

# SPINAL ULTRASONOGRAPHY

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[Instructions for Use](#) ⓘ

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Community Plan Policy
<ul style="list-style-type: none"> <li><a href="#">Spinal Ultrasonography</a></li> </ul>

## COVERAGE RATIONALE

**Spinal and paraspinal ultrasonography is proven and medically necessary in newborns and infants for evaluating and managing suspected spinal disorders (e.g., congenital cord anomalies, spinal cord tumors, vascular malformations and birth-related trauma).**

**Spinal and paraspinal ultrasonography (including extremities, pelvis, or soft tissues of the head and neck) are unproven and not medically necessary for the following uses due to insufficient evidence of efficacy:**

- To diagnose and manage spinal pain and radiculopathies
- To guide rehabilitation of neuromusculoskeletal disorders and spinal pain

## APPLICABLE CODES

The following list(s) of procedure and/or diagnosis codes is provided for reference purposes only and may not be all inclusive. Listing of a code in this policy does not imply that the service described by the code is a covered or non-covered health service. Benefit coverage for health services is determined by the member specific benefit plan document and applicable laws that may require coverage for a specific service. The inclusion of a code does not imply any right to reimbursement or guarantee claim payment. Other Policies and Coverage Determination Guidelines may apply.

CPT Code	Description
76536	Ultrasound, soft tissues of head and neck (e.g., thyroid, parathyroid, parotid), real time with image documentation
76800	Ultrasound, spinal canal and contents
76856	Ultrasound, pelvic (nonobstetric), real time with image documentation; complete
76857	Ultrasound, pelvic (nonobstetric), real time with image documentation; limited or follow-up (e.g., for follicles)
76881	Ultrasound, complete joint (i.e., joint space and peri-articular soft tissue structures) real-time with image documentation
76882	Ultrasound, limited, joint or other nonvascular extremity structure(s) (e.g., joint space, peri-articular tendon[s], muscle[s], nerve[s], other soft tissue structure[s], or soft tissue mass[es]), real-time with image documentation

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## DESCRIPTION OF SERVICES

Ultrasonography is a noninvasive imaging technique that relies on detection of the reflections or echos generated as high-frequency sound waves are passed into the body. This technique is commonly used for a number of imaging

purposes such as investigation of abdominal and pelvic masses, cardiac echocardiography, and prenatal fetal imaging. Less commonly, it has also been applied to detection of spinal and paraspinal disorders.

Spinal ultrasonography has been used to investigate degenerative disc disease to determine whether back pain is a consequence of fissuring or herniation of the gelatinous discs that separate the vertebrae. Spinal ultrasound has also been used in the assessment of injuries to paraspinal ligaments after spinal fractures. Although ultrasonography has limited ability to reveal bone and tissues surrounding bone, it has been studied as a means to assess the posterior ligament complex that contributes to the maintenance of spinal stability.

Spinal ultrasonography is also being studied to determine if it can be used to guide rehabilitation of neuromusculoskeletal disorders and back pain. In this application, rehabilitative ultrasound imaging (RUSI) has been used to evaluate motor morphology and function during physical tasks and exercise and to assist in determining which exercise treatment or rehabilitation programs can improve neuromuscular function.

Interventional procedures for axial and radicular spine pain have been available for decades, and common imaging modalities have relied on ionizing radiation for guidance. Over the past decade, ultrasound (US) has become increasingly popular to image both peripheral musculoskeletal and axial structures. In this study of techniques, Hurdle (2016) outlines the use of US in the guidance of spine procedures, including cervical and lumbar facet injections and medial branch blocks, third occipital nerve blocks, thoracic facet and costotransverse joint injections, sacroiliac joint injections, and caudal and interlaminar epidural injections. Also addressed are the advantages and disadvantages versus CT and fluoroscopic guidance. Large studies comparing the safety and efficacy of US-guided spinal interventions versus CT and fluoroscopy are needed to further define the role of these procedures.

In newborns and infants, various tumors and vascular disorders, especially vascular malformations, can be detected with spinal US. In newborns up to six months of age, spinal cord lesions can be detected with US because the posterior elements are membranous rather than bony. Beyond this age, these elements calcify, reserving magnetic resonance imaging (MRI) for cases where spinal ultrasound is equivocal or has revealed a definite abnormality.

