04-70450-24

Original Effective Date: 09/15/09

Reviewed: 07/25/24

Revised: 08/15/24

Subject: Computed Tomography (CT) Extremity (Upper and Lower)

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DESCRIPTION:

Computed tomography (CT) is a radiologic modality that provides clinical information in the detection, differentiation and demarcation of disease. CT is a form of medical imaging that involves the exposure of members to ionizing radiation. CT should only be performed under the supervision of a physician with training in radiation protection to optimize examination safety. Radiation exposure should be taken into account when considering the use of this technology. This guideline addresses the use of CT of the extremity (upper and lower) for evaluation, diagnosis and management of extremity (upper and lower) related conditions in the outpatient setting.

Summary and Analysis of Evidence: Indications for computed tomography (CT) of the upper extremity include but not limited to: suspected acute acute hand or wrist trauma, distal radioulnar joint or carpal malalignment in the absence of fracture, suspect penetrating trauma with a foreign body in the soft tissues in the hand or wrist, chronic wrist pain, when there is concern for nonunion, malunion, osteonecrosis, or post-traumatic osteoarthritis, traumatic shoulder pain, humeral head or neck fracture, scapula fracture, lesions, labral tear, bone loss, neuropathic syndrome, chronic elbow pain with mechanical symptoms such as locking, clicking, or limited range of motion, suspect intra-articular pathology such as osteocartilaginous body, osteochondral lesion, or synovial abnormality and suspect occult stress fracture or other bone abnormality, evaluation of a soft tissue mass and suspected tumors, suspected septic arthritis in the setting of arthroplasty or other implanted intra-articular surgical hardware, suspected soft tissue infection in the setting of possible retained foreign bodies from puncture wounds and suspected soft tissue infection (ACR, 2013, 2017, 2019, 2022).

Indications for computed tomography (CT) of the lower extremity include but not limited to: evaluation of suspected radiographically occult knee fractures, evaluation of a painful knee prosthesis for aseptic loosening or osteolysis or instability, suspected periprosthetic or hardware fracture and measuring

component rotation, hip osteonecrosis with articular collapse, degenerative joint disease of the ankle and hindfoot, preoperative assessment of bony anatomy in the setting of femoracetabular impingement (FAI) and hip dysplasia, evaluation of a soft tissue mass and suspected tumors, evaluation of a soft tissue mass and suspected tumors, and acute trauma of the foot (e.g., injury dislocation, foreign body) (ACR, 2017, 2019, 2022, 2023).

POSITION STATEMENT:

Upper Extremity

Computed tomography (CT) of the upper extremity (hand, wrist, arm, elbow, or shoulder) **meets the definition of medical necessity** for the following:

Joint or muscle pain without positive findings on an orthopedic exam as listed below, after x-ray completed

- Persistent joint or musculotendinous pain unresponsive to conservative therapy, within the last 6 months which includes active medical therapy (physical therapy, chiropractic treatments, and/or physician supervised exercise) of at least four (4) weeks; **OR**
- With progression or worsening of symptoms during the course of conservative treatment.

Joint specific orthopedic examination

- Shoulder
    - Any of the following positive test:
        - Rotator cuff weakness
        - Bear hug test
        - Drop arm test
        - Full can test
        - Hornblower's sign
        - Internal rotation lag sign
        - Supraspinatus test
- Elbow
    - Any of the following positive test:
        - Valgus stress
        - Varus stress
        - Posterolateral rotatory drawer test
        - Milking maneuver
        - Push-up test

- Wrist
  - Any of the following positive test:
    - Watson test (scaphoid shift test)
    - Scapholunate ballottement test
    - Reagan test (lunotriquetral ballottement test)

Clinical suspicion of injury with clinical findings and x-ray

- Triangular fibrocartilage complex (TFCC) injury
- Superior labral anterior to posterior complex (SLAP) lesions.

