

ACR Appropriateness Criteria® Chronic Knee Pain: Update 2026

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Abstract

Chronic knee pain is prevalent in the adult population and is the most common musculoskeletal complaint in the primary care setting. Although osteoarthritis is the most common etiology of chronic knee pain, other sources include osteochondral lesion, subchondral insufficiency fracture, patellofemoral maltracking, or chronic tendon, meniscus, or ligament abnormalities. Imaging plays a key role in the evaluation of chronic knee pain, noting that the etiology cannot be reliably diagnosed or excluded via physical examination alone. Radiographs are the initial imaging modality of choice for chronic knee pain. If radiographs demonstrate osteoarthritis, this document outlines specific scenarios in which additional imaging may be warranted. This document also discusses the appropriate imaging workup for the other entities described above, including soft tissue abnormalities and subchondral insufficiency fracture.

The American College of Radiology Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed annually by a multidisciplinary expert panel. The guideline development and revision process support the systematic analysis of the medical literature from peer reviewed journals. Established methodology principles such as Grading of Recommendations Assessment, Development, and Evaluation or GRADE are adapted to evaluate the evidence. The RAND/UCLA Appropriateness Method User Manual provides the methodology to determine the appropriateness of imaging and treatment procedures for specific clinical scenarios. In those instances where peer reviewed literature is lacking or equivocal, experts may be the primary evidentiary source available to formulate a recommendation.

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The ACR Appropriateness Criteria documents are updated regularly. Please go to the ACR website at <https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Appropriateness-Criteria> to confirm that you are accessing the most current content.

Disclaimer: The ACR Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the FDA have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

Key Words: Appropriateness Criteria, Appropriate Use Criteria, AUC, chronic, CT, imaging, knee pain, MRI, radiographs

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ACR Appropriateness Criteria® Chronic Knee Pain: Update 2026. [Variants 1 to 5](#) and [Tables 1 and 2](#).

Variant 1. Adult. Chronic knee pain. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography knee	Usually Appropriate	☢
US knee	Usually Not Appropriate	○
MR arthrography knee	Usually Not Appropriate	○
MRI knee without and with IV contrast	Usually Not Appropriate	○
MRI knee without IV contrast	Usually Not Appropriate	○
CT arthrography knee	Usually Not Appropriate	☢
CT knee with IV contrast	Usually Not Appropriate	☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
CT knee without IV contrast	Usually Not Appropriate	☢
Bone scan knee	Usually Not Appropriate	☢☢☢

Variant 2. Adult. Chronic knee pain. Radiographs show osteoarthritis. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MRI knee without IV contrast	May Be Appropriate	○
CT knee without IV contrast	May Be Appropriate	☢
US knee	Usually Not Appropriate	○
MR arthrography knee	Usually Not Appropriate	○
MRI knee without and with IV contrast	Usually Not Appropriate	○
CT arthrography knee	Usually Not Appropriate	☢
CT knee with IV contrast	Usually Not Appropriate	☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
Bone scan knee	Usually Not Appropriate	☢☢☢

Variant 3. Adult. Chronic knee pain. Radiographs performed. Suspect abnormality of tendon or meniscus or ligament. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MRI knee without IV contrast	Usually Appropriate	○
US knee	Usually Not Appropriate	○
MR arthrography knee	Usually Not Appropriate	○
MRI knee without and with IV contrast	Usually Not Appropriate	○
CT arthrography knee	Usually Not Appropriate	☢
CT knee with IV contrast	Usually Not Appropriate	☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
CT knee without IV contrast	Usually Not Appropriate	☢
Bone scan knee	Usually Not Appropriate	☢☢☢

Variant 4. Adult. Chronic knee pain. Radiographs performed. Suspect osteochondral lesion or subchondral insufficiency fracture. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
MRI knee without IV contrast	Usually Appropriate	○
MR arthrography knee	May Be Appropriate	○
US knee	Usually Not Appropriate	○
MRI knee without and with IV contrast	Usually Not Appropriate	○
CT arthrography knee	Usually Not Appropriate	☢
CT knee with IV contrast	Usually Not Appropriate	☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
CT knee without IV contrast	Usually Not Appropriate	☢
Bone scan knee	Usually Not Appropriate	☢☢☢

Variant 5. Adult. Chronic knee pain. Radiographs performed. Suspect patellofemoral maltracking. Next imaging study

