This tool addresses common symptoms and symptom complexes. Imaging requests for patients with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or patient’s Primary Care Physician (PCP) may provide additional insight.

**SPINE GUIDELINES**
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MedSolutions, Inc. Clinical Decision Support Tool
for Advanced Diagnostic Imaging

Common symptoms and symptom complexes are addressed by this tool. Imaging requests for patients with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician may provide additional insight.

*This version incorporates MSI accepted revisions prior to 11/30/06*
ABBREVIATIONS for SPINE GUIDELINES

AIDS: Acquired Immunodeficiency Syndrome
ANA: antinuclear antibody
CNS: central nervous system
CT: computed tomography
EMG: electromyogram
ESR: erythrocyte sedimentation rate
FUO: fever of unknown origin
MRI: magnetic resonance imaging
MS: Multiple sclerosis
NCV: nerve conduction velocity
RF: rheumatoid factors
SI: sacro-iliac
Von H-L Syndrome: von Hippel-Lindau Syndrome
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SPINE IMAGING GUIDELINES

SP-1 ~ GENERAL GUIDELINES

- Spinal pain is an immensely common problem affecting almost everyone at one time or another. Few cases indicate serious disease, and well over 90% of episodes will clear up on their own with the aid of minor analgesics, continued activity, and time (typically 8 weeks or less). The low back is the most common location.
- Certain syndromes other than simple back pain—radiculopathy, lumbar spinal stenosis, and myelopathy—can generally be identified clinically and approached separately.
- In some cases, a serious cause for the pain is rendered likely (or at least less unlikely) by so-called “red or yellow flags.”
- These guidelines will take the approach of dealing first with the identifiable syndromes (radiculopathy, lumbar stenosis, and myelopathy), and then with the much more common plain spinal pain (often called mechanical pain).
- The Spine guidelines are the same for both the pediatric population and the adult population, unless there are specific Pediatric guidelines (highlighted in yellow).

SP-2 ~ IMAGING TECHNIQUES

- MRI:
  - Procedure of choice to evaluate disc disease, spinal cord and nerve root disorders, and most other spinal conditions.
  - Performed without contrast for disc and nerve root disorder, fractures, and degenerative disease.
  - Contrast is optional in looking for metastatic cancer in vertebrae.
  - Contrast is appropriate in evaluating spinal infections, tumors inside the spinal canal, multiple sclerosis or other causes of myelitis, syringes, and in the postoperative lumbar spine.
  - As with the brain, spine MRI is performed either without contrast or with contrast.
  - A with contrast study alone is appropriate only to complete a study begun without contrast if the without study was done within one to two weeks prior.
- CT:
  - Indications:
    - To look specifically at bony structures.
    - As a part of myelography or discography.
    - In patients who cannot have MRI.
  - CT myelograms and discograms are coded as with contrast studies only.
  - Otherwise the use of contrast in CT parallels that for MRI.
- The value of spinal imaging:
In patients with radiculopathy or lumbar canal stenosis, the diagnosis is infrequently in doubt, and imaging is done in essence as a part of pre-procedural evaluation.

Earlier imaging may be useful to spine specialists in those patients in whom the diagnosis is unclear.

In low back pain without neurological features, imaging is done in those who fail to improve chiefly to exclude occult metastatic disease and infection.

In longstanding pain, imaging may be useful to aid in the selection of pain management procedures.

In intrinsic spinal cord disorders, imaging is done to confirm a diagnosis, reveal the extent of a disease process, or monitor results of treatment.

- **A limitation of spinal imaging in degenerative spinal disorders**: as the years pass, fewer and fewer healthy adults have “normal” CT or MRI of the spine. Even frank disc protrusions are seen in about 30% of individuals with no symptoms.

In patients with poorly defined clinical findings, “abnormal” spinal imaging results are likely not to be significant.*


“Specialist” means neurosurgeon, orthopedist, neurologist, or physiatrist (PM&R) and also, in their areas of expertise, pain specialist, oncologist, rheumatologist, and cardiovascular specialist.

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**SP-3 ~ PAINFUL LUMBOSACRAL RADICULOPATHY**

- **Uncomplicated radiculopathy** (pain radiating in a radicular pattern):
  - Conservative treatment is appropriate, including continued regular activity and analgesics. Physician-directed clinical care with clinical re-evaluation should be attempted for 6 to 8 weeks before imaging (noncontrast MRI) is considered.
  - Approximate date of onset must be documented by branch script or notes, and this is an absolute requirement in patients age 18 to 50.
  - **Note**: musculo-ligamentous back pain frequently radiates into the gluteal region and hamstrings. This feature is not sufficient on its own to indicate the likelihood of radiculopathy.
  - **Specialist evaluation**: in patients who suffer from acute radiculopathy, MRI is in essence a pre-procedural test done to confirm a diagnosis and establish its segmental level.
    - MRI may be appropriate in the initial evaluation of patients who are referred to neuro specialists or spinal orthopedists after initial symptomatic efforts have failed, and noncontrast MRI should be considered in that setting if requested.
  - **Failure of symptomatic therapy**: patients who are worsening despite at least a two week trial of “conservative” therapy should be considered for imaging. See below under complicated radiculopathy.

