

# Evolut Clinical Guideline [0442037](#) for Lumbar Spine Magnetic Resonance Imaging (MRI)

<b>Guideline or Policy Number:</b> Evolut_CG_ <a href="#">0442037</a>	<b><u>Applicable Codes</u></b>	
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## STATEMENT

### General Information

- *It is an expectation that all patients receive care/services from a licensed clinician.- All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided.-~~If~~ If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*
- *The guideline criteria in the following sections were developed utilizing evidence-based and peer-reviewed resources from medical publications and societal organization guidelines as well as from widely accepted standard of care, best practice recommendations.*

### Purpose

Magnetic resonance imaging (MRI) is used in the evaluation, diagnosis, and management of spine-related conditions, e.g., degenerative disc disease, cauda ~~equine~~ equina compression, radiculopathy, infections, or cancer in the lumbar spine. ~~MRI provides high quality multiplanar images of organs and structures within the body without the use of x-rays or radiation. In the lumbar area where gonadal exposure may occur, MRI's lack of radiation is an advantage.~~

### Special Note

~~+~~ + If there is a combination request\* for an overlapping body part, either requested at the same time or sequentially (within the past 3 months) one of the following must be demonstrated:

- The results of the prior study should be inconclusive or show a need for additional or follow-up imaging evaluation ~~OR~~
- The office notes should clearly document an indication why overlapping imaging is needed and how it will change management for the patient.

(\*Unless approvable in the combination section as noted in the guidelines)

## INDICATIONS FOR LUMBAR SPINE MRI

### Evaluation of Neurologic Deficits (1)(4);2)

- With any of the following new neurological deficits documented on physical exam that localizes to the ~~cervical~~ lumbar spine
  - Extremity muscular weakness (~~and~~ not likely caused by plexopathy ~~or~~ peripheral neuropathy)<sup>3</sup> or neuromuscular disease

- Pathologic ~~or~~ abnormal reflexes (~~and~~ not likely caused by plexopathy, ~~or~~ peripheral neuropathy)<sup>(4)</sup> or neuromuscular disease
- Absent/decreased ~~sensory changes~~ sensation along a particular lumbar dermatome (nerve distribution): pin prick, touch, vibration, proprioception or temperature (and not likely caused by plexopathy, or peripheral neuropathy)
- Lower extremity ~~increased~~ decreased muscle tone (not likely caused by plexopathy, peripheral neuropathy or neuromuscular disease)
- New onset bowel or bladder dysfunction (e.g., retention or incontinence)—not related to an inherent bowel or bladder process
- Gait abnormalities (see **Table 1** below for more details)
- New onset foot drop (not related to a peripheral nerve injury, e.g., peroneal nerve)
- Cauda Equina Syndrome as evidence by severe back pain/sciatica along with one of the defined symptoms (see **Cauda Equina Syndrome** section)

## Evaluation of Back Pain ~~(5)~~(1)(4)

### With any of the Following:

- With new or worsening objective **neurologic deficits** on exam, as above
- Failure of **conservative treatment\*** for a minimum of six (6) weeks within the last six (6) months<sup>;</sup>

**NOTE** - Failure of conservative treatment is defined as one of the following:

- Lack of meaningful improvement after a full course of treatment; **OR**
- Progression or worsening of symptoms during treatment; **OR**
- Documentation of a medical reason the member is unable to participate in treatment

*Closure of medical or therapy offices, patient inconvenience, or noncompliance without explanation does not constitute “inability to complete” treatment.*

- With progression or worsening of symptoms during the course of **conservative treatment\***
- With an abnormal electromyography (EMG) or nerve conduction study (if performed) indicating a lumbar radiculopathy. (~~EMG is not recommended to determine the cause of axial-lumbar, thoracic, or cervical spine pain~~)<sup>(6)(2,3)(2,3)</sup>
- Isolated back pain in pediatric population<sup>(7,8)</sup> ~~( when at least ONE of the following red flags are present~~ <sup>(4,5)(4,5)</sup> (**Note:** conservative care not required if red flags are present). Red flags that prompt imaging include any ONE of the following:
  - Age 5 or younger
  - Constant pain
  - Pain lasting > 4 weeks
  - Abnormal neurologic examination

- Early morning stiffness and/or gelling
- Night pain that prevents or disrupts sleep
- Radicular pain
- Fever, ~~or~~ weight loss, or ~~or~~ malaise
- Postural changes (e.g., kyphosis or scoliosis)
- Limp (or refusal to walk in a younger child)

