Cigna Medical Coverage Policies – Radiology
Pediatric Musculoskeletal Imaging
Effective November 15, 2018

Instructions for use
The following coverage policy applies to health benefit plans administered by Cigna. Coverage policies are intended to provide guidance in interpreting certain standard Cigna benefit plans and are used by medical directors and other health care professionals in making medical necessity and other coverage determinations. Please note the terms of a customer’s particular benefit plan document may differ significantly from the standard benefit plans upon which these coverage policies are based. For example, a customer’s benefit plan document may contain a specific exclusion related to a topic addressed in a coverage policy.

In the event of a conflict, a customer’s benefit plan document always supersedes the information in the coverage policy. In the absence of federal or state coverage mandates, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of:

1. The terms of the applicable benefit plan document in effect on the date of service
2. Any applicable laws and regulations
3. Any relevant collateral source materials including coverage policies
4. The specific facts of the particular situation

Coverage policies relate exclusively to the administration of health benefit plans. Coverage policies are not recommendations for treatment and should never be used as treatment guidelines.

This evidence-based medical coverage policy has been developed by eviCore, Inc. Some information in this coverage policy may not apply to all benefit plans administered by Cigna.

These guidelines include procedures eviCore does not review for Cigna. Please refer to the Cigna CPT code list for the current list of high-tech imaging procedures that eviCore reviews for Cigna.

CPT® (Current Procedural Terminology) is a registered trademark of the American Medical Association (AMA). CPT® five digit codes, nomenclature and other data are copyright 2017 American Medical Association. All Rights Reserved. No fee schedules, basic units, relative values or related listings are included in the CPT® book. AMA does not directly or indirectly practice medicine or dispense medical services. AMA assumes no liability for the data contained herein or not contained herein.
# Pediatric Musculoskeletal Imaging Guidelines

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric Musculoskeletal Imaging Guidelines</td>
<td>2</td>
</tr>
<tr>
<td>PEDMS-1: General Guidelines</td>
<td>5</td>
</tr>
<tr>
<td>PEDMS-2: Fracture and Dislocation</td>
<td>10</td>
</tr>
<tr>
<td>PEDMS-3: Soft Tissue and Bone Masses</td>
<td>14</td>
</tr>
<tr>
<td>PEDMS-4: Limping Child</td>
<td>17</td>
</tr>
<tr>
<td>PEDMS-5: Developmental Dysplasia of the Hip</td>
<td>20</td>
</tr>
<tr>
<td>PEDMS-6: Avascular Necrosis (AVN) / Legg-Calvé-Perthes Disease / Idiopathic Osteonecrosis</td>
<td>22</td>
</tr>
<tr>
<td>PEDMS-7: Suspected Physical Child Abuse</td>
<td>25</td>
</tr>
<tr>
<td>PEDMS-8: Infection/Osteomyelitis</td>
<td>27</td>
</tr>
<tr>
<td>PEDMS-9: Foreign Body</td>
<td>28</td>
</tr>
<tr>
<td>PEDMS-10: Inflammatory Musculoskeletal Disease</td>
<td>29</td>
</tr>
<tr>
<td>PEDMS-11: Muscle/Tendon Unit Injuries</td>
<td>33</td>
</tr>
<tr>
<td>PEDMS-12: Osgood-Schlatter Disease</td>
<td>34</td>
</tr>
<tr>
<td>PEDMS-13: Popliteal (Baker) Cyst</td>
<td>35</td>
</tr>
<tr>
<td>PEDMS-14: Slipped Capital Femoral Epiphysis (SCFE)</td>
<td>36</td>
</tr>
<tr>
<td>PEDMS-15: Limb Length Discrepancy</td>
<td>37</td>
</tr>
<tr>
<td>PEDMS-16: Congenital Anomalies of the Foot</td>
<td>38</td>
</tr>
<tr>
<td>Procedure Codes Associated with Musculoskeletal Imaging</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>MRI</strong></td>
<td><strong>CPT®</strong></td>
</tr>
<tr>
<td>Upper Extremity MRI non-joint without contrast</td>
<td>73218</td>
</tr>
<tr>
<td>Upper Extremity MRI non-joint with contrast (rarely used)</td>
<td>73219</td>
</tr>
<tr>
<td>Upper Extremity MRI non-joint without and with contrast</td>
<td>73220</td>
</tr>
<tr>
<td>Upper Extremity MRI joint without contrast</td>
<td>73221</td>
</tr>
<tr>
<td>Upper Extremity MRI joint with contrast (rarely used)</td>
<td>73222</td>
</tr>
<tr>
<td>Upper Extremity MRI joint without and with contrast</td>
<td>73223</td>
</tr>
<tr>
<td>Lower Extremity MRI non-joint without contrast</td>
<td>73718</td>
</tr>
<tr>
<td>Lower Extremity MRI non-joint with contrast (rarely used)</td>
<td>73719</td>
</tr>
<tr>
<td>Lower Extremity MRI non-joint without and with contrast</td>
<td>73720</td>
</tr>
<tr>
<td>Lower Extremity MRI joint without contrast</td>
<td>73721</td>
</tr>
<tr>
<td>Lower Extremity MRI joint with contrast (rarely used)</td>
<td>73722</td>
</tr>
<tr>
<td>Lower Extremity MRI joint without and with contrast</td>
<td>73723</td>
</tr>
<tr>
<td>Unlisted MRI procedure (for radiation planning or surgical software)</td>
<td>76498</td>
</tr>
</tbody>
</table>