- **Complicated radiculopathy**:
  - Weakness on objective exam indicates prompt need for noncontrast MRI.
- Weakness must be documented via clinical notes or branch script and should be myotomal as follows:
  - e.g. ankle dorsiflexion for L5 (trouble walking on heels) on the involved side
  - plantar flexion for S1 (trouble walking on toes) on the involved side.
- **Intractable pain** despite a reasonable attempt at conservative therapy can properly accelerate the timing of MRI but must be documented.
- **Cauda Equina Syndrome:** the very rare patient, usually a late adolescent or young adult, who develops acute bilateral sciatica complicated by urinary retention (not incontinence), perineal sensory loss (saddle distribution sensory loss) or decreased anal sphincter tone, requires urgent noncontrast lumbar MRI (CPT 72148).
  - Specialist consultation is helpful in evaluating these patients.
- **Hemangiomas:** spinal hemangiomas are benign lesions generally incidentally encountered on spinal imaging studies.
  - If the MRI appearance of a hemangioma is typical, further imaging is not needed.
  - Occasionally, MRI may be indeterminate, and noncontrast CT of the area is then generally diagnostic.
  - No follow-up is necessary once the diagnosis is established.
- **Objective sensory loss with radiculopathy:**
  - Subjective numbness is common with uncomplicated radiculopathy, but objective loss on sensory testing is not typical.
  - Specialist evaluation is helpful in determining the need for advanced imaging.
  - Noncontrast MRI to clarify the diagnosis may be indicated.
- **Trauma:** Noncontrast lumbar CT (CPT 72131) or MRI (CPT 72148) may be appropriate in patients with lumbar radiculopathy after moderate to severe trauma.
  - Specialist consultation is helpful in determining the need for advanced imaging.
  - Also see SP-10 bullet 4 Mechanical Back Pain
- **Tarlov cysts:** cystic dilatation of the sacral root sleeve. It is unclear whether these cause symptoms of sciatica or not, but they can cause local bone erosion.
  - Tarlov cysts that communicate with the subarachnoid space can be seen to fill during CT myelography, and when a likely Tarlov cyst is seen on MRI, CT lumbar myelography (CPT 72132) can be performed for evaluation.
- **NOTE:** In patients between age 18 and 50 who have not completed at least 4 weeks of conservative care, the reasons for earlier scanning must be documented.
- **Recurrent radiculopathy:** patients having their third or greater episode within two years without prior imaging or surgery often benefit from obtaining noncontrast lumbar spine MRI (CPT 72148).
- **Contrast MRI:** patients with prior lumbar surgery should have MRI without and with contrast (CPT 72158), but noncontrast MRI (CPT 72148) is acceptable during pregnancy and upon specialist request.
- **CT:** as an alternative to MRI, noncontrast lumbar spine CT (CPT 72131) or CT myelogram (CPT 72132) may be appropriate for patients who cannot have MRI or upon specialist request.
- **Recurrent postoperative radicular symptoms within a year of back surgery:** specialist evaluation is helpful in determining the need for advanced imaging and the appropriate imaging pathway (plain x-ray, CT, CT myelogram, MRI, discography).
- **Repeat studies:** requests by orthopedists and neurosurgeons for repeat MRI or CT studies more than six months old are acceptable if the patient's clinical condition has changed in the interval.
- **Meralgia paresthetica:** numbness of the outside of the thigh is infrequently due to radiculopathy.
  - Also see PN-2.4 Meralgia paresthetica in the Peripheral Nerve Disorders guidelines.
- **References:**
  - ACR Appropriateness Criteria, Low back pain, Rev 2005
  - American Academy of Neurology
  - Also supported by the North American Spine Society

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**SP-4 ~ LUMBAR SPINAL STENOSIS**

- Lumbar canal stenosis generally occurs in patients over 60 years old and presents with chronic backache typically associated with pseudo-claudication—the patient has pain radiating into the legs on walking which is relieved by bending forward or sitting down.
- Lumbar canal stenosis can readily be confused with either painful polyneuropathy or arterial insufficiency.
  - Diabetics and alcoholics especially should have EMG to exclude neuropathy.
  - In those with pseudoclaudication, vascular insufficiency must be excluded by physical exam or by arterial Doppler prior to consideration of advanced imaging.
  - Specialist consultation is often useful.
- Patients with mild to moderate symptoms (see next bullet) should be treated with analgesics and a regimen of regular activity. Noncontrast lumbar spine MRI (CPT 72148) or CT (CPT 72131) is appropriate for those who fail to reach a level of symptoms they find acceptable.
• Noncontrast lumbar MRI (CPT 72148) is indicated in patients with more severe symptoms restricting normal activity or requiring narcotic analgesics, once other confounding diagnoses have been excluded.
• In patients with previous lumbar surgery, MRI without and with contrast (CPT 72158) is appropriate.
  o Specialist evaluation is helpful in determining the appropriate imaging pathway.
  o CT will generally not be useful in this setting.
• References:
  o ACR Appropriateness Criteria, Low Back Pain, Rev 2005 Variant 6

SP-5 ~ MERALGIA PARESTHETICA

• See PN-2.4 Meralgia paresthetica in the Peripheral Nerve Disorders guidelines and SP-3 Meralgia paresthetica under Painful Lumbosacral Radiculopathy

SP-6 ~ FIBROMYALGIA

• Pain syndrome characterized by chronic, diffuse musculoskeletal pain, fatigue, abnormal sleep, headaches, morning stiffness, and abnormal soft tissue tenderness to palpation.
  o Most frequently seen in females between the ages of 20 to 50 years old.
  o The diagnosis is based on clinical findings established by the American College of Rheumatologists. (See SP-6 Evidence Based Clinical Support section)
  o These clinical findings have 88% sensitivity and 81% specificity.
• Advanced imaging studies in patients with fibromyalgia are not indicated without specific clinical features appropriate to the region for which the request is made.