Other shoulder conditions after active conservative therapy and x-ray

- Shoulder Impingement
- Non-Traumatic Shoulder Instability
- Glenoid labral tear (i.e., SLAP lesion) if MRI cannot be completed.

Shoulder dislocations

- Recurrent
- First time in any of the following situations that increase the risk of repeated dislocation
  - Glenoid or humeral bone loss on x-ray
  - 14-35 year-old competitive contact sport athlete.

Extremity mass

- Mass or lesion after non-diagnostic x-ray or ultrasound

Known cancer of the extremity

- Cancer staging
- Cancer restaging
- Signs or symptoms of recurrence.

Infection of bone or joint

- Abnormal x-ray or ultrasound
- Negative x-ray but with a clinical suspicion of infection
- Ulcer (diabetic, pressure, ischemic, traumatic) with signs of infection that is not improving despite treatment and bone or deep infection is suspected

- Increased suspicion if size or temperature increases, bone is exposed/positive probe-to-bone test, new areas of breakdown, new smell.

Osteonecrosis (avascular necrosis (AVN))

- Abnormal x-ray
- Normal or indeterminate x-rays, but symptomatic and high risk (e.g., glucocorticosteroid use, renal transplant recipient, glycogen storage disease, alcohol abuse, sickle cell anemia).

Inflammatory arthropathy

- Further evaluation of an abnormality or non-diagnostic findings on prior imaging
- Imaging of a single joint for diagnosis or response to therapy after plain films and appropriate lab tests.

Crystalline arthropathy

- Dual-energy CT can be used to characterize crystal deposition disease, such as gout versus calcium pyrophosphate deposition (CPPD).

Bone fracture

- Suspected stress or insufficiency fracture with a negative initial x-ray
- Intra articular fractures or carpal bone fractures or instability that may require surgery
- Suspected scaphoid fracture with negative x-ray
- Other upper extremity fractures that may require surgery
- Nonunion or delayed union as demonstrated by no healing between two sets of x-rays.

Note: If a fracture has not healed by 4-6 months, there is delayed union. Incomplete healing by 6-8 months is nonunion.

Occult wrist ganglion, after indeterminate or negative ultrasound

- Clinical suspicion and failed 4 weeks conservative treatment including **ALL** of the following:
  - Activity modification;
  - Rest, ice or heat;
  - Splinting or orthotics; **AND**
  - Medication.

Osteochondral lesions (defects, fractures, osteochondritis dissecans)

- Clinical suspicion based on mechanism of injury and physical findings and x-ray
- Loose bodies or synovial chondromatosis seen on x-ray or ultrasound

Foreign body

- Indeterminate x-ray and ultrasound.

Tendon or muscle rupture

- Clinical suspicion based on mechanism of injury and physical findings (e.g., Popeye, hook, Yergasons sign) and x-ray.

Peripheral nerve entrapment (e.g., carpal tunnel)

- Abnormal electromyogram or nerve conduction study
- Abnormal x-ray or ultrasound
- Clinical suspicion and failed 4 weeks conservative treatment including at least two of the following:
    - Activity modification;
    - Rest, ice or heat;
    - Splinting or orthotics; **OR**
    - Medication.

Brachial plexopathy

- If mechanism of injury or electromyogram (EMG)/nerve conduction velocity (NCV) studies are suggestive.

Pre-operative/procedural evaluation

- Pre-operative evaluation for planned surgery or procedure.

Post-operative/procedural evaluation

- When imaging, physical, or laboratory findings indicate joint infection, delayed or non-healing, or other surgical/procedural complications.
- Joint prosthesis loosening or dysfunction, x-rays non-diagnostic.

Lower Extremity

Computed tomography (CT) of the lower extremity (ankle, foot, hip, leg or knee) **meets the definition of medical necessity** for the following:

Joint or muscle pain without positive findings on an orthopedic exam as listed below after x-ray completed and MRI is contraindicated or cannot be performed (does not apply to young children)

- Persistent joint or musculotendinous pain unresponsive to conservative therapy, within the last 6 months which includes active medical therapy (physical therapy, chiropractic treatments, and/or

physician supervised exercise) of at least four (4) weeks or progression or worsening of symptoms during the course of conservative treatment

- Persistent hip mechanical symptoms including clicking, locking, catching, giving way or hip instability with a clinical suspicion of labral tear, with or without clinical findings suggestive of impingement.

