

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 IMAGING 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 11/30/08**

## ABBREVIATIONS for SPINE GUIDELINES

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

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## SPINE IMAGING GUIDELINES

### SP-1~GENERAL GUIDELINES

- Spinal pain is an immensely common problem affecting most adults 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).

### SP-2~IMAGING TECHNIQUES

- Detailed history and physical examination are the first step in the evaluation of spinal disorders and should precede advanced imaging.
- Advanced imaging studies of the spine should be limited to clinically appropriate spinal regions which are involved or could reasonably be suspected to be involved in the patient’s clinical syndrome, and documentation should reflect this.
- **SP-2.1 Anatomic guidelines:**
  - CT cervical spine covers from the skull base/foramen magnum through T1.
  - MRI cervical spine covers from skull base through T1 on the sagittal images and from C2 through T1 on the axial images.
  - CT or MRI thoracic spine covers from C7 through L1.
  - CT lumbar spine covers from T12 through mid sacrum.
  - MRI lumbar spine covers from T12 through mid sacrum on the sagittal images and from L1 through S1 on the axial images.
  - CT or MRI of the cervical and thoracic spine will image the entire spinal cord. Therefore, lumbar spine imaging is not needed when imaging the spinal cord.
  - Exception: if tethered cord is present, lumbar spine imaging will be necessary to image the entire spinal cord.
    - Also see SP-12.1 Myelopathy
- **SP-2.2 MRI of the spine**
  - 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, syrinxes, (except post-traumatic syrinx), and in the postoperative lumbar spine.

- As with the brain, spine MRI is performed either without contrast or without and 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.
- **NOTE:** see SP-16 Procedure Related Guidelines, Open MRI Scanners regarding repeat of inadequate studies performed in open scanners.
- **Screening studies of the entire spine**
  - The recent development of the phased-array surface coil has solved the problem of limited longitudinal field-of-view. This allows screening studies of the entire spine to be made in one acquisition, rather than treating the spine as three separate units (cervical, thoracic, and lumbar).
  - Selected axial images (T1 or fast spin-echo T2) should be obtained only through the levels of abnormality, rather than through the entire spine. \*  
\*Lee RR and Hart BL. *Imaging of the spinal cord*: In Lin VW (Ed.) *Spinal Cord Medicine, Principles and Practice*. Demos Medical Publishing, Inc. 2003.  
<http://www.ncbi.nlm.nih.gov/books/bv.fcgi?indexed=google&rid=spinalcord.section.259>
  - By convention, sagittal/coronal screening studies of the entire spine are coded as one segment (cervical [CPT 72141], thoracic [CPT 72146], or lumbar [72148]), whichever is most appropriate.
- **SP-2.3 CT of the spine**
  - Indications:
    - To look specifically at detail within 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.
    - **Indications for CT myelogram:**
      - When ordered by a specialist in a patient who is unable to have an MRI, **or** has had an MRI which is neither completely normal nor diagnostic of a single level problem, **or** has recently had spine surgery and meets criteria for MRI (but has not had an MRI)
  - Otherwise the use of contrast in CT parallels that for MRI.
- **SP-2.4 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 in the very occasional patient in whom the diagnosis is unclear despite a complete medical history and neurological examination.
  - In low back pain without neurological features, imaging is done to establish a diagnosis. It is chiefly to exclude occult metastatic disease and infection in those who are very likely to harbor such a cause or who have failed to respond to conservative treatment.
  - 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.