SP-7 ~ SACRO-ILIAC (SI) JOINT PAIN

• SI joints are located in the pelvis and join the sacrum to the hips.
  o Pain may be referred to SI joint, lumbosacral spine, or ipsilateral leg.
  o Onset usually follows rotation coupled with axial load (lift and turn, push and turn).
  o Pain tends to be worse in the morning, with bending, and with prolonged standing/sitting.
  o SI joint pain causes no neurological features.
  o Patrick’s sign is typically present.
Diagnosis is made by SI joint injection of local anesthetic and this should be performed prior to advanced imaging in non-rheumatoid cases.

- Plain x-rays of the SI joints (pelvis) are the initial study.
- Noncontrast CT (CPT 72192) or MRI (CPT 72195) may be useful to identify erosions when x-rays are non-diagnostic, but their significance is uncertain.*
  - Rheumatology or other relevant specialist consultation is helpful initially.
  
  *Rheumatology 2004;43:234-237

- Reference:

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**SP-8 ~ VERTEBRAL COMPRESSION FRACTURES**

- Sudden localized back pain is the typical feature, but compression fractures may be subclinical (painless). They are associated with age and osteoporosis. Incidence in the US is > 700,000 per year.
  - Reference:
    - J Fam Practice 2005 Sept (Supplement):781-788
- Plain spinal x-rays should be performed initially.
  - If the x-rays reveal a compression fracture, noncontrast MRI or CT may be appropriate.
  - Orthopedic or neurosurgical consultation is helpful in determining the need for advanced imaging.
  - If the x-rays are non-diagnostic and pain persists over a week in an elderly patient or a patient with known osteoporosis, noncontrast MRI of the painful spinal level is appropriate.
  - Reference:
- In a patient < 55 years old with atraumatic compression fracture, malignancy should be considered and MRI (contrast as requested) is recommended.
- MRI or CT is appropriate preoperatively in patients ≥2 weeks following known compression fracture, who are going to undergo kyphoplasty or vertebroplasty.
- Compression fractures are a frequent incidental finding on spinal x-rays. If the patient has appropriately located back pain, bone scan may be needed to determine the fracture’s age (new vs old).
- Reference:
  - ACR Appropriateness Criteria, Low Back Pain, Rev 2005

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**SP-9 ~ SPINAL PAIN IN CANCER PATIENTS**

- This guideline applies to patients with known cancers of types which metastasize to bone and who develop new back pain. It does not apply to longstanding (>4 months) pain in such patients.
  - Breast, lung, prostate, renal cell and colon cancers, along with myeloma, are the most likely to metastasize to bone.
• **Localized back pain:** MRI (contrast as requested) of the affected region is appropriate and should be done expeditiously.

• **Generalized back pain:** nuclear bone scan is appropriate initially to help localize any region of concern.
  - If bone scan is nondiagnostic, MRI of the thoracic and lumbar spine (contrast as requested) may be appropriate.
  - Specialist consultation is helpful in determining the appropriate imaging pathway.

• **Further MRI in patients with known spinal metastasis:** one third of patients with a known spinal metastasis have further metastases, so imaging of the remaining spine (MRI contrast as requested) is appropriate.
  - Inclusion of the cervical spine is at the discretion of the treating physician (cervical metastases are much less common than lumbar and thoracic metastases).

• **Spinal pain with neurological findings:** urgent spinal MRI (contrast as requested) is indicated. Selection of levels to be scanned depends on the spinal level of the findings, but areas above that may be included at the discretion of the treating physician.

• **Reference:**
  - *ACR Appropriateness Criteria, Low Back Pain, Rev 2005*

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**SP-10 ~ MECHANICAL BACK PAIN**

**BACK PAIN WITHOUT NEUROLOGICAL FEATURES**

• **Red flag settings** are situations in which localized back pain is likely to reflect serious underlying disease. If the pain is severe and persists for more than a week, advanced imaging (generally noncontrast MRI; MRI contrast as requested if there is a high suspicion for tumor) of the symptomatic level (lumbar or thoracic) is appropriate. This group as a whole represents about 1% to 2% of all back pain cases.  

  **MRI of the relevant spinal level (contrast as requested) is appropriate in the following circumstances:**
  - Patients with known recent or metastatic malignancies, (the meaning of recent varies with the tumor type).
  - Patients with persistent septicemia (FUO>3 weeks) or known endocarditis. This includes fever and severe localized backache in intravenous drug users.
  - Immunocompromised hosts (AIDS, transplant patients, those on immunosuppressant therapy or chronic dialysis).
  - Clinical suspicion of disc space infection, epidural abscess, or spinal osteomyelitis.
  - Hematuria is often added to this list, but generally requires evaluation for its cause first (see AB-36 Hematuria in the Abdomen guidelines).