Joint specific provocative orthopedic examination

- Ankle
  - Unstable syndesmotic injury (high ankle injury)
    - With inconclusive stress x-rays (standing CT preferred)
    - Can have positive fibular translation, squeeze or cotton test, but imaging may be needed to confirm diagnosis
- Knee
  - Any of the following positive test:
    - McMurray's
    - Thessaly
    - Apley's
    - Lachman's
    - Anterior or posterior drawer sign
    - Varus or valgus stress
    - Acute mechanical locking of the knee not due to guarding
- Hip and any of the following positive test:
  - Anterior impingement sign (labral tear)
  - Posterior impingement sign (labral tear)

Ankle instability and suspected anterior talofibular ligament rupture (anterior and posterior drawer tests) as a result of a sprain requires initial active conservative therapy and x-ray.

Painful acquired or congenital flatfoot deformity in an adult, after x-ray completed

- After failure of active conservative therapy listed above.

Extremity mass

- Mass or lesion after non-diagnostic x-ray or ultrasound

Known cancer of the extremity

- Cancer staging
- Cancer restaging

- Signs or symptoms of recurrence.

Infection of bone or joint

- Abnormal x-ray or ultrasound
- Negative x-ray but with a clinical suspicion of infection
- Ulcer (diabetic, pressure, ischemic, traumatic) with signs of infection that is not improving despite treatment and bone or deep infection is suspected
    - Increased suspicion if size or temperature increases, bone is exposed/positive probe-to-bone test, new areas of breakdown, new smell
- Neuropathic foot with friable or discolored granulation tissue, foul odor, non-purulent discharge, and delayed wound healing.

Osteonecrosis (avascular necrosis (AVN), Legg-Calve-Perthes disease)

- Abnormal x-ray
- Normal or indeterminate x-rays, but symptomatic and high risk (e.g., glucocorticosteroid use, renal transplant recipient, glycogen storage disease, alcohol abuse, sickle cell anemia).

Evaluation of known or suspected autoimmune disease (e.g. rheumatoid arthritis)

- Further evaluation of an abnormality or non-diagnostic findings on prior imaging
- Initial imaging of a single joint for diagnosis or response to therapy after plain films and appropriate lab tests (e.g., rheumatoid factor (RF), antinuclear antibody (ANA), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR))
- To determine change in treatment or when diagnosis is uncertain prior to start of treatment
- Follow-up to determine treatment efficacy of early rheumatoid arthritis
- Follow-up to determine treatment efficacy of advanced rheumatoid arthritis if x-ray and ultrasound are equivocal or noncontributory.

Crystalline arthropathy

- Dual-energy CT can be used to characterize crystal deposition disease, such as gout versus calcium pyrophosphate deposition (CPPD).

Trauma

Bone fracture

- Suspected stress or insufficiency fracture with a negative initial x-ray
- Pathologic fracture on x-ray
- Suspected acute hip fracture with initial x-rays negative or non-diagnostic
- Intra articular fractures that may require surgery (e.g., depressed tibial plateau fracture)

- Nonunion or delayed union as demonstrated by no healing between two sets of x-rays.

Note: If a fracture has not healed by 4-6 months, there is delayed union. Incomplete healing by 6-8 months is nonunion.

Tendon or muscle rupture (after x-ray)

Suspected ACL rupture (knee)

Acute knee injury with physical exam limited by pain and swelling with x-ray completed.

Osteochondral lesions (defects, fractures, osteochondritis dissecans) and x-ray performed.

Foreign body

- Indeterminate x-ray and ultrasound.