- **SP-2.5 Limitations 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 and may even lead to inappropriate treatment.\*
    - \**N Engl J Med* 1994;331:69-73
  - Consequently, advanced spinal imaging based only on the presence of spinal degenerative disease identified on x-rays is not generally indicated in patients who are either asymptomatic or who present with non-specific spinal region pain.
- **SP-2.6 Miscellaneous spinal lesions**
  - **Hemangiomas:** spinal hemangiomas are benign lesions usually incidentally encountered on spinal imaging studies.
    - If the MRI appearance of a hemangioma is typical, further imaging is not normally needed.
    - Occasionally, MRI may be indeterminate, and noncontrast CT of the area is indicated.
    - No follow-up is necessary once the diagnosis is established.
  - **Tarlov cysts:** cystic dilatation of a sacral root sleeve. It is unclear whether these cause symptoms of sciatica or not, but they can cause local bone erosion.
    - Further evaluation of a known or suspected Tarlov cyst can be performed with a post-contrast MRI or with CT lumbar myelography (CPT 72132).
  - **Reference:**
    - Grossman RI, Yousem DM. *Neuroradiology, the requisites*, 2<sup>nd</sup> Ed. Philadelphia, Mosby, 2003, pp.806-807
- **SP-2.7 “Specialist”** means neurosurgeon, orthopedist, neurologist, or physiatrist (PM&R) and also, in their areas of expertise, pain specialist, oncologist, rheumatologist, and cardiovascular specialist

## SP-3~PAINFUL LUMBOSACRAL RADICULOPATHY

- **SP- 3.1 Uncomplicated radiculopathy** (pain radiating in a radicular pattern): in the lumbar spine, that pattern is generally from back to thigh and **into the leg**.
  - **Note:** musculo-ligamentous back pain frequently radiates into the gluteal region and hamstrings. This feature is not sufficient to validate the diagnosis of radiculopathy.
  - Symptoms of trochanteric bursitis (lateral hip pain usually with local tenderness) can be confused with radiation of pain from lumbar disc disease, and if present alone without other symptoms or signs are not an indication for spine imaging.
- Recent detailed history and relevant physical examination should be performed initially.

- Symptomatic treatment is appropriate before consideration of advanced imaging. Physician-directed clinical care with clinical re-evaluation should be attempted for 6 to 8 weeks before imaging (generally noncontrast lumbar MRI [CPT 72148]) is considered.
  - Advanced imaging of the hip or pelvis is not generally appropriate in the evaluation of apparent lumbar radiculopathy unless a separate recognized indication for such studies is documented. (see MS-25.2, Hip Pain in the Musculoskeletal guidelines).
- The approximate date of onset must be documented by survey or notes, and this is an absolute requirement in patients age 18 to 50.
- **Advanced imaging (MRI lumbar spine without contrast [CPT 72148]) is appropriate in the following situations:**
  - **Failure of symptomatic therapy:** patients who fail to recover after a full course of physician-directed therapy.
  - **Specific objective weakness:** must be documented and should be myotomal:
    - 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 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 (or incontinence if there is an incompetent sphincter), perineal sensory loss (“saddle anesthesia”), or decreased anal sphincter tone, requires urgent noncontrast lumbar MRI (CPT 72148).
  - **Societal convenience:** imaging may be necessary to permit the return of police and fire fighters to their jobs, and this is acceptable as a reason.
  - **Specialist consultation:** patients are not often referred to spine specialists unless symptomatic therapy has failed. Requests for imaging after the initial consultation are usually appropriate.
  - **Recurrent radiculopathy:** patients having  $\geq 3$  episodes within two years without prior imaging or surgery.
  - **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 in the case notes.
- **Resolved or improving radiculopathy:** advanced imaging is generally unnecessary in patients with lumbar radiculopathy that has resolved or is improving.
- **SP- 3.2 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-9 Mechanical Back Pain, Trauma