• **Yellow flag settings** are situations where there is some increased likelihood that a backache is a sign of serious underlying disease, but much less strongly so than in a red flag setting.
- Patients with two or more yellow flags should have consideration of level-appropriate spine MRI without contrast.
- With one yellow flag, a four week trial of conservative therapy is indicated prior to consideration of advanced imaging in most cases.
- **Yellow Flags:**
  - Coincident systemic symptoms, adenopathy, or unintentional weight loss >10 pounds.
  - History of remote "internal" cancer or non-melanoma skin cancer. E.g. a history of lung cancer two years ago would be a red flag; a history of bowel cancer 15 years ago would be a yellow flag (because people who have formed one cancer are likelier to form another one).
  - History of intravenous drug use without other medical complications of drug use.
  - Back pain worse at night or unrelieved with position change.
  - Age > 60.
  - Elevated ESR (>24).

**Uncomplicated backache:** patients with lumbar or thoracic pain uncomplicated by neurological features or red/yellow flags (as described above) rarely have a serious underlying cause.
- Analgesics, supportive care and continued physical activity under the direction of a physician are appropriate for 4 to 8 weeks.
- Patients improving by 4 weeks should continue with conservative treatment.
- Patients with no improvement at 4 weeks should receive careful clinical re-evaluation and continued therapy.
- At six weeks, re-evaluation, perhaps including lumbar x-rays, is appropriate. If the x-rays show abnormalities other than simple degenerative disease, noncontrast MRI of the relevant area of the spine can be performed.
- After 12 weeks duration without improvement (including 4 to 8 weeks of those 12 weeks being under the care of a physician), noncontrast MRI is appropriate regardless of prior treatment or not. *

**Trauma:** patients with trauma affecting the lower spine should have lumbar spine x-rays and a thorough neurological examination. If both are normal, further imaging is generally unnecessary.
- If there is concern about an occult fracture, nuclear bone scan or noncontrast CT (CPT 72131) is indicated.
- In patients with uncomplicated clear-cut radicular features after spinal trauma, noncontrast lumbar MRI (CPT 72148) is appropriate.

**References:**
- Radiol 2001;220:393-395
SP-11 ~ THORACIC SPINAL PAIN (UPPER BACK)

- Upper back pain is generally from musculo-tendinous causes and responds to time and conservative management. Pain management consultation is often useful when the problem is prolonged.
- Thoracic radicular-pattern pain is not common, but can be seen with diabetic intercostal neuropathy and zoster (shingles).
  - In most cases of shingles, pain is the initial symptom, but the cause becomes evident with the appearance of the typical rash. Imaging is rarely required for either.
- Thoracic radiculopathy from disc disease is quite uncommon (0.1%-0.5% of disc disease).
  - It presents with thoracic level dermatomal pain on one side.
  - In clinically typical thoracic radiculopathy, noncontrast thoracic MRI (CPT 72146) is appropriate if significant symptoms persists for >8 weeks.
  - Specialist consultation is helpful to clarify diagnosis and aid in selection of imaging choices.
  - Reference:
- Interscapular pain usually reflects either non-neurological disease or cervical spondylosis. Specialist evaluation is helpful in determining the need for advanced imaging.
- Spinal metastases from systemic cancer occur most often in the thoracic spine.
  - See Sp-9 Spinal Pain in Cancer Patients
  - See also SP-13 Myelopathy

SP-12 ~ CERVICAL RADICULOPATHY

- The management of neck pain and cervical radiculopathy is similar to that of the analogous lumbar spine problems. Some differences are noted below.
  - Reference:
    - Continuum: Pain and Palliative Care 2005;11(6):94-136
    - American Academy of Neurology
- Uncomplicated radiculopathy: Cervical radiculopathy is distinctly less common than the lumbar syndrome, and its management is similar.
  - Most cases resolve over 6-12 weeks and will start to show improvement within 2-4 weeks.
  - Conservative therapy for 4 weeks, continuing longer if improvement begins, is appropriate prior to consideration of advanced imaging.
  - Approximate date of onset of the symptoms should be documented.
  - Reference:
American Academy of Neurology

- **Complicated radiculopathy**: Intractable pain, objective (myotomal) weakness, or objective sensory loss can accelerate timing of the MRI, but must be documented, preferably by a detailed neurological examination.

- **Recurrent radiculopathy**: patients having their third or greater episode within two years without prior imaging should be approved for noncontrast cervical spine MRI (CPT 72141).

- **Advanced imaging modalities**: patients who fail conservative management as outlined above and are surgical candidates should be imaged by noncontrast cervical spine MRI (CPT 72141).
  
  - Noncontrast cervical spine CT (CPT 72125) can be useful in patients greater than 60 years old to evaluate for bony spurs, but is of little value in visualizing cervical disc disease.
  
  - Specialist evaluation is helpful in determining the most appropriate imaging study for those patients who cannot have MRI performed.
    - CT myelogram (CPT 72126) and cervical spine CT without contrast (CPT 72125) can be useful in this setting.

- **Patients with prior cervical spine surgery**: Contrast is not often useful in this setting in the cervical spine (in contrast to the lumbar spine).
  
  - Noncontrast cervical spine MRI (CPT 72141) and cervical CT myelogram (CPT 72126) can both be useful.
  
  - Specialist input is helpful in evaluating patients with recurrent symptoms within a year of cervical spinal surgery, and is useful in all recurrent problems.
  
  - **Postoperative MRI**:
    - Not indicated if patient is doing well.
    - If there are continued postoperative symptoms with new neurological findings postoperatively, noncontrast cervical spine MRI (CPT 72141) is appropriate.
    - Continued symptoms postoperatively without neurological findings should be treated for 6 to 8 weeks before consideration of follow-up MRI.

