Complete Summary

GUIDELINE TITLE

Chronic ankle pain.

BIBLIOGRAPHIC SOURCE(S)

DeSmet AA, Dalinka MK, Daffner RH, El-Khoury GY, Kneeland JB, Manaster BJ, Morrison WB, Pavlov H, Rubin DA, Schneider R, Steinbach LS, Weissman BN, Haralson RH III, Expert Panel on Musculoskeletal Imaging. Chronic ankle pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 8 p. [55 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American College of Radiology (ACR), Expert Panel on Musculoskeletal Imaging. Chronic ankle pain. Reston (VA): American College of Radiology (ACR); 2002. 12 p. (ACR appropriateness criteria).

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
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SCOPE

DISEASE/CONDITION(S)

Chronic ankle pain

GUIDELINE CATEGORY

Diagnosis

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Nuclear Medicine
Orthopedic Surgery
Podiatry
Radiology

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for chronic ankle pain

TARGET POPULATION

Patients with chronic ankle pain

INTERVENTIONS AND PRACTICES CONSIDERED

1. X-ray
    - Anterior-posterior (AP) view
    - Lateral view
    - Mortise view
    - Stress films--with manual stressing
    - Stress films--stress using biomechanical device
    - Stress films--manual stress while under general anesthesia
2. Nuclear medicine (NUC), bone scan
3. Ultrasound (US)
4. Magnetic resonance imaging (MRI)
5. Computed tomography (CT)
6. Conventional arthrography
7. CT arthrography
8. Magnetic resonance (MR) arthrography
9. Tenography
10. Diagnostic injection of anesthetic

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed for reaching agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table

and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1 to 9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by this Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Chronic Ankle Pain

Variant 1: Chronic ankle pain of any origin, best initial study.

Radiologic Exam Procedure	Appropriateness Rating	Comments
X-ray, ankle, AP, lateral, and mortise	9	

Radiologic Exam Procedure	Appropriateness Rating	Comments
views		
X-ray, ankle, stress films -- with manual stressing	2	
X-ray, ankle, stress films -- stress using biomechanical device	2	
X-ray, ankle, stress films - manual stress while under general anesthesia	2	
NUC, bone scan	2	
US, ankle	2	
MRI, ankle	2	
CT, ankle	2	
Conventional arthrography, ankle	2	
CT arthrography, ankle	2	
MR arthrography, ankle	2	
Tenography, ankle	2	
Diagnostic injection of anesthetic	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Suspected osteochondral injury, ankle radiographs normal. Next study.

Radiologic Exam Procedure	Appropriateness Rating	Comments

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, ankle	9	
US, ankle	2	
CT, ankle	2	If MRI not available.
X-ray, ankle, stress films - with manual stressing	2	
X-ray, ankle, stress films - stress using biomechanical device	2	
X-ray, ankle, stress films - manual stress while under general anesthesia	2	
NUC, bone scan	2	
Conventional arthrography, ankle	2	
CT arthrography, ankle	2	
MR arthrography, ankle	2	
Tenography, ankle	2	
Diagnostic injection of anesthetic, ankle	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Suspected tendinopathy, ankle radiographs normal. Next study.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, ankle	9	

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, ankle	6	Only if experienced examiner available
CT, ankle	2	
X-ray, ankle, stress films - with manual stressing	2	
X-ray, ankle, stress films - stress using biomechanical device	2	
X-ray, ankle, stress films - manual stress while under general anesthesia	2	
NUC, bone scan	2	
Conventional arthrography, ankle	2	
CT arthrography, ankle	2	
MR arthrography, ankle	2	
Tenography, ankle	2	
Diagnostic injection of anesthetic, ankle	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: Suspected ankle instability, ankle radiographs normal. Next study.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, ankle	3	
US, ankle	2	

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, ankle	2	
X-ray, ankle, stress films - with manual stressing	2	
X-ray, ankle, stress films - stress using biomechanical device	2	
X-ray, ankle, stress films - manual stress while under general anesthesia	2	
NUC, bone scan	2	
Conventional arthrography, ankle	2	
CT arthrography, ankle	2	
MR arthrography, ankle	2	
Tenography, ankle	2	
Diagnostic injection of anesthetic, ankle	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 5: Pain of uncertain etiology, ankle radiographs normal. Next study.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, ankle	6	If patient needs an imaging study, it should be MRI.
Diagnostic injection of anesthetic, ankle	5	Depending on clinical implication and severity of pain

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, ankle	2	
CT, ankle	2	
Conventional arthrography, ankle	2	
CT arthrography, ankle	2	
MR arthrography, ankle	2	
Tenography, ankle	2	
X-ray, ankle, stress films - with manual stressing	2	
X-ray, ankle, stress films - stress using biomechanical device	2	
X-ray, ankle, stress films - manual stress while under general anesthesia	2	
NUC, bone scan	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 6: Multiple sites of degenerative joint disease (DJD) by ankle radiographs, operative candidate. Next study.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Diagnostic injection of anesthetic, ankle	6	
Conventional arthrography, ankle	2	
CT arthrography,	2	

Radiologic Exam Procedure	Appropriateness Rating	Comments
ankle		
MR arthrography, ankle	2	
Tenography, ankle	2	
X-ray, ankle, stress films - with manual stressing	2	
X-ray, ankle, stress films - stress using biomechanical device	2	
X-ray, ankle, stress films - manual stress while under general anesthesia	2	
NUC, bone scan	2	
US, ankle	2	
MRI, ankle	2	
CT, ankle	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 7: Suspected ankle impingement syndrome, initial ankle radiographs normal. Next study.