- **SP- 3.3 Other issues**
  - **Contrast in Lumbar MRI:** patients with prior lumbar surgery should generally have MRI without and with contrast (CPT 72158) when MRI is indicated, 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 for the evaluation of spondylolisthesis, and/or upon specialist request.
  - **Recurrent postoperative radicular symptoms within a year of back surgery:** a very detailed history of the recurrent problem and spinal/neurological examination should be performed to determine the need for advanced imaging and the appropriate imaging pathway (plain x-ray, CT, CT myelogram, MRI, discography).
  - **Routine post-fusion imaging:** following a clinically successful spinal fusion procedure or laminectomy, advanced imaging is not indicated after the immediate postoperative interval unless plain x-rays are equivocal or show failure of fusion or the patient develops worsening symptoms (see bullet above).
  - **Repeat studies:** requests by orthopedists and neurosurgeons for repeat MRI or CT studies more than six months old are acceptable when a spinal interventional procedure is planned or if the patient's clinical condition has changed since the time of the prior study.
- **SP- 3.4 Meralgia paresthetica:** numbness of the outside of the thigh is infrequently due to radiculopathy.
  - Also see PN-2.6 Meralgia paresthetica in the Peripheral Nerve Disorders guidelines.
- **SP- 3.5 References:**
  - *ACR Appropriateness Criteria, Low back pain, Rev 2008*
  - *Continuum: Neck and Back Pain Part A 2001;7(1):142-151*  
*American Academy of Neurology*
  - *American Academy of Orthopedic Surgeons (AAOS) clinical guidelines on low back pain/sciatica (acute) (phase I and II). <http://www.guideline.gov>*  
Also supported by the North American Spine Society Accessed November 20, 2006
  - *Herniated disc. In: North Am Spine Society phase III clinical guidelines for multidisciplinary spine care specialists. 2000.<http://www.guideline.gov>. Accessed November 20, 2006*

## 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.

- Detailed examination including neurological and peripheral vascular examination is appropriate initially.
- Diabetics and alcoholics especially should have EMG to exclude peripheral neuropathy unless there is very clear cut pseudoclaudication.
- In those with pseudoclaudication, vascular insufficiency must be excluded by physical exam or by arterial Doppler prior to consideration of advanced imaging.
- Patients with mild to moderate symptoms (see next bullet) should be treated with an extended trial of conservative therapy, including analgesics and a regimen of regular activity. Conservative treatment is successful 70% of the time in these patients.\*
  - 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.
    - \*Highlights from the 2007 North American Spine Society Meeting. Sq2 Web Seminar, November 8, 2007
- 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.
  - When there are diagnostic uncertainties unresolved by MRI, a lumbar CT myelogram (CPT 72132) may be appropriate to resolve them.
  - In patients with severe spinal stenosis, decompression is effective 80% of the time.\*
    - \*Highlights from the 2007 North American Spine Society Meeting. Sq2 Web Seminar, November 8, 2007
- In patients with previous lumbar surgery, MRI without and with contrast (CPT 72158) is appropriate.
  - Specialist evaluation is helpful in determining the appropriate imaging pathway in patients with prior lumbar surgery.
  - The value of CT in this post-operative setting is limited.
- **References:**
  - ACR Appropriateness Criteria, Low Back Pain, Rev 2008
  - North Am Spine Society, Clinical guidelines for multidisciplinary spine care specialists: spinal stenosis. Version 1.0 2002  
<http://www.guideline.gov> Accessed November 20, 2006
  - Grossman RI, Yousem DM. Neuroradiology, the requisites, 2<sup>nd</sup> Ed. Philadelphia, Mosby, 2003,pp.784-786

## SP-5~FIBROMYALGIA

- Pain syndrome characterized by chronic, diffuse musculoskeletal pain, fatigue, abnormal sleep, headaches, morning stiffness, and abnormal soft tissue tenderness to palpation.
  - Most frequently seen in females between the ages of 20 to 50 years old.
  - The diagnosis is based on clinical findings established by the American College of Rheumatologists. (See SP-5 Evidence Based Clinical Support section)

- 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-6~SACRO-ILIAC (SI) JOINT PAIN and COCCYDYNIA

- SI joints are located in the pelvis and join the sacrum to the hips.
  - Pain may be referred to SI joint, lumbosacral spine, or ipsilateral leg.
  - Onset usually follows rotation coupled with axial load (lift and turn, push and turn).
  - Pain tends to be worse in the morning, with bending, and with prolonged standing/sitting.
  - SI joint pain causes no neurological features.
  - 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.
  - **Ankylosing Spondylitis:** see SP-9.5 Ankylosing Spondylitis
- Plain x-rays of the SI joints (pelvis) are the initial study.
- Noncontrast CT pelvis (CPT 72192) or MRI pelvis (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:**
  - [Am Acad Orthop Surg 2004;12:255-265](#)
- **Coccydynia:** plain x-rays normally visualize the structures relevant to coccygeal pain, and advanced imaging is infrequently of value.
  - **References**
    - [Spine 1996;21:2588-2593](#)
    - [Spine 2000;25:3072-3079](#)