| **MRA**                                                | **CPT®** |
| Upper Extremity MRA                                    | 73225    |
| Lower Extremity MRA                                    | 73725    |

| **CT**                                                 | **CPT®** |
| Upper Extremity CT without contrast                    | 73200    |
| Upper Extremity CT with contrast                       | 73201    |
| Upper Extremity CT without and with contrast           | 73202    |
| Lower Extremity CT without contrast                    | 73700    |
| Lower Extremity CT with contrast                       | 73701    |
| Lower Extremity CT without and with contrast           | 73702    |
| Bone Mineral Density CT, one or more sites, axial skeleton | 77078    |
| Bone Mineral Density CT, one or more sites, appendicular skeleton | 77079    |
| CT Guidance for Placement of Radiation Therapy Fields  | 77014    |
| Unlisted CT procedure (for radiation planning or surgical software) | 76497    |

<p>| <strong>CTA</strong>                                                | <strong>CPT®</strong> |
| Upper Extremity CTA                                    | 73206    |
| Lower Extremity CTA                                    | 73706    |</p>
<table>
<thead>
<tr>
<th>Ultrasound</th>
<th>CPT®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ultrasound, extremity, nonvascular; complete</td>
<td>76881</td>
</tr>
<tr>
<td>Ultrasound, extremity, nonvascular; limited, anatomic specific for focal</td>
<td>76882</td>
</tr>
<tr>
<td>abnormality</td>
<td></td>
</tr>
<tr>
<td>Ultrasound, infant hips; dynamic (requiring physician manipulation)</td>
<td>76885</td>
</tr>
<tr>
<td>Ultrasound, infant hips; limited, static (not requiring physician manipulation)</td>
<td>76886</td>
</tr>
<tr>
<td>Ultrasound, axilla</td>
<td>76882</td>
</tr>
<tr>
<td>Ultrasound, upper back</td>
<td>76604</td>
</tr>
<tr>
<td>Ultrasound, lower back</td>
<td>76705</td>
</tr>
<tr>
<td>Ultrasound, other soft tissue areas not otherwise specified</td>
<td>76999</td>
</tr>
<tr>
<td>Limited bilateral noninvasive physiologic studies of upper or lower</td>
<td>93922</td>
</tr>
<tr>
<td>extremity arteries</td>
<td></td>
</tr>
<tr>
<td>Complete bilateral noninvasive physiologic studies of upper or lower</td>
<td>93923</td>
</tr>
<tr>
<td>extremity arteries</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of upper extremity arteries or arterial bypass grafts; complete</td>
<td>93930</td>
</tr>
<tr>
<td>bilateral</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of upper extremity arteries or arterial bypass grafts; unilateral or limited</td>
<td>93931</td>
</tr>
<tr>
<td>Non-invasive physiologic studies of extremity veins, complete bilateral</td>
<td>93965</td>
</tr>
<tr>
<td>study</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of extremity veins including responses to compression and other</td>
<td>93970</td>
</tr>
<tr>
<td>maneuvers; complete bilateral study</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of extremity veins including responses to compression and other</td>
<td>93971</td>
</tr>
<tr>
<td>maneuvers; unilateral or limited</td>
<td></td>
</tr>
<tr>
<td>Duplex scan of hemodialysis access (including arterial inflow, body of</td>
<td>93990</td>
</tr>
<tr>
<td>access and venous outflow)</td>
<td></td>
</tr>
</tbody>
</table>
# PEDMS-1: General Guidelines

<table>
<thead>
<tr>
<th>PEDMS-1.1: Age Considerations</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEDMS-1.2: Appropriate Clinical Evaluation and Conservative Treatment</td>
<td>6</td>
</tr>
<tr>
<td>PEDMS-1.3: Modality General Considerations</td>
<td>7</td>
</tr>
</tbody>
</table>
**PEDMS-1.1: Age Considerations**

Many conditions affecting the musculoskeletal system in the pediatric population are different diagnoses than those occurring in the adult population. For those diseases which occur in both pediatric and adult populations, minor differences may exist in management due to individual age, comorbidities, and differences in disease natural history between children and adults.

- Individuals who are < 18 years old should be imaged according to the Pediatric Musculoskeletal Imaging Guidelines, and individuals who are ≥ 18 years old should be imaged according to the adult Musculoskeletal Imaging Guidelines, except where directed otherwise by a specific guideline section.

**PEDMS-1.2: Appropriate Clinical Evaluation and Conservative Treatment**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, appropriate laboratory studies, and basic imaging such as plain radiography or ultrasound should be performed prior to considering advanced imaging (CT, MR, Nuclear Medicine), unless the individual is undergoing guideline-supported scheduled follow up imaging evaluation.

- Plain x-ray should be done prior to advanced imaging for musculoskeletal conditions to rule out those situations that do not require advanced imaging, such as osteoarthritis, acute/healing fracture, osteomyelitis, and tumors of bone amenable to biopsy or radiation therapy (in known metastatic disease), etc.
  - Even in soft tissue masses, plain x-rays are helpful in evaluating for calcium/bony deposits, e.g. myositis ossificans and invasion of bone.

- Provider-directed conservative care may include any or all of the following: R.I.C.E (rest, ice, compression, and elevation), NSAIDs (non-steroidal anti-inflammatory drugs), narcotic and non-narcotic analgesic medications, oral or injectable corticosteroids, viscosupplementation injections, a provider-directed home exercise program, cross-training, physical medicine, or immobilization by splinting/casting/bracing.