Peripheral nerve entrapment (e.g., tarsal tunnel, Morton's neuroma)

- Abnormal electromyogram or nerve conduction study
- Abnormal x-ray or ultrasound
- Clinical suspicion and failed 4 weeks conservative treatment including at least two of the following (active treatment with physical therapy is not required):
    - Activity modification;
    - Rest, ice or heat;
    - Splinting or orthotics;
    - Medication.

Pediatrics

- Osteoid osteoma (after x-ray)
- Painful flatfoot (pes planus) deformity with suspected tarsal coalition, not responsive to active conservative care:
    - When MRI cannot be performed; **OR**
    - Extra-articular coalition is suspected (bony bridges around the joints); **OR**
    - When needed for surgical planning
- Slipped capital femoral epiphysis and chronic recurrent multifocal osteomyelitis.

Pre-operative/procedural evaluation

- Pre-operative evaluation for a planned surgery or procedure.

Post-operative/procedural evaluation

- When imaging, physical, or laboratory findings indicate joint infection, delayed or non-healing, or other surgical/procedural complications
- Joint prosthesis loosening or dysfunction, x-rays non-diagnostic
- Trendelenburg sign or other indication of muscle or nerve damage after recent hip surgery.

BILLING/CODING INFORMATION:

CPT Coding:

73200	Computed tomography, upper extremity; without contrast material
73201	Computed tomography, upper extremity; with contrast material(s)
73202	Computed tomography, upper extremity; without contrast material, followed by contrast material(s) and further sections
73700	Computed tomography, lower extremity; without contrast material
73701	Computed tomography, lower extremity; with contrast material(s)
73702	Computed tomography, lower extremity; without contrast material, followed by contrast material(s) and further sections
76380	Computed tomography, limited or localized follow-up study

REIMBURSEMENT INFORMATION:

Reimbursement for computed tomography (73200 – 73202 and 73700 – 73702, 76380) performed on the same anatomical area is limited to two (2) computed tomography (73200 – 73202 and 73700 – 73702, 76380) within a 6-month period. Computed tomography (73200 – 73202 and 73700 – 73702, 76380) in excess of two (2) computed tomography (73200 – 73202 and 73700 – 73702, 76380) within a 6-month period are subject to medical review of documentation to support medical necessity. Documentation should include radiology reason for study, radiology comparison study-date and time, radiology comparison study observation, radiology impression, and radiology study recommendation.

Reimbursement for computed tomography (73200 – 73202 and 73700 – 73702, 76380) for an oncologic condition undergoing active treatment or active treatment completed within the previous 12 months on the same anatomical area is limited to four (4) computed tomography (73200 – 73202 and 73700 – 73702, 76380) within a 12-month period. Computed tomography (73200 – 73202 and 73700 – 73702, 76380) for an oncologic condition in excess of four (4) computed tomography (73200 – 73202 and 73700 – 73702, 76380) within a 12-month period are subject to medical review of documentation to support medical necessity. Documentation should include radiology reason for study, radiology comparison study-date and time, radiology comparison study observation, radiology impression, and radiology study recommendation.

Re-imaging or additional imaging of the extremity (upper and lower) due to poor contrast enhanced exam or technically limited exam is the responsibility of the imaging provider.

LOINC Codes:

The following information may be required documentation to support medical necessity: physician history and physical, physician progress notes, plan of treatment and reason for computed tomography (CT) of the extremity (upper and lower).

Documentation Table	LOINC Codes	LOINC Time Frame Modifier Code	LOINC Time Frame Modifier Codes Narrative
Physician history and physical	28626-0	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Attending physician progress note	18741-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Plan of treatment	18776-5	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology reason for study	18785-6	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology comparison study-date and time	18779-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology comparison study observation	18834-2	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology-study observation	18782-3	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology-impression	19005-8	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology study-recommendation (narrative)	18783-1	18805-2	Include all data of the selected type that represents observations made six months or

			fewer before starting date of service for the claim

PROGRAM EXCEPTIONS:

Federal Employee Plan (FEP): Follow FEP guidelines.