## SP-7~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.
- Detailed neurological examination and review of plain x-rays are indicated initially.
  - If the x-rays reveal a compression fracture, noncontrast MRI or CT of the affected spinal level 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:**

- *J Fam Practice* 2005 Sept (Supplement):781-788
- *Am Fam Physician* 2004;69:111-116
- 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 2008*

## SP-8~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 which has either persisted over two weeks or is progressively severe. 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.
- See **ONC-27.4 Metastatic Cancer Bone (and Spine)** for guideline regarding imaging pathways in cancer patients with back pain.
- **Additional MRI scans in patients with known spinal metastasis:** one third of patients with a known spinal metastasis have further metastases, so imaging of any spinal regions that have not already been imaged is appropriate (MRI contrast as requested)
  - 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 2008*

## SP-9~MECHANICAL BACK PAIN BACK PAIN WITHOUT NEUROLOGICAL FEATURES

- Mechanical back pain of benign causes accounts for over 90% of cases in the general backache group.
- **SP- 9.1 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-42 Hematuria in the Abdomen guidelines).
- **SP- 9.2 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).
    - **Reference:**
      - [\*Ann Intern Med\* 2000;137:586-597](#)
  - **SP- 9.3 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.

- Lumbar spine x-rays can be important in identifying spondylolisthesis, lumbar scoliosis, spondylolysis, and transitional spinal segments.
  - 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.\*
    - \**N Engl J Med* 1998;339:1021-1029
  - **Chronic low back pain:**
    - Repeating previously nondiagnostic advanced imaging studies is rarely helpful in patients with longstanding back pain without neurological features.
- **SP- 9.4 Spondylolysis**
  - Thought to be caused by repeated microtrauma resulting in stress fracture of the pars interarticularis. Heredity is also believed to be a factor.<sup>1</sup>
  - Immobilization with various corsets or braces and activity restriction are the principles of treatment of symptomatic patients.<sup>2</sup>
  - Surgical treatment is only recommended for very symptomatic patients whose symptoms have not responded to non-surgical care and whose symptoms are disabling.<sup>2</sup>
  - Is best recognized on plain x-rays, and advanced imaging is generally not indicated. If imaging is needed because of radiological uncertainty or associated spondylolisthesis, noncontrast CT or MRI is acceptable. (MRI must be performed on 1.0 Tesla [minimum] machine with 3 mm cuts and at relatively high resolution).<sup>1</sup>
  - Specialist evaluation is helpful in determining the need for advanced imaging.
    - <sup>1</sup> Weinberg EP. *Spondylolysis*. eMedicine, June 17, 2005. <http://www.emedicine.com>. Accessed November 29, 2007
    - <sup>2</sup> Scoliosis Research Society, Spinal Deformity Information, *Spondylolisthesis*. <http://www.srs.org/professionals>. Accessed November 29, 2007
- **SP- 9.5 Ankylosing Spondylitis**
  - 97% of patients are HLA B-27 positive
  - Recent clinical examination, positive HLA test result, and plain x-rays should precede consideration of advanced imaging.
    - There is no evidence-based data demonstrating that advanced imaging changes patient management decisions in patients with proven SI disease on plain x-rays.
    - MRI has shown inflammatory changes in the SI joints prior to visible x-ray changes in several small studies.
      - However, further data is needed to establish the ability of MRI to characterize inflammation in early ankylosing spondylitis, the ability of MRI to predict destructive changes, and the value of monitoring treatment effects.\*
        - \**Rheumatology* 2004;43:234-237
  - If there are specific neurological problems, noncontrast MRI of the relevant spinal level is appropriate
  - Pelvic MRI without and with contrast (CPT 72197) may be indicated in difficult diagnostic situations such as rheumatoid arthritis.

