone scan of the hip in the assessment of the extent of cartilage damage in a patient with chronic hip pain.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
B. CT arthrography hip

Direct visualization of articular cartilage is possible using those imaging techniques that provide either intrinsic contrast (MRI and US) or extrinsic contrast (any type of arthrography) [89]. Hip cartilage abnormalities can be successfully evaluated by high-resolution CT arthrography [18,90-93], thus allowing for improved assessment of the degree of cartilage loss when compared with the initial radiographs.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
C. CT hip with IV contrast

Because of its inherent poor soft tissue contrast resolution, there is no relevant literature to support the use of CT hip with IV contrast in the assessment of the extent of cartilage damage in a patient with chronic hip pain.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
D. CT hip without and with IV contrast

Because of its inherent poor soft tissue contrast resolution, there is no relevant literature to support the use of CT hip without and with IV contrast in the assessment of the extent of cartilage damage in a patient with chronic hip pain.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
E. CT hip without IV contrast

Because of its inherent poor soft tissue contrast resolution, there is no relevant literature to support the use of CT hip without IV contrast in the assessment of the extent of cartilage damage in a patient with chronic hip pain.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
F. Fluoride PET/CT skull base to mid-thigh

There is no relevant literature to support the use of fluoride PET/CT skull base to mid-thigh in the assessment of the extent of cartilage damage in a patient with chronic hip pain.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

Although image-guided anesthetic and/or corticosteroid injections may be useful in the diagnosis and treatment of patients with osteoarthritis, it does not offer the possibility of evaluating the extent of cartilage damage that may exist in a joint. Image-guided therapeutic injections have not been shown to alter patient reported outcome measures [94].

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
H. MR arthrography hip

Direct visualization of articular cartilage is possible on MRI because of its intrinsic excellent soft tissue contrast resolution. Intra-articular administration of contrast can also help with the direct visualization of articular cartilage [89]. MR arthrography has been shown to have high sensitivity and fair specificity of 92.5% and 54.5%, respectively, for the detection of chondral pathology in the setting of FAI [52]. A lower sensitivity for the detection of chondral pathology has been reported for the detection of hip articular cartilage defects in a more generalized group of patients [55]. Assessment of the T2* relaxation time is not affected by the presence of intra-articular gadolinium injection [95], and, although more commonly used for research purposes, T2* may be used to assess cartilage ultrastructure.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
I. MRI hip without and with IV contrast

Indirect arthrography falls under the technique of MRI hip with IV contrast. The diagnostic accuracy of indirect MR arthrography has not been widely studied [96], and, as such, there is insufficient literature to support the use of MRI with IV contrast in assessment for the degree of cartilage damage. IV contrast administration can; however, help to demonstrate the degree of enhancing inflamed synovium. Delayed gadolinium-enhanced MRI of cartilage may be useful in assessing the degree of hip cartilage damage, but this is most frequently employed in the research setting [97]. Overall, given the scant literature supporting indirect arthrography, this is a technique that is not often used clinically.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
J. MRI hip without IV contrast

Direct visualization of articular cartilage is possible on MRI because of its intrinsic excellent soft tissue contrast resolution [89]. MRI can demonstrate the articular cartilage and areas of chondral pathology [18,91,93]. MRI has been shown to be 85.92% accurate for identification of acetabular chondral rim lesions when compared to arthroscopy [85]. Various MRI techniques such as T2 mapping, T1rho, and sodium imaging allow for the ultrastructural assessment of articular cartilage [98]. Although these techniques are primarily used in the research setting, some have also been applied in the routine evaluation of clinical patients.