Spinal ultrasonography has also been used for investigation of neonatal spinal dysraphism, a disorder resulting from incomplete closure of the neural tube during gestation. This type of birth defect occurs in approximately 2 per 1000 live births, and the resulting spinal disorders include spinal agenesis, low cord, tethered cord, hydromyelia, diastematomyelia, myelocystocele, and myelomeningocele. Spinal ultrasonography may be used as the primary screening tool, reserving magnetic resonance imaging (MRI) for cases where spinal ultrasound is equivocal or has revealed a definite abnormality.

Compared with computed tomography (CT) and magnetic resonance imaging (MRI), ultrasonography provides less detailed images of bone and the structures within and near bone. However, ultrasonography has the advantages of being simpler, more widely available, requiring no exposure to ionizing radiation, and having less susceptibility to patient movement.

## CLINICAL EVIDENCE

### **Spinal and Paraspinal Ultrasonography**

Lee et al (2017) conducted a retrospective study of 74 patients with cervical radiculopathy who received an ultrasonography-guided nerve block at an outpatient clinic from July 2012 to July 2014. Before actual injection of the steroid was performed, the authors evaluated the vulnerable blood vessels around each C5, C6, and C7 nerve root of each patient's painful side, with Doppler ultrasound. The results of this study showed that there was a high prevalence of vulnerable blood vessels, either at the targeted nerve root or at the site of the needle's projected pathway to the nerve root. Also, it shows a higher prevalence of vulnerable blood vessels either at the targeted nerve root or at the site of an imaginary needle's projected pathway to the nerve root as the spinal nerve root level gets lower. The authors concluded that routinely evaluating for the presence of vulnerable blood vessels around each cervical nerve root using Doppler ultrasound imaging before the cervical nerve root block, (especially for the lower cervical nerve root level) is necessary to prevent unexpected critical complications. This study has several limitations identified by the authors: only C5-7 cervical root level were examined; lack of detailed clinical data, as well as sociodemographic and long term outcomes; and not evaluating the efficacy of US guided nerve block, only showing vulnerable arteries. Additionally, this study is uncontrolled with a small sample size, and further investigation is needed before clinical usefulness of this procedure is proven.

Perlas et al (2016) conducted a systematic review and meta-analysis to examine the evidence for preprocedural neuraxial ultrasound as an adjunct to lumbar spinal and epidural anesthesia in adults. Electronic databases were searched for randomized controlled and cohort studies that reported data for one or more of the following questions: (1) Does ultrasound accurately identify a given lumbar intervertebral space? (2) Does ultrasound accurately predict the needle insertion depth required to reach the epidural or intrathecal space? (3) Does ultrasound improve the

efficacy and safety of spinal or lumbar epidural anesthesia? Thirty-one clinical trials and 1 meta-analysis met these inclusion criteria. 8 studies indicate that neuraxial ultrasound can identify a given lumbar intervertebral space more accurately than by landmark palpation alone. Thirteen studies reported an excellent correlation between ultrasound-measured depth and needle insertion depth to the epidural or intrathecal space. The mean difference between the 2 measurements was within 3 mm in most studies. Thirteen RCTs, 5 cohort studies, and 1 meta-analysis reported data on efficacy and safety outcomes. Results consistently showed that ultrasound resulted in increased success and ease of performance. There is significant evidence supporting the role of neuraxial ultrasound in improving the precision and efficacy of neuraxial anesthetic techniques, and reduce the risk of traumatic procedures but there was otherwise insufficient evidence to conclude if it significantly improves safety.

The largest study of spinal ultrasonography for detection of disc disease was conducted by Berth et al. (2003) who performed magnetic resonance imaging (MRI) and ultrasonography on 119 patients. The diagnostic capability of ultrasonography varied depending on the disc examined, with 46% sensitivity and 91% specificity at the L3/4 level, 83% sensitivity and 65% specificity at the L4/5 level, and 78% sensitivity and 67% specificity at the L5/S1 level. This study could not be evaluated fully since it was published in a German-language journal and only the abstract was available in English.

Klauser et al. (2005) evaluated the use of contrast agents for color Doppler ultrasound (CDUS) and magnetic resonance imaging (MRI) in the detection of sacroiliitis in 103 consecutive patients with inflammatory low back pain and 30 controls without low back pain. All patients and controls underwent unenhanced and contrast-enhanced CDUS and MRI. The investigators concluded that enhanced CDUS was significantly better than unenhanced CDUS for the diagnosis of sacroiliitis verified by MRI.

In an article discussing the assessment of spinal pain, Braun et al. (2014) stated that the main imaging techniques used for the detection of spinal pathologies are conventional radiographs, CT, and MRI.