- **Differential diagnosis**: cervical spondylosis is often confused with other entities, most commonly:
  
  - **Shoulder-arm symptoms**: non-localized aching or numbness in the entire arm is a symptom of muscle spasm in the neck or shoulder, not cervical radicular disease.
    - Orthopedic evaluation is helpful in determining the need for advanced imaging for this symptom complex.
  
  - **Carpal tunnel syndrome**: distal paresthesia of a hand (rather than one or two fingers), especially if worse at night, is typical of carpal tunnel syndrome.
    - Advanced imaging is not usually required for the diagnosis and treatment of carpal tunnel syndrome.
    - Carpal tunnel syndrome is usually diagnosed by clinical features supplemented by nerve conduction studies (EMG/NCV).
    - See also PN-2.1 Carpal tunnel syndrome in the Peripheral Nerve Disorders guidelines and MS-18 Carpal Tunnel under Wrist in the Musculoskeletal guidelines.
Brachial “plexitis” (Parsonage-Turner syndrome): this is a clinical
diagnosis assisted initially by EMG. Neurological consultation is helpful, and
at times, brachial plexus imaging may be appropriate.
- Also see PN-4 Brachial Plexus in the Peripheral Nerve Disorders
guidelines.
Cervical radiculopathy itself: C7 (pain radiates to index and middle fingers)
and then C6 (pain radiates to thumb and index finger) are the locations
commonly seen.
- See SP-12 Evidence Based Clinical Support section.

SP-13 ~ MYELOPATHY

- Myelopathy refers to abnormal spinal cord function
  - Classic signs are spastic legs with hyperreflexia and upgoing toes (positive
    Babinski). Sensory level and urinary incontinence are also seen.
  - Advanced imaging is generally appropriate in the initial evaluation of
documented or reasonably suspected myelopathy.
  - MRI is the procedure of choice for initial evaluation of the spinal cord.
    - Cervical and thoracic spine MRI scans are sufficient since the spinal cord
      normally ends at L1-2, which is seen on thoracic MRI.
  - CT myelography also has a role at times in diagnosis of spinal cord
    compression.
  - Specialist evaluation is helpful in determining the appropriate imaging
    pathway in spinal cord disease.
- Acute myelopathy, except after obvious trauma, is generally either inflammatory
  or neoplastic.
  - MRI without and with contrast is appropriate, but specialists’ requests for
    noncontrast MRI should be honored.
  - When inflammation is suspected (MS included), cervical and thoracic MRI is
    appropriate.
- Traumatic myelopathy: noncontrast MRI is generally sufficient, but noncontrast
  CT for fracture definition or to detect occult fractures may also be indicated.
- Chronic cervical myelopathy is usually spondylitic (from disc or degenerative
disease). Noncontrast MRI (CPT 72141) is sufficient.
- Because of the pattern of blood supply to the spinal cord, chronic cervical
  myelopathy may simulate a high thoracic pattern (esp.T4). Requests for cervical
  imaging are appropriate in that setting.
- Progressive thoracic myelopathy is unusual except in cancer patients and in
  intrinsic cord disorders, including MS.
  - In such cases, MRI without and with contrast is appropriate because of the
    likelihood of primary tumor.
  - Specialist evaluation is helpful in determining the need for advanced imaging.
- Cancer patients: see SP-9 Spinal Pain in Cancer Patients.
  - Evaluation is on a very urgent basis if there are signs of myelopathy.
• Use of the term spinal stenosis outside the lumbar spine is best avoided. A narrowed cervical or thoracic canal matters when it affects spinal cord function. Therefore, myelopathy is the important issue.

• Lhermitte’s sign:
  o The presence of a more or less reproducible electric sensation that shoots down the entire spine and sometimes into the limbs with sudden neck flexion.
    ➢ This is a common occasional event in normal individuals, but it is significant when it is sustained and prominent.
  o When sustained and prominent, this is a sign of cervical myelopathy, and cervical spine MRI is appropriate.
    ➢ The need for contrast will depend on the clinical setting and the choice is best left to the treating physician.

• Babinski’s sign ("upgoing toe"):  
  o A reliable sign of a lesion somewhere in the central nervous system (CNS) above the lumbar spine.
  o In a patient with a prior appropriately located CNS lesion, a Babinski’s sign per se requires no imaging.
  o Patients with an unexplained Babinski’s sign should undergo neuroimaging
    ➢ The most appropriate imaging pathway will depend on other findings.
    ➢ If there are no other known findings, noncontrast brain MRI (CPT 70551) is generally the best initial study.
    ➢ Neurological consultation is helpful in determining the most appropriate imaging pathway.

SP-14 ~ MECHANICAL NECK PAIN
NECK PAIN WITHOUT NEUROLOGICAL FEATURES

• Uncomplicated neck pain: conservative management for 6 to 8 weeks is appropriate. By far, most neck pain is musculo-tendinous in origin.

• Complicated neck pain: 
  o Patients with red or yellow flags are managed as for lumbar pain, but both red and yellow flag situations are much less common in the neck than in the lower spine.