Procedure	Appropriateness Category	Relative Radiation Level
MRI knee without IV contrast	Usually Appropriate	○
CT knee without IV contrast	May Be Appropriate	☢
US knee	Usually Not Appropriate	○
MR arthrography knee	Usually Not Appropriate	○
MRI knee without and with IV contrast	Usually Not Appropriate	○
CT arthrography knee	Usually Not Appropriate	☢
CT knee with IV contrast	Usually Not Appropriate	☢
CT knee without and with IV contrast	Usually Not Appropriate	☢
Bone scan knee	Usually Not Appropriate	☢☢☢

Table 1. 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.

Table 2. Relative radiation level designations

RRL	Adult Effective Dose Estimate Range (mSv)	Pediatric Effective Dose Estimate Range (mSv)
0	0	0
⊕	<0.1	<0.03
⊕⊕	0.1-1	0.03-0.3
⊕⊕⊕	1-10	0.3-3
⊕⊕⊕⊕	10-30	3-10
⊕⊕⊕⊕⊕	30-100	10-30

Note: Relative radiation level (RRL) assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (eg, region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "varies."

SUMMARY OF LITERATURE REVIEW

Introduction/Background

A growing number of individuals in the United States are affected by chronic knee pain. An increase of the aging population and obesity are most frequently cited as underlying causes for this growing prevalence [1,2]. There are many causes of chronic knee pain, with osteoarthritis being the most common and should be considered in each individual presenting with knee pain.

Chronic knee pain occurs in >25% of all individuals over 45 years of age in the United States and is the most common musculoskeletal complaint in the primary care setting [3]. Although we frequently associate chronic knee pain with osteoarthritis, a number of other conditions may either be co-existent or be the primary source of chronic pain.

Imaging, such as radiography, may be performed in the evaluation of chronic knee pain. If the initial imaging is normal but there are ongoing symptoms or initial imaging shows abnormalities such as a joint effusion, subchondral

fracture, or osteochondral injury, further imaging may be indicated. Abnormalities of the cartilage, menisci, tendons, or ligaments can all be symptomatic but may not be evident radiographically. The accurate diagnosis and treatment of these conditions is important in preventing the development of osteoarthritis, and as such additional imaging beyond radiographs may be recommended.

In this document we aim to provide guidance for appropriate imaging in patients presenting with chronic knee pain. Please note that there are several other guidelines pertaining to the imaging evaluation of patients with knee symptoms. To evaluate knee pain associated with other conditions, please refer to the following ACR Appropriateness Criteria® topics on: "Chronic Extremity Joint Pain-Suspected Inflammatory Arthritis, Crystalline Arthritis, or Erosive Osteoarthritis", for patient with suspected inflammatory arthritis or synovitis [4], "Acute Trauma to the Knee" for acute knee injuries [5], "Imaging After Total Knee Arthroplasty" for patients with total knee arthroplasty [6], "SoftTissue Masses" for a patient

with a suspected soft-tissue mass [7], “Suspected Primary Bone Tumors” for a patient with a suspected or known bone tumor [8], “Osteonecrosis” [9] for osteonecrosis at the knee, and “Suspected Osteomyelitis, Septic Arthritis, or Soft Tissue Infection (Excluding Spine and Diabetic Foot)” for a suspected bone or soft tissue infection in the musculoskeletal system [10].

SPECIAL IMAGING CONSIDERATIONS

Ideally, in individuals with chronic knee pain, radiography will be performed standing, as this may better display medial and/or lateral compartmental joint space narrowing, best assessed both on frontal (anteroposterior or Rosenberg) views and lateral views. Weight-bearing radiographs show correlations with the cartilage thickness on MRI and more specifically with greater full thickness cartilage loss at the medial compartment and osteoarthritis pain scores ($P < .001$) [11-13]. A merchant or sunrise view can also be complementary to the lateral view in assessing the patellofemoral compartment and should be part of the radiographic series [14].

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:

- There 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

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

DISCUSSION OF PROCEDURES BY VARIANT

Variant 1: Adult. Chronic knee pain. Initial imaging

In patients with chronic knee pain, imaging is often indicated to assess for common causes of symptoms, which may include arthritis or prior trauma. The radiographic diagnosis of osteoarthritis is confirmed by identifying joint space narrowing, osteophyte formation, subchondral cysts, and sclerosis [15]. The severity of osteoarthritis may be graded by a variety of ways, with the most common being the use of the Kellgren-Lawrence classification, with osteoarthritis graded from 0 (none) to 4 (severe) [16].