Variant 5: Chronic hip pain. Radiographs equivocal or positive for mild osteoarthritis. Evaluate articular cartilage integrity. Next imaging study.
K. US hip

US is limited in the hip by its inability to evaluate the acetabular or the majority of the femoral head cartilage. The acoustic window to see articular cartilage in the hip is limited.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor,

osteochondromatosis, other synovial neoplasm. Next imaging study.
A. Bone scan hip

There is no relevant literature to support the use of bone scan of the hip in the assessment of the intra-articular synovial hyperplasia/neoplasia in a patient with chronic hip pain.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
B. CT arthrography hip

CT arthrography may be helpful in evaluating whether there are intra-articular bodies or hypertrophic synovium.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
C. CT hip with IV contrast

There is no relevant literature to support the use of CT hip with IV contrast for the workup of synovial hyperplasia/neoplasia in a patient with chronic hip pain.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
D. CT hip without and with IV contrast

It can be quite difficult to distinguish diffuse tenosynovial giant cell tumor from synovial chondromatosis and other proliferative synovial processes on imaging. CT without IV contrast might help to detect calcification. However, there is no added benefit of administering IV contrast for the diagnosis of a synovial proliferative process.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
E. CT hip without IV contrast

Intra-articular sources of pain such as synovitis, whether inflammatory (eg, Lyme disease), proliferative (eg, synovial chondromatosis), or neoplastic (eg, chondroma), are well demonstrated on MRI. It can be quite difficult to distinguish tenosynovial giant cell tumor from synovial chondromatosis and other proliferative synovial processes, although CT might help to detect subtle calcifications, which can sometimes be seen with synovial chondromatosis but are not typically seen in the setting of tenosynovial giant cell tumor.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
F. Fluoride PET/CT skull base to mid-thigh

There is no relevant literature to support the use of fluoride PET/CT skull base to mid-thigh in the assessment of the intra-articular synovial hyperplasia/neoplasia in a patient with chronic hip pain.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

There is no relevant literature to support the use of image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures in the assessment of the intra-articular synovial hyperplasia/neoplasia in a patient with chronic hip pain.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
H. Image-guided aspiration hip

Image-guided aspiration/injections demonstrate brown or bloody aspirate in patients with the diffuse form of tenosynovial giant cell tumor [99,100]. The diagnosis of synovial hyperplasia/neoplasia may require a tissue sample.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
I. MR arthrography hip

Instillation of intra-articular contrast may be helpful in elucidating whether a body/bodies are intra-articular. However, in cases in which precise intra-articular pathology is still unknown and neoplasm remains a consideration, histologic sampling of the neoplastic process is probably indicated before instillation of contrast into the joint to avoid unintended harm.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
J. MRI hip without and with IV contrast

MRI hip with IV contrast administration may be helpful in distinguishing enhancing inflamed synovium from a bland joint effusion.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
K. MRI hip without IV contrast

Intra-articular sources of pain such as synovitis, whether inflammatory (eg, Lyme disease), proliferative (eg, synovial chondromatosis), or neoplastic (eg, chondroma), are well demonstrated on MRI. It can be quite difficult to distinguish tenosynovial giant cell tumor from synovial chondromatosis and other proliferative synovial processes. MRI, including a gradient-echo sequence, may be useful in assessing for blooming, which would indicate the presence of hemosiderin, such as can be seen in tenosynovial giant cell tumor.

Variant 6: Chronic hip pain. Radiographs suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, other synovial neoplasm. Next imaging study.
L. US hip

There is no relevant literature to support the use of diagnostic US hip in the assessment of the intra-articular synovial hyperplasia/neoplasia in a patient with chronic hip pain.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs

demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

A. Bone scan hip

Although a bone scan of the hip may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

B. CT arthrography hip

Hip cartilage abnormalities can be successfully evaluated by high-resolution CT arthrography [18,90-93]. Visualization of the degree of cartilage loss does not enable quantification of the amount of pain that is generated by the patient's hip pathology. However, the injection of an anesthetic agent along with the contrast that is administered for arthrography may help determine whether intra-articular pathology can account for the patient's symptoms [13].

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

C. CT hip with IV contrast

Although CT hip with IV contrast may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

D. CT hip without and with IV contrast

Although CT hip without and with IV contrast may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

E. CT hip without IV contrast

Although CT hip without IV contrast may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

F. Fluoride PET/CT skull base to mid-thigh

Although fluoride PET/CT skull base to mid-thigh may be able to demonstrate pathology about the hip, knee, and spine, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.

G. Image-guided anesthetic +/- corticosteroid injection hip joint or surrounding structures

Fluoroscopic-, CT-, or US-guided anesthetic and/or corticosteroid injections can be a useful tool for the diagnosis of chronic hip pain. In addition to intra-articular injections, selective trochanteric and iliopsoas bursal/peritendinous injections can be performed for diagnostic purposes using anesthetic and/or corticosteroid injectate. Symptomatic relief following selective injection of particular structure(s) can help to define the etiology of the patient's symptoms and guide future therapy [19-22].