• Trauma: patients with a history of trauma affecting the neck should have cervical spine x-rays and a thorough physical and neurological examination. Subsequent cervical imaging pathway depends on the clinical situation.
  o If x-rays show fracture or dislocation: urgent spinal surgical consultation is appropriate.
    ➢ Noncontrast CT (CPT 72125) and/or MRI (CPT 72141) will likely be the next step.
  o If x-rays do not show fracture or dislocation: 
    ➢ If the patient is asymptomatic with normal clinical examination: further imaging is not generally required.
    ➢ Patients with persistent neck pain and a normal clinical examination: noncontrast CT (CPT 72125) to exclude occult fracture is appropriate.
MRI (CPT 72141) can be chosen if there are uncertain neurological findings.
- Patients with abnormal neurological findings (arm or below) with or without persistent pain: noncontrast MRI (CPT 72141) is indicated.
  - If x-rays are equivocal for fracture: noncontrast CT (CPT 72125) can be performed.
  - Remember that patients with significant head trauma must be presumed to be at risk for cervical spine trauma.

### SP-15 ~ FAILED BACK SYNDROME

- The term designates prolonged intractable pain following spinal surgery. It is not used in reference to cancer patients.
  - Specialist involvement is especially helpful in determining the need for advanced imaging and the appropriate imaging pathway in these patients (neurologists, spine surgeons, physiatrists and pain specialists).
- MRI of a spinal region can be difficult to interpret if the MRI is obtained within three months of surgery in that region.
  - A patient with new or recurrent symptoms related to the surgical area should have either MRI or CT myelography if imaging is needed (usually at the discretion of the spine specialist).
  - Specialist evaluation is helpful in determining the most appropriate imaging pathway.
- When the patient is more than six months past surgical intervention, MRI is again preferred (without and with contrast in the lumbar—CPT 72158 and thoracic spine—CPT 72157, noncontrast in the cervical spine—CPT 72141).
  - However, a trial of conservative therapy may be beneficial prior to considering advanced imaging.
- If there has been the placement of orthopedic hardware or a prior fusion whose status is being checked, noncontrast CT or CT myelography is generally preferred.
- Reference:
PEDIATRIC SPINAL IMAGING

Appropriate imaging pathways for spinal disorders in children are as for adults unless separately discussed.

SP-16 ~ PEDIATRIC BACK PAIN

- **Simple back pain:** unless there are neurological abnormalities, certain pediatric "red flags", or intolerable pain, conservative treatment for 4 weeks should be attempted before considering imaging.
  - When red flags are present, initial imaging is appropriate.
  - Noncontrast MRI is the usual procedure in pediatric spine imaging.
- **Pediatric "red flags" include:**
  - Age under 5: tumor likelihood is high (MRI without and with contrast).
  - Severe pain or pain worse at night.
  - Accompanying systemic symptoms (fever, weight loss, etc.)
  - Neurological symptoms or findings, including bowel or bladder dysfunction.
  - Painful thoracic scoliosis (see Scheuermann Disease below).
  - The presence of a known systemic cancer (MRI without and with contrast; contrast as requested for specialists).

SP-17 ~ CONGENITAL AND PEDIATRIC SPINE PROBLEMS

- **Achondroplasia:** patients are at risk for hydrocephalus, and with age, myelopathy from spinal stenosis. Noncontrast spinal MRI directed at the clinical level is appropriate. This guideline applies also to adults.
- **Ankylosing spondylitis:** 97% of patients are HLA B-27 positive.
  - Advanced imaging is not generally useful in this condition.
  - Both a positive test result and plain x-rays should precede consideration of advanced imaging.
  - If there are specific neurological problems, imaging by noncontrast MRI is appropriate to the problem.
- **Chiari malformation:** see HD-7 Chiari Malformation in the Head guidelines. The Klippel–Feil anomaly is often also seen.
- **Klippel–Feil anomaly** itself (congenital fusion of cervical vertebrae) is generally an incidental finding:
  - Imaging is indicated if there are symptoms or if multiple levels are involved.
  - Specialist evaluation is helpful in determining the appropriate imaging pathway.
- **Marfan syndrome:** MRI (contrast as requested)* is an appropriate study for Marfan Syndrome if dural ectasias are present.
- **Neurofibromatosis type I:** see HD-27 von Recklinghausen’s Disease in the Head guidelines.
• **Pilonidal cysts/sacral dimpling:** both commonly occur at the coccyx. Imaging is not generally required, but for surgical planning, noncontrast lumbar MRI (CPT 72148) may be approved in those with a prominent midline dimple above the assumed level of the coccyx (the upper end of the gluteal fold) to exclude extension of the tract to within the spine.
  o Reference:
    ➢ *Dorsal Dermal Sinus.* [http://www.amirsys.com](http://www.amirsys.com)
    Accessed November 20, 2006
• **Scheuermann Disease:** vertebral wedging with thoracic kyphosis totaling over 40º should be identified by plain x-rays before advanced imaging is considered.
  o Thoracic noncontrast MRI (CPT 72146) is best, but lumbar MRI (CPT 72148) is also appropriate in some cases.
• **Spondylolysis** is best recognized on plain x-rays, and advanced imaging is generally not required. If imaging is needed because of associated spondylolisthesis, noncontrast CT or MRI is acceptable.
• **Tethered cord:** can be found in both lumbosacral and thoracic regions and are often associated with spinal lipomas in either region.
  o Noncontrast lumbar MRI (CPT 72148) is usual, but thoracic MRI and use of contrast may be appropriate in individual cases. Referral to a Medical Director is recommended.
• **von Hippel-Lindau (H-L) syndrome** is associated with spinal hemangiomas and syrinx: level-appropriate MRI without and with contrast may be indicated.
  o Many authorities perform MRI of the entire neural axis every other year in these patients. The issue is currently unclear since the risk of bleeding from the hemangiomas of von H-L syndrome is low.
  o Also see HD-25 von Hippel-Lindau Disease in the Head guidelines
  o von Hippel-Lindau syndrome does not usually become symptomatic until the early adult years.