- Rheumatology evaluation is helpful in assessing the need for advanced imaging.
- **SP- 9.6 Trauma:** patients with trauma affecting the lumbar or thoracic spine should have lumbar or thoracic 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 or 72128) is indicated.
  - In patients with uncomplicated clear-cut radicular features after spinal trauma, noncontrast MRI (CPT 72148 or 72146) is appropriate.
  - Spinal cord trauma: see SP-12 Myelopathy.
- **SP- 9.7** Advanced pelvic or hip imaging is not generally appropriate in evaluation of **low back pain with pelvic radiation**.
  - Such requests should be approved only when there is documentation of a separate pelvic problem
  - Also see PN-2.5 Femoral neuropathy in the Peripheral Nerve Disorders guidelines.
- **SP- 9.8 Thoracic spine advanced imaging** is generally not appropriate in evaluation of low back pain with radiation toward the thoracic region unless there are documented features indicating thoracic spine disease.
- **SP- 9.9 References:**
  - *Herniated disc. In: North Am Spine Society phase III clinical guidelines for multidisciplinary spine care specialists. 2000*  
<http://www.guideline.gov>. Accessed November 20, 2006
  - *Ann Intern Med* 2000;137:586-597
  - *Radiol* 2001;220:393-395
  - *N Engl J Med* 2001;344:363-370
  - *N Engl J Med* 2005;352:1891-1898

## SP-10~SUSPECTED THORACIC SPINE PATHOLOGY

- **SP-10.1 Thoracic pain**
  - Careful physical examination and detailed history are the first step in the evaluation of thoracic regional pain.
  - 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.
  - Plain x-rays of the thoracic spine are the appropriate initial imaging study in patients with thoracic pain without radiculopathy, a history of cancer, immunocompromised status, or sepsis.
  - Interscapular pain usually reflects either non-neurological disease or a cervical etiology.
  - Thoracic pain which consistently awakens the patient from sleep raises the possibility of a spinal tumor (esp. meningioma or nerve sheath tumor).
- **SP-10.2 Thoracic radiculopathy**
  - 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.
    - The thoracic dermatomes essentially include the entire ventral trunk.
  - 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:
    - Grossman RI, Yousem DM. *Neuroradiology, the requisites*. 2<sup>nd</sup> Ed. Philadelphia, Mosby, 2003.p.773
- **SP-10.3 Metastatic disease to the thoracic spine**
  - Spinal metastases from systemic cancer occur most often in the thoracic spine.
    - See SP 8 Spinal Pain in Cancer Patients
- **SP-10.4 Thoracic spine trauma**
  - See SP-9.6 Trauma
- **SP-10.5 Myelopathy**
  - See also SP-12 Myelopathy

## SP-11~CERVICAL RADICULOPATHY

- Detailed history and physical examination are appropriate initially.
- Cervical radiculopathy is distinctly less common than the lumbar syndrome, but 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.
  - **Note:** patients are generally referred to spinal specialists in this condition after a failed trial of symptomatic treatment. Requests for cervical spine MRI without contrast (CPT 72141) after specialty consultation are generally appropriate.
  - Approximate date of onset of the symptoms should be documented. Date of the first office visit is of limited relevance if the patient has previously seen other physicians for the problem
  - Reference:
    - *Continuum: Neck and Back Pain Part A* 2001;7(1):142-151  
*American Academy of Neurology*
    - *Continuum: Pain and Palliative Care* 2005;11(6):94-136 *American Academy of Neurology*
- **SP-11.1 Escalation of advanced imaging (CPT 72141)** is appropriate in certain circumstances:

