

AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.*	
Clinical guideline CERVICAL SPINE MRI	Original Date: September 1997
CPT Codes: 72141, 72142, 72156	Last Revised Date: May 2020
Guideline Number: NIA_CG_040	Implementation Date: January 2021TBD

GENERAL INFORMATION:

It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. All prior relevant imaging results, and the reason that alternative imaging (gold standard, protocol, contrast, etc.) cannot be performed must be included in the documentation submitted.

INDICATIONS FOR CERVICAL SPINE MRI:

For evaluation of neck pain with any of the following (Allegri, 2016)

- With new or worsening objective neurologic deficits on exam
- Failure of conservative treatment* for at least six (6) weeks within the last six (6) months (ACR, 2013; Eubanks, 2010).
- With progression or worsening of symptoms during the course of conservative treatment*.
- With an abnormal electromyography (EMG) or nerve conduction study (if performed) indicating a cervical radiculopathy. (EMG is not recommended to determine the cause of axial lumbar, thoracic, or cervical spine pain (NASS, 2013)).

For evaluation of neurologic deficits (ACR, 2013; NASS, 2010)

- With any of the following new neurological deficits: extremity muscular weakness; pathologic (e.g., Babinski, Chaddock Sign, Hoffman's) or abnormal reflexes; or abnormal sensory changes along a particular dermatome (nerve distribution) as documented on physical exam; bowel or bladder dysfunction; spasticity, sensory, or motor level (Acharya, 2019).

* National Imaging Associates, Inc. (NIA) is a subsidiary of Magellan Healthcare, Inc.

As part of initial post-operative / procedural evaluation (“CT best examination to assess for hardware complication, extent of fusion” (ACR, 2015; Rao, 2018) and MRI for cord, nerve root compression, disc pathology or post-op infection):

- A follow-up study may be needed to help evaluate a patient’s progress after treatment, procedure, intervention, or surgery in the last 6 months. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested (routine surveillance post-op not indicated without symptoms)
- Changing neurologic status post-operatively.
- Surgical infection as evidenced by signs/symptoms, laboratory, or prior imaging findings.
- Residual or recurrent symptoms with any of the following neurological deficits: upper extremity weakness, objective sensory loss, or abnormal reflexes (Rao, 2018).

For evaluation of suspected myelopathy
(ACR, 2015; Behrbalk, 2013; Davies, 2018; Vilaca, 2016)

- Does not require conservative care
- Concurrent cervical/thoracic imaging not recommended
- Progressive symptoms including hand clumsiness, worsening handwriting, difficulty with grasping and holding objects, diffuse numbness in the hands, pins and needles sensation, increasing difficulty with balance and ambulation
- {Signs: unsteadiness, broad-based gait, increased muscle tone, weakness and wasting of the upper and lower limbs; diminished sensation to light touch, temperature, proprioception, vibration; limb hyperreflexia and pathologic reflexes (upper or lower extremity); bowel and bladder dysfunction in more severe cases}.

For evaluation of known or suspected multiple sclerosis (MS)

(ACR, 2015; Filippi, 2016)

- Evidence of MS on recent baseline Brain MRI.
- Suspected MS with new or changing symptoms consistent with cervical spinal cord disease (focal neurologic deficit or clinical sign, e.g., Lhermitte sign).
- Follow up of known Multiple Sclerosis.
- Follow up to the initiation or change in medication for patient with known Multiple Sclerosis.
- Cervical and/or Thoracic MRI for evaluation of suspected multiple sclerosis (MS) when Brain MRI does not fulfill diagnostic criteria (Filippi, 2016).
- Cervical and/or Thoracic MRI for evaluation of neuromyelitis optica spectrum disorders (recurrent or bilateral optic neuritis; recurrent transverse myelitis) (Wingerchuk, 2015)

~~For evaluation of neurologic deficits
(ACR, 2013; NASS, 2010)~~

- ~~• With any of the following new neurological deficits: extremity myotomal weakness; pathologic (e.g. Babinski, Chaddock Sign, Hoffman’s) or abnormal reflexes; or abnormal sensory changes along a particular dermatome (nerve distribution) as documented on physical exam; bowel or bladder dysfunction; spasticity, sensory, or motor level.~~

For evaluation of suspected myelopathy

(ACR, 2015; Behrbalk, 2013; Vilaca, 2016; Davies, 2018)