### ***Professional Societies***

#### **American Chiropractic Association (ACA)**

In a 1996, policy titled Diagnostic Ultrasound of the Adult Spine, the ACA states that-the application of diagnostic ultrasound in the adult spine in areas such as disc herniation, spinal stenosis and nerve root pathology is inadequately studied and its routine application for these purposes cannot be supported by the evidence at this time. This position has not been changed despite annual re-evaluation.

#### **American College of Physicians/American Pain Society (ACP/APS)**

In a 2007 joint clinical practice guideline from the American College of Physicians and the American Pain Society, for the diagnosis and treatment of low back pain, imaging recommendations include MRI and CT for persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis.

#### **American Institute of Ultrasound in Medicine (AIUM)**

A 2007 (Updated 2014) practice guideline states that the indications for sonography of the neonatal spinal canal and its contents include visible stigmata known to be associated with congenital cord anomalies that lead to dysraphic anomalies and tethering of the cord, such as midline masses, skin discolorations, skin tags, hair tufts, and hemangiomas and pinpoint midline or paramedian deep dimples often associated with hyperpigmentation or hypertrichosis indicative of a dorsal dermal sinus tract. The spectrum of caudal regression syndrome, including anal atresia and cloacal extrophy, may be associated with cord anomalies and constitutes an established indication for sonography.

The guideline lists the following indications for ultrasound examination of the neonatal spine:

- Detection of sequelae of injury (e.g., hematoma after spinal tap or birth injury; post-traumatic leakage of cerebrospinal fluid; and sequelae of prior instrumentation, infection, or hemorrhage).
- Evaluation of suspected defects such as cord tethering, diastematomyelia, hydromyelia, and syringomyelia.
- Guidance for lumbar puncture.
- Lumbosacral stigmata known to be associated with spinal dysraphism.
- Post-operative assessment for cord retethering.
- Spectrum of caudal regression syndrome (e.g., anal atresia or stenosis; sacral agenesis).
- Visualization of fluid with characteristics of blood products within the spinal canal in neonates and infants with intra-cranial hemorrhage.

Other than evaluation of spina bifida aperta, there are no contraindications to this examination. Infants with simple, low-lying sacrococcygeal dimples typically have normal spinal contents, and in this group of patients, the examination is of low yield.

## **American College of Radiology (ACR)**

In the ACR Appropriateness Criteria for chronic back pain and suspected sacroiliitis/spondyloarthropathy, an expert panel on musculoskeletal imaging concluded that although a few studies show potential for the use of US with Doppler imaging of the sacroiliac joints for initial screening and for follow-up of treatment, more research needs to be done before US can be included in their general diagnostic imaging recommendations. (2016)

The ACR Practice Guideline for the Performance of an Ultrasound Examination of the Neonatal Spine (Updated 2016) states the following for neonatal spinal ultrasound:

- Indications including but not limited to:
  - Lumbosacral stigmata known to be associated with spinal dysraphism and tethered spinal cord, including but not limited to:
    - Midline or paramedian masses
    - Midline skin discolorations
    - Skin tags
    - Hair tufts
    - Hemangiomas
    - Small midline dimples
    - Paramedian deep dimples
  - The spectrum of caudal regression syndrome, including patients with sacral agenesis and patients with anal atresia or stenosis
  - Evaluation of suspected cord abnormalities such as cord tethering, diastematomyelia, hydromyelia, syringomyelia
  - Detection of sequelae of injury, such as:
    - Hematoma following injury such as birth injury
    - Infection or hemorrhage secondary to prior instrumentation, such as lumbar puncture
    - Post-traumatic leakage of cerebrospinal fluid (CSF)
  - Visualization of blood products within the spinal canal in patients with intracranial hemorrhage
  - Guidance for lumbar puncture
  - Postoperative assessment for cord retethering
- Contraindications:
  - Preoperative examination in patients with open spinal dysraphic defect. However, in such cases the closed portion of the spinal canal away from the open defect can be examined for other suspected abnormalities, such as syrinx or diastematomyelia. These latter abnormalities should be identified preoperatively.
  - Examination of the contents of a closed neural tube defect if the skin overlying the defect is thin or no longer intact

The guideline states, "In experienced hands, ultrasound of the infant spine has been demonstrated to be an accurate and cost-effective examination that is comparable to MRI for evaluating congenital or acquired abnormalities in the neonate and young infant."