Radiologic Exam Procedure	Appropriateness Rating	Comments
MRI, ankle	8	
MR arthrography, ankle	8	
CT arthrography, ankle	4	
Diagnostic injection of	4	

Radiologic Exam Procedure	Appropriateness Rating	Comments
anesthetic in the ankle		
NUC, bone scan	2	
US, ankle	2	
CT, ankle	2	
Conventional arthrography, ankle	2	
Appropriateness Criteria Scale **1 2 3 4 5 6 7 8 9** **1 = Least appropriate 9 = Most appropriate**		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

For assessing chronic ankle pain, there are multiple imaging options, including stress radiography, radionuclide bone scanning, ultrasound (US), computed tomography (CT), magnetic resonance imaging (MRI), and injection procedures. Injection procedures include arthrography, CT arthrography, magnetic resonance (MR) arthrography, and diagnostic injection with anesthetics. There have been no studies specifically addressing the value of radiographs in assessing chronic ankle pain. However, radiographs are routinely obtained as the first option to exclude arthritis, infection, fracture, or neoplasm.

Ankle instability has traditionally been imaged using radiographs obtained with varus, valgus, or anterior stress on the ankle. However, recent studies have questioned the value of stress radiographs. Even with a mechanical stress device, there is overlap between stable and unstable ankles. Patients may have successful surgery for clinically unstable ankles even if the stress radiographs are normal. One study found that stress radiographs obtained preoperatively were not as accurate as intraoperative stress films while the patient is under general anesthesia. Another study found that MR arthrography was significantly more accurate than stress radiography in detecting chronic tears of the ankle ligaments. A review of eight prospective clinical series using stress radiography for assessment of chronic instability concluded that "the large variability in talar tilt and anterior draw values in both injured and noninjured ankles precludes their routine use." More recently, a comparison of stress radiography and stress radiostereometry for assessing syndesmotic injuries in a cadaver model concluded that stress radiography is not reliable for assessing these injuries. However another study reported that both stress radiography and MRI were both accurate in diagnosing the extent of both lateral ligament and syndesmosis injuries. The accuracy of MRI for diagnosing tibiofibular syndesmotic injuries was also confirmed in a study comparing routine radiography and MRI with ankle arthroscopy. When compared to stress radiography, MRI offers the additional advantage of evaluating for injuries associated with or mimicking lateral instability such as tenosynovitis, tendon injury, and osteochondral lesions.

Radionuclide bone scanning, CT, and MRI have been used to assess the ankle joint for osteochondral injuries. Two studies reported that ankle CT is useful in assessing persistent ankle pain after trauma. One study used CT to evaluate 31 consecutive patients with chronic ankle pain after an injury. Thirteen of these 31 patients had normal radiographs but had occult intra-articular or juxta-articular fractures noted on CT. In one study, four of 32 osteochondral lesions of the talus were occult by radiographs but identified on direct coronal CT scanning. Another study reviewed 92 patients with talar osteochondral lesions. Although they did not report the accuracy for occult lesions alone, only 66% of the osteochondral lesions were seen on radiographs, but the sensitivity was 99% with bone scanning and 98% with CT. There have been no reports on the accuracy of CT arthrography for detecting osteochondral fractures in the ankle. However, case reports suggest that CT arthrography can help detect intra-articular loose bodies and assess the stability of osteochondritis dissecans.

MRI can be used to assess osteochondritis dissecans of the talus with a high accuracy in determining lesion stability. In a multimodality study, 17 cases of occult osteochondral fractures were found in 30 patients with normal radiographs and posttraumatic chronic ankle pain. MRI detected all occult osteochondral injuries, bone scanning missed one, and CT missed four. Radiography has also been shown to be unreliable for detecting osteochondritis dissecans of the tibial plafond. The accuracy of MRI and its ability to stage osteochondritis dissecans of the talar dome have also been assessed in a study of 54 patients who had operative confirmation of the presence and stage of their lesions. MRI may also have a role in monitoring the healing of an osteochondral lesion after surgery.