Articular cartilage is evaluated indirectly on radiographs by joint space narrowing and changes in the subchondral

bone. When a severe varus or valgus deformity is present, significant cartilage loss in the apparently “wider” compartment may not be evident. Conversely joint space narrowing may be caused by meniscal extrusion or degeneration rather than cartilage loss.

Chronic knee pain is associated with radiographic demonstration of periarticular osteophytes with the development of nonuniform joint space narrowing. Joint space narrowing is progressive, culminating with “bone-on-bone” end-stage appearance or complete joint space loss on subsequent radiographs, indicating progression of osteoarthritis and potential need for arthroplasty.

Radiography Knee. Radiography is the most useful initial imaging modality in patients with chronic knee pain. Radiographs may show findings of osteoarthritis, including osteophytes, subchondral cysts, and joint space narrowing. Radiographs not only may help confirm the clinical suspicion of osteoarthritis associated knee pain, but may also serve as a baseline study for future comparisons that may guide treatment decisions, including surgery. More specifically, the progression of medial compartment joint space narrowing is associated with knee pain, with the radiographic progression of osteoarthritis showing a 5-fold greater likelihood to undergo total knee arthroplasty within 2 years [17-22].

Radiographs may also show soft tissue findings such as a joint effusion, tendon thickening, or soft tissue swelling that may warrant further investigation.

US Knee. There is no relevant literature to support the use of ultrasound (US) of the knee as the initial imaging modality in patients with chronic knee pain.

MR Arthrography Knee. There is no relevant literature to support the use of MR arthrography of the knee as the initial imaging modality in patients with chronic knee pain.

MRI Knee Without and With IV Contrast. There is no relevant literature to support the use of MRI of the knee without and with intravenous (IV) contrast as the initial imaging modality in patients with chronic knee pain.

MRI Knee Without IV Contrast. There is no relevant literature to support the use of MRI of the knee without IV contrast as the initial imaging modality in patients with chronic knee pain. See additional variants below for further discussion.

CT Arthrography Knee. There is no relevant literature to support the use of CT arthrography of the knee as the initial imaging modality in patients with chronic knee pain.

CT Knee With IV Contrast. There is no relevant literature to support the use of CT of the knee with IV contrast as the initial imaging modality in patients with chronic knee pain.

CT Knee Without and With IV Contrast. There is no relevant literature to support the use of CT of the knee without and with IV contrast as the initial imaging modality in patients with chronic knee pain.

CT Knee Without IV Contrast. There is no relevant literature to support the use of CT of the knee without IV contrast as the initial imaging modality in patients with chronic knee pain.

Bone Scan Knee. There is no relevant literature to support the use of bone scintigraphy as the initial imaging modality in patients with chronic knee pain.

Variant 2: Adult. Chronic knee pain. Radiographs show osteoarthritis. Next imaging study

In patients with chronic pain and signs of osteoarthritis on radiographs, further imaging may be indicated to further characterize the extent of arthritis or elucidate other reasons for chronic pain.

In patients in whom radiographs show advanced osteoarthritis (ie, Kellgren-Lawrence grade 4), MRI is unlikely to change patient management. However, if the radiographs show minimal osteoarthritis (Kellgren-Lawrence grade 0-1), MRI may change management in 70% of patients, demonstrating meniscal tears or subchondral fractures [23]. Please see subsequent variants for further discussion for the evaluation of meniscal tears and subchondral fractures.

MRI Knee Without IV Contrast. If the radiographs show osteoarthritis, further evaluation with noncontrast MRI may be indicated if the radiographs do not explain the patient's symptoms (eg, the patient's pain does not match the severity or compartment localization of the radiographic osteoarthritis is needed) or may be helpful for surgical treatment planning. MRI may not change the nonoperative management of radiographically severe (Kellgren-Lawrence grade 4) osteoarthritis, but one study demonstrated that MRI changed management in 24% of chronic knee pain patients over 60 years of age and 70% of those with Kellgren-Lawrence grade 0-1 osteoarthritis [23].