## ~~Pre-Operative/Post-Operative/Procedural Evaluation~~

~~As part of initial pre-operative/post-operative/procedural evaluation (The best examinations are CT to assess for hardware complication, extent of fusion and pseudarthrosis and MRI for cord, nerve root compression, disc pathology, or post-op infection)<sup>(6)</sup>~~

- ~~● For preoperative evaluation/planning~~
- ~~● CSF leak highly suspected and supported by patient history and/or physical exam findings (leak (known or suspected spontaneous (idiopathic) intracranial hypotension (SIH), post lumbar puncture headache, post spinal surgery headache, orthostatic headache, rhinorrhea or otorrhea, or cerebrospinal venous fistula))<sup>(9)</sup>~~
- ~~● A follow-up study may be needed to help evaluate a patient's progress after treatment, procedure, intervention, or surgery in the last 6 months. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested (routine surveillance post-op not indicated without symptoms)~~
- ~~● Surgical infection as evidenced by signs/symptoms, laboratory, or prior imaging findings~~
- ~~● New or changing neurological deficits or symptoms post-operatively<sup>(10)</sup> (see neurological deficit section above).~~
- ~~● When combo requests (see above statement\*) are submitted (i.e., MRI and CT of the spine), the office notes should clearly document the need for both studies to be done simultaneously (e.g., the need for both soft tissue and bony anatomy is required)<sup>(11)</sup>~~
  - ~~○ Combination requests where both lumbar spine CT and MRI lumbar spine are both approvable (not an all-inclusive list):~~
- ~~● Pathologic or complex fractures~~
- ~~● Malignant process of spine with both bony and soft tissue involvement~~
- ~~● Clearly documented indication for bony and soft tissue abnormality where assessment will change management for the patient~~

## ~~Evaluation of Trauma or Acute Injury~~ <sup>(12)</sup>~~(6)~~~~(6)~~

- Presents with any of the following neurological deficits as above
- With progression or worsening of symptoms during the course of conservative treatment\*

- History of underlying spinal abnormalities (i.e., ankylosing spondylitis or diffuse idiopathic skeletal hyperostosis) (Both MRI and CT are approvable)<sup>(13,14)</sup> (7,8)(7-8)
- When the patient is clinically unevaluable or there are preliminary imaging findings (x-ray or CT) needing further evaluation

~~MRI and CT provide complementary information. When indicated it is appropriate to perform both examinations<sup>(13)</sup>~~

## **Pars Defect (Spondylolysis) or Spondylolisthesis <sup>(15,16)</sup>**

- Pars defect (spondylolysis) or spondylolisthesis in adults when Flexion/Extension x-rays show instability <sup>(17)(9)(9)</sup>
- Clinically suspected pars defect (spondylolysis) after plain films (flexion extension instability not required) in pediatric population (< 18 yr.) or athletes (and imaging would change treatment) ~~(flexion-extension instability not required)~~ and imaging would change treatment<sup>(7)(4)(4)</sup>

~~**NOTE:** Initial imaging (x-ray, or planar bone scan without SPECT; Bone scan with SPECT is superior to MRI and CT in the detection of pars interarticularis pathology including spondylolysis)<sup>(7)</sup>~~

## **Evaluation of ~~of Known Fracture or New Compression Fractures~~ <sup>(18)(10)(10)</sup>**

~~(With Worsening Back Pain)~~

- With history of malignancy
  - To aid in differentiation of benign osteoporotic fractures from metastatic disease
    - A follow-up MRI in 6-8 weeks after initial MRI when initial imaging cannot decipher (indeterminate) benign osteoporotic fracture from metastatic disease <sup>(19)</sup>
- Fracture on initial imaging in a young patient (< 50) with no history of trauma and concern for pathologic fracture
- Fracture with imaging characteristics concerning for underlying malignancy
- With an associated new focal **neurologic deficit** as above<sup>(12)</sup>
- Prior to a planned surgery/intervention or if the results of the MRI will change management

## **Evaluation of Tumor, Cancer, or Metastasis**

**With any of the Following:**

~~MRI is usually the preferred study (CT may be needed to further characterize solitary indeterminate lesions seen on MRI)<sup>(20,21,22)</sup>~~