- These guidelines are based upon using advanced imaging to answer specific clinical questions that will affect individual management. Imaging is not indicated if the results will not affect individual management decisions. Standard medical practice would dictate continuing conservative therapy prior to advanced imaging in individuals who are improving on current treatment programs.

- Unless otherwise stated in a specific guideline section, repeat imaging studies of the same body area are not necessary unless there is evidence for progression of disease, new onset of disease, and/or documentation of how repeat imaging will affect individual management or treatment decisions.
PEDMS-1.3: Modality General Considerations

MRI

- MRI without contrast is the preferred modality for pediatric musculoskeletal imaging unless otherwise stated in a specific guideline section, as it is superior in imaging the soft tissues and can also define physiological processes in some instances, e.g. edema, loss of circulation (AVN), and increased vascularity (tumors).

- MRI without and with contrast is frequently recommended for evaluation of tumors, infection, post-operative evaluation, arthrography, and juvenile idiopathic arthritis, as described in the disease-specific guideline sections.

- Due to the length of time for image acquisition and the need for the individual to lie still, anesthesia is required for almost all infants and young children (age < 7 years), as well as older children with delays in development or maturity. In this individual population, MRI imaging sessions should be planned with a goal of minimizing anesthesia exposure adhering to the following considerations:
  - MRI should always be performed without and with contrast unless there is a specific contraindication to gadolinium use, since the individual already has intravenous access for anesthesia.
    - Recent evidence based literature demonstrates the potential for gadolinium deposition in various organs including the brain, after the use of MRI contrast.
    - The U.S. Food and Drug Administration (FDA) has noted that there is currently no evidence to suggest that gadolinium retention in the brain is harmful and restricting gadolinium-based contrast agents (GBCAs) use is not warranted at this time. It has been recommended that GBCA use should be limited to circumstances in which additional information provided by the contrast agent is necessary and the necessity of repetitive MRIs with GBCAs should be assessed.
    - If requesting clinicians indicate that a non-contrast study is being requested due to concerns regarding the use of gadolinium, the exam can be approved.
  - If multiple body areas are supported by eviCore guidelines for the clinical condition being evaluated, MRI of all necessary body areas should be obtained concurrently in the same imaging session.

- The presence of surgical hardware or implanted devices may preclude MRI, as magnetic field distortion may limit detail in adjacent structures. CT may be the procedure of choice in these cases.

- The selection of best examination may require coordination between the provider and the imaging service.
CT

- CT without contrast is generally superior to MRI for imaging bone and joint anatomy; thus it is useful for studying complex fractures (particularly of the joints, dislocations, and assessing delayed union or non-union of fractures, integration of bone graft material, if plain x-rays are equivocal.
  - CT should not be used to replace MRI in an attempt to avoid sedation unless listed as a recommended study in a specific guideline section.
  - CT beam attenuation can result in streak artifact which can obscure adjacent details. This can occur with radiopaque material such as metal objects or dense bones.
  - The selection of best examination may require coordination between the requesting provider and the rendering imaging facility.

Ultrasound

- Ultrasound is frequently used to evaluate infants for hip dysplasia, to detect and/or aspirate joint effusion, and as an initial evaluation of extremity soft tissue masses.
- CPT® codes vary by body area and the use of Doppler imaging. These CPT® codes are included in the table at the beginning of this guideline.

3D Rendering

- 3D Rendering indications in pediatric musculoskeletal imaging are identical to those for adult individuals. See MS-3: 3D Rendering for imaging guidelines.

The guidelines listed in this section for certain specific indications are not intended to be all-inclusive; clinical judgment remains paramount and variance from these guidelines may be appropriate and warranted for specific clinical situations.

References

1. ACR–SPR Practice Parameter for the performance and interpretation of pediatric magnetic resonance imaging (MRI) Amended 2014


# PEDMS-2: Fracture and Dislocation

<table>
<thead>
<tr>
<th>PEDMS-2.1: Acute Fracture</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEDMS-2.2: Joint Fracture</td>
<td>11</td>
</tr>
<tr>
<td>PEDMS-2.3: Growth Plate Injuries (Salter-Harris Fractures)</td>
<td>11</td>
</tr>
<tr>
<td>PEDMS-2.4: Osteochondral or Chondral Fractures, Including Osteochondritis Dissecans</td>
<td>12</td>
</tr>
<tr>
<td>PEDMS-2.5: Stress/Occult Fracture</td>
<td>12</td>
</tr>
<tr>
<td>PEDMS-2.6: Compartment Syndrome</td>
<td>13</td>
</tr>
<tr>
<td>PEDMS-2.7: Physical Child Abuse</td>
<td>13</td>
</tr>
</tbody>
</table>
A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging.

**PEDMS-2.1: Acute Fracture**

- Plain x-rays should be performed initially in any obvious or suspected acute fracture or dislocation.
  - If plain x-rays are positive, no further imaging is generally indicated except in complex (comminuted or displaced) joint fractures where MRI or CT without contrast can be approved for preoperative planning.
  - 3D Rendering may sometime be indicated for complex fracture repairs. See **MS-3: 3D Rendering** for imaging guidelines.
- CT or MRI without contrast is indicated if plain x-rays are negative or equivocal for fracture, and fracture or bone marrow edema is still clinically suspected, and if the results will determine immediate treatment decisions as documented by the treating physician.