CT Knee Without IV Contrast. Literature supporting the use of CT of the knee without IV contrast in patients with radiographically confirmed osteoarthritis is limited to preoperative planning (ie, knee arthroplasty). Preoperative CT in these patients for the use of 3-D modeling techniques has been shown to result in improved postoperative physical function, pain, and minimal complications versus manual total knee arthroplasties [24].

US Knee. There is limited evidence to support the use of US in the setting of radiographically confirmed osteoarthritis. US

poorly evaluates the menisci, subchondral bone, and articular cartilage. US has the potential to determine treatment effects in arthritis resulting in synovial changes, including decreased synovial thickening and potentially diminished color flow [25-27].

MR Arthrography Knee. There is no relevant literature to support the use of MR arthrography of the knee in patients with this clinical scenario.

MRI Knee Without and With IV Contrast. There is no relevant literature to support the use of MRI of the knee without and with IV contrast in patients with radiographically confirmed osteoarthritis. At this time, further research is needed to support the administration of IV contrast. MRI of the knee without IV contrast alone can assess the bone marrow, tendons, ligaments, cartilage, and menisci.

CT Arthrography Knee. There is no relevant literature to support the use of CT arthrography of the knee in patients with this clinical scenario.

CT Knee With IV Contrast. There is no relevant literature to support the use of CT of the knee with IV contrast in patients with this clinical scenario.

CT Knee Without and With IV Contrast. There is no relevant literature to support the use of CT of the knee without and with IV contrast in patients with this clinical scenario.

Bone Scan Knee. There is no relevant literature to support the use of bone scintigraphy in patients with this clinical scenario.

Variant 3: Adult. Chronic knee pain. Radiographs performed. Suspect abnormality of tendon or meniscus or ligament. Next imaging study

In patients with chronic knee pain, radiography may or may not hint at abnormalities of the tendons, menisci, or ligaments, such as with focal areas of soft tissue swelling, enthesophytes, meniscal extrusion, or a joint effusion.

MRI Knee Without IV Contrast. In individuals with chronic knee pain and suspected tendon, meniscal, or ligament abnormalities, MRI of the knee without IV contrast is the most useful imaging test. MRI may have a sensitivity of 88% and specificity of 94% in the detection of a meniscal tear and potentially a 100% sensitivity and 89% specificity in detecting patellar tendinosis [28,29].

US Knee. There is limited evidence to support the use of US in the evaluation of the tendons, menisci, or ligaments at the knee. US poorly evaluates abnormalities of the

menisci and anterior and posterior cruciate ligaments. US may have a role in the evaluation of chronic knee pain to assess for tendinopathy, showing at least 84% sensitivity and 100% specificity in diagnosing patellar or quadriceps tendinopathy [30,31].

MR Arthrography Knee. There is limited evidence to support the use of MR arthrography of the knee in individuals with chronic knee pain. MR arthrography of the knee may be reserved as a second-line test in a small subset of patients—those status post prior meniscal repair—as in these patients, MR arthrography of the knee has shown superior accuracy in the diagnosis of a meniscal re-tear relative to MRI of the knee without IV contrast, with an accuracy of 89% versus 65% when more than 25% of the meniscus has been removed [32]. MRI of the knee without IV contrast can otherwise effectively evaluate the ligaments, tendons, and menisci and is noninvasive.

MRI Knee Without and With IV Contrast. There is no relevant literature to support the use of MRI of the knee without and with IV contrast in patients with chronic pain and suspected tendon, meniscus, or ligament abnormalities.

CT Arthrography Knee. There is limited evidence to support the use of CT arthrography of the knee in patients with chronic knee pain. CT arthrography of the knee may show ligament, cartilage, and meniscal abnormalities, including sensitivities of 87% and 91% and specificities of 93% and 98% in evaluating the anterior cruciate ligament and menisci, respectively, compared with arthroscopy [33,34]. Due to its invasiveness and relatively poor soft tissue evaluation of extraarticular structures including the tendons relative to other modalities, CT arthrography of the knee is generally not useful.

CT Knee With IV Contrast. There is no relevant literature to support the use of CT of the knee with IV contrast in patients with chronic knee pain and suspected tendon, meniscus, or ligament abnormalities.

CT Knee Without and With IV Contrast. There is no relevant literature to support the use of CT of the knee without and with IV contrast in patients with chronic knee pain and suspected tendon, meniscus, or ligament abnormalities.