- **Primary tumor** <sup>(11)(14)</sup>

- Initial staging primary spinal tumor <sup>(23)</sup>
- Follow-up of known primary cancer of patient undergoing active treatment within the past year or as per surveillance imaging guidance for that cancer
- Known spinal tumor with new signs or symptoms (e.g., new or increasing nontraumatic pain, physical, laboratory, and/or imaging findings)
- With an associated new focal **neurologic deficit** as above<sup>(12)</sup>
- **Metastatic tumor** <sup>(12)(12)</sup>
  - With evidence of metastasis on bone scan needing further clarification **OR** inconclusive findings on a prior imaging exam
  - With an associated new focal **neurologic deficit**<sup>(12)</sup>
  - Known malignancy with new signs or symptoms (e.g., new or increasing nontraumatic pain, radiculopathy or back pain that occurs at night and wakes the patient from sleep with known active cancer, physical, laboratory, and/or imaging findings) in a tumor that tends to metastasize to the spine <sup>(24)(13)(13)</sup>

## ~~FURTHER EVALUATION OF INDETERMINATE FINDINGS~~

~~Unless follow-up is otherwise specified within the guideline~~

- ~~● For initial evaluation of an inconclusive finding on a prior imaging report that requires further clarification.~~
- ~~● One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam).~~

## Evaluation of Known or Suspected Infection ~~/Abscess~~

~~(25,26)(14)(14)~~

### ~~Infection~~

#### ~~E.g. Osteomyelitis or abscess~~

- As evidenced by signs and/or symptoms, laboratory (i.e., abnormal white blood cell count, ESR and/or CRP) or prior imaging findings
- Follow-up imaging of infection
  - With worsening symptoms/laboratory values (i.e., white blood cell count, ESR/CRP) or radiographicx-ray findings

## Evaluation of Known or Suspected Inflammatory Disease

- Spondyloarthropathies, known or suspected

- Ankylosing Spondylitis/Spondyloarthropathies with non-diagnostic or indeterminate x-ray and appropriate rheumatology workup
- Known and suspected neuroinflammatory conditions (such as sarcoidosis, Bechet's)
  - Initial evaluation of suspected neuroinflammatory conditions after initial workup and detailed neurological examination
  - Follow-up of known neuroinflammatory conditions when there are either:
    - New or worsening signs or symptoms OR
    - To evaluate treatment response

**E.g., osteomyelitis**

## Evaluation of Spine Abnormalities Related to Immune System Suppression <sup>(25)(14)(14)</sup>

**E.g., HIV, chemotherapy, leukemia, or lymphoma**

- As evidenced by signs/symptoms, laboratory, or prior imaging findings

**E.g., HIV, chemotherapy, leukemia, or lymphoma**

## Other Indications ~~for Lumbar Spine MRI~~

**Note:** See combination requests, below, for initial advanced imaging assessment and pre-operatively

- Tethered cord or spinal dysraphism (known or suspected), based on preliminary imaging, neurological exam, and/or high-risk cutaneous stigmata <sup>(27,28,29)(15,16)(15,16)</sup>
- Known anorectal malformations <sup>(30)(17)(17)</sup>
- Suspicious sacral dimple (those that are deep, larger than 0.5 cm, located within the superior portion of the gluteal crease or above the gluteal crease, multiple dimples, or associated with other cutaneous markers) or duplicated or deviated gluteal cleft <sup>(31)(18)(18)</sup>
  - Patients  $\leq$ 3 months should have ultrasound
- Toe walking in a child when associated with upper motor neuron signs, including hyperreflexia, spasticity; or orthopedic deformity with concern for spinal cord pathology and/or tethered cord (e.g., pes cavus, clawed toes, leg or foot length deformity (excluding tight heel cords)) <sup>(32)(19)(19)</sup>
- Known Chiari II (Arnold-Chiari syndrome), III, or IV malformation <sup>(29)(15)(15)</sup>
- For follow-up/repeat evaluation of Arnold-Chiari I with new signs or symptoms suggesting recurrent spinal cord tethering (For initial diagnosis see Combinations section below)
- CSF leak highly suspected and supported by patient history and/or physical exam findings (e.g., known or suspected spontaneous intracranial hypotension (SIH), post

lumbar puncture headache, post spinal surgery headache, orthostatic headache, rhinorrhea or otorrhea, or cerebrospinal-venous fistula ~~(CT myelogram)~~ <sup>(20)(29)</sup>

## PREOPERATIVE OR POSTOPERATIVE ASSESSMENT <sup>(1)</sup>

When not otherwise specified in the guideline:

Preoperative Evaluation:

- Imaging of the area requested is needed to develop a surgical plan

Postoperative Evaluation:

- Evaluation of postoperative pseudarthrosis, hardware complication and/or extent of fusion after initial x-rays

**NOTE:** for this indication, advanced imaging should not occur until > 6 months after surgery

- Surgical infection as evidenced by signs/symptoms, laboratory, or prior imaging findings
- New or changing neurological deficits or symptoms post-operatively <sup>(21)(24)</sup> (see **neurological deficit** section above)
- Known or suspected complications
- A clinical reason is provided how imaging may change management

**NOTE:** This section applies only within the first few months following surgery unless otherwise specified

## FURTHER EVALUATION OF INDETERMINATE FINDINGS

Unless follow-up is otherwise specified within the guideline

- For initial evaluation of an inconclusive finding on a prior imaging report that requires further clarification.
- One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam).