Medicare Advantage products:

No Local Coverage Determination (LCD) was found at the time of the last guideline reviewed date.

The following National Coverage Determination (NCD) was reviewed on the last guideline reviewed date: Computed Tomography, (220.1) located at cms.gov

DEFINITIONS:

Chronic: persisting over a long period of time.

Laxity: slackness or looseness; a lack of tautness, firmness, or rigidity. Slackness or displacement (whether normal or abnormal) in the motion of a joint.

Legg-Calve-Perthes disease: osteochondrosis of the capitular epiphysis of the femur.

Occult: obscure; concealed from observation; difficult to understand.

Osteochondritis: inflammation of both bone and cartilage.

Osteochondrosis: a disease of the growth or ossification centers in children that begins as degeneration or necrosis and is followed by regeneration or recalcification.

Slipped femoral capital epiphysis: dislocation of the epiphysis of a bone, as of the epiphysis of the head of the femur.

Tarsal coalition: the fibrous, cartilaginous, or bony fusion of two or more of the tarsal bones, often resulting in talipes planovalgus, although other deformities occur and some patients are asymptomatic; it may be congenital or acquired as a response to trauma, infection, or joint disease.

Tendonitis: inflammation of tendons and of tendon-muscle attachments.

Union: the process of healing; the renewal of continuity in a broken bone or between the edges of a wound.

Valgus stress: a pressure applied to the leg that tires to bend the lower leg sideways at the knee, away from the other leg.

Varus stress: a pressure applied to the leg that tires to bend the lower leg sideways at the knee, toward the other leg.

RELATED GUIDELINES:

Computed Tomography to Detect Coronary Artery Calcification, 04-70450-02

Computed Tomographic Angiography (CTA), 04-70450-03

Computerized Axial Tomography (CT), Head/Brain 04-70450-18

Computerized Axial Tomography (CT), Temporal Bone/Mastoid & Maxillofacial 04-70450-19

Computerized Axial Tomography (CT), of the Neck for Soft Tissue Evaluation 04-70450-20

Computerized Axial Tomography (CT), Thorax 04-70450-21

Computerized Axial Tomography (CT) Abdomen and Pelvis 04-70450-22

Computerized Axial Tomography (CT), Spine (Cervical, Thoracic, Lumbar) 04-70450-23

Whole Body Computed Tomography (CT) Scanning, 04-70450-25

OTHER:

Other name used to report computed tomography (CT):

CAT scanning

Pediatric Examinations

The use of CT in pediatric examinations requires assessment of the risks, benefits and use of the studies. The lowest possible radiation dose consistent with acceptable diagnostic image quality should be used in pediatric examinations. Radiation doses should be determined periodically based on a reasonable sample of pediatric examinations. Technical factors should be appropriate for the size and the age of the child and should be determined with consideration of parameters (e.g., characteristics of the imaging system, organs in the radiation field, lead shielding).

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3. American College of Radiology (ACR) Appropriateness Criteria Shoulder Pain-Traumatic, 2017.
4. American College of Radiology Appropriateness Criteria: Acute Trauma to the Foot, 2019.
5. American College of Radiology Appropriateness Criteria: Acute Trauma to the Knee, 2019
6. American College of Radiology Appropriateness Criteria: Avascular Necrosis (Osteonecrosis) of the Hip, 2022.
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9. American College of Radiology Appropriateness Criteria: Chronic Hip Pain, 2022.
10. American College of Radiology Appropriateness Criteria: Chronic Wrist Pain, Revised 2017.
11. American College of Radiology Appropriateness Criteria: Imaging After Knee Arthroplasty, 2023.
12. American College of Radiology Appropriateness Criteria: Primary Bone Tumors, 2019.