**PEDMS-2.2: Joint Fracture**

- CT can be approved in complex (comminuted or displaced) fractures involving a joint for preoperative planning.
- CT can be approved when there is clinical concern for delayed union or non-union of fracture or joint fusions on follow-up plain x-ray.

**PEDMS-2.3: Growth Plate Injuries (Salter-Harris Fractures)**

- These fractures can generally be diagnosed and managed adequately with plain x-ray.
- If there is concern for delayed union or non-union of the bone, CT without contrast is indicated.
- MRI without contrast is indicated for the evaluation of a suspected physeal bar in a healing fracture or other complication of a fracture involving the growth plate, which may result in abnormal growth.
- Compressive injuries of the growth plate (Salter-Harris I) injuries may be difficult to identify on plain films, and MRI without contrast is indicated for confirmation.
PEDMS-2.4: Osteochondral or Chondral Fractures, Including Osteochondritis Dissecans

- If x-rays are negative and an osteochondral fracture is still suspected, or if x-ray or clinical exam suggests an unstable osteochondral injury, either MRI without contrast, MR arthrogram, or CT arthrogram is indicated.
- If plain x-rays show a non-displaced osteochondral fragment, follow up imaging should be with plain x-rays. Advanced imaging is not necessary.
- MRI without contrast or CT without contrast is indicated when healing cannot be adequately assessed on follow up plain x-rays.

Background and Supporting Information
An Osteochondral fracture is a tear of the cartilage which covers the end of a bone, within a joint. It is also known as Osteochondritis Dissecans. In both disorders, loose bone fragments may form in a joint.

PEDMS-2.5: Stress/Occult Fracture

These fractures, almost always in weight bearing bones, can usually be adequately evaluated by history, physical exam, plain x-ray and bone scan.
- Plain x-rays should be performed before advanced imaging. Plain x-rays are often negative initially but become positive at 4 weeks in stress fractures or 14 days in occult fractures.
- Bone scan (CPT® 78315 or CPT® 78320) is indicated for evaluation of suspected stress fracture when two x-rays are negative at least 10 days apart.
- Periodic follow-up plain x-rays will usually show progressive healing.
  - CT without contrast is indicated when there is clinical concern for non-union.
- MRI or CT without contrast is indicated without waiting 4 weeks or obtaining follow-up plain x-rays if a stress fracture involving the pelvis, sacrum, hip, femur, tibia, tarsal navicular, proximal 5th metatarsal, or scaphoid is suspected and the initial plain x-ray or bone scan fails to establish a definitive diagnosis.
- MRI or CT without contrast is indicated if follow-up plain x-rays are negative after 4 weeks of conservative therapy and stress fracture is still suspected for all other suspected stress fractures.
**PEDMS-2.6: Compartment Syndrome**

- Acute compartment syndrome is a clinical diagnosis made by direct measurement of compartment pressure and is a surgical emergency. Advanced imaging is not indicated.

- See **MS-11.3: Chronic Exertional Compartment Syndrome** for imaging guidelines.

**PEDMS-2.7: Physical Child Abuse**

- See **PEDMS-7: Suspected Child Abuse** for imaging guidelines

**References**


<table>
<thead>
<tr>
<th>PEDMS-3: Soft Tissue and Bone Masses</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PEDMS-3.1: General Considerations</td>
<td>15</td>
</tr>
<tr>
<td>PEDMS-3.2: Soft Tissue Mass with Negative X-ray and Abnormal Ultrasound</td>
<td>15</td>
</tr>
<tr>
<td>PEDMS-3.3: Soft Tissue Mass with Calcification/Ossification on X-ray</td>
<td>16</td>
</tr>
<tr>
<td>PEDMS-3.4: Mass Involving Bone (Including Lytic and Blastic Metastatic Disease)</td>
<td>16</td>
</tr>
</tbody>
</table>
**PEDMS-3.1: General Considerations**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, with detailed information on the mass (including location, size, duration, solid vs. cystic, fixed vs. not fixed to bone) should be performed prior to considering advanced imaging.

- Evaluation by a surgical specialist is strongly recommended to help determine the most helpful advanced imaging studies for an individual.

- Plain x-rays should be performed as initial imaging. This is true even for soft tissue masses that are clearly not directly associated with osseous structures. Details such as soft tissue calcification, presence or absence of phleboliths, radiographic density, and any effect on adjacent bone are all potentially significant plain film findings that may help better identify the etiology of the mass and determine the optimal modality and contrast level when advanced imaging is indicated.

- Ultrasound (CPT® 76881 or CPT® 76882) if initial plain x-ray is negative to evaluate:
  - Ill-defined masses or areas of swelling
  - Hematomas
  - Subcutaneous lipomas with inconclusive clinical examination
  - Lipomas in other locations
  - Masses that have been present and stable for ≥ 1 year
  - Vascular malformations (see **PEDPVD-2: Vascular and Lymphatic Malformations** for imaging guidelines)

- Advanced imaging is not indicated for the following entities:
  - Ganglion cysts
  - Sebaceous cysts
  - Hematomas
  - Subcutaneous lipomas
    - MRI without or without and with contrast can be performed if surgery is planned.

- MRI without and with contrast or ultrasound (CPT® 76881 or CPT® 76882) for lipomas in other locations (not subcutaneous).