## IMAGING IN KNOWN GENETIC CONDITIONS

- LZTR1-related Schwannomatosis <sup>(22)(22)</sup>:
  - Every 2 years starting at age 12



- Every 2 years starting at age 12
- Neurofibromatosis 1 (NF1) <sup>(23,24)</sup>(23,24)
  - Signs and symptoms concerning for spinal tumor

### **Brain/Cervical Spine/Thoracic Spine/Lumbar Spine/Abdomen MRI**

- Von Hippel-Lindau (VHL) every 2 years starting at age 15 <sup>(33)</sup>(27)(27)
  - Annually (including at diagnosis) starting at age 11

### **Brain MRI/Cervical Spine MRI/Thoracic Spine/Lumbar Spine/Whole Body MRI**

- SMARCA4 and SMARCB1 (includes SMARCB1-associated Schwannomatosis and Rhabdoid Tumor Predisposition Syndrome) <sup>(22,26)</sup>(22,26)
  - At diagnosis
  - Monthly from age 0-6 months
  - Every 2 months from age 7-18 months
  - Every 3 months from age 19 months – 5 years
  - Annually after age 5

## **OTHER COMBINATION STUDIES WITH LUMBAR SPINE MRI**

**NOTE:** When medical necessity is met for an individual study **AND** conscious sedation is required (such as for young pediatric patients or patients with significant developmental delay), the entire combination is indicated)

### **Lumbar Spine MRI and /Lumbar Spine CT**

- Pathologic or complex fractures
- Malignant process of spine with both bony and soft tissue involvement
- Clearly documented indication for bony and soft tissue abnormality where assessment will change management for the patient

### **Brain/Cervical Spine/ Thoracic Spine/Lumbar Spine MRI (any combination)**

- For ~~initial~~initial evaluation of a suspected Arnold Chiari malformation
- Follow-up imaging of a known type II or type III Arnold Chiari malformation. For Arnold Chiari type I, follow-up imaging only if new or changing signs/symptoms <sup>(34,35,36)</sup>(15,29-31)(15,29-31)

- Oncological Applications (e.g., primary nervous system, ~~metastatic~~metastatic) <sup>(11)(44)</sup>
  - Drop metastasis from brain or spine
  - Suspected leptomeningeal carcinomatosis <sup>(37)(32)(32)</sup>
  - Known tumor evaluation and monitoring in neurocutaneous syndromes
- CSF leak highly suspected and supported by patient history and/or physical exam findings (e.g. known or suspected spontaneous ~~(idiopathic)~~ intracranial hypotension (SIH), post lumbar puncture headache, post spinal surgery headache, orthostatic headache, rhinorrhea or otorrhea, or cerebrospinal-venous fistula) <sup>(20)(20)</sup>
- ~~For evaluation of known Arnold-Chiari Malformation~~
- ~~Tumor evaluation and monitoring in cancer predisposition syndromes~~
  - ~~Von Hippel Lindau (VHL) – imaging of the brain and spinal cord for hemangioblastomas every 2 years starting at age 14~~ <sup>(38,39,40)</sup>
  - ~~Rhabdoid Tumor Predisposition Syndrome – Brain and Spine MRI At diagnosis and monthly age 0-6 months if whole body MRI not done; Q2-3 months age 7-18months, Q3months age 19 months-5 years~~
  - ~~NF-2 – Brain IAC annually starting at the age of 10 years and spinal imaging at baseline and every 2 to 3 years with more frequent imaging, if warranted, based on sites of tumor involvement~~ <sup>(44)</sup>
  - ~~Schwannomatosis – Brain and spine MRI every two to three years beginning at age 12 years~~

Note: diagnosis is met with both genetic testing AND clinical features due to incomplete penetrance

## **Cervical and/or Spine/Thoracic and/or Spine/Lumbar MRIs (Any Combination)Spine MRI**

**Note:** These body regions might be evaluated separately or in combination as documented in the clinical notes by physical examination findings (e.g., localization to a particular segment of the spinal cord), patient history, and other available information, including prior imaging.

**Exception:** Indications for combination studies <sup>(42,43)</sup>: Are approved indications as noted below and being performed in children who will need anesthesia for the procedure

- ~~Any combination of these studies for:~~
  - Survey/complete initial assessment of infant/child with congenital scoliosis or juvenile idiopathic scoliosis under the age of 10 <sup>(44,45,46)(33,34)(33,34)</sup> (e.g., congenital scoliosis, idiopathic scoliosis, scoliosis with vertebral anomalies)
  - In the presence of neurological deficit, progressive spinal deformity, or for preoperative planning <sup>(47)(35,36)(35,36)</sup>
  - Back pain with known vertebral anomalies (hemivertebrae, hypoplasia, agenesis, butterfly, segmentation defect, bars, or congenital wedging) in a child on preliminary

imaging

- Scoliosis with any of the following <sup>(48)(36,37)(36,37)</sup>
  - Progressive spinal deformity
  - Neurologic deficit (new or unexplained)
  - Early onset
  - Atypical curve (e.g., short segment, >30° kyphosis, left thoracic curve, associated organ anomalies)
  - Pre-operative planning; **OR**
  - When office notes clearly document how imaging will change management
- Arnold-Chiari malformations <sup>(29,49)(15,38)(15,38)</sup>
  - Arnold-Chiari I
    - For evaluation of spinal abnormalities associated with initial diagnosis of Arnold-Chiari Malformation. (C/T/L spine due to association with tethered cord and syringomyelia), and initial imaging has not been completed <sup>(44)(34)(34)</sup>
  - Arnold-Chiari II-IV - For initial evaluation and follow-up as appropriate
    - Usually associated with open and closed spinal dysraphism, particularly meningocele <sup>(27)(39)(39)</sup>
- Tethered cord, or spinal dysraphism (known or suspected) based on preliminary imaging, neurological exam, and/or high-risk cutaneous stigmata <sup>(27,28,29) (15,16,39)(15,16,39)</sup> when anesthesia required for imaging <sup>(50)(40)(40)</sup> (e.g., meningocele, lipomeningocele, diastematomyelia, fatty/thickened filum terminale, and other spinal cord malformations)
- Oncological Applications (e.g., primary nervous system, ~~metastatic~~metastatic) <sup>(11)</sup>
  - Drop metastasis from brain or spine (imaging also includes brain)
  - Suspected leptomeningeal carcinomatosis (LC) <sup>(5+)</sup> <sup>(41)</sup>
  - ~~Known tumor evaluation and monitoring in neurocutaneous syndromes~~Any combination of these for spinal survey in patient with metastases
  - ~~Tumor evaluation and monitoring in neurocutaneous syndromes (See Neurocutaneous Syndromes)~~
- CSF leak highly suspected and supported by patient history and/or physical exam findings (~~leak (e.g. known or suspected spontaneous (idiopathic) intracranial hypotension (SIH), post lumbar puncture headache, post spinal surgery headache, orthostatic headache, rhinorrhea or otorrhea, or cerebrospinal-venous fistula)~~) <sup>(9)</sup> <sup>(20)</sup>

## Combination Studies for Malignancy for Initial Staging or Restaging

Unless otherwise specified in this guideline, indication for combination studies for malignancy for initial staging or restaging:

- Concurrent studies to include CT or MRI of any of the following areas as appropriate depending on the cancer: Abdomen, Brain, Chest, Neck, Pelvis, Cervical Spine, Thoracic Spine or Lumbar Spine.


## CODING AND STANDARDS

### Coding

### ~~CPT~~ Codes

72148, 72149, 72158, +0698T

### Applicable Lines of Business

<input checked="" type="checkbox"/>	CHIP (Children’s Health Insurance Program)
<input checked="" type="checkbox"/>	Commercial
<input checked="" type="checkbox"/>	Exchange/Marketplace
<input checked="" type="checkbox"/>	Medicaid
<input checked="" type="checkbox"/> 	Medicare Advantage

## BACKGROUND

### \*Conservative Treatment

Non-operative conservative treatment should include a multimodality approach consisting of at least one (1) active and one (1) inactive component targeting the affected region.