13. American College of Radiology Appropriateness Criteria: Soft-Tissues Masses, 2022.
14. American College of Radiology Appropriateness Criteria: Suspected Osteomyelitis, Septic Arthritis, or Soft Tissue Infection (Excluding Spine and Diabetic Foot), 2022.
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24. Expert Panel on Musculoskeletal Imaging: Small KM, Adler RS, Shah SH, et al. ACR Appropriateness Criteria® Shoulder Pain-Atraumatic. J Am Coll Radiol. 2018 Nov;15(11S): S388-S402.
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COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 07/25/24.

GUIDELINE UPDATE INFORMATION:

09/15/09	New Medical Coverage Guideline.
01/01/10	Revised Florida Blue Radiology Management program exception section.
09/15/11	Scheduled review; no change in position statements. Added 76380. Revised limitation to two (2) within a 6-month period. Updated references.
10/01/11	Revision; formatting changes.
05/15/12	Revised and expanded position statement for upper and lower extremity: added tumor evaluation (bone), evaluation for fracture, fracture or subluxation with trauma, determine position of known fracture or subluxation, assessment of fracture healing for delayed union or non-union, evaluation of: auto immune disease, shoulder (impingement, rotator cuff tear, labral tear). Revised and expanded position statement for other: added statement for contraindication for MRI and when guideline criteria are

	met, abnormal physical findings, brachial plexus dysfunction and recurrent dislocation. Deleted but is not limited to. Updated references.
10/15/13	Scheduled review; MCG subject changed to “Computed Tomography (CT) Extremity (Upper and Lower)”. Updated program exceptions and reference sections.
01/01/15	Scheduled review; added osteochondral abnormalities. Added limitation statement for an oncologic condition; limited to four (4) computed tomography within a 12-month period. Updated references.
03/15/18	Revision; revised position statement (upper and lower extremity). MCG subject: Changed “Computerized” to “Computed” and removed “Axial”. Updated definitions and references.
11/15/19	Revised position statements for (upper extremity: mass/tumor, known cancer, infection or inflammatory disease, pre-operative/procedural evaluation, additional indications for upper extremity, shoulder, wrist)) and (lower extremity: mass/tumor, pre-operative procedural evaluation, additional indications for lower extremity, foot, knee, hip). Updated references.
04/15/20	Revew/revision. Revised position statements and expanded criteria and indications for upper and lower extremity. Updated references.
03/15/22	Review/revision. Upper extremity: Revised and expanded criteria for: extremity mass, infection of bone or joint, bone fracture, and osteochondral lesions. Revised osteonecrosis, inflammatory arthropathy, tendon or muscle rupture after x-ray, peripheral nerve entrapment, and joint specific provocative orthopedic examination. Added criteria for brachial plexopathy. Added indication and criteria for: joint or muscle pain, injury, other specific shoulder conditions, shoulder dislocation, and crystalline arthropathy. Lower extremity: Revised and expanded criteria for: extremity mass, infection of bone or joint, bone fracture, osteochondral lesions, autoimmune disease, bone fracture, and joint specific provocative orthopedic examination. Revised extremity mass, osteonecrosis, osteochondral lesions, foreign body, peripheral nerve entrapment and post-operative/procedural evaluation. Deleted joint or muscle pain, x-ray completed, hemarthrosis, and leg length discrepancy. Added indication and criteria for: joint or muscle pain, ankle stability, flatfoot deformity in an adult, infection of bone or joint, crystalline arthropathy, tendon or muscle rupture, suspected ACL rupture, and pediatrics indications. Updated references.
05/15/22	Revision; Upper extremity: Revised occult wrist ganglion, osteochondral lesions, peripheral nerve entrapment, and brachial plexopathy. Lower extremity: Revised painful acquired or congenital flatfoot deformity, extremity mass, osteonecrosis, evaluation of known or suspected autoimmune disease, bone fracture, tendon or muscle rupture, and peripheral nerve entrapment.
07/01/22	Revision to Program Exceptions section.
12/09/23	Review: position statements and references updated.
08/15/24	Review; no change in position statement. Updated references.