**PEDMS-3.2: Soft Tissue Mass with Negative X-ray and Abnormal Ultrasound**

- MRI without and with contrast is indicated.
  - CT without or with contrast is indicated if MRI is contraindicated.
**PEDMS-3.3: Soft Tissue Mass with Calcification/Ossification on X-ray**

- MRI without and with contrast is indicated.
  - CT without or with contrast is indicated if MRI is contraindicated.

**PEDMS-3.4: Mass Involving Bone (Including Lytic and Blastic Metastatic Disease)**

- Many benign bone tumors have a characteristic appearance on plain x-ray and advanced imaging is not necessary unless one of the following applies:
  - MRI without and with contrast and/or CT without may be indicated for preoperative planning.
  - MRI without and with contrast when the diagnosis is uncertain based on plain x-ray appearance.
    - CT without or with contrast can be approved if MRI is contraindicated.
- Known benign bone tumors, Osteogenic Sarcoma, and Ewing Sarcoma Family of Tumors should be imaged according to **PEDONC-9: Bone Tumors**.

**References**

<table>
<thead>
<tr>
<th>PEDMS-4: Limping Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEDMS-4.1: General Evaluation of the Limping Child</td>
</tr>
<tr>
<td>PEDMS-4.2: Limping Child with Suspected Trauma</td>
</tr>
<tr>
<td>PEDMS-4.3: Limping Child with Suspected Infection</td>
</tr>
<tr>
<td>PEDMS-4.4: Limping Child with No Evidence of Trauma or Infection</td>
</tr>
</tbody>
</table>
PEDMS-4.1: General Evaluation of the Limping Child

- This guideline primarily applies to children under the age of 6 years. It may also be applied to older children with pre-existing conditions who may not be able to communicate, such as a child with severe intellectual disability. Many of these cases will be urgent, because of the risk of adverse outcomes in delay of diagnosis.

- A recent (within 60 days) face to face evaluation, including a detailed history and physical examination, should be performed, which will help determine any indication for advanced imaging. Based on this clinical evaluation, the most likely etiology should be determined, usually trauma, infection, or neither trauma nor infection.

PEDMS-4.2: Limping Child with Suspected Trauma

- Plain radiographs are indicated. For children under age 4 this may require X-rays of the entire leg from hip to foot. If clinical suspicion is high for “toddler fracture” imaging may start with tibia/fibula radiographs, and if a fracture is demonstrated, additional imaging may not be required.

- If initial radiographs are negative, but limping symptoms or avoidance of weight-bearing persist, follow-up radiographs in 7 to 10 days are indicated.

- CT use is limited in the evaluation of the limping child with suspected trauma. Requests should be for Medical Director Review.

- MRI without contrast of the affected body area is indicated if plain films are negative and suspicion remains high for stress fractures or soft tissue injury.

- Radionuclide bone scan (CPT® 78300, CPT® 78305, or CPT® 78306) may be indicated in setting of a non-focal exam, especially in younger and non-verbal children. Due to relatively high radiation exposure, bone scan is reserved for high suspicion cases with negative radiographs. It is a preferred examination in a child with implanted hardware or devices precluding MRI.

PEDMS-4.3: Limping Child with Suspected Infection

- Pain localized to hip:
  - It is essential to exclude septic arthritis. Ultrasound of the hip (CPT® 76881 or CPT® 76882) is used to exclude hip joint effusion.
    - Hip joint fluid aspiration to distinguish infection from non-infectious etiologies if hip joint effusion is demonstrated.
    - Plain radiographs should be obtained if no hip joint effusion is demonstrated.
    - MRI without or without and with contrast is indicated if plain films are not diagnostic.
    - For unilateral hip use CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast).
For bilateral hips use a single CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast) and add modifier -50.

- Pain localized distal to hip:
  - MRI without contrast or without and with contrast of the affected body part is indicated if plain radiographs of the leg are not diagnostic.

- Nonlocalized pain:
  - Plain radiographs of the spine, pelvis, and lower extremities may be necessary to localize the abnormality.
  - Whole body bone scan (CPT® 78306) or MRI without contrast or without and with contrast of the affected body area is indicated if plain radiography is not diagnostic and suspicion for infection remains high.

PEDMS-4.4: Limping Child with No Evidence of Trauma or Infection

- This differential diagnosis is quite broad.
  - Transient (or toxic) synovitis of the hip:
    - Ultrasound of the hip (CPT® 76881 or CPT® 76882) is the preferred initial exam.
      - Plain radiographs if no hip effusion is demonstrated.
      - Hip joint fluid aspiration is indicated if a hip joint effusion is demonstrated. This is usually performed with US guidance, though fluoroscopic guidance or blind aspiration may be required.

- Avascular Necrosis: See PEDMS-6: Avascular Necrosis (AVN/Legg-Calvé-Perthes Disease

- Juvenile Idiopathic Arthritis: See PEDMS-10: Juvenile Idiopathic Arthritis

- Histiocytic Disorders: See PEDONC-18: Pediatric Histiocytic Disorders


- Child Abuse: See PEDMS-7: Suspected Child Abuse

References
Screening studies

The routine use of ultrasound in screening neonates and infants without risk factors for DDH is not recommended by the American Academy of Pediatrics and the American Academy of Orthopedic Surgeons.

Screening ultrasound (CPT® 76885 or CPT® 76886) is recommended for infants between 4 to 6 weeks of age and 6 months of age with one or more of the following risk factors:
- Breech presentation
- Family history of DDH
- Abnormal hip exam (e.g. positive Ortolani or Barlow maneuvers, asymmetric thigh folds, shortening of the thigh observed on the dislocated side, limitation of hip abduction).