- ~~Progressive symptoms including hand clumsiness, worsening handwriting, difficulty with grasping and holding objects, diffuse numbness in the hands, pins and needles sensation, increasing difficulty with balance and ambulation (Signs: unsteadiness, broad-based gait, increased muscle tone, weakness and wasting of the upper and lower limbs; diminished sensation to light touch, temperature, proprioception, vibration; limb hyperreflexia and pathologic reflexes; bowel and bladder dysfunction in more severe cases).~~

For evaluation of chronic neck pain with any of the following (Allegri, 2016)

- ~~With new or worsening objective neurologic deficits on exam~~
- ~~Failure of conservative treatment* for at least six (6) weeks (ACR, 2013; Eubanks, 2010) within the last six (6) months.~~
- ~~With progression or worsening of symptoms during the course of conservative treatment*.~~
- ~~With an abnormal electromyography (EMG) or nerve conduction study (if performed) indicating a cervical radiculopathy. (EMG is not recommended to determine the cause of axial lumbar, thoracic or cervical spine pain (NASS, 2013))~~

For evaluation of new onset of neck pain (Allegri, 2016):

- ~~With new or worsening objective neurologic deficits on exam~~
- ~~Failure of conservative treatment*, for at least six (6) weeks (ACR, 2013; Eubanks, 2010) within the last six (6) months.~~
- ~~With progression or worsening of symptoms during the course of conservative treatment*.~~
- ~~With an abnormal electromyography (EMG) or nerve conduction study (if performed) indicating a cervical radiculopathy. (EMG is not recommended to determine the cause of axial lumbar, thoracic or cervical spine pain (NASS, 2013)).~~

For evaluation of trauma or acute injury

(ACR, 2018)

- Presents with any of the following neurological deficits: muscle weakness, abnormal reflexes, and/or sensory changes along a particular dermatome (nerve distribution).
- **With progression or worsening of symptoms during the course of conservative treatment*.**
- **History of underlying spinal abnormalities (i.e. ankylosing spondylitis) (Koivikko, 2008)**
- When the patient is clinically unevaluable or there are preliminary imaging findings (X-ray or CT) needing further evaluation.
- When office notes specify the patient meets NEXUS (National Emergency X-Radiography Utilization Study) or CCR (Canadian Cervical Rules) criteria for imaging:
 - CT for initial imaging.
 - MRI when suspect spinal cord or nerve root injury or when patient is obtunded, and CT is negative.
 - CT or MRI for treatment planning of unstable spine.

("MRI and CT provide complementary information. When indicated It is appropriate to perform both examinations") (ACR, 2018).

For evaluation of known or new compression fractures with worsening back-neck pain (ACR, 2018):

- With history of malignancy
 - To aid in differentiation of benign osteoporotic fractures from metastatic disease-
 - A follow up MRI in 6-8 weeks after initial MRI when initial imaging cannot decipher (indeterminate) benign osteoporotic fracture from metastatic disease (Kumar, 2016)
- With an associated new focal neurologic deficit
- Prior to a planned surgery/intervention or if the results of the MRI will change management.

For evaluation of known tumor, cancer, or evidence of metastasis with any of the following (MRI is usually the preferred study, but CT may help-be needed to further characterize solitary indeterminate lesions seen on MRI) (Kim, 2012)

- For staging of known tumor.
- For follow-up evaluation of patients undergoing active cancer treatment.
- Presents with new signs or symptoms (e.g., physical, laboratory, and/or imaging findings) of new tumor or change in tumor.
- With evidence of metastasis on bone scan or previous imaging study.
- Initial imaging of new or increasing non-traumatic cervical-or-neck pain or radiculopathy or neck that pain occurs at night -and wakes the patient from sleep with known active cancer and a tumor that tends to metastasize to the spine (ACR, 2018; Ziu, 2019).

For evaluation of suspected tumor
(ACR, 2018)

- Prior abnormal or indeterminate imaging that requires further clarification.

Indication for combination studies for the initial pre-therapy staging of cancer, OR active monitoring for recurrence as clinically indicated, OR evaluation of suspected metastases:

- < 5 concurrent studies to include CT or MRI of any of the following areas as appropriate depending on the cancer: Neck, Abdomen, Pelvis, Chest, Brain, Cervical Spine, Thoracic Spine or Lumbar Spine.

For evaluation of known or suspected infection, abscess, or inflammatory disease
(ACR, 2018)

- Infection:
 - Most common site is the lumbar spine (58%), followed by the thoracic spine (30%) and the cervical spine (11%)
 - As evidenced by signs and/or symptoms, laboratory (-i.e., abnormal white blood cell count, ESR and/or CRP) or prior imaging findings (Bond, 2016).