- Extremely severe or worsening pain despite a two week plus trial of symptomatic treatment.
- Objective weakness in the relevant myotome (includes grip strength, biceps strength [C6] and triceps strength [C7]). This must be documented.
- 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).
- **SP-11.2 Special clinical features of painful cervical radiculopathy**
  - Pain radiation patterns often include the interscapular area, and the addition of thoracic spine advanced imaging on that basis alone is generally inappropriate.
  - Radiation of pain into the limb (arm and forearm) is less clear cut than the analogous radiation in lumbar radiculopathy.
  - Sensory radiation (subjective paresthesia), however, is better defined: C6 into the thumb and C7 into the middle finger.
  - 90% of cases involve either the C6 or C7 root.
  - C5 radiculopathy is not common, but it is often very hard to tell clinically from shoulder pain, even after careful clinical evaluation. MRI of the shoulder without contrast (CPT 73221) may be appropriate in this setting, but only when the nature of the clinical issue is documented.
    - Patients with C5 radiculopathy with objective weakness benefit from prompt surgical evaluation, since early nerve root decompression may be needed to prevent permanent loss of strength.
  - Ulnar neuropathy must be considered in patients suspected of C8/T1 radiculopathy (radiation to pinkie finger). Generally, nerve conduction studies (EMG/NCV) should precede advanced spinal imaging.
    - Also see PN-2.2 Ulnar neuropathy in the Peripheral Nerve Disorders guidelines.
- **SP-11.3 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.
- **SP-11.4 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.
- **SP-11.5 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-22 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.
- **SP-11.6 Cervical Spine Trauma:** see Trauma bullet point in SP-13 Mechanical neck pain

## SP-12~MYELOPATHY

- See also HD-22.3 Isolated Clinical Syndromes, Transverse Myelitis located in the Head guidelines
- **SP-12.1 Myelopathy** refers to abnormal spinal cord function
  - Detailed history and neurological examination focused on the spinal cord should be performed initially.
  - 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.
      - Specialist evaluation is helpful in determining the appropriate imaging pathway in spinal cord disease.

- If the conus medullaris is known to end at L2/3 or below, it is tethered, and lumbar MRI (contrast as requested) is appropriate.
    - If the conus is not seen on the thoracic spine MRI, the spinal cord must be presumed to be tethered, and lumbar MRI (contrast as requested) is appropriate.
  - CT myelography also has a role at times in diagnosis of spinal cord compression.
- **SP-12.2 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 scans are appropriate.
- **SP-12.3 Traumatic myelopathy:** noncontrast MRI is generally sufficient, but noncontrast CT for fracture definition or to detect occult fractures may also be indicated. Patients with acute traumatic myelopathy are rarely evaluated in an outpatient setting.
  - **Post-traumatic syrinx:** the use of MRI to evaluate a post-traumatic syrinx in a patient with an established spinal cord injury is usually appropriate only in patients with increased spinal pain or a worsening neurological picture. Contrast is usually not indicated.
    - 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.
- **SP-12.4 Chronic cervical myelopathy** is usually spondylitic (from disc or degenerative disease). Noncontrast cervical spine MRI (CPT 72141) is often sufficient, but MRI of the spinal cord without and with contrast is acceptable when other sources of myelopathy require exclusion.
- 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.
- **SP-12.5 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.
- **SP-12.6 Cancer patients:** see SP-8 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 is only significant when it affects spinal cord function. Therefore, myelopathy is the important issue.
- **SP-12.7 Lhermitte's sign:**
  - 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.
  - 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.
- **SP-12.8 Babinski's sign** ("upgoing toe"):
  - A reliable sign of a lesion somewhere in the central nervous system (CNS) above the lumbar spine.
  - In a patient with a prior appropriately located CNS lesion, a Babinski's sign per se requires no imaging.
  - Patients with an unexplained Babinski's sign should undergo neuroimaging
    - The most appropriate imaging pathway will depend on other findings, so history and detailed neurological examination are essential.
    - 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-13~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:**
  - Patients with red or yellow flags are managed as for lumbar pain (see SP-9 Mechanical Back 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 a thorough history and neurological examination. Subsequent cervical imaging pathway depends upon the clinical situation. Either noncontrast cervical spine CT (CPT 72125) or plain x-rays are the appropriate initial imaging study, depending on the mechanism of injury (patients with significant head or facial trauma must be presumed to be at risk for cervical spine trauma).
  - If x-rays or CT shows fracture or dislocation: urgent spinal surgical consultation is appropriate.
    - Noncontrast CT (CPT 72125) and/or MRI (CPT 72141) will likely be the next step.
  - 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 if it was not the initial study.
    - MRI of the cervical spine without contrast (CPT 72141) is appropriate if there are neurological symptoms or examination findings (arm or below).
  - If x-rays were performed and are equivocal for fracture: noncontrast CT (CPT 72125) can be performed.

## SP-14~FAILED BACK SYNDROME

- The term designates prolonged intractable pain following or despite spinal surgery. It is not used in reference to cancer patients.
  - Specialist involvement (neurologists, spine surgeons, physiatrists and pain specialists) is especially helpful in determining the need for advanced imaging and the appropriate imaging pathway in these very complex patients.
- 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).
    - At times, both MRI and CT myelography will be needed. These should be requested by a spine specialist who has clear documentation of the indications for both studies.
- 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.
- If ordered by the operating surgeon, CTA or MRA of the pelvis (or abdomen and pelvis) can be performed prior to revision of a lumbar spinal fusion.
  - CPT codes:
    - CTA pelvis 72191
    - MRA pelvis 72198
    - CTA abdomen 74175
    - MRA abdomen 74185
- **Reference:**
  - Grossman RI, Yousem DM. *Neuroradiology, the requisites*. 2<sup>nd</sup> Ed. Philadelphia, Mosby, 2003,pp.788-791

## SP-15~SYRINGOMYELIA

- Syringomyelia may begin to form in childhood but rarely becomes symptomatic before the adult years.
  - See HD-8 Chiari Malformation in the Head guidelines for imaging choices in that setting.
- The evaluation of potential syringomyelia begins with a detailed history and neurological examination, including the spine.
- Noncontrast MRI of the cervical spine (CPT 72141) is indicated for evaluation of a possible syrinx. If a syrinx or hydromyelia is found, contrast will be needed.
  - Except for routine imaging in Chiari patients, specialist evaluation is helpful in determining the need for advanced imaging.

- The study should be performed without and with contrast initially if syrinx is the expected diagnosis (high clinical suspicion based on prior clinical information or imaging studies) in order 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.
  - MRI of the thoracic spine is also appropriate to define the lower extent or to identify a skip lesion.
  - 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:**
  - Mancall ER. *Syringomyelia*. In Rowland LP (Ed.). *Merritt's Neurology*. 11<sup>th</sup> Ed. Philadelphia, Lippincott, 2005, pp:870-874

## SP-16~PROCEDURE RELATED GUIDELINES

- **Positional or weight-bearing MRI:** See HD-35.8 in Newer MRI Techniques in the Head Guidelines
  - 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 repeat imaging in a closed unit MRI scanner is necessary.
  - The use of open scanner spinal imaging should be discouraged but is sometimes unavoidable.
  - Adequate studies can generally be obtained from one of the newer open MRI 0.7 Tesla units.
  - 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.
  - CT myelography may be useful to clarify equivocal MRI findings or to further evaluate the significance of multiple abnormal levels.
  - Other exceptions are noted throughout the guidelines.
  - 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.

- 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.

## SP-17~DISCOGRAPHY

- **Lumbar Discography:**
  - Indications:
    - To identify a symptomatic pseudo-arthrosis 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 the discogenic nature of pain in a patient with an abnormal disc seen on MRI and to rule out pain from an adjacent level.
    - To confirm a diagnosis of the presumed entity “symptomatic internal disc disruption.”
  - **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-arthrosis 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 and by a small number of spine specialists.
  - 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.
  - Requests should be sent for Medical Director review.
  - The caveats mentioned in lumbar discography apply.
- **References:**
  - *Spine J* 2001;1:364-372
  - Resnick DK, Malone DG, Ryken TC. *Guidelines for the use of discography for the diagnosis of painful degenerative lumbar disc disease from Neurosurgical Focus.* MedScape, Oct 30, 2002, <http://www.medscape.com>. Accessed November 29, 2007
  - *Spine* 1995;20:2048-2059

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- Barna SA, Santiago-Palma J, Hord ED, et. al. *Discography. eMedicine*, Feb 21, 2007, <http://www.emedicine.com>. Accessed December 5, 2007