Indications for follow-up hip ultrasound (CPT® 76885 or CPT® 76886):
- Type IIA hip was diagnosed on a previous hip ultrasound using the Graf method and follow-up hip ultrasound is requested to confirm normal development.
- Graf type IIA hip has an alpha angle (bony angle) between 50 to 59 degrees in a child less than 3 months of age.
- The overwhelming majority of these hips mature spontaneously, but follow-up may be required to ensure that maturation has occurred.
- Prior ultrasound demonstrates abnormal hip and treatment has been applied, such as a Pavlik harness or other device. Follow-up ultrasound is indicated to document effectiveness of treatment, to ensure the femoral head remains located in the acetabulum or to identify treatment failure. The usual interval for follow-up sonography is monthly, but earlier imaging is indicated for clinical suspicion of treatment failure, subluxation or dislocation of the hip.
MRI without contrast or CT without contrast is indicated to evaluate alignment following reduction. Children in casts or following surgery may require repeated advanced imaging to ensure the reduction remains satisfactory, or to assess incorporation of bone graft material.

- For unilateral Hip MRI use CPT® 73721
- For bilateral Hips MRI use a single CPT® 73721 and add modifier -50
- For unilateral Hip CT use CPT® 73700
- For bilateral Hips CT use a single CPT® 73700 and add modifier -50

Hip ultrasound is NOT indicated for the following:

- Infants less than 2 weeks of age, since hip laxity is normal after birth and usually resolves spontaneously.
- Infants older than 6 months of age as plain x-ray of the hips become more reliable due to femoral head ossification and should be used in infants over 6 months of age.
- Type I, IIB, IIC, IID, and III hips diagnosed on a previous hip ultrasound using the Graf method. Type I hip is normal, and Type IIB, IIC, IID, and III require referral for treatment rather than follow-up imaging.
- Plain x-ray of the hips should be performed rather than ultrasound if there is a clinical suspicion for teratogenic dysplasia.

**Background and Supporting Information**

Developmental dysplasia of the hip (DDH) was formerly known as congenital dislocation of the hip. DDH includes a spectrum of abnormalities including abnormal acetabular shape (dysplasia) and malposition of the femoral head ranging from mild subluxation, dislocatable hip to fixed dislocation. 60 to 80% of abnormalities are identified by physical exam, and more than 90% are identified by ultrasound. Treatment may involve placement in a Pavlik harness, casting, or surgery in extreme or refractory cases.

**References**

PEDMS-6: Avascular Necrosis (AVN) / Legg-Calvé-Perthes Disease / Idiopathic Osteonecrosis

PEDMS-6.1: Avascular Necrosis and Legg-Calvé-Perthes Disease

PEDMS-6.2: Osteonecrosis
Legg-Calvé-Perthes Disease (LCP) is idiopathic osteonecrosis (AVN) of the femoral head. This may occur in children when the femoral head loses its blood supply. It most commonly affects children between the ages of 4 and 8 (occasionally younger or older). Clinically, LCP is quite different than adult AVN since there is good healing potential of the femoral head, especially in younger children. Treatment is observation in mild cases and containment of the head within the acetabulum by abduction bracing or occasionally surgery in more severe cases.

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging, unless the individual is undergoing guideline-supported scheduled follow-up imaging evaluation.

**PEDMS-6.1: Avascular Necrosis and Legg-Calvé-Perthes Disease**

- Plain x-ray is the initial imaging study and may be all that is necessary for follow-up.
- Hip MRI either without contrast or without and with contrast is indicated if the diagnosis is uncertain on plain x-ray.
  - For unilateral hip use CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast).
  - For bilateral hips use a single CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast) and add modifier -50
  - If MRI is contraindicated or unavailable, any one of the following study may be approved in lieu of MRI:
    - CT scan without contrast, with contrast or without and with contrast

**PEDMS-6.2: Osteonecrosis**

- Osteonecrosis can occur in a number of conditions, including during treatment for developmental dysplasia of the hip.
- Individuals with acute lymphoblastic leukemia, lymphoblastic lymphoma, or other conditions with recurrent exposure to high dose corticosteroids and known or suspected osteonecrosis should be imaged according to guidelines in: **PEDONC-3.2: Acute Lymphoblastic Leukemia**.
- Known or suspected osteonecrosis in long term cancer survivors should be imaged according to guidelines in: **PEDONC-19.4: Osteonecrosis in Long Term Cancer Survivors**.
References


PEDMS-7: Suspected Physical Child Abuse

The suspicion of physical abuse of a child often requires imaging, both for clinical management and for forensic purposes. Every effort should be made to support reasonable requests for imaging in these children.

Skeletal Injury

- The radiographic skeletal survey is the primary imaging procedure for detecting fractures, especially in children age 24 months or younger. In older children, skeletal survey may be indicated, but more tailored radiographic evaluation based on history and physical examination may be preferable to skeletal survey.

- Bone scan (CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, or CPT® 78320) is complimentary to plain radiographs, and may be used when the skeletal survey is negative but clinical suspicion remains high.

- Suspected injury to the spine should usually first be evaluated with plain radiographs. CT without contrast and/or MRI without contrast or without and with contrast may be required for complete evaluation of osseous and soft tissue spine injuries. If requested for suspected or known physical abuse, both CT and MRI should be approved.