Ankle tendon pathology has been studied using tenography, CT, MRI, and US. Tenography uniquely demonstrates the configuration of the tendon sheath and can identify tenosynovial irregularity and focal stenosis. One study found that five patients with tenographic evidence of moderate to severe tenosynovitis failed conservative treatment but that three patients with normal or minimally abnormal tenograms responded to conservative treatment. However, another study reported a series of 111 patients who had tenography and injection of anesthetic and corticosteroid. They found that 47% of patients who had been previously refractory to treatment had prolonged relief after injection. The degree of tenosynovitis on tenography did not correlate with the therapeutic response. Other authors found peroneal stenosing tenosynovitis in ten patients with prior calcaneal fractures.

Both CT and MRI can be used to identify tendon pathology. The greater tissue contrast of MRI and its sensitivity to fluid allow easier and more specific diagnosis of chronic tendinitis and partial and complete tendon tears. Rosenberg et al found a slightly lower accuracy for CT than MRI in distinguishing an intact from a torn ankle tendon. However, MRI was significantly more accurate than CT in staging the severity of the tendon injury. One report found that MRI staging was more accurate in predicting patient outcome after tendon reconstruction than intraoperative staging. MRI is also useful for diagnosing injuries of the superior peroneal retinaculum.

Imaging can also be used to diagnose ankle impingement syndromes which can occur in the anterolateral, anterior, anteromedial, posteromedial, and posterior aspects of the ankle joint. In one study, CT arthrography was found to be

accurate in diagnosing anterolateral impingement syndrome when compared to arthroscopy. Studies on the accuracy of MRI in diagnosing anterolateral impingement syndrome have drawn different conclusions. While one study found considerable overlap in the MRI findings of patients with anterolateral impingement and control individuals, another found that MRI was useful when an ankle effusion was present, and a third found no overlap in the MRI appearance of patients with anterolateral impingement and control ankles. There are only limited reports on the use of MRI for the other forms of ankle impingement syndrome, so its accuracy in these conditions is not well established. MR arthrography has been found to be an accurate method for assessing both anterolateral and anteromedial impingement with the advantage of joint capsule distention by intra-articular contrast injection.

Recently, US has been used in assessing ankle tendon pathology. Although a limitation of US is the dependence on operator skill, several studies have reported a high degree of accuracy. In one series in which 54 tendons were examined by US and surgery, the sensitivity and specificity of US for tendon tears were 100% and 88%, respectively. In another series with surgical correlation, One study found that the sensitivity and specificity for detection of ankle tendon pathology were 100% and 89.9% for US and 23.4% and 100% for MRI. However, the sensitivity of MRI for tendon pathology in this study was much lower than the 92 to 95% previously reported. Sonography of posterior tibial tendinopathy was found to have a sensitivity of 80% and specificity of 90% when MRI was used as the gold standard. A unique advantage of sonography when compared to CT and MRI is the ability to perform dynamic imaging for conditions such as subluxation of the peroneal tendons and identify causes of tendon impingement.

Injection procedures include CT arthrography, MR arthrography, and tenography as discussed above, as well as conventional arthrography and diagnostic injections with anesthetic. Another study performed arthrograms to assess the ankle ligaments in 61 patients with chronic ankle instability and noted 20 true-positive, one false-positive, and four false-negative arthrograms in 25 patients who underwent surgery. Ankle arthrography is also useful to diagnose adhesive capsulitis after ankle trauma. The importance of post-traumatic adhesive capsulitis has not been determined.

Although anesthetic injection has been shown to be useful in assessment of hindfoot pain, the value of this technique has not been studied in the ankle joint itself. One report states that Xylocaine injection into the peroneal tendon sheaths of ten patients helped to confirm that the patients' pain was due to tendon pathology.

Abbreviations

- AP, anterior-posterior
- CT, computed tomography
- MR, magnetic resonance
- MRI, magnetic resonance imaging
- NUC, nuclear medicine
- US, ultrasound

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for evaluation of patients with chronic ankle pain

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (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 exams 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 U.S. Food and Drug Administration (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.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

DeSmet AA, Dalinka MK, Daffner RH, El-Khoury GY, Kneeland JB, Manaster BJ, Morrison WB, Pavlov H, Rubin DA, Schneider R, Steinbach LS, Weissman BN, Haralson RH III, Expert Panel on Musculoskeletal Imaging. Chronic ankle pain. [online publication]. Reston (VA): American College of Radiology (ACR); 2005. 8 p. [55 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998 (revised 2005)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Musculoskeletal Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Arthur A. DeSmet, MD (*Principal Author*); Murray K. Dalinka, MD (*Panel Chair*); Richard H. Daffner, MD; George Y. El-Khoury, MD; John B. Kneeland, MD; B.J. Manaster, MD, PhD; William B. Morrison, MD; Helene Pavlov, MD; David A. Rubin, MD; Robert Schneider, MD; Lynne S. Steinbach, MD; Barbara N. Weissman, MD; Robert H. Haralson III, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

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GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® *Anytime*, *Anywhere*™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer as of June 29, 2001. This summary was updated by ECRI on May 22, 2003. The information was verified by the guideline developer on June 23, 2003. This NGC summary was updated by ECRI on January 5, 2006. The updated information was verified by the guideline developer on January 19, 2006.

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