CT Knee Without IV Contrast. There is no relevant literature to support the use of CT of the knee without IV contrast in patients with chronic knee pain and suspected tendon, meniscus, or ligament abnormalities.

Bone Scan Knee. There is no relevant literature to support the use of bone scintigraphy in patients with chronic knee pain and suspected tendon, meniscus, or ligament abnormalities.

Variant 4: Adult. Chronic knee pain. Radiographs performed. Suspect osteochondral lesion or subchondral insufficiency fracture. Next imaging study

In patients with chronic knee pain, radiographs are typically performed if there is a suspected osteochondral injury or subchondral fracture. Additional imaging may be indicated, particularly if the clinical suspicion is high but radiographs are unrevealing.

MRI Knee Without IV Contrast. When radiographs are normal but a subchondral insufficiency fracture is suspected, MRI is the most useful imaging study, as it can best detect occult fractures or bone marrow edema [35].

In patients in whom radiographs demonstrate a subchondral insufficiency fracture, MRI may be used, as it can show frequently co-existing findings that may not be evident radiographically, including meniscal tearing or cartilage loss [35-37].

In patients with a suspected osteochondral injury, MRI can provide prognostic information, including the size of the cartilage abnormality, cartilage stability, and bony alterations including the presence of cysts. After repair, MRI can assess the integrity of both the subchondral bone and cartilage at this site [38-41].

MR Arthrography Knee. MR arthrography of the knee may better detail chondral injuries relative to routine MRI of the knee without IV contrast, with sensitivities and specificities for MR arthrography at 75% and 99% versus 65% and 98% for routine MRI [42]. Generally, though, because of its invasiveness and only slightly improved assessment, MR arthrography is reserved for patients in whom there has been prior surgical intervention, and where there is concern MRI of the knee without IV contrast may have difficulty in distinguishing surgical alterations with recurrent meniscal or cartilage abnormalities [42-44].

There is no relevant literature to support the use of MR arthrography to evaluate for a subchondral insufficiency fracture.

US Knee. There is no relevant literature to support the use of US of the knee to evaluate for to evaluate for an osteochondral lesion or subchondral insufficiency fracture.

MRI Knee Without and With IV Contrast. There is no relevant literature to support the use of MRI of the knee without and with IV contrast to evaluate for to evaluate for an osteochondral lesion or subchondral insufficiency fracture.

CT Arthrography Knee. There is limited evidence to support the use of CT arthrography of the knee to evaluate for an osteochondral lesion or subchondral insufficiency fracture. CT arthrography of the knee has been used in

other joints, such as the ankle to assess for osteochondral injuries and shown an accuracy of 88% to 92%, but there is limited evidence demonstrating its usefulness in this specific indication at the knee [45]. CT arthrography of the knee is generally not a first-line imaging modality due to lesser assessment of bone marrow changes and its invasiveness, but may evaluate for changes of the bone, articular cartilage, and intraarticular bodies [34,43].

CT Knee With IV Contrast. There is no relevant literature to support the use of CT of the knee with IV contrast to evaluate for to evaluate for an osteochondral lesion or subchondral insufficiency fracture.

CT Knee Without and With IV Contrast. There is no relevant literature to support the use of CT of the knee without and with IV contrast to evaluate for to evaluate for an osteochondral lesion or subchondral insufficiency fracture.

CT Knee Without IV Contrast. There is no relevant literature to support the use of CT of the knee without IV contrast to evaluate for to evaluate for an osteochondral lesion or subchondral insufficiency fracture.

Bone Scan Knee. There is no relevant literature to support the use of bone scintigraphy to evaluate for to evaluate for an osteochondral lesion or subchondral insufficiency fracture.

Variant 5: Adult. Chronic knee pain. Radiographs performed. Suspect patellofemoral maltracking. Next imaging study

In patients with chronic knee pain and suspected patellofemoral maltracking, radiographs are often first performed as they may show patellar malalignment or findings of patellofemoral arthritis, including joint space narrowing and subchondral cysts. Depending on the radiographic findings, further imaging may be warranted.