### SP-18 ~ SYRINGOMYELIA

• Syringomyelia may begin to form in childhood but rarely becomes symptomatic before the adult years.
  o See HD-7 Chiari Malformation in the Head guidelines for imaging choices in that setting.
• Noncontrast MRI of the cervical spine (CPT 72141) is indicated for evaluation of suspected syrinxes. If a syrinx or hydromyelia is found, contrast will be needed.
  o Except for routine imaging in Chiari patients, specialist evaluation is helpful in determining the need for advanced imaging.
  o Use of contrast is appropriate initially if syrinx is the expected diagnosis, to enable distinction of a primary syrinx from one secondary to a cord tumor.
• **Initial imaging pathway:** following initial recognition of a syrinx, MRI of the brain (generally noncontrast—CPT 70551) is recommended to evaluate for syringobulbia.
• If the syrinx extends toward the distal cervical spine, MRI of the thoracic spine is also appropriate to define the lower extent.
• Separate lumbar spine imaging is useful if there is concern for tethered cord.

**Follow-up imaging:** repeat noncontrast cervical spine MRI (CPT 72141), (and, when involved, head or other spinal regions) will be appropriate following surgical treatment of a syrinx (including posterior fossa decompression).
• Annual follow-up is appropriate until stability is established, then imaging every few years for life can be performed.
• Re-imaging is appropriate whenever there is clinical deterioration.
• Post-traumatic syrinx in spinal cord injury patients does not require re-imaging unless there is a change in the neurological picture at or below the syrinx.

• Reference:

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**SP-19 ~ PROCEDURE RELATED GUIDELINES**

• **Positional or weight-bearing MRI:** See HD-35 Newer MRI Techniques in the Head Guidelines
  o Currently regarded as experimental.

• **Open MRI Scanners:** spinal images produced by some of these scanners are inferior to those obtained in closed 1.5 Tesla MRI units and sometimes require repeat in a closed unit.
  o The use of open scanner spinal imaging should be discouraged but is sometimes unavoidable.
  o Adequate studies can generally be obtained from one of the newer open MRI 0.7 Tesla units.
  o Requests from neuro specialists and spinal orthopedists for repeat of an inadequate spinal MRI done on an open unit are acceptable.

• **CT myelography** is generally unnecessary when a good quality and diagnostic MRI has been obtained. However, MedSolutions will attempt to honor established practice patterns of spine surgeons.
  o CT myelography may be useful to clarify equivocal MRI findings or to further evaluate the significance of multiple abnormal levels.
  o Other exceptions are noted throughout the guidelines.
  o CT myelography may also be useful with calcified lesions, since MRI shows calcification poorly.

• **Epidural steroid injection:** a treatment used by many pain specialists to treat radicular or mechanical spine pain which has not responded to an adequate trial of non-invasive conservative measures, especially when it is desired to avoid spine surgery.
  o Noncontrast MRI may be appropriate to select the level of injection, but without substantial change in the clinical picture or intervening surgery, repeat studies are not necessary with each injection or series of injections.
• **Lumbar Discography:**
  
  o **Indications:**
    - To identify a symptomatic pseudo-arthritis in a failed back fusion.
    - To identify which of two herniated discs seen on MRI is symptomatic when that cannot be determined clinically.
    - To confirm a diagnosis of the presumed entity “symptomatic internal disc disruption.”
  
  o **Preconditions of approval:**
    - The patient must have had an MRI and a CT myelogram which were not completely normal but failed to establish a clear diagnosis.
    - Current specialist involvement is helpful.
    - There must be an absence of defined objective neurological findings except for those with multiple level disc protrusions in whom prior imaging has not resolved uncertainty about the symptomatic level.
    - Since lumbar discography is essentially a pre-procedural study, the patient must be a candidate for spinal fusion surgery or percutaneous disk procedure.
    - Patients with failed back surgery are generally not candidates except for those being evaluated for pseudo-arthritis as above.
    - Psychological testing prior to discography is prudent, since those with high symptom fixation scores are unreliable subjects.
    - Those unable to provide meaningful responses during this interactive test are not candidates for it.

• **Cervical and thoracic discography** are even more controversial than lumbar discography, and are used infrequently by a small number of spine specialists.
  
  o Given the uncertainty of benefit and the very real risk of complications (>1%), these procedures should not be approved for coverage except in exceptional circumstances.
  
  o Involvement of a medical director is needed.
  
  o The caveats mentioned in lumbar discography apply.
**SP-3 ~ PAINFUL LUMBOSACRAL RADICULOPATHY**

**Evidence Based Clinical Support**

- About 4% of those in the back pain group, mostly patients between 20 and 50 years old, have sciatica or lumbar radiculopathy.
- Radiculopathy in the lumbar region involves L5 or S1 in 95% of cases and causes sciatica—these nerve roots are the major contributors to the sciatic nerve. Pain radiates through the thigh to well below the knee. Back pain is usual but not invariable. There is generally a positive straight leg raising sign. An absent or very depressed ankle jerk (S1) and radicular sensory subjective complaints are common.
- Occasional cases involve L3 or L4: the pain will radiate to the anterior thigh from the back; the knee jerk may be lost, and sensory complaints, if present, usually refer to the medial leg.
- Lumbar radicular pain is usually worse while sitting.
- Weakness most typically involves ankle dorsiflexion for L5 (patient has foot drop or trouble walking on the involved heel) and ankle plantar flexion for S1 (patient has weakness trying to walk on toe on the involved side).
- It is important to remember that asymptomatic disc bulges and herniations are immensely common in healthy people (about 35%). Without a clear-cut radicular syndrome, their significance is doubtful, so careful clinical evaluation must precede imaging.
- The same warning applies even more strongly to disc “degeneration” (dehydration): such changes are all but inevitable with age, and bear, at most, a tenuous connection to symptoms.
- Consequently, a cervical or lumbar MRI performed on a patient with nonspecific clinical features is much likelier to lead the practitioner astray than to clarify the situation.
- In the cervical spine, where radiculopathy is less frequent and other causes of pain more frequent, this is especially so.