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.
H. MR arthrography hip

Although MR arthrography hip may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology. If anesthetic is mixed with the contrast that is injected into the joint, this may help determine whether the patient's symptoms are the result of intra-articular pathology [13].

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.
I. MRI hip without and with IV contrast

Although MRI hip without and with IV contrast may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.
J. MRI hip without IV contrast

Although MRI hip without IV contrast may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Variant 7: Chronic hip pain with low back or knee pathology or pain. Radiographs demonstrate hip osteoarthritis. Want to quantify amount of pain related to the hip. Next imaging study.
K. US hip

Although US hip may be able to demonstrate pathology about the hip, it cannot be used to quantify the amount pain that is generated from the hip pathology.

Summary of Highlights

riant 1: Radiography pelvis and Radiography hip are usually appropriate for the initial imaging of chronic hip pain. These procedures are complementary (ie, more than one procedure is ordered as a set or simultaneously in which each procedure provides unique clinical information to effectively manage the patient's care).

riant 2: In the setting of chronic hip pain with negative or nondiagnostic radiographs, MRI hip without IV contrast or US hip is usually appropriate as the next imaging study for suspected noninfectious extra-articular abnormality, such as tendonitis or bursitis. These procedures are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care).

riant 3: In the setting of chronic hip pain with negative or nondiagnostic radiographs, MR arthrography hip or MRI hip without IV contrast is usually appropriate as the next imaging study for suspected impingement or dysplasia. These procedures are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care).

riant 4: In the setting of chronic hip pain with negative or nondiagnostic radiographs, MR arthrography hip or MRI hip without IV contrast is usually appropriate to evaluate for a labral tear. These procedures are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care).

ariant 5: In the setting of chronic hip pain with equivocal or mild osteoarthritis by radiographs, MR arthrography hip or MRI hip without IV contrast is usually appropriate as the next imaging study to assess articular cartilage integrity. These procedures are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care).

riant 6: In the setting of chronic hip pain, MRI hip without and with IV contrast or MRI hip without IV contrast is usually appropriate as the next imaging study when radiographs are suspicious for intra-articular synovial hyperplasia or neoplasia, including nodular synovitis, diffuse tenosynovial giant cell tumor, osteochondromatosis, or other synovial neoplasm. These procedures are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care).

riant 7: In the setting of concomitant chronic hip pain with low back or knee pathology or pain, Image-guided anesthetic +/- corticosteroid injection of the hip joint or surrounding structures is usually appropriate as the next imaging study to quantify the amount of pain arising from the hip when radiographs also demonstrate hip osteoarthritis.

Supporting Documents

The evidence table, literature search, and appendix for this topic are available at https://acsearch.acr.org/list. The appendix includes the strength of evidence assessment and the final rating round tabulations for each recommendation.

For additional information on the Appropriateness Criteria methodology and other supporting documents, please go to the ACR website at https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Appropriateness-Criteria.

Safety Considerations in Pregnant Patients

Appropriateness Category Names and Definitions

Appropriateness Category Name	Appropriateness Rating	Appropriateness Category Definition
Usually Appropriate	7, 8, or 9	The imaging procedure or treatment is indicated in the specified clinical scenarios at a favorable risk-benefit ratio for patients.
May Be Appropriate	4, 5, or 6	The imaging procedure or treatment may be indicated in the specified clinical scenarios as an alternative to imaging procedures or treatments with a more favorable risk-benefit ratio, or the risk-benefit ratio for patients is equivocal.
May Be Appropriate (Disagreement)	5	The individual ratings are too dispersed from the panel median. The different label provides transparency regarding the panel's recommendation. "May be appropriate" is the rating category and a

		rating of 5 is assigned.
Usually Not Appropriate	1, 2, or 3	The imaging procedure or treatment is unlikely to be indicated in the specified clinical scenarios, or the risk-benefit ratio for patients is likely to be unfavorable.

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radiologist in light of all the circumstances presented in an individual examination.

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