## SP-18~SCOLIOSIS

- Scoliosis an abnormal lateral curve of the thoracic or thoraco-lumbar spine in the frontal plane. A small lateral curve is not uncommon.
  - Using the Cobb technique for measuring these curves, a curve of under 10° is clearly normal, a curve over 20° is significantly abnormal, and a curve >40° is severely abnormal.
  - Most patients with significant scoliosis have some element of kyphosis as well.
- There are many ways of classifying scoliosis. These guidelines will classify scoliosis as congenital, developmental, and neuromuscular scoliosis.
  - Developmental scoliosis (onset in childhood or adolescence) is the most common.
  - Most developmental scoliosis, especially in adolescents, is idiopathic (no known cause).
  - Also see PACSP-3.2 Scoliosis in the Pediatric and Congenital Spine guidelines
- The initial step in the evaluation of all patients with scoliosis is a careful neurological examination, including detailed examination of the spine in different body positions.
- Spinal anteroposterior (AP) and lateral x-rays are the initial imaging study.
- **References:**
  - Boas SR. *Kyphoscoliosis: Adolescent Idiopathic Scoliosis and Congenital Scoliosis* (Chapter 416.5). In Kliegman RM, Behrman RE, Jenson HB, et al. (Eds.). *Nelson Textbook of Pediatrics*. 18<sup>th</sup> Ed. Philadelphia, Elsevier, 2007, pp.1843-1844
  - Spiegel DA, Hosalkar HS, Dormans JP. *The Spine* (Chapter 678). In Kliegman RM, Behrman RE, Jenson HB, et al. (Eds.). *Nelson Textbook of Pediatrics*. 18<sup>th</sup> Ed. Philadelphia, Elsevier, 2007, pp.2811-2815
  - *J Bone Joint Surg Am* 2001;83:577-579
  - *J Bone Joint Surg Am* 2002;84:2230-2234

## SP-19~SPONDYLOLISTHESIS

- Spondylolisthesis is the forward or backward displacement of one vertebra in relation to the adjacent vertebra below.
  - Two types:
    - Isthmic (lytic)
    - Degenerative

- Diagnosis is by plain x-rays—anteroposterior (AP), lateral, and oblique films
- CT or MRI of the appropriate spinal region may be indicated for the following:
  - To determine the presence of nerve compression in patients who fail to respond to conservative therapy
  - For preoperative planning in patients who are scheduled for surgery
- **Reference:**
  - *Diagnostic testing for spondylolisthesis. MedifocusHealth.*  
[http://www.medifocushealth.com/RT015/Diagnosis-of-Spondylolisthesis\\_Diagnostic-Testing-for-Spondylolisthesis.php](http://www.medifocushealth.com/RT015/Diagnosis-of-Spondylolisthesis_Diagnostic-Testing-for-Spondylolisthesis.php). Accessed November 18, 2008

## SP-20~POSTOPERATIVE IMAGING AFTER SPINE FUSION

- **Routine post-fusion imaging:** following a clinically successful spinal fusion procedure or laminectomy, advanced imaging is not indicated after the immediate postoperative interval (approximately 3 weeks) unless plain x-rays are equivocal or show failure of fusion, or the patient develops worsening symptoms.
  - If new or worsening symptoms develop, a very detailed history of the recurrent problem and spinal/neurological examination is helpful in determining the need for advanced imaging and the appropriate imaging pathway (plain x-ray, CT, CT myelogram, MRI, discography).

## EVIDENCE BASED CLINICAL SUPPORT

### Evidence Based Clinical Support SP-3~PAINFUL LUMBOSACRAL RADICULOPATHY

- 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.

### Evidence Based Clinical Support SP-4~LUMBAR SPINAL STENOSIS

- 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).

### Evidence Based Clinical Support SP-5~FIBROMYALGIA

- The diagnosis is based on clinical findings established by the American College of Rheumatologists:

- Greater than 3 month's duration of widespread pain bilaterally above and below the diaphragm
- 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.

**Evidence Based Clinical Support  
SP-11~CERVICAL RADICULOPATHY**

- 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.

**Evidence Based Clinical Support  
SP-13~MECHANICAL NECK PAIN**

- 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.

**Evidence Based Clinical Support  
SP-15~SYRINGOMYELIA**

- 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.

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### **SP-8~Spinal Pain in Cancer Patients**

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### **SP-9~Mechanical Back Pain/Back Pain without Neurological Features**

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