MRI Knee Without IV Contrast. MRI of the knee without IV contrast can add value in the assessment of patients with suspected patellofemoral maltracking. Not only might there be altered position of the patella or morphologic changes of trochlear dysplasia, but there may be secondary imaging findings indicating maltracking [46,47]. These secondary findings include signal changes within the cartilage or superolateral Hoffa's fat pad that indicate chronic instability or evidence of prior injury to the medial patellofemoral ligament with edema, thickening, or heterotopic ossification that predispose to chronic instability [48-50]. An association also exists between proximal patellar tendinosis and patellar instability, which can be best demonstrated on MRI,

including signal changes of the patellar tendon and a high position of the patella and lateralization of the tibial tuberosity [49,51].

CT Knee Without IV Contrast. CT of the knee without IV contrast may be helpful in the evaluation of patients with suspected patellofemoral maltracking, particularly the surgical planning for these patients. CT can assess the alignment between the patella and trochlea and provide measurements on patellar positioning, trochlear depth, and relationship between the tibial tubercle or patellar tendon and the trochlear groove, all of which could indicate patellar maltracking [52-55]. These measurements along with the 3-D capabilities of CT can provide guidelines on appropriate surgical techniques in these patients.

US Knee. There is no relevant literature to support the use of US of the knee in patients with suspected patellofemoral maltracking.

MR Arthrography Knee. There is no relevant literature to support the use of MR arthrography of the knee in patients with suspected patellofemoral maltracking.

MRI Knee Without and With IV Contrast. There is no relevant literature to support the use of MRI of the knee without and with IV contrast in patients with suspected patellofemoral maltracking.

CT Arthrography Knee. There is no relevant literature to support the use of CT arthrography of the knee in patients with suspected patellofemoral maltracking.

CT Knee With IV Contrast. There is no relevant literature to support the use of CT of the knee with IV contrast in patients with suspected patellofemoral maltracking.

CT Knee Without and With IV Contrast. There is no relevant literature to support the use of CT of the knee without and with IV contrast in patients with suspected patellofemoral maltracking.

Bone Scan Knee. There is no relevant literature to support the use of bone scintigraphy in patients with suspected patellofemoral maltracking.

SUMMARY OF HIGHLIGHTS

This is a summary of the key recommendations from the variant tables. Refer to the complete narrative document for more information.

- **Variant 1:** Radiographs of the knee are usually appropriate as the initial imaging to evaluate a patient with chronic knee pain.

- **Variant 2:** If the radiographs show osteoarthritis, CT or MRI of the knee without IV contrast may be appropriate. CT can be helpful in preoperative planning for knee arthroplasty, whereas MRI may be useful when the symptoms do not match the severity or location of the radiographically apparent osteoarthritis.
- **Variant 3:** If an abnormality of a tendon, meniscus, or ligament is suspected clinically after radiographs have been performed, MRI of the knee without IV contrast is usually appropriate due to its relatively high sensitivity and specificity, particularly in evaluating for a meniscal tear or patellar tendinosis.
- **Variant 4:** If there is concern for an osteochondral lesion or insufficiency fracture after radiographs have been performed, MRI of the knee without IV contrast can best evaluate for bone marrow changes (including those associated with insufficiency fracture or osteochondral lesion) and can evaluate the articular cartilage. MR arthrography of the knee may be appropriate, particularly in those with prior surgery for an osteochondral lesion and in patients in whom it may be difficult to distinguish a recurrent cartilage abnormality or surgical alteration.
- **Variant 5:** If there is suspicion for patellofemoral maltracking, radiographs should be performed as the initial imaging study, and if further imaging is needed, MRI of the knee without IV contrast will usually be appropriate as it can show anatomic abnormalities of the patella and trochlea as well as secondary findings, including associated cartilage and tendon abnormalities. CT of the knee without IV contrast may be useful as it can show the anatomic abnormalities of the patella and trochlea for potential surgical planning.

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>.

GENDER EQUALITY AND INCLUSIVITY CLAUSE

The ACR acknowledges the limitations in applying inclusive language when citing research studies that predates the

use of the current understanding of language inclusive of diversity in sex, intersex, gender, and gender-diverse people. The data variables regarding sex and gender used in the cited literature will not be changed. However, this guideline will use the terminology and definitions as proposed by the National Institutes of Health [56].

RELATIVE RADIATION LEVEL INFORMATION

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, because of both organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared with those specified for adults (see [Table 2](#)). Additional information regarding radiation dose assessment for imaging examinations can be found in the ACR Appropriateness Criteria® Radiation Dose Assessment Introduction document [57].

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