**SP-4 ~ LUMBAR SPINAL STENOSIS**

**Evidence Based Clinical Support**

- About 3% of low back cases, usually in the elderly, are a manifestation of lumbar canal stenosis. This is a degenerative disease infrequent below age 60.
- The characteristic symptoms are back, and, especially, leg pain relieved by sitting or bending forward (in contrast to the worsening of radicular pain that way). The pain is often brought on by walking (pseudoclaudication).
SP-6 ~ FIBROMYALGIA
Evidence Based Clinical Support

• The diagnosis is based on clinical findings established by the American College of Rheumatologists:
  o Greater than 3 month’s duration of widespread pain bilaterally above and below the diaphragm
  o 11 out of 18 tender, painful points in characteristic locations
• No special diagnostic studies but fibromyalgia can co-exist with other diseases.
• CBC, ESR, Thyroid panel, ANA, RF, and Creatinine Kinase should be obtained to rule out Rheumatoid diseases, anemia, malignancy, etc.

SP-10 ~ MECHANICAL BACK PAIN
Evidence Based Clinical Support

• Mechanical back pain of benign causes amounts to over 90% of cases in the general backache group.

SP-12 ~ CERVICAL RADICULOPATHY
Evidence Based Clinical Support

• Cervical radiculopathy is much less common than lumbar. 90% of cases involve C6 or C7 roots. Pain radiates from the neck to the forearm or hand (thumb/index finger for C6 and middle finger/index finger for C7). Lost or depressed reflexes (triceps for C7 and biceps/brachioradialis for C6) and dermatomal subjective sensory complaints can be seen. Pain radiates somewhat diffusely into the arm and forearm and often includes inter-scapular pain.
• C5 radiculopathy (10% of cases) is hard to tell from a shoulder problem, which often results in requests from neuro specialists and orthopedists for both cervical spine and shoulder imaging. The likelier diagnosis should generally be pursued first.

SP-14 ~ MECHANICAL NECK PAIN
Evidence Based Clinical Support

• Metastatic cancer and infection involve the cervical spine much less commonly than they do the lumbar or thoracic spine (about 90% of metastases to spine are thoracic, lumbar, or sacral).
• Neck pain generally originates from soft tissues.
• Degenerative changes of the cervical spine are all but universal with age, but their relation to actual symptoms is unclear.
**SP-17 ~ CONGENITAL AND PEDIATRIC SPINE PROBLEMS**

**Evidence Based Clinical Support**

- **Pilonidal cysts/Sacral dimpling/Dorsal dermal sinus**
  - Skin indentations at the base of the spine which in the case of the first two are always benign and never communicate with the subarachnoid space, and the latter which frequently extends into the subarachnoid space and is associated with intraspinal pathology including spinal abscess, tethered cord and epidermoid tumor.
  - The sentinel finding is the location of the dimple/sinus. If it is below the upper end of the intergluteal crease, the tract never communicates with the spinal canal.
  - In dimples/sinuses above the upper end of the intergluteal crease, MRI without contrast is indicated.
  - Ultrasound can be done in infants under 12 months of age, but MRI should be done if ultrasound is positive.*

* [Dorsal Dermal Sinus](http://www.amirsys.com) Accessed November 20, 2006

- Other suggestive findings of dorsal dermal sinus are hair and capillary hemangioma around the opening.
- MRI without contrast is also appropriate in any dimple with positive lower extremity neurological findings.

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**SP-18 ~ SYRINGOMYELIA**

**Evidence Based Clinical Support**

- Syringomyelia is an illness usually involving the cervical spinal cord which generally evolves over decades. It can present subacutely, although this is not common. Many cases are associated with Chiari I malformations. The thoracic cord and even the brain stem can be involved. Syrinxes may be associated with tumor, trauma, or infection.
SPINE GUIDELINE REFERENCES

SP- 2~Imaging Techniques

SP-3~Painful Lumbosacral Radiculopathy
American Academy of Neurology

SP-4~Lumbar Spinal Stenosis

SP-7~Sacro-iliac (SI) Joint Pain

SP-8~Vertebral Compression Fractures
SP-9~Spinal Pain in Cancer Patients
   ➢ ACR Appropriateness Criteria, Low Back Pain  Rev 2005

SP-10~Mechanical Back Pain/Back Pain without Neurological Features

SP-11~Thoracic Spinal Pain (Upper Back)

SP-12~Cervical Radiculopathy

SP-15~Failed Back Syndrome

SP-17~Congenital and Pediatric Spine Problems

SP-18~Syringomyelia
SP-17 ~ Congenital and Pediatric Spine Problems
Evidence Based Clinical Support