Head Injury

- CT Head without contrast (CPT® 70450) is indicated when there is clinical evidence of head injury or when skull fracture of any age is detected on survey skull x-ray.
  - CT Head without contrast (CPT® 70450) is also indicated when known or suspected cervical trauma is present in a pediatric individual.

- MRI Brain without contrast (CPT® 70551) or without and with contrast (CPT® 70553) is indicated to further evaluate brain parenchymal injury, or in a child where the clinical signs of brain injury are not sufficiently explained by CT findings.

- Infants may require advanced imaging even if no neurologic symptoms are detected due to the great potential morbidity of abusive head trauma.
Other Body Area Injuries

- CT should be performed with IV contrast unless an absolute contraindication exists.
- Any of the following imaging studies are indicated for suspected injury to the abdomen or pelvis:
  - Abdominal ultrasound (CPT® 76700)
  - Pelvic ultrasound (CPT® 76856)
  - CT Abdomen with contrast (CPT® 74160)
  - CT Pelvis with contrast (CPT® 72193)
  - CT Abdomen/Pelvis with contrast (CPT® 74177)
- Any of the following imaging studies are indicated for suspected injury to the chest:
  - CT Chest without contrast (CPT® 71250)
  - CT Chest with contrast (CPT® 71260)

Screening of other children

- A skeletal survey, or other imaging, may be requested for siblings of abused children, or for other household members under the age of two due to the high incidence of occult fractures in these children. All such requests should be approved.

Background and Supporting Information

Child abuse injuries may affect any organ or system. Fractures are common, but injuries may also include solid and hollow visceral organs, superficial and deep soft tissue injuries, or burns. Some fracture patterns are highly correlated with non-accidental mechanisms, such as the “classic metaphyseal lesion,” also known as a corner fracture or bucket handle fracture, but fractures may occur in any bone. Unsuspected fractures, multiple fractures at various stages of healing, or fractures of a configuration or distribution inconsistent with the history provided, may raise the suspicion for physical abuse.

References

PEDMS-8: Infection/Osteomyelitis

- Infection and osteomyelitis imaging indications in pediatric individuals are identical to those for adult individuals other than the limping child.
  - See MS-9: Infection/Osteomyelitis for imaging guidelines other than in the limping child.
  - See PEDMS-4.3: Limping Child with Suspected Infection for imaging guidelines when limping is present.
  - See PEDMS-10: Inflammatory Musculoskeletal Disease for imaging guidelines for chronic recurrent multifocal osteomyelitis (CRMO, which is an autoimmune disease).

References
PEDMS-9: Foreign Body

- Ultrasound (CPT® 76881) to identify foreign body
- See MS-6.1: Foreign Body – General for additional imaging guidelines.

**Background and Supporting Information**
The common soft tissue foreign bodies in children are wood, glass, and metal slivers. The latter two elements are radiopaque and visible to some degree on plain radiographs, whereas wood is usually radiolucent and nearly always imperceptible on radiographs. When a radiolucent foreign body is suspected,

**References**
| PEDMS-10.1: Juvenile Idiopathic Arthritis                      | 30 |
| PEDMS-10.2: Chronic Recurrent Multifocal Arthritis           | 30 |
| PEDMS-10.3: Inflammatory Muscle Diseases                     | 31 |
**PEDMS-10.1: Juvenile Idiopathic Arthritis**

- A recent (within 60 days) face to face evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging.

- Inflammatory arthritis imaging indications in pediatric individuals are very similar to those for adult individuals. See [MS-15: Rheumatoid Arthritis and Inflammatory Arthritis](#) for imaging guidelines.

- Ultrasound (CPT® 76881) is indicated for assessment of: size and characteristics of joint effusions, extent of synovial hypertrophy, which is the hallmark of juvenile idiopathic arthritis, and involvement of tendinous structures.

**PEDMS-10.2: Chronic Recurrent Multifocal Arthritis**

- Individuals with Chronic Recurrent Multifocal Osteomyelitis (CRMO) can have the following imaging for evaluation of new or worsening pain, or response to treatment in patients without complete clinical resolution of pain symptoms, when plain x-rays are non-diagnostic:
  - Bone scan (CPT® codes: CPT® 78300, CPT® 78305, CPT® 78306, CPT®78315, or CPT® 78320)
  - Nuclear Bone Marrow imaging (CPT® codes: CPT® 78102, CPT® 78103, or CPT® 78104), OR
  - Radiopharmaceutical inflammatory imaging (CPT® codes: CPT® 78805, CPT® 78806, or CPT® 78807)
  - MRI without contrast of specific painful body areas when plain x-ray and bone scan are insufficient to direct acute patient care decisions.
  - Whole body MRI is considered investigational for CRMO at this time due to lack of standardization in technique and lack of published evidence showing improvement in patient outcomes over monitoring with clinical symptoms, plain radiography, and bone scan. See [Preface 5.2: Whole Body MR Imaging](#) for additional details.

**Background and Supporting Information**

Chronic recurrent multifocal osteomyelitis (CRMO) is a rare autoimmune disease affecting multiple bones, arising most commonly during the second decade of life. Treatment consists of anti-inflammatory and immunomodulatory therapies, and is directed predominantly by status of clinical symptoms (most commonly pain).
PEDMS-10.3: Inflammatory Muscle Diseases

- A recent (within 60 days) face-to-face evaluation including a detailed history, physical examination, and plain radiography should be performed prior to considering advanced imaging.