- High risk populations (indwelling hardware, history of endocarditis, IVDA, recent procedures) with appropriate signs/symptoms.
- Follow up imaging of infection
 - With worsening symptoms/laboratory values (i.e., white blood cell count, ESR/CRP) or radiographic findings (Berbari, 2015)
- As evidenced by signs/symptoms, laboratory or prior imaging findings.
- In rheumatoid arthritis with neurologic signs/~~or symptoms~~, or evidence of subluxation ~~or~~ positive on radiographs (lateral radiograph in flexion and neutral should be the initial study) (Colebatch, 2013; Tehranzadeh, 2017)
 - Patients with negative radiographs but symptoms suggestive of cervical instability or in patients with neurologic deficits MRI is indicated (Gillick, 2015):
- High risk disorders affecting the atlantoaxial articulation, such as Down syndrome, Marfan syndrome with neurological signs/symptoms, abnormal neurological exam, or evidence of abnormal or inconclusive radiographs of the cervical spine (Henderson, 2017)

For evaluation of spine abnormalities related to immune system suppression, e.g., HIV, chemotherapy, leukemia, or lymphoma
(ACR, 2015; Nagashima, 2010; ACR, 2015)

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

~~As part of initial post-operative /procedural evaluation (“CT best examination to assess for hardware complication, extent of fusion” (ACR, 2015; Rao, 2018) and MRI for cord, nerve root compression, disc pathology or post-op infection):~~

- ~~• A follow up study may be needed to help evaluate a patient’s progress after treatment, procedure, intervention or surgery in the last 6 months. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.~~
- ~~• Changing neurologic status post-operatively.~~
- ~~• Surgical infection as evidenced by signs/symptoms, laboratory or prior imaging findings.~~
- ~~• Residual or recurrent symptoms with any of the following neurological deficits: Lower uUpper extremity weakness, objective sensory loss, or abnormal reflexes (Rao, 2018).~~

Other Indications for a Cervical Spine MRI:

- For preoperative evaluation/planning.
- Suspected cord compression with any of the following neurological deficits: extremity weakness; sensory deficits, abnormal gait; abnormal reflexes; spinal level; bowel or bladder incontinence.
- Tethered cord, or spinal dysraphism (known or suspected) based on preliminary imaging, neurological exam, and/or high-risk~~high-risk~~ cutaneous stigmata (AANS, 2019; Duz, 2008; Milhorat, 2009; ~~NIH~~).
- Known Arnold-Chiari syndrome.

- Chiari I malformation without syrinx or hydrocephalus, follow-up imaging after initial diagnosis for new or changing signs/symptoms or exam findings (Hitson, 2015)
- Congenital abnormalities (Trenka, 2016):
 - In the presence of neurologic deficit, progressive spinal deformity, or for preoperative planning (Trenka, 2016)
 - Back pain and vertebral anomalies (hemivertebrae, hypoplasia, agenesis, butterfly, segmentation defect, bars, or congenital wedging) in a child on preliminary imaging.
 - Scoliosis with any of the following:
 - Progressive spinal deformity;
 - Neurologic deficit;
 - Early onset;
 - Atypical curve (e.g., short segment, >30° kyphosis, left thoracic curve, associated organ anomalies);
 - Pre-operative planning; OR
 - When office notes clearly document how imaging will change management
- Syrinx or syringomyelia (known or suspected):
 - With neurologic findings and/or predisposing conditions (e.g., Chiari malformation, prior trauma, neoplasm, arachnoiditis, severe spondylosis (Timpone, 2015)),
 - To further characterize a suspicious abnormality seen on prior imaging.
 - Known syrinx with worsening symptoms.
- CSF leak highly suspected and supported by patient history and/or physical exam findings.
- For pediatric population (ACR, 2016)
 - Red flags that prompt imaging should include the presence of constant pain, night pain, and radicular pain lasting for 4 weeks or more.
 - Back pain associated with suspected inflammation, infection, or malignancy
- ~~In rheumatoid arthritis with neurologic signs or symptoms, evidence of subluxation or positive radiograph (lateral radiograph in flexion and neutral should be the initial study (Colebatch, 2013; Tehranzadeh, 2017))~~

Ossification Posterior Longitudinal Ligament (OPLL) (Choi, 2011):

~~Most common in cervical spine (rare but more severe in thoracic spine) Move to background section~~

- CT to evaluate the calcification and MR for evaluation of cord.
 - Both CT and MRI would be approvable if surgery is planned, as signal changes in the cord would suggest a poorer prognosis after surgery

COMBINATION OF STUDIES WITH CERVICAL SPINE MRI:

Cervical/Thoracic/Lumbar MRIs:

- Any combination of these for scoliosis survey in infant/child with congenital scoliosis or under the age of 10 (~~Strahle, 2015;~~ ACR, 2018; SRS, 2019; Strahle, 2015).
- Any combination of these for spinal survey in patient with metastases.