## **Rehabilitative Ultrasound**

Interest in rehabilitative ultrasound imaging (RUSI) of the posterior paraspinal muscles is growing, along with the body of literature to support integration of this technique into routine physical therapy practice. This clinical commentary review (Hides, 2007) shows RUSI can be used as an evaluative and treatment tool and proposes guidelines for its use for the posterior muscles of the lumbar and cervical regions. Measurement of morphological characteristics of the muscles (morphometry) in healthy populations and people with spinal pathology are described. Further investigation of many of these observations is required using controlled studies to provide conclusive evidence that RUSI enhances clinical practice.

Rehabilitative ultrasound imaging has been used to explore the neurophysiologic mechanisms of interventions e.g., spinal manipulation used in the treatment of common spine-related disorders (Brenner, 2007; Raney, 2007). The associations between variances in muscle morphology and their role in the etiology and/or persistence of spinal complaints are largely unknown (Fernandez-de-las-Penas, 2008).

There are conflicting conclusions from systematic reviews about the reliability of ultrasound imaging. Hebert, et al (2009) determined that there is good reliability of ultrasound imaging within the majority of research studies that measured the abdominal and lumbar trunk muscles. The levels of reliability were influenced by several factors: operator experience; measurement targets (measures of muscle thickness were more reliable than cross-sectional area); and calculation methodology (a mean of measures was more reliable). In another recent systematic review Costa, et al (2009) concluded, "The current evidence of the reproducibility of RUSI [rehabilitative ultrasound imaging] for measuring abdominal muscle activity is based mainly on studies with suboptimal designs and the study of people who were healthy." The authors highlighted a lack of studies investigating the reproducibility of muscle thickness changes and differences in thickness changes over time as a key limitation of existing research on the reliability of

ultrasound imaging for assessing the abdominal wall muscles. In addition to systematic reviews on the reliability of rehabilitative ultrasound imaging, questions about the influence of gender, body mass index, posture, hand dominance, and different populations on muscle morphology remain unclear (Stokes, 2006; Teyhen, 2006).

The clinical utility of spinal ultrasound imaging has received preliminary investigation. Whittaker (2006) outlined challenges of accurate interpretation, hurdles with comparing imaging studies over time, and in generating reliable and meaningful measurements in a clinical environment. Hodges (2006) commented on the consideration of spinal ultrasound imaging from a patient-centered perspective, "whether rehabilitative ultrasound imaging measures contribute to prediction of those who benefit from an intervention, and whether changes in rehabilitative ultrasound imaging measures with intervention are associated with positive clinical outcomes. An additional consideration is whether feedback provided using rehabilitative ultrasound imaging improves clinical outcomes. Although a number of studies have confirmed that treatments that include rehabilitative ultrasound imaging lead to better outcomes than control interventions, these studies have not compared the same exercise interventions with and without feedback from rehabilitative ultrasound imaging." A cross-sectional study (Hebert, 2010) provided preliminary evidence that supports the construct validity of factors predictive of successful clinical outcomes and muscular activation via a stabilization exercise program monitored with ultrasound imaging. This study was limited by the lack of longitudinal follow-up and small sample size.

### ***Professional Societies/Position Statements***

#### **American Academy of Neurology (AAN)**

The AAN's Therapeutics and Technology Assessment (TTA) Subcommittee developed a statement on spinal ultrasound based on a search of the published literature for any studies involving the use of ultrasound for diagnosis of back pain and radicular disorders. This search did not yield any studies, and therefore the AAN stated that ultrasound cannot be recommended for use in the clinical evaluation of patients with back pain or radicular symptoms. The AAN obtained a statement from the American College of Radiology that indicates that while ultrasound is appropriately used intra-operatively and in newborns and infants for the evaluation of the spinal cord and canal, there is currently no documented evidence of the effectiveness of this modality in the evaluation of the spine and paraspinal tissues in adults. (AAN 1996, Reaffirmed July 2016)

#### **American Institute of Ultrasound in Medicine (AIUM)**

In the AIUM's 2014 official statement, the AIUM states that, at this time, the use of non-operative spinal/paraspinal ultrasound in adults (for study of intervertebral discs, facet joints and capsules, central nerves and fascial edema, and other subtle paraspinal abnormalities) for diagnostic evaluation, for screening, diagnostic evaluation, including pain or radiculopathy syndromes, and for monitoring of therapy has no proven clinical utility.

#### **Ultrasonography of Other Sites to Diagnose Spinal Pain**

Evidence regarding the use of ultrasound to diagnose back pain or the underlying etiology/pathology of back pain based on ultrasound examination of musculoