

# Clinical Appropriateness Guidelines: Advanced Imaging

Appropriate Use Criteria: Imaging of the Spine

Effective Date: November 20, 2017

Proprietary

Date of Origin: 03/30/2005

Last revised: 07/26/2016

Last reviewed: 07/26/2016



8600 W Bryn Mawr Avenue

South Tower - Suite 800

Chicago, IL 60631

P. 773.864.4600

[www.aimspecialtyhealth.com](http://www.aimspecialtyhealth.com)

<b>Description and Application of the Guidelines</b> .....	<b>3</b>
<b>Administrative Guidelines</b> .....	<b>4</b>
Ordering of Multiple Studies .....	4
Pre-test Requirements .....	5
<b>Spine Imaging</b> .....	<b>6</b>
CT of the Cervical Spine .....	6
MRI of the Cervical Spine .....	10
CT of the Thoracic Spine .....	14
MRI of the Thoracic Spine .....	17
CT of the Lumbar Spine .....	20
MRI of the Lumbar Spine .....	23
MRA of the Spinal Canal .....	26
Spine Bibliography .....	27

# Description and Application of the Guidelines



AIM's Clinical Appropriateness Guidelines (hereinafter "AIM's Clinical Appropriateness Guidelines" or the "Guidelines") are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based, where possible, criteria for medical necessity determinations. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of healthcare
- To promote the most efficient and cost-effective use of services

AIM's guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up to date clinical principles and best practices. Relevant citations are included in the "References" section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of AIM's Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of AIM's Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

---

CPT® (Current Procedural Terminology) is a registered trademark of the American Medical Association (AMA). CPT® five digit codes, nomenclature and other data are copyright by the American Medical Association. All Rights Reserved. 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.

# Administrative Guideline: Ordering of Multiple Studies



Requests for multiple imaging studies to evaluate a suspected or identified condition and requests for repeated imaging of the same anatomic area are subject to additional review to avoid unnecessary or inappropriate imaging.

## Simultaneous Ordering of Multiple Studies

In many situations, ordering multiple imaging studies at the same time is not clinically appropriate because:

- Current literature and/or standards of medical practice support that one of the requested imaging studies is more appropriate in the clinical situation presented; or
- One of the imaging studies requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice; or
- Appropriateness of additional imaging is dependent on the results of the lead study.

When multiple imaging studies are ordered, the request will often require a peer-to-peer conversation to understand the individual circumstances that support the medical necessity of performing all imaging studies simultaneously.

Examples of multiple imaging studies that may require a peer-to-peer conversation include:

- CT brain and CT sinus for headache
- MRI brain and MRA brain for headache
- MRI cervical spine and MRI shoulder for pain indications
- MRI lumbar spine and MRI hip for pain indications
- MRI or CT of multiple spine levels for pain or radicular indications
- MRI foot and MRI ankle for pain indications
- Bilateral exams, particularly comparison studies

There are certain clinical scenarios where simultaneous ordering of multiple imaging studies is consistent with current literature and/or standards of medical practice. These include:

- Oncologic imaging – Considerations include the type of malignancy and the point along the care continuum at which imaging is requested
- Conditions which span multiple anatomic regions – Examples include certain gastrointestinal indications or congenital spinal anomalies

## Repeated Imaging

In general, repeated imaging of the same anatomic area should be limited to evaluation following an intervention, or when there is a change in clinical status such that imaging is required to determine next steps in management. At times, repeated imaging done with different techniques or contrast regimens may be necessary to clarify a finding seen on the original study.

Repeated imaging of the same anatomic area (with same or similar technology) may be subject to additional review in the following scenarios:

- Repeated imaging at the same facility due to motion artifact or other technical issues
- Repeated imaging requested at a different facility due to provider preference or quality concerns
- Repeated imaging of the same anatomic area (MRI or CT) based on persistent symptoms with no clinical change, treatment, or intervention since the previous study
- Repeated imaging of the same anatomical area by different providers for the same member over a short period of time

# Administrative Guideline: Pre-Test Requirements



Critical to any finding of clinical appropriateness under the guidelines for specific imaging exams is a determination that the following are true with respect to the imaging request:

- A clinical evaluation has been performed prior to the imaging request (which should include a complete history and physical exam and review of results from relevant laboratory studies, prior imaging and supplementary testing) to identify suspected or established diseases or conditions.
- **For suspected diseases or conditions:**
  - Based on the clinical evaluation, there is a reasonable likelihood of disease prior to imaging; and
  - Current literature and standards of medical practice support that the requested imaging study is the most appropriate method of narrowing the differential diagnosis generated through the clinical evaluation and can be reasonably expected to lead to a change in management of the patient; and
  - The imaging requested is reasonably expected to improve patient outcomes based on current literature and standards of medical practice.
- **For established diseases or conditions:**
  - Advanced imaging is needed to determine whether the extent or nature of the disease or condition has changed; and
  - Current literature and standards of medical practice support that the requested imaging study is the most appropriate method of determining this and can be reasonably expected to lead to a change in management of the patient; and
  - The imaging requested is reasonably expected to improve patient outcomes based on current literature and standards of medical practice.
- If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the pre-test requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

# Computed Tomography (CT) Cervical Spine



## CPT Codes

- 72125..... CT of cervical spine, without contrast
- 72126..... CT of cervical spine, with contrast
- 72127..... CT of cervical spine, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Entire cervical spine (C1-C7), from the craniocervical junction through the T1 vertebra
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

## Imaging Considerations

- MRI is the modality of choice for most cervical spine imaging indications, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- CT is the preferred technique for certain clinical scenarios such as suspected fracture, follow-up of known fracture, osseous tumor evaluation and congenital vertebral defects, as well as procedures such as cervical spine CT myelography
- Do not use CT cervical spine for imaging of the soft tissues of the neck. See CPT codes 70490-70492 CT soft tissue neck for this service

## Common Diagnostic Indications

MRI is the preferred modality for most cervical spine imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; osseous tumor assessment; developmental vertebral abnormalities) and CT myelography

### Abnormalities detected on other imaging studies which require additional clarification to direct treatment

#### Fracture evaluation

- Following initial evaluation with radiographs

#### Post-myelogram CT or CT following other cervical spine interventional procedure

#### Post-trauma

- Neurologic deficit with possible spinal cord injury
- Progressively worsening pain

#### Significant acute trauma to the cervical spine region

**When the patient's condition meets the cervical spine MRI guidelines, but there is either a contraindication to MRI or the patient cannot tolerate MRI examination (for example, due to claustrophobia)**

For most other indications, MRI is the preferred modality for advanced cervical spine imaging, unless contraindicated

#### Chiari malformation (Arnold-Chiari malformation)

# Common Diagnostic Indications

## Congenital spine anomalies

- Cervical spine dysraphism and other congenital anomalies involving the cervical spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

## Infectious process

- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis

## Neck pain without neurologic or radicular features

**Note:** This guideline does not apply to patients with known or suspected malignancy, infection, or underlying conditions which predispose to instability at the craniocervical junction.

**Diagnosis of the etiology of neck pain in patients who are willing and able to undergo spine surgery or epidural steroid injection (ESI) when both of the following criteria are met:**

- Lack of improvement or worsening during a six (6) week course of therapy with at least two (2) different forms of treatment
- Cervical spine X-ray is negative or does not clearly explain the cause of the patient's symptoms.

## Neck pain with radiculopathy

**Note:** This guideline does not apply to patients with known or suspected malignancy, infection, myelopathy, or underlying conditions which predispose to instability at the craniocervical junction.

**Diagnosis of the etiology of cervical nerve root compression in patients who are willing and able to undergo spine surgery or cervical epidural steroid injection (ESI) when either of the following criteria are met:**

- Documented abnormality on neurological exam in a dermatome/radicular distribution that has not previously been imaged or has progressed since a prior imaging study has been performed
- Lack of improvement or worsening during a six (6) week course of therapy with at least two (2) different forms of treatment

## Post-operative or post-procedure evaluation

## Preoperative or pre-procedure evaluation

**Note:** This indication is for preoperative evaluation of conditions not specifically referenced elsewhere in this guideline.

## Rheumatoid arthritis

- For suspected cervical subluxation in a patient with confirmed rheumatoid arthritis

## Severe scoliosis, for the following patient populations:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; **OR**
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); **OR**
- With scoliosis related to other pathologic processes such as neurofibromatosis; **OR**
- For pre-operative evaluation of severe scoliosis

# Common Diagnostic Indications

## Spondyloarthropathies

**Note:** Including but not limited to: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, juvenile-onset spondyloarthritis

- For diagnosis following non-diagnostic work-up including but not limited to:
  - Radiographs
  - Standard laboratory work-up for spondyloarthropathy

---

## Syringomyelia (syrinx)

### Tumor evaluation

- Including but not limited to the following:
  - Primary or metastatic neoplasm involving the vertebrae
  - Tumor spread within the spinal canal
  - Spinal cord neoplasm



## References

1. Abbed KM, Coumans JV. Cervical radiculopathy: pathophysiology, presentation, and clinical evaluation. *Neurosurgery*. 2007 Jan;60(1 Supp1 1):S28-34.
2. Ahn NU, Ahn UM, Ipsen B, Mechanical neck pain and cervicogenic headache. *Neurosurgery*. 2007 Jan;60(1 Supp1 1):S21-7.
3. Alentado VJ, Lubelski D, Steinmetz MP, Benzel EC, Mroz TE. Optimal duration of conservative management prior to surgery for cervical and lumbar radiculopathy: a literature review. *Global Spine J*. 2014 Dec;4(4):279-86. doi: 10.1055/s-0034-1387807. Epub 2014 Aug 28. Review.
4. Anekstein Y, Blecher R, Smorgick Y et al. What is the best way to apply the Spurling test for cervical radiculopathy? *Clin Orthop Relat Res*. 2012 Sep;470(9):2566-72.
5. Corey DL, Comeau D. Cervical radiculopathy. *Med Clin North Am*. 2014 Jul;98(4):791-9
6. Duggal N, Pickett GE, Mitsis DK, et al. Early clinical and biomechanical results following cervical arthroplasty. *Neurosurg Focus*. Sep 15 2004;17(3):E9.
7. Ellenberg MR, Honet JC, Treanor WJ. Cervical radiculopathy. *Arch Phys Med Rehabil*. 1994 Mar;75(3):342-52.
8. Eubanks JD. Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms. *Am Fam Physician*. 2010 Jan 1;81(1):33-40.
9. Forbush SW, Cox T, Wilson E. Treatment of patients with degenerative cervical radiculopathy using a multimodal conservative approach in a geriatric population: a case series *J Orthop Sports Phys Ther*. 2011 Oct;41(10):723-33
10. Fortin J, Riethmiller DW, Vilensky JA. No clear winner in differing imaging modalities for cervical radiculopathy. *Pain Physician*. 2002 Jul;5(3):285-7.
11. Gross A, Kay TM, Cervical Overview Group, et al. Exercises for mechanical neck disorders. *Cochrane Database Syst Rev*. 2015 Jan 28;1:CD004250.
12. Gross A, Langevin P, Burnie SJ, et al. Manipulation and mobilisation for neck pain contrasted against an inactive control or another active treatment. *Cochrane Database Syst Rev*. 2015 Sep 23;(9):CD004249.
13. Kuijper B, Tans JT, Beelen A, Nollet F, de Visser M. Cervical collar or physiotherapy versus wait and see policy for recent onset cervical radiculopathy: randomised trial. *BMJ*. 2009 Oct 7;339:b3883
14. Mummaneni PV, Kaiser MG, Joint Section on Disorders of the Spine and Peripheral Nerves of the American Association of Neurological Surgeons and Congress of Neurological Surgeons, et al. Preoperative patient selection with magnetic resonance imaging, computed tomography, and electroencephalography: does the test predict outcome after cervical surgery? *J Neurosurg Spine*. 2009 Aug;11(2):119-29.
15. Narváez JA, Narváez J, Serrallonga M, et al. Cervical spine involvement in rheumatoid arthritis: correlation between neurological manifestations and magnetic resonance imaging findings. *Rheumatology (Oxford)*. 2008 Dec;47(12):1814-9
16. Nordin M, Carragee EJ, Hogg-Johnson S, Assessment of neck pain and its associated disorders: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Spine (Phila Pa 1976)*. 2008 Feb 15;33(4 Suppl):S101-22.
17. Rhee JM, Yoon T, Riew KD. Cervical radiculopathy. *J Am Acad Orthop Surg*. 2007 Aug;15(8):486-94.
18. van Eerd M, Patijn J, Lataster A. Cervical facet pain. *Pain Pract*. 2010 Mar-Apr;10(2):113-23.

# Magnetic Resonance Imaging (MRI) Cervical Spine



## CPT Codes

- 72141..... MRI of cervical spine, without contrast
- 72142..... MRI of cervical spine, with contrast
- 72156..... MRI of cervical spine, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Entire cervical spine (C1-C7), from the craniocervical junction through the T1 vertebra
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

## Imaging Considerations

- For most cervical spine abnormalities, MRI is the examination of choice
- CT of the cervical spine is often reserved for suspected fracture, follow-up of a known fracture, osseous tumor evaluation, congenital vertebral defects and procedures such as cervical spine CT myelography
- In most other clinical situations, MRI is the preferred modality for cervical spine imaging, unless contraindicated [due to pacemaker, implantable cardioverter-defibrillator (ICD), and other non-compatible devices unsafe for use in an MRI scanner] or not tolerated by the patient (usually secondary to claustrophobia)
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Authorization requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request

## Common Diagnostic Indications

### Abnormalities detected on other imaging studies which require additional clarification to direct treatment

#### Chiari malformation (Arnold-Chiari malformation)

#### Congenital spine anomalies

- Cervical spine dysraphism and other congenital anomalies involving the cervical spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

#### Fracture evaluation

- Following initial evaluation with radiographs

#### Infectious process

- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis

#### Multiple sclerosis and other white-matter diseases

- Initial diagnosis; **OR**
- Periodic scans to assess asymptomatic progression in multiple sclerosis during the course of disease; **OR**
- Tracking the progress of multiple sclerosis to establish a prognosis or evaluation of response to treatment; **OR**
- To evaluate changes in neurologic signs and symptoms

# Common Diagnostic Indications

## Myelopathy

---

### Neck pain without neurologic or radicular features

**Note:** This guideline does not apply to patients with known or suspected malignancy, infection, or underlying conditions which predispose to instability at the craniocervical junction.

Diagnosis of the etiology of neck pain in patients who are willing and able to undergo spine surgery or epidural steroid injection (ESI) when **both** of the following criteria are met:

- Lack of improvement or worsening during a six (6) week course of therapy with at least two (2) different forms of treatment
  - Cervical spine X-ray is negative or does not clearly explain the cause of the patient's symptoms.
- 

### Neck pain with radiculopathy

**Note:** This guideline does not apply to patients with known or suspected malignancy, infection, myelopathy, or underlying conditions which predispose to instability at the craniocervical junction.

Diagnosis of the etiology of cervical nerve root compression in patients who are willing and able to undergo spine surgery or cervical epidural steroid injection (ESI) when **either** of the following criteria are met:

- Documented abnormality on neurological exam in a dermatome/radicular distribution that has not previously been imaged or has progressed since a prior imaging study has been performed
  - Lack of improvement or worsening during a six (6) week course of therapy with at least two (2) different forms of treatment
- 

## Post-operative or post-procedure evaluation

---

### Post-trauma

- Neurologic deficit with possible spinal cord injury
  - Progressively worsening pain
- 

### Preoperative or pre-procedure evaluation

**Note:** This indication is for preoperative evaluation of conditions not specifically referenced elsewhere in this guideline.

---

### Rheumatoid arthritis

- For suspected cervical subluxation in a patient with confirmed rheumatoid arthritis
- 

### Severe scoliosis, for the following patient populations:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; **OR**
  - With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); **OR**
  - With scoliosis related to other pathologic processes such as neurofibromatosis; **OR**
  - For pre-operative evaluation of severe scoliosis
- 

## Significant acute trauma to the cervical spine region

---

### Spinal cord infarct

# Common Diagnostic Indications

## Spondyloarthropathies

- For diagnosis following non-diagnostic work-up including but not limited to:
  - Radiographs
  - Standard laboratory work-up for spondyloarthropathy

**Note:** *Including but not limited to ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, juvenile-onset spondyloarthritis*

---

## Syringomyelia (syrinx)

### Tumor evaluation

- Including but not limited to the following:
  - Primary or metastatic neoplasm involving the vertebrae
  - Tumor spread within the spinal canal
  - Spinal cord neoplasm

## References

1. Abbed KM, Coumans JV. Cervical radiculopathy: pathophysiology, presentation, and clinical evaluation. *Neurosurgery*. 2007 Jan;60(1 Supp1 1):S28-34.
2. Ahn NU, Ahn UM, Ipsen B, Mechanical neck pain and cervicogenic headache. *Neurosurgery*. 2007 Jan;60(1 Supp1 1):S21-7.
3. Alentado VJ, Lubelski D, Steinmetz MP, Benzel EC, Mroz TE. Optimal duration of conservative management prior to surgery for cervical and lumbar radiculopathy: a literature review. *Global Spine J*. 2014 Dec;4(4):279-86. doi: 10.1055/s-0034-1387807. Epub 2014 Aug 28. Review.
4. Anekstein Y, Blecher R, Smorgick Y et al. What is the best way to apply the Spurling test for cervical radiculopathy? *Clin Orthop Relat Res*. 2012 Sep;470(9):2566-72.
5. Corey DL, Comeau D. Cervical radiculopathy. *Med Clin North Am*. 2014 Jul;98(4):791-9
6. Duggal N, Pickett GE, Mitsis DK, et al. Early clinical and biomechanical results following cervical arthroplasty. *Neurosurg Focus*. Sep 15 2004;17(3):E9.
7. Ellenberg MR, Honet JC, Treanor WJ. Cervical radiculopathy. *Arch Phys Med Rehabil*. 1994 Mar;75(3):342-52.
8. Eubanks JD. Cervical radiculopathy: nonoperative management of neck pain and radicular symptoms. *Am Fam Physician*. 2010 Jan 1;81(1):33-40.
9. Forbush SW, Cox T, Wilson E. Treatment of patients with degenerative cervical radiculopathy using a multimodal conservative approach in a geriatric population: a case series *J Orthop Sports Phys Ther*. 2011 Oct;41(10):723-33
10. Fortin J, Riethmiller DW, Vilensky JA. No clear winner in differing imaging modalities for cervical radiculopathy. *Pain Physician*. 2002 Jul;5(3):285-7.
11. Gross A, Kay TM, Cervical Overview Group, et al. Exercises for mechanical neck disorders. *Cochrane Database Syst Rev*. 2015 Jan 28;1:CD004250.
12. Gross A, Langevin P, Burnie SJ, et al. Manipulation and mobilisation for neck pain contrasted against an inactive control or another active treatment. *Cochrane Database Syst Rev*. 2015 Sep 23;(9):CD004249.
13. Kuijper B, Tans JT, Beelen A, Nollet F, de Visser M. Cervical collar or physiotherapy versus wait and see policy for recent onset cervical radiculopathy: randomised trial. *BMJ*. 2009 Oct 7;339:b3883
14. Mummaneni PV, Kaiser MG, Joint Section on Disorders of the Spine and Peripheral Nerves of the American Association of Neurological Surgeons and Congress of Neurological Surgeons, et al. Preoperative patient selection with magnetic resonance imaging, computed tomography, and electroencephalography: does the test predict outcome after cervical surgery? *J Neurosurg Spine*. 2009 Aug;11(2):119-29.
15. Narváez JA, Narváez J, Serrallonga M, et al. Cervical spine involvement in rheumatoid arthritis: correlation between neurological manifestations and magnetic resonance imaging findings. *Rheumatology (Oxford)*. 2008 Dec;47(12):1814-9
16. Nordin M, Carragee EJ, Hogg-Johnson S, Assessment of neck pain and its associated disorders: results of the Bone and Joint Decade 2000-2010 Task Force on Neck Pain and Its Associated Disorders. *Spine (Phila Pa 1976)*. 2008 Feb 15;33(4 Suppl):S101-22.
17. Rhee JM, Yoon T, Riew KD. Cervical radiculopathy. *J Am Acad Orthop Surg*. 2007 Aug;15(8):486-94.
18. van Eerd M, Patijn J, Lataster A. Cervical facet pain. *Pain Pract*. 2010 Mar-Apr;10(2):113-23.

# Computed Tomography (CT)

## Thoracic Spine



### CPT Codes

- 72128..... CT of thoracic spine, without contrast
- 72129..... CT of thoracic spine, with contrast
- 72130..... CT of thoracic spine, without contrast, followed by re-imaging with contrast

### Standard Anatomic Coverage

- Entire thoracic spine (T1-T12), from the cervicothoracic region through the thoracolumbar junction
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

### Imaging Considerations

- Advanced diagnostic imaging of the thoracic spine is indicated in selected clinical scenarios and is performed significantly less often than in the lumbar and cervical regions
- MRI is the modality of choice for most thoracic spine imaging indications, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- CT is the preferred technique for certain clinical scenarios such as suspected fracture, osseous tumor evaluation, congenital vertebral defects and interventional procedures such as CT myelography
- Authorization request for re-imaging, due to technically limited exams, is the responsibility of the imaging provider

### Common Diagnostic Indications

MRI is the preferred modality for most thoracic spine imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; occasional osseous tumor assessment; developmental vertebral abnormalities) and CT myelography

#### Abnormalities detected on other imaging studies which require additional clarification to direct treatment

##### Fracture evaluation

- Following initial evaluation with radiographs

##### Post-myelogram CT or CT following other thoracic spine interventional procedure

##### Post-trauma

- Neurologic deficit with possible spinal cord injury
- Progressively worsening pain

#### When the patient's condition meets the thoracic spine MRI guidelines, but there is either a contraindication to MRI or the patient cannot tolerate MRI examination (for example, due to claustrophobia)

For most other indications, MRI is the preferred modality for advanced thoracic spine imaging, unless contraindicated

##### Congenital spine anomalies

- Thoracic spine dysraphism and other congenital anomalies involving the thoracic spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

# Common Diagnostic Indications

## Infectious process

- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis

---

## Mid-back pain with signs of compression

- In a patient with mid-back or radicular pain and red flag signs including:
  - Reflex abnormality
  - Objective muscle weakness
  - Objective sensory abnormality in the thoracic dermatome distribution
  - Spasticity

**Note:** *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated<sup>1-4</sup>*

---

## Non-specific mid-back pain

- In a patient where focused history and physical exam suggest non-specific thoracic pain and/or referred posterior chest pain and all of the following are met:
  - Patient is a potential candidate for surgery or epidural steroid injection; **AND**
  - Patient has, following clinical examination, completed a minimum of 4-6 consecutive weeks of physician supervised conservative therapy for the current episode of pain, including but not limited to any of the following:
    - NSAIDs
    - Muscle relaxants
    - Steroids
    - Physical therapy; **AND**
  - After trial of conservative therapy as listed above, patient fails to show substantial improvement on clinical re-evaluation; **OR**
- Mid-back pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, drug abuse, or tuberculosis, abnormal labs suggestive of malignancy such as abnormal serum or urine electrophoresis, elevated prostate specific antigen (PSA)

---

## Post-operative or post-procedure evaluation

---

### Preoperative or pre-procedure evaluation

**Note:** *This indication is for pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline.*

---

### Severe scoliosis, including the following patient populations:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; **OR**
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); **OR**
- With scoliosis related to other pathologic processes such as neurofibromatosis; **OR**
- For pre-operative evaluation of severe scoliosis

---

## Spondyloarthropathies

**Note:** *Including but not limited to: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, juvenile-onset spondyloarthritis*

- For diagnosis following non-diagnostic work-up including but not limited to:
  - Radiographs
  - Standard laboratory work-up for spondyloarthropathy

---

## Syringomyelia (syrinx)

## Common Diagnostic Indications

### Tumor evaluation

- Including but not limited to the following:
  - Primary or metastatic neoplasm involving the vertebrae
  - Tumor spread within the spinal canal
  - Spinal cord neoplasm

## References

1. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at [www.choosingwisely.org](http://www.choosingwisely.org).
2. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology*. 2009;72(2):185-192.
3. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol*. 2010;23(3):242-248.
4. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology*. 2005;64(2):199-207.



# Magnetic Resonance Imaging (MRI) Thoracic Spine



## CPT Codes

72146..... MRI of thoracic spine, without contrast

72147..... MRI of thoracic spine, with contrast

72157..... MRI of thoracic spine, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Entire thoracic spine (T1-T12), from the cervicothoracic region through the thoracolumbar junction
- Imaging planes generally include sagittal and axial/oblique axial (parallel with the disc spaces) views

## Imaging Considerations

- Advanced imaging of the thoracic spine is indicated in selected clinical scenarios and is performed significantly less often than in the cervical and lumbar regions
- CT is the preferred technique for certain indications, including fracture detection, follow-up of a known fracture, osseous tumor assessment, congenital vertebral defects and for interventional procedures, such as CT myelography
- In most other clinical situations, MRI is the modality of choice for thoracic spine imaging, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request

## Common Diagnostic Indications

### Abnormalities detected on other imaging studies which require additional clarification to direct treatment

#### Congenital spine anomalies

- Thoracic spine dysraphism and other congenital anomalies involving the thoracic spine and/or spinal cord
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

#### Fracture evaluation

- Following initial evaluation with radiographs

#### Infectious process

- Including but not limited to the following:
  - Abscess
  - Osteomyelitis
  - Discitis

#### Mid-back pain with signs of compression

- In a patient with mid-back or radicular pain and red flag signs including:
  - Reflex abnormality
  - Objective muscle weakness
  - Objective sensory abnormality in the thoracic dermatome distribution
  - Spasticity

**Note:** *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated<sup>1-4</sup>*

# Common Diagnostic Indications

## Multiple sclerosis and other white-matter diseases

- Initial diagnosis; **OR**
- Periodic scans to assess asymptomatic progression in multiple sclerosis during the course of disease; **OR**
- Tracking the progress of multiple sclerosis to establish a prognosis or evaluation of response to treatment; **OR**
- To evaluate changes in neurologic signs and symptoms

---

## Myelopathy

### Non-specific mid-back pain

- In a patient where focused history and physical exam suggest non-specific thoracic pain and/or referred posterior chest pain and all of the following are met:
  - Patient is a potential candidate for surgery or epidural steroid injection; **AND**
  - Patient has, following clinical examination, completed a minimum of 4-6 consecutive weeks of physician supervised conservative therapy for the current episode of pain, including but not limited to any of the following:
    - NSAIDs
    - Muscle relaxants
    - Steroids
    - Physical therapy; **AND**
  - After trial of conservative therapy as listed above, patient fails to show substantial improvement on clinical re-evaluation; **OR**
- Mid-back pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, drug abuse, or tuberculosis, abnormal labs suggestive of malignancy such as abnormal serum or urine electrophoresis, elevated prostate specific antigen (PSA)

---

## Post-operative or post-procedure evaluation

### Post-trauma

- Neurologic deficit with possible spinal cord injury
- Progressively worsening pain

---

## Pre-operative or pre-procedure evaluation

**Note:** This indication is to be used for pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline

---

## Severe scoliosis, for the following patient populations:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; **OR**
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); **OR**
- With scoliosis related to other pathologic processes such as neurofibromatosis; **OR**
- For pre-operative evaluation of severe scoliosis

---

## Spinal cord infarct

### Spondyloarthropathies

- For diagnosis following non-diagnostic work-up including but not limited to:
  - Radiographs
  - Standard laboratory work-up for spondyloarthropathy

**Note:** Including but not limited to: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, juvenile-onset spondyloarthritis

## Common Diagnostic Indications

### Syringomyelia (syrinx)

---

#### Tumor evaluation

- Including but not limited to the following:
  - Primary or metastatic neoplasm involving the vertebrae
  - Tumor spread within the spinal canal
  - Spinal cord neoplasm

## References

1. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at [www.choosingwisely.org](http://www.choosingwisely.org).
2. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology*. 2009;72(2):185-192.
3. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol*. 2010;23(3):242-248.
4. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology*. 2005;64(2):199-207.

# Computed Tomography (CT) Lumbar Spine



## CPT Codes

- 72131..... CT of lumbar spine, without contrast
- 72132..... CT of lumbar spine, with contrast
- 72133..... CT of lumbar spine, without contrast, followed by re-imaging with contrast

## Standard Anatomic Coverage

- Entire lumbar spine (L1-L5), from the thoracolumbar region through the lumbosacral junction
- Axial images are routinely obtained, with capability for coronal and sagittal reconstructions

## Imaging Considerations

- CT of the lumbar spine is often reserved for suspected fracture, follow-up of a known fracture, skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates, congenital vertebral defects, osseous tumor evaluation, and procedures such as lumbar CT myelography
- For most other lumbar spine abnormalities, MRI is the modality of choice, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)

## Common Diagnostic Indications

MRI is the preferred modality for most lumbar spine advanced imaging, except for a few indications which include CT evaluation of bony abnormalities (such as suspected fracture or fracture follow-up; skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates; osseous tumor assessment; developmental vertebral abnormalities) as well as lumbar CT myelography

### Abnormalities detected on other imaging studies which require additional clarification to direct treatment

#### Fracture evaluation

- Following initial evaluation with radiographs

#### Post-trauma

- Neurologic deficit with possible spinal cord injury
- Progressively worsening pain

#### Post-myelogram CT or CT following other lumbar spine interventional procedure

#### Spondylolysis and spondylolisthesis

- Following non-diagnostic or abnormal lumbar spine radiographs (including oblique views) which require additional clarification to direct treatment in an operative candidate

**When the patient's condition meets the lumbar spine MRI guidelines, but there is either a contraindication to MRI or the patient cannot tolerate MRI examination (for example, due to claustrophobia)**

# Common Diagnostic Indications

For most other indications, MRI is the preferred modality for advanced lumbar spine imaging, unless contraindicated

## Congenital spine anomalies

- Lumbar spine dysraphism and other congenital anomalies involving the lumbar spine and/or lower spinal cord (Conus Medullaris). filum terminale or nerve roots, when MRI is contraindicated
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

## Infectious process

- Including but not limited to the following:
  - Abscess
  - Arachnoiditis
  - Discitis
  - Osteomyelitis

## Low back pain with signs of cauda equina compression<sup>1</sup>

- In a patient with low back or radicular pain and red flag signs including:
  - Severe bilateral sciatica, especially L5-S1 distribution
  - Saddle or genital sensory disturbance
  - Bladder, bowel or sexual dysfunction

**Note:** *The diagnosis of acute cord compression is often considered a medical emergency and typically not managed by elective outpatient imaging*

## Low back pain with signs of radicular compression

- In a patient with low back or radicular pain and neurologic findings related to the lumbar spine such as:
  - Reflex abnormality
  - Objective muscle weakness
  - Objective sensory abnormality in the lumbar dermatome distribution
  - Spasticity

**Note:** *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated<sup>2-5</sup>*

## Non-specific low back pain

- In a patient where focused history and physical exam suggest non-specific lumbar pain and/or referred buttock or lower extremity pain and all of the following are met:
  - Patient is a potential candidate for surgery or epidural steroid injection; **AND**
  - Patient has, following clinical examination, completed a minimum of six (6) consecutive weeks of physician supervised conservative therapy for the current episode of pain, including but not limited to any of the following:
    - NSAIDs
    - Muscle relaxants
    - Steroids
    - Physical therapy; **AND**
  - After trial of conservative therapy as listed above, patient fails to show substantial improvement on clinical re-evaluation; **OR**
- Low back pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, drug abuse, or tuberculosis, abnormal labs suggestive of malignancy such as abnormal serum or urine electrophoresis, elevated prostate specific antigen (PSA)

## Post-operative or post-procedure evaluation

### Preoperative or pre-procedure evaluation

**Note:** *This indication is for pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline.*

## Common Diagnostic Indications

### Severe scoliosis, including the following patient populations:

- With high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; **OR**
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); **OR**
- With scoliosis related to other pathologic processes, such as neurofibromatosis; **OR**
- For pre-operative evaluation of severe scoliosis

---

### Spondyloarthropathies

**Note:** Including but not limited to: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, juvenile-onset spondyloarthritis

- For diagnosis following non-diagnostic work-up including but not limited to:
  - Radiographs
  - Standard laboratory work-up for spondyloarthropathy

---

### Tethered cord

#### Tumor evaluation

- Including but not limited to the following:
  - Primary or metastatic neoplasm involving the vertebrae
  - Tumor spread within the spinal canal
  - Spinal cord neoplasm

## References

1. Gardner A, Gardner E, Morley T. Cauda equina syndrome: a review of the current clinical and medico-legal position. *Eur Spine J.* 2011;20(5):690-697.
2. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question.* ABIM Foundation; February 10, 2015. Available at [www.choosingwisely.org](http://www.choosingwisely.org).
3. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology.* 2009;72(2):185-192.
4. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol.* 2010;23(3):242-248.
5. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology.* 2005;64(2):199-207.

# Magnetic Resonance Imaging (MRI)

## Lumbar Spine



### CPT Codes

- 72148..... MRI of lumbar spine, without contrast
- 72149..... MRI of lumbar spine, with contrast
- 72158..... MRI of lumbar spine, without contrast, followed by re-imaging with contrast

### Standard Anatomic Coverage

- Entire lumbar spine (L1-L5), from the thoracolumbar region through the lumbosacral junction
- Imaging planes generally include sagittal and axial/oblique axial (parallel with disc spaces) views

### Imaging Considerations

- For most other lumbar spine abnormalities, MRI is the modality of choice, unless contraindicated or not tolerated by the patient (for example, secondary to claustrophobia)
- Lumbar spine CT is often reserved for suspected fracture, follow-up of a known fracture, skeletal abnormalities such as spondylolysis and spondylolisthesis in operative candidates, congenital vertebral defects, osseous tumor evaluation, and procedures such as lumbar CT myelography
- For the majority of patients with acute low back pain, symptoms and/or physical exam findings will improve or resolve during a trial of conservative treatment and diagnostic imaging is not necessary
- The spinal cord normally ends at L1-L2, which is seen on thoracic MRI. If the conus medullaris is not seen on thoracic spine imaging, the spinal cord is presumed to be tethered and lumbar MRI is appropriate
- Definitive diagnosis is not achieved in as many as 85% of patients with low back pain
- The CPT code assignment for an MRI procedure is based on the anatomic area imaged. Requests for multiple MRI imaging of the same anatomic area to address patient positional changes, additional sequences or equipment are not allowed. These variations or extra sequences are included within the original imaging request

### Common Diagnostic Imaging

#### Abnormalities detected on other imaging studies which require additional clarification to direct treatment

##### Congenital spine anomalies

- Lumbar spine dysraphism and other congenital anomalies involving the lumbar spine and/or lower spinal cord (conus medullaris), filum terminale or nerve roots
- Congenital vertebral defects for assessment of bony defects such as segmentation and fusion anomalies

##### Fracture evaluation

- Following initial evaluation with radiographs

##### Infectious process

- Including but not limited to the following:
  - Abscess
  - Arachnoiditis
  - Discitis
  - Osteomyelitis

# Common Diagnostic Indications

## Low back pain with signs of cauda equina compression<sup>1</sup>

- In a patient with low back or radicular pain and red flag signs including:
  - Severe bilateral sciatica, especially L5-S1 distribution
  - Saddle or genital sensory disturbance
  - Bladder, bowel or sexual dysfunction

**Note:** *The diagnosis of acute cord compression is often considered a medical emergency and typically not managed by elective outpatient imaging*

---

## Low back pain with signs of radicular compression

- In a patient with low back or radicular pain and neurologic findings related to the lumbar spine such as:
  - Reflex abnormality
  - Objective muscle weakness
  - Objective sensory abnormality in the lumbar dermatome distribution
  - Spasticity

**Note:** *Imaging in patients with polyneuropathy without additional abnormalities on neurological exam is not indicated<sup>5-8</sup>*

---

## Myelopathy involving the lower spinal cord

---

### Non-specific low back pain<sup>2-4</sup>

- In a patient where focused history and physical exam suggest non-specific lumbar pain and/or referred buttock or lower extremity pain and all of the following are met:
    - Patient is a potential candidate for surgery or epidural steroid injection; **AND**
    - Patient has, following clinical examination, completed a minimum of six (6) consecutive weeks of physician supervised conservative therapy for the current episode of pain, including but not limited to any of the following:
      - NSAIDs
      - Muscle relaxants
      - Steroids
      - Physical therapy; **AND**
    - After trial of conservative therapy as listed above, patient fails to show substantial improvement on clinical re-evaluation; **OR**
  - Low back pain not meeting the above criteria but associated with “red flag” symptoms such as unexplained weight loss, history of malignant disease, fever, drug abuse, or tuberculosis, abnormal labs suggestive of malignancy such as abnormal serum or urine electrophoresis, elevated prostate specific antigen (PSA)
- 

## Post-operative or post-procedure evaluation

---

### Post-trauma

- Neurologic deficit with possible spinal cord injury
  - Progressively worsening pain
- 

### Pre-operative or pre-procedure evaluation

**Note:** *This indication is to be used for pre-operative evaluation of conditions not specifically referenced elsewhere in this guideline*

---

### Severe scoliosis, for the following patient populations:

- In patients with a high risk for neural axis abnormalities, such as infantile and juvenile idiopathic scoliosis and congenital scoliosis; **OR**
- With adolescent idiopathic scoliosis and atypical findings (pain, rapid progression, development of neurologic signs/symptoms); **OR**
- With scoliosis related to other pathologic processes such as neurofibromatosis; **OR**
- For pre-operative evaluation of severe scoliosis



# Common Diagnostic Indications

## Spinal cord infarct

### Spondyloarthropathies

- For diagnosis following non-diagnostic work-up including but not limited to:
  - Radiographs
  - Standard laboratory work-up for spondyloarthropathy

**Note:** Including but not limited to: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, spondyloarthritis associated with inflammatory bowel disease, juvenile-onset spondyloarthritis

### Spondylolysis and spondylolisthesis

- Following non-diagnostic or abnormal lumbar spine radiographs (including oblique views) which require additional clarification to direct treatment, in an operative candidate

## Tethered cord

### Tumor evaluation

- Including but not limited to the following:
  - Primary or metastatic neoplasm involving the vertebrae
  - Tumor spread within the spinal canal
  - Spinal cord neoplasm

## References

1. Gardner A, Gardner E, Morley T. Cauda equina syndrome: a review of the current clinical and medico-legal position. *Eur Spine J.* 2011;20(5):690-697.
2. American College of Physicians. *Choosing Wisely: Five Things Physicians and Patients Should Question.* Philadelphia, PA: ABIM Foundation; April 4, 2012. Available at [http://choosingwisely.org/wp-content/uploads/2012/04/5things\\_12\\_factsheet\\_Amer\\_College\\_Phys.pdf](http://choosingwisely.org/wp-content/uploads/2012/04/5things_12_factsheet_Amer_College_Phys.pdf). Accessed May 15, 2012
3. North American Spine Society. *Choosing Wisely: Five Things Physicians and Patients Should Question.* Philadelphia, PA: ABIM Foundation; October 9, 2013. Available at <http://www.choosingwisely.org/societies/north-american-spine-society/> Accessed October 10, 2015.
4. American College of Emergency Physicians. *Choosing Wisely: Ten Things Physicians and Patients Should Question.* Philadelphia, PA: ABIM Foundation; October 14, 2013 and October 27, 2014. Available at <http://www.choosingwisely.org/societies/american-college-of-emergency-physicians/> Accessed October 10, 2015.
5. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question.* ABIM Foundation; February 10, 2015. Available at [www.choosingwisely.org](http://www.choosingwisely.org).
6. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology.* 2009;72(2):185-192.
7. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol.* 2010;23(3):242-248.
8. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology.* 2005;64(2):199-207.

# MR Angiography (MRA) Spinal Canal



## CPT Codes

72159..... Magnetic resonance angiography of spinal canal

## Standard Anatomic Coverage

- Scan coverage depends on the specific clinical indication for the spinal canal MRA
- General landmarks extend from the cranio-cervical junction through the lumbosacral region

## Imaging Considerations

- MRA of the spinal canal is an infrequently requested exam. Potential applications which have been described include evaluation of spinal arteriovenous fistula (AVF) and arteriovenous malformation (AVM). These vascular lesions are usually detected by MRI or myelography. Intra-arterial digital subtraction angiography (DSA) of the spinal vasculature may be necessary to define the precise location and type of vascular abnormality
- MRI of the spinal canal CPT 72159 includes imaging of the entire spinal canal. Requests for multiple exams to address each anatomic area of the spinal canal are inappropriate

## Magnetic Resonance Angiography of the Spinal Canal

- MR Angiography (MRA) of the spinal canal is an evolving technology under clinical development. This clinical application of MRA and its impact on health outcomes will continue to undergo review, as new evidence-based studies are published. At this point, medically necessary applications are limited (see below). Interval routine coverage for MR angiography of the spinal canal is not generally available and is not considered medically appropriate at this time

## Diagnostic Indications

**Abnormalities detected on other imaging studies which require additional clarification to direct treatment**

---

**Post-operative or post-procedure evaluation**

---

**Preoperative or pre-procedure evaluation**

*Note: This indication is for preoperative evaluation of conditions not specifically referenced elsewhere in this guideline.*

1. American Academy of Family Physicians. *Choosing Wisely: Five Things Physicians and Patients Should Question*. Philadelphia, PA: ABIM Foundation; 2012. [http://choosingwisely.org/wp-content/uploads/2012/04/5things\\_12\\_factsheet\\_Amer\\_Acad\\_Fam\\_Phys.pdf](http://choosingwisely.org/wp-content/uploads/2012/04/5things_12_factsheet_Amer_Acad_Fam_Phys.pdf). Accessed May 15, 2012.
2. American College of Physicians. *Choosing Wisely: Five Things Physicians and Patients Should Question*. Philadelphia, PA: ABIM Foundation; April 4, 2012. [http://choosingwisely.org/wp-content/uploads/2012/04/5things\\_12\\_factsheet\\_Amer\\_College\\_Phys.pdf](http://choosingwisely.org/wp-content/uploads/2012/04/5things_12_factsheet_Amer_College_Phys.pdf). Accessed May 15, 2012.
3. American College of Rheumatology Extremity Magnetic Resonance Imaging Task Force. Extremity magnetic resonance imaging in rheumatoid arthritis: report of the American College of Rheumatology Extremity Magnetic Resonance Imaging Task Force. *Arthritis Rheum*. 2006 Apr;54(4):1034-1047
4. Benedetti P, Fahr L, Kuhns L, et al. MR imaging findings in spinal ligamentous injury. *AJR Am J Roentgenol*. 2000;175:661-665.
5. Bennett DL, Ohashi K, El-Khoury GY. Spondyloarthropathies: ankylosing spondylitis and psoriatic arthritis. *Radiol Clin North Am*. 2004 Jan;42(1):121-134.
6. Blackmore CC, Emerson SS, Mann FA, Koepsell TD. Cervical spine imaging in patients with trauma: determination of fracture risk to optimize use. *Radiology*. 1999;211:759-765.
7. Bot JC, Blezer EL, Kamphorst W, et al. The spinal cord in multiple sclerosis: relationship of high spatial-resolution quantitative MR imaging findings to histopathologic results. *Radiology*. 2004;233:531-540.
8. Brant-Zawadzki MN, Dennis SC, Gade GF, Weinstein MP. Low back pain. What the clinician wants to know. *Radiology*. 2000;217:321-330.
9. Braun J, van den Berg R, Baraliakos X, et al. 2010 update of the ASAS/EULAR recommendations for the management of ankylosing spondylitis. *Ann Rheum Dis* 2011;70(6):896-904.
10. Bub L, Balckmore CC, Mann FA, Lomoschitz FM. Cervical spine fractures in patients 65 years and older: a clinical prediction rule for blunt trauma. *Radiology*. 2005;234:143-149.
11. Chou R, Fu R, Carrino JA, Deyo RA. Imaging strategies for low-back pain: systematic review and meta-analysis. *Lancet*. 2009. 373(9662):463-472.
12. Chou R, Qaseem A, Owens DK, Shekelle P. Diagnostic imaging for low back pain: advice for high-value health care from the American College of Physicians. *Ann Int Med*. 2011;154:181-189.
13. Chou R, Qaseem A, Snow V, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med*. 2007;147(7):478-491
14. Deyo RA, Weinstein JN. Low back pain. *N Engl J Med*. 2001;344(5):363-370.
15. Gilbert FJ, Grant AM, Gillan MGC, et al. Low back pain: influence of early MR imaging or CT on treatment and outcome—multicenter randomized trial. *Radiology*. 2004;231:343-351.
16. Gillan MG, Gilbert FJ, Andrew JE, et al. Influence of imaging on clinical decision making in the treatment of lower back pain. *Radiology*. 2001;220:393-399.
17. Gray DT, Hollingworth W, Balckmore CC, et al. Conventional radiography, rapid MR imaging and conventional MR imaging for low back pain: activity-based costs and reimbursement. *Radiology*. 2003;227:669-680.
18. Guyer RD, Ohnmeiss DD. Contemporary concepts in spine care lumbar discography. *Spine*. 1995;20(18):2048-2059.
19. Hanson JA, Blackmore CC, Mann FA, Wilson AJ. Cervical spine injury. a clinical decision rule to identify high-risk patients for helical CT screening. *AJR Am J Roentgenol*. 2000;174:713-717.
20. Jaramillo D, Poussaint TY, Grottkau BE, et al. Scoliosis: evidence-based diagnostic evaluation. *Neuroimaging Clin N Am*. 2003;13:335-341.
21. Jaramillo D, Poussaint TY, Grottkau BE. Scoliosis: evidence-based diagnostic evaluation. *Neuroimaging Clin N Am*. 2003;13:335-341.
22. Jarvik J. Imaging of adults with low back pain in the primary care setting. *Neuroimaging Clin N Am*. 2003;13:293-305.
23. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. *Ann Intern Med*. 2002;137:586-597.

24. Jarvik JG, Hollingworth W, Martin B, et al. Rapid magnetic resonance imaging vs radiographs for patients with low back pain: a randomized controlled trial. *JAMA*. 2003;289:2810-2818.
25. Keenan HT, Hollingshead MC, Chung CJ, Ziglar MK. Using CT of the cervical spine for early evaluation of pediatric patients with head trauma. *AJR Am J Roentgenol*. 2001;177:1405-1409.
26. Koeller KK, Rosenblum RS, Morrision AL. Neoplasms of the spinal cord and filum terminale: radiologic-pathologic correlation. *Radiographics*. 2000;20:1721-1749.
27. Mazanec DJ, Podichetty, VK, Hsia A. Lumbar canal stenosis: start with nonsurgical therapy. *Cleve Clin J Med*. 2002;69(11):909-917.
28. National Collaborating Centre for Chronic Conditions (UK). *Rheumatoid Arthritis: National Clinical Guideline for Management and Treatment in Adults*. National Institute for Health and Clinical Excellence (NICE) Clinical Guidelines, No. 79. London: Royal College of Physicians (UK); February 2009.
29. Quality Standards Subcommittee of the American Academy of Neurology. Practice parameters: magnetic resonance imaging in the evaluation of low back syndrome. *Neurology*. 1994;44:767-770.
30. Resnick DK, Malone DG, Ryken TC. Guidelines for the use of discography for the diagnosis of painful degenerative lumbar disc disease. *Neurosurg Focus*. 2002;13(2):1-9.
31. Shekelle P. *Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. What's new? What's different?* National Guideline Clearinghouse, Expert commentary. <http://www.guidelines.gov/expert/expert-commentary.aspx?id=16452>. February 11, 2008. Accessed January 3, 2012.
32. Sliker C, Mirvis S, Shanmuganathan K. Assessing cervical spine stability in obtunded blunt trauma patients: review of medical literature. *Radiology*. 2005;234:733-739.
33. Staiger TO, Paauw DS, Deyo RA, Jarvik JG. Imaging studies for acute low back pain. When and when not to order them. *Postgrad Med*. 1999;105(4):161-162,165-166,171-172.
34. Wintermark M, Mouhsine E, Theumann N, et al. Thoracolumbar spine fractures in patients who have sustained severe trauma: depiction with multi-detector row CT. *Radiology*. 2003;227:681-689
35. American Association of Neuromuscular and Electrodiagnostic Medicine. *Choosing Wisely: Five Things Physicians and Patients Should Question*. ABIM Foundation; February 10, 2015. Available at [www.choosingwisely.org](http://www.choosingwisely.org).
36. England JD, Gronseth GS, Franklin G, et al. Practice Parameter: evaluation of distal symmetric polyneuropathy: role of laboratory and genetic testing (an evidence-based review). *Neurology*. 2009;72(2):185-192.
37. Tracy JA, Dyck PJB. Investigations and treatment of chronic inflammatory demyelinating polyradiculoneuropathy and other inflammatory demyelinating polyneuropathies. *Curr Opin Neurol*. 2010;23(3):242-248.
38. England JD, Gronseth GS, Franklin G, et al. Distal symmetric polyneuropathy: a definition for clinical research: report of the American Academy of Neurology, the American Association of Electrodiagnostic Medicine, and the American Academy of Physical Medicine and Rehabilitation. *Neurology*. 2005;64(2):199-207.
39. North American Spine Society. *Choosing Wisely: Five Things Physicians and Patients Should Question*. Philadelphia, PA: ABIM Foundation; October 9, 2013. Available at <http://www.choosingwisely.org/societies/north-american-spine-society/> Accessed October 10, 2015.
40. American College of Emergency Physicians. *Choosing Wisely: Ten Things Physicians and Patients Should Question*. Philadelphia, PA: ABIM Foundation; October 14, 2013 and October 27, 2014. Available at <http://www.choosingwisely.org/societies/american-college-of-emergency-physicians/> Accessed October 10, 2015.