- For evaluation of spinal abnormalities associated with Arnold-Chiari Malformation. (C/T/L spine due to association with tethered cord and syringomyelia) (Milhorat, 2009; Strahle, 2015).
- Tethered cord, or spinal dysraphism (known or suspected) based on preliminary imaging, neurological exam, and/or ~~high-risk~~**high-risk** cutaneous stigmata ([AANS, 2019](#); ~~AANS~~; Duz, 2008; Milhorat, 2009; ~~NIH~~), when anesthesia required for imaging.
- ~~Drop metastasis from brain or spine (imaging also includes brain).~~
- ~~History of Suspected~~ **Leptomeningeal carcinomatosis (LC)** ([Shah, 2011](#))
- Tumor evaluation and monitoring in neurocutaneous syndromes - See Background
- **CSF leak highly suspected and supported by patient history and/or physical exam findings**

Cervical and ~~L~~Thoracic Combination MRI-

- **Transverse Myelitis- with appropriate clinical symptoms (e.g., i.e. bilateral weakness, sensory disturbance, and autonomic dysfunction which typically evolve over hours or days (Goh, 2011); elevated protein on cerebrospinal fluid (CSF) analysis)**

Cervical MRI/CT

- ~~For unstable craniocervical junction~~**on**.

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Brain MRI/Cervical MRI –

- For evaluation of Arnold Chiari malformation.
- For follow-up of known Multiple Sclerosis (MS) (Filippi, 2016).
- Suspected MS with new or changing symptoms consistent with cervical spinal cord disease.
- Follow up to the initiation or change in medication for patient with known Multiple Sclerosis

BACKGROUND:

Magnetic resonance imaging (MRI) produces high quality multiplanar images of organs and structures within the body without radiation. It is the preferred modality for evaluating the internal structure of the spinal cord, providing assessment of conditions such as degenerative disc pathology, osteomyelitis, and discitis.

OVERVIEW:

***Conservative Therapy:** (Spine) should include a multimodality approach consisting of a **combination of active and inactive components**. Inactive components, such as rest, ice, heat, modified activities, medical devices, acupuncture and/or stimulators, medications, injections (epidural, facet, bursal, and/or joint, not including trigger point), and diathermy can be utilized. **Active modalities may consist of physical therapy, a physician supervised home exercise program**, and/or osteopathic manipulative medicine (OMT) or chiropractic care.** ~~Active modalities may consist of physical therapy, a physician supervised home exercise program**, and/or chiropractic care.~~

****Home Exercise Program - (HEP)/ Therapy** – the following elements are required to meet guidelines for completion of conservative therapy (ACR, 2015; Last, 2009):

- Information provided on exercise prescription/plan AND
- Follow up with member with documentation provided regarding lack of improvement (failed) after completion of HEP (after suitable 6 week period), or inability to complete HEP due to physical reason- i.e. increased pain, inability to physically perform exercises. (Patient inconvenience or noncompliance without explanation does not constitute “inability to complete” HEP).
- Dates and duration of failed PT, physician supervised HEP, or chiropractic treatment should be documented in the original office notes or an addendum to the notes.

Cervical myelopathy: Symptom severity varies and a high index of suspicion is essential for making the proper diagnosis in early cases. Symptoms of pain and radiculopathy may not be present. The natural history of myelopathy is characterized by neurological deterioration. The most frequently encountered symptom is gait abnormality (86%) followed by increased muscular reflexes (79.1%), pathological reflexes (65.1%), paresthesia of upper limb (69.8%), and pain (67.4%) (Vilaca, 2016).

Infection, Abscess, or Inflammatory disease:

- Infection:
 - Most common site is the lumbar spine (58%), followed by the thoracic spine (30%) and the cervical spine (11%) (Graeber, 2019)
 - High risk populations (indwelling hardware, history of endocarditis, IVDA, recent procedures) with appropriate signs/symptoms.

MRI and Cutaneous Stigmata (Dias, 2015)

TABLE 1 Risk Stratification for Various Cutaneous Markers

High Risk	Intermediate Risk	Low Risk
Hypertrichosis	Capillary malformations (also	Coccygeal dimple
Infantile hemangioma	referred to as NFS or salmon	Light hair
Atretic meningocele	patch when pink and poorly	Isolated café au lait spots
DST	defined, or PWS when darker red	Mongolian spots
Subcutaneous lipoma	and well defined)	Hypo- and hypermelanotic macules or papules
Caudal appendage		Deviated or forked gluteal cleft
Segmental hemangiomas in association with LUMBAR syndrome		Nonmidline lesions

LUMBAR, lower body hemangioma and other cutaneous defects, urogenital abnormalities, ulcerations, myelopathy, bony defects, anorectal malformations, arterial anomalies, and renal anomalies.

MRI for Evaluation of Discitis – Discitis is a known complication of cervical discography. Postoperative discitis in the cervical spine does not occur frequently but can result from accidental inoculation of bacteria into the disc space intra-operatively by a contaminated spinal needle being used as a radiological marker. There may be other causes for postoperative discitis, e.g., esophageal perforation, hematogenous spread, inoculation of bacteria during surgery. Patients with an alteration in the nature of their symptoms after cervical discectomy and fusion may have discitis. Symptoms may include complaints of mild paresthesia in extremities and neck pain. MRI may be performed to reveal feature of discitis with associated abscesses and may help to confirm the diagnosis and decide on the further management.

MRI for Cervical Radiculopathy – MRI is a useful test to evaluate the spine because it can show abnormal areas of the soft tissues around the spine; ~~int~~ addition to the bones, it can also show pictures of the nerves and discs and is used to find tumors, herniated discs or other soft-tissue disorders. MRI has a role both in the pre-operative screening and post-operative assessment of radicular symptoms due to either disc or osteophyte.

MRI and Multiple Sclerosis (MS) – MRI is a sensitive method of detecting the white matter lesions of MS. These plaques on MRI generally appear as multiple, well demarcated, homogenous, small ovoid lesions which often lack mass effect and are oriented perpendicular to the long axis of the lateral ventricles. Sometimes they present as large, space occupying lesions that may be misinterpreted as tumors, abscesses, or infarcts.

MRI and Neck Pain – Neck pain is common in the general population and usually relates to musculoskeletal ~~causes~~~~causes~~, but it may also be caused by spinal cord tumors. When neck pain is accompanied by extremity weakness, abnormal gait, or asymmetric reflexes, spinal MRI may be performed to evaluate the cause of the pain. MRI may reveal areas of cystic expansion

within the spinal cord. Enhancement with gadolinium contrast may suggest that the lesion is neoplastic.

Ossification Posterior Longitudinal Ligament (OPLL) (Choi, 2011) - Most common in cervical spine (rare but more severe in thoracic spine)

Back Pain with Cancer History - Bone is the third most common site of metastases after the liver and the lungs, and approximately two-thirds of all osseous metastases occur in the spine. Approximately 60–70% of patients with systemic cancer will have spinal metastasis. Radiographic (x-ray) examination should be performed in cases of back pain when a patient has a cancer history, but without known active cancer or a tumor that tends to metastasize to the spine. This can make a diagnosis in many cases. This may occasionally allow for selection of bone scan in lieu of MRI in some cases. When radiographs do not answer the clinical question, then MRI may be appropriate after a consideration of conservative care.

Neoplasms causing VCF (vertebral compression fractures) include: primary bone neoplasms, such as hemangioma or giant cell tumors, and tumor-like conditions causing bony and cellular remodeling, such as aneurysmal bone cysts, or Paget's disease (osteitis deformans); infiltrative neoplasms including and not limited to multiple myeloma and lymphoma, and metastatic neoplasms (ACR, 2018).

Most common spine metastasis involving primary metastasis originate from the following tumors in descending order: breast (21%), lung (19%), prostate (7.5%), renal (5%), gastrointestinal (4.5%), and thyroid (2.5%). While all tumor can seed to the spine, the cancers mentioned above metastasize to the spinal column early in the disease process. **(Ziu, 2019)-Spinal metastasis is more commonly found in the thoracic region, followed by the lumbar region, while the cervical region is the least likely site of metastasis (Ziu, 2019).**

Cervical Spine Trauma Imaging (ACR, 2018): The National Emergency X-Radiography Utilization Study (NEXUS) and the Canadian Cervical Rules (CCR) represent clinical criteria used to help determine the presence of significant cervical spine injury. Although the criteria are highly sensitive (99.6% for NEXUS), specificity is low (12.9% for Nexus).

A patient not meeting any of the NEXUS criteria of focal neurologic deficit, midline spinal tenderness, altered consciousness, intoxication, or distracting injury is unlikely to have a significant cervical spine injury. Imaging evaluation of the cervical spine in these patients is not necessary. In the CCR criteria a patient without any high risk factors (Age >65 years, paresthesias in extremities, dangerous mechanism, falls from ≥3 feet/5 stairs, axial load to head, motor vehicle crash with high speed, rollover, or ejection, bicycle collision, motorized recreational vehicle accident) is next evaluated for low risk factors (Simple rear-end motor vehicle crash, patient in sitting position in emergency center, patient ambulatory at any time after trauma, delayed onset of neck pain, absence of midline cervical spine tenderness). If the patients meets a low risk criteria, they are asked to move their head 45 degrees from midline in

both directions. If the patient can accomplish this the spine is cleared and imaging is not necessary.

MRI and Neurocutaneous Syndromes

- In NF-1, clinical evaluation appears to be more useful to detect complications than is screening imaging in asymptomatic patients. Imaging is indicated in evaluation of suspected tumors based clinical evaluation and for follow-up of known intracranial tumors (Borofsky, 2013).
- Conversely in NF-2, routine MR imaging screening is always indicated, given the high prevalence of CNS tumors especially vestibular schwannomas. In patients with NF-2, routine screening brain/IAC imaging is indicated annually starting from age 10 if asymptomatic or earlier with clinical signs/symptoms. Most individuals with NF2 eventually develop a spinal tumor, mostly commonly schwannomas, but meningioma and ependymomas are also seen. Spinal imaging at baseline and every 2 to 3 years is also advised with more frequent imaging if warranted based on sites of tumor involvement (Evans, 2017).
- In patients with Tuberous Sclerosis, Brain MRI should be obtained every 1-3 years up until age 25 for surveillance for CNS abnormalities (Krueger, 2013).
- In Von Hippel Lindau Syndrome, imaging of the brain and spinal cord for hemangioblastomas is recommended every 2 years (Von Hippel-Lindau, 2017).
- In Sturge Weber Syndrome, Brain MRI can rule out intracranial involvement after only after age 1 and is recommended in patients <1 year only if symptomatic (Comi, 2011).

POLICY HISTORY:

Review Date: June 2019

Review Summary:

- Added:
 - new or worsening objective neuro deficits for chronic and acute back pain
 - CSF leak
 - last 6 months for allowable post op f/u period and removed EMG comment
 - red flags specifically for peds back pain and pain related to malignancy, infection, inflammation
 - new sections: pars defect; compression fractures; congenital abnormalities including section on scoliosis and vertebral anomalies in children w/back pain;
 - For combination studies cervical/thoracic/lumbar added drop metastasis, tumor evaluation for neurocutaneous syndromes, and abnormalities associated w/Arnold Chiari, as well as separate indication for tethered cord or spinal dysraphism
- Improved section for evaluation of multiple sclerosis including NMO disorders and recurrent transverse myelitis; Lhermitte~~improved~~s sign
- Modified section on evaluation of neurologic deficits; added specific pathologic findings; spasticity, sensory, or motor level changes
- Included signs in section on myelopathy including hyperreflexia and pathologic reflexes

- Enhanced sections on trauma; rheumatoid arthritis; back pain in cancer patients with known active cancer in tumors that tend to metastasize to spine
- Expanded on tethered cord in Other Indications for imaging and added section on sacral dimple
- For combination studies Brain/Cervical Spine added suspected MS with new or changing symptoms and follow up to initiation of treatment with known MS

Review Date: May 2020

Review Summary:

- Added:

- For evaluation of neurologic deficits are new
- Added Imaging of Ossification of the Posterior Longitudinal Ligament (OPPL)
- Added imaging in high risk patients predisposed to spinal injury
- Added imaging in high risk patients for atlantoaxial injury
- Added transverse myelitis
- Modified Initial imaging of new or increasing non-traumatic neck pain or radiculopathy or neck pain that occurs at night and wakes the patient from sleep with known active cancer and a tumor that tends to metastasize to the spine
- Added to background of imaging of infection
- Added Osteopathic Manipulative medicine to conservative care therapy

Unilateral neurologic exam deficits (e.g. reflexes and muscle testing)

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Reviewed / Approved by  M. Atif Khalid, M.D., Medical Director, Radiology
~~Reviewed / Approved by~~  ~~ig, VP, Medical Director~~

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