#### Active Modalities

- Physical therapy
- Physician-supervised home exercise program\*\*
- Chiropractic care

#### Inactive Modalities

- Medications (e.g., NSAIDs, steroids, analgesics)

- Injections (e.g., epidural injection, selective nerve root block)
- Medical Devices (e.g., TENS unit, bracing)

## \*\*Home Exercise Program

The following two elements are required to meet conservative therapy guidelines for HEP <sup>(5)(1)</sup>:

- Documentation of an exercise prescription/plan provided by a physician, physical therapist, or chiropractor; **AND**
- Follow-up documentation regarding completion of HEP after the required 6-week timeframe or inability to complete HEP due to a documented medical reason (e.g., increased pain or inability to physically perform exercises).

## Gait and Spine Imaging

**Table 1** <sup>(52,53,54,55,56,57)</sup>(42–45)

Gait	Characteristic	Work up/Imaging
Hemiparetic	Spastic unilateral, circumduction	Brain and/or, Cervical spine imaging based on associated symptoms
Diplegic	Spastic bilateral, circumduction	Brain, Cervical and Thoracic Spine imaging
Myelopathic	Wide based, stiff, unsteady	Cervical and/or Thoracic spine MRI based on associated symptoms
Cerebellar Ataxic	Broad based, clumsy, staggering, lack of coordination, usually also with limb ataxia	Brain imaging <b>see Brain MRI Guideline</b>
Apraxic	Magnetic, shuffling, difficulty initiating	Brain imaging <b>see Brain MRI Guideline</b>
Parkinsonian	Stooped, small steps, rigid, turning en bloc, decreased arm swing	Brain Imaging <b>see Brain MRI Guideline</b>
Choreiform	Irregular, jerky, involuntary	Medication review, consider brain imaging as per movement

Gait	Characteristic	Work up/Imaging
	movements	disorder Brain MR guidelines
Sensory ataxic	Cautious, stomping, worsening without visual input (ie + Romberg)	EMG, blood work, consider spinal (cervical or thoracic cord imaging) imaging based on EMG
<b>Neurogenic Neuropathic</b>	Steppage, dragging of toes	EMG initial testing; BUT if there is a foot drop, lumbar spine MRI is appropriate without EMG  Pelvis MR if there is evidence of plexopathy
Vestibular	Insecure, veer to one side, worse when eyes closed, vertigo	Consider Brain/IAC MRI <b>see Brain MRI Guideline</b>

## Cauda Equina Syndrome

- Symptoms include severe back pain or sciatica along with one or more of the following:
  - Saddle anesthesia - loss of sensation restricted to the area of the buttocks, perineum, and inner surfaces of the thighs (areas that would sit on a saddle)
  - Recent bladder/bowel dysfunction
  - Achilles reflex absent on both sides
  - Sexual dysfunction that can come on suddenly
  - Absent anal reflex and bulbocavernosus reflex

## MRI and Neurocutaneous Syndromes

- In NF-1, clinical evaluation appears to be more useful to detect complications than is screening imaging in asymptomatic patients. Imaging is indicated in evaluation of suspected tumors based on clinical evaluation and for follow-up of known intracranial and intraspinal tumors.<sup>(68)</sup>
- Conversely in NF-2, routine MR imaging screening is always indicated, given the high prevalence of CNS tumors, especially vestibular schwannomas. In patients with NF-2, routine screening brain/IAC imaging is indicated annually starting from age 10, if asymptomatic, or earlier with clinical signs/symptoms. Most individuals with NF2 eventually develop a spinal tumor, mostly commonly schwannomas, but meningioma and ependymomas are also seen. Spinal imaging at baseline and every 2 to 3 years is

also advised with more frequent imaging, if warranted, based on sites of tumor involvement.<sup>(59)</sup>

- In patients with Tuberous Sclerosis, Brain MRI should be obtained every 1-3 years up until age 25 for surveillance for CNS abnormalities.<sup>(60)</sup>
- In Von Hippel-Lindau Syndrome, imaging of the brain and spinal cord for hemangioblastomas is recommended every 2 years.<sup>(33)</sup>

## Contraindications and Preferred Studies

- Contraindications and reasons why a CT/CTA cannot be performed may include: impaired renal function, significant allergy to IV contrast, pregnancy (depending on trimester)
- Contraindications and reasons why an MRI/MRA cannot be performed may include: impaired renal function, claustrophobia, non-MRI compatible devices (such as non-compatible defibrillator or pacemaker), metallic fragments in a high-risk location, patient exceeds weight limit/dimensions of MRI machine

## SUMMARY OF EVIDENCE

### ACR Appropriateness Criteria® Low Back Pain: 2021 Update <sup>(1)</sup>

**Study Design:** The study is an update of the ACR Appropriateness Criteria for low back pain, developed by the Expert Panel on Neurological Imaging. The criteria are evidence-based guidelines for specific clinical conditions, reviewed annually by a multidisciplinary expert panel. The guideline development and revision include an extensive analysis of current medical literature from peer-reviewed journals and the application of well-established methodologies (RAND/UCLA Appropriateness Method and Grading of Recommendations Assessment, Development, and Evaluation or GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios.

**Target Population:** The target population includes patients in the United States with acute low back pain, with or without radiculopathy. Acute low back pain is the leading cause of years lived with disability and the third-ranking cause of disability-adjusted life-years in the United States. The criteria address various scenarios, including uncomplicated acute low back pain, subacute or chronic low back pain, low back pain with suspected cauda equina syndrome, low back pain with a history of prior lumbar surgery, and low back pain with one or more risk factors such as low-velocity trauma, osteoporosis, elderly individuals, or chronic steroid use.

### Key Factors

**Imaging Recommendations:** The criteria provide detailed recommendations on the appropriateness of various imaging procedures for different clinical scenarios. For example, imaging is typically not warranted for acute uncomplicated low back pain, while MRI is recommended for patients with suspected cauda equina syndrome or those who are candidates for surgery or intervention with persistent or progressive symptoms.

**Clinical Scenarios:** The document outlines seven variants of low back pain and provides specific imaging recommendations for each variant. These include acute low

back pain with or without radiculopathy, subacute or chronic low back pain, low back pain with suspected cauda equina syndrome, low back pain with a history of prior lumbar surgery, and low back pain with risk factors such as low-velocity trauma, osteoporosis, elderly individuals, or chronic steroid use.

**Radiation Levels:** The criteria also include relative radiation level designations for each imaging examination, providing information on potential adverse health effects associated with radiation exposure.

### **ACR Appropriateness Criteria® Acute Spinal Trauma** <sup>(6)</sup>

**Study Design:** The document is a revised guideline by the American College of Radiology (ACR) for the appropriateness of imaging procedures in acute spinal trauma. It includes a summary of literature reviews, expert panel recommendations, and evidence-based criteria for various clinical scenarios.

**Target Population:** The guidelines focus on patients aged 16 years and older who have experienced acute blunt trauma to the cervical, thoracic, or lumbar spine. Specific criteria are provided for different age groups and clinical conditions, including low-risk patients, those with suspected arterial injury, and obtunded patients.

#### **Key Factors:**

**Imaging Procedures:** The document outlines the appropriateness of various imaging modalities such as CT, MRI, MRA, and radiography for different clinical scenarios. It emphasizes the use of CT without IV contrast as the initial imaging modality for most cases.

**Clinical Criteria:** The guidelines incorporate the NEXUS and Canadian C-Spine Rule (CCR) criteria for determining the need for cervical spine imaging. These criteria are based on factors such as age, mechanism of injury, and clinical symptoms.

**Radiation Levels:** The document includes relative radiation level designations for each imaging procedure, highlighting the importance of minimizing radiation exposure.

**Expert Panel:** The guidelines were developed by an expert panel on neurological imaging, including specialists from various institutions and organizations.

### **ACR Appropriateness Criteria® Management of Vertebral Compression Fractures: 2022 Update** <sup>(10)</sup>

**Study Design:** The study design involves the development and revision of the ACR Appropriateness Criteria, which are evidence-based guidelines for specific clinical conditions. These guidelines are reviewed annually by a multidisciplinary expert panel. The guideline development includes an extensive analysis of current medical literature from peer-reviewed journals and the application of well-established methodologies such as the RAND/UCLA Appropriateness Method and the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios.

**Target Population:** The target population for this study includes individuals with vertebral compression fractures, which can be caused by various etiologies such as trauma.

osteoporosis, or neoplastic infiltration. Osteoporosis-related fractures are the most common cause of VCFs and have a high prevalence among postmenopausal women and similarly aged men. The study also addresses VCFs caused by trauma and malignancies, including primary bone tumors and metastatic cancers.

### Key factors:

- The prevalence and causes of VCFs, highlighting the high incidence among postmenopausal women and the increasing incidence in men.
- The importance of diagnostic imaging in characterizing VCFs and guiding treatment decisions.
- The use of various imaging modalities such as MRI, CT, FDG-PET/CT, and bone scans to evaluate VCFs.
- The management of both osteoporotic and pathologic VCFs, including medical management, percutaneous vertebral augmentation, and surgical consultation.
- The role of minimally invasive percutaneous image-guided techniques for treating spine tumors and the potential benefits of vertebral augmentation procedures.