**Inflammatory Muscle Diseases:**
These include dermatomyositis, polymyositis, and sporadic inclusion body myositis. MRI without contrast of a single site is indicated in these disorders for the following purposes:

- Selection of biopsy site
- Treatment monitoring
- Detection of occult malignancy

**Juvenile Dermatomyositis:**

- MRI without contrast can frequently confirm the diagnosis and thus avoid a biopsy.
- CT without contrast (CPT® 73700) is indicated to follow progressive calcification in muscles, but MRI (CPT® 73718) is often used instead since it permits assessment of the primary muscle disease as well.
  - Both CT and MRI are rarely indicated concurrently, and these requests should be forwarded for medical director review.
- Contrary to adult dermatomyositis, juvenile dermatomyositis is very rarely paraneoplastic in nature, and routine screening for occult neoplasm is not indicated.
  - CT Chest (CPT® 71260) and Abdomen/Pelvis (CPT® 74177) with contrast are indicated for individuals with palpable lymphadenopathy or hepatosplenomegaly.

**References**


PEDMS-11: Muscle/Tendon Unit Injuries

- Muscle and tendon unit injury imaging indications in pediatric individuals are identical to those for adult individuals. See **MS-11: Muscle/Tendon Unit Injuries/Diseases** for imaging guidelines.
PEDMS-12: Osgood-Schlatter Disease

This is defined as traction apophysitis of the tibial tubercle in skeletally immature individuals. Diagnosis is by clinical examination and x-ray, and treatment is conservative.

> Advanced imaging is not indicated in this disorder.

References
PEDMS-13: Popliteal (Baker) Cyst

- Ultrasound (CPT® 76881 or CPT® 76882) is the appropriate initial imaging study.
- MRI without contrast (CPT® 73721) is indicated for preoperative planning or if ultrasound is non-diagnostic.

**Background and Supporting Information**

Popliteal or Baker cyst in children is a different clinical entity than in adults and is almost never due to intra-articular pathology. These lesions are usually treated conservatively and rarely require surgery.

**Reference**

PEDMS-14: Slipped Capital Femoral Epiphysis (SCFE)

- Anteroposterior and lateral x-rays (frog leg or cross table lateral) of both hips will confirm or exclude the diagnosis.
  - MRI without contrast (CPT® 73721) or without and with contrast (CPT® 73723) is indicated to detect widening of the physis before the femoral head is displaced (pre-slip) if clinical suspicion remains after negative plain films.
- Because a significant percentage of SCFE is bilateral at presentation, it is reasonable to evaluate the contralateral hip if requested, as some surgeons advocate surgical treatment of pre-slip. All bilateral hip requests should be forwarded for Medical Director Review.
  - For unilateral hip use CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast).
  - For bilateral hips use a single CPT® 73721 (without contrast) or CPT® 73723 (without and with contrast) and add modifier -50.
- MRI without contrast is indicated for preoperative planning if MRI was not completed for diagnosis.

Background and Supporting Information
Slipped capital femoral epiphysis (SCFE) should be considered in young adolescents or preadolescents with groin, anterior thigh, or atraumatic knee pain. Symptoms often include a history of intermittent limp and pain for several weeks or months that are often poorly localized to the thigh, groin, or knee. Any obese adolescent or preadolescent presenting with a history of a limp and thigh, knee, or groin pain for several weeks to one month should be presumed to have a slipped capital femoral epiphysis (SCFE).

References
PEDMS-15: Limb Length Discrepancy

- Limb length discrepancy imaging indications in pediatric individuals are identical to those for adult individuals. See MS-17.1: Limb Length Discrepancy for imaging guidelines.
PEDMS-16: Congenital Anomalies of the Foot

PEDMS-16.1: Tarsal Coalition (Calcaneonavicular Bar/Rigid Flat Foot) 39
PEDMS-16.2: Club Foot 39
PEDMS-16.3: Vertical Talus 39
PEDMS-16.1: Tarsal Coalition (Calcaneonavicular Bar/Rigid Flat Foot)

- Plain x-rays should be performed initially since the calcaneonavicular bar is readily visible in older children and adults.
  - Talocalcaneal coalition is more difficult to evaluate on plain x-rays.
- CT without contrast (CPT® 73700) or MRI without contrast (CPT® 73718) is indicated if tarsal coalition is suspected (because of restricted hindfoot motion on physical exam), and plain x-rays are negative.

PEDMS-16.2: Club Foot

- Plain x-rays should be performed initially since the anomaly is readily visible in older children and adults.
- Ultrasound can be used to characterize the cartilaginous tarsal bones and demonstrate tarsal bone alignment in infants with non-ossified tarsal bones.
- MRI is not currently used to image clubfoot, and limited experiences are published in the literature. MRI (CPT® 73718) or CT (CPT® 73700) is used to determine residual deficits following repair.

Background and Supporting Information

Club Foot is a congenital foot contracture with foot in equinus (plantar flexion) and heel and forefoot in varus/adduction (turned in). Immediate diagnosis and specialty evaluation in the first week of life provide the best chance for successful correction.

PEDMS-16.3: Vertical Talus

- Plain x-rays should be performed initially since the anomaly is readily visible in older children and adults.

Background and Supporting Information

Congenital vertical talus (also known as congenital rocker-bottom foot) is a fixed foot deformity characterized by irreducible talonavicular dislocation. The talus is plantar flexed and does not articulate with the navicular bone.
References