## ANALYSIS OF EVIDENCE

### Shared Findings

**Imaging Recommendations:** All three articles emphasize the importance of imaging in diagnosing and managing spinal conditions. They recommend using MRI and CT scans as primary imaging modalities due to their high sensitivity and specificity in detecting spinal injuries and abnormalities. For instance, "Hassankhani et al 2024 ACR Acute Spinal Trauma" highlights the use of CT and MRI for acute spinal trauma, while "Hutchins et al 2021 JACR Low Back Pain" and "Khan et al 2023 JACR Management of Vertebral Compression Fractures" also stress the importance of these imaging techniques for low back pain and vertebral compression fractures, respectively. <sup>(1,6,10)</sup>

**Clinical Criteria and Guidelines:** The articles provide evidence-based guidelines and criteria for managing spinal conditions. "Hassankhani et al 2024 ACR Acute Spinal Trauma" discusses the use of the National Emergency X-Radiography Utilization Study (NEXUS) and the Canadian C-Spine Rule (CCR) for cervical spine injuries. <sup>(6)</sup> Similarly, "Hutchins et al 2021 JACR Low Back Pain" outlines the American College of Radiology Appropriateness Criteria for low back pain management. <sup>(1)</sup> "Khan et al 2023 JACR Management of Vertebral Compression Fractures" provides guidelines for managing vertebral compression fractures, including the use of the Spinal Instability Neoplastic Score (SINS) for evaluating spinal stability. <sup>(10)</sup>

**Non-Surgical Management:** All three articles emphasize the importance of non-surgical management as the first line of treatment. They recommend conservative therapies such as pain management, physical therapy, and bracing before considering surgical interventions. For example, "Hutchins et al 2021 JACR Low Back Pain" and "Khan et al 2023 JACR Management of Vertebral Compression Fractures" both highlight the role of

conservative management in treating low back pain and vertebral compression fractures. <sup>(1,10)</sup>

## POLICY HISTORY

### Summary

Date	Summary
<a href="#">June 2025</a>	<ul style="list-style-type: none"> <li>● <a href="#">Guideline name changed from Lumbar Spine MRI to Lumbar Spine Magnetic Resonance Imaging (MRI)</a></li> <li>● <a href="#">Guideline number changed from Evolent CG 044 to Evolent CG 2037</a></li> <li>● <a href="#">Added new bullet-point to the General Statement section</a></li> <li>● <a href="#">Checked the Medicare Advantage box in the Applicable Lines of Business table</a></li> <li>● <a href="#">Added a Summary of Evidence and Analysis of Evidence</a></li> <li>● <a href="#">Updated references and background</a></li> <li>● <a href="#">Updated the Genetics and Rare Diseases section and renamed to Imaging in Known Genetic Conditions</a></li> <li>● <a href="#">Clarified neurological deficit</a></li> <li>● <a href="#">Evaluation of Compression Fractures</a></li> </ul> <p><u>Added</u></p> <ul style="list-style-type: none"> <li>● <a href="#">Fracture on initial imaging in a young patient (&lt;50) with no history of trauma and concern for pathologic fracture</a></li> <li>● <a href="#">Fracture with imaging characteristics concerning for underlying malignancy</a></li> </ul>
June 2024	<ul style="list-style-type: none"> <li>● Combination Studies made uniform across Guidelines</li> <li>● Added Contraindications and Preferred studies section</li> <li>● Reduced Background</li> <li>● Updated references</li> </ul>
<a href="#">May 2023</a>	<ul style="list-style-type: none"> <li>● <del>Updated references</del></li> <li>● <del>Updated background section</del></li> <li>● <del>Clarified pathological reflexes</del></li> <li>● <del>Added "Further evaluation of indeterminate or questionable findings on prior imaging":-</del></li> <li>● <del>Clarified cerebellar ataxia in gait table</del></li> </ul>

Date	Summary
	<ul style="list-style-type: none"> <li>● <del>Removed “radicular pain” and “malaise” from Isolated Back Pain in the Pediatric population: Red flags</del></li> <li>● <del>General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline</del></li> <li>● <del>Added statement regarding further evaluation of indeterminate findings on prior imaging</del></li> <li>● <del>Removed Additional Resources</del></li> </ul>

## LEGAL AND COMPLIANCE

### Guideline Approval

#### Committee

Reviewed / Approved by Evolent Specialty [Services](#) Clinical Guideline Review Committee

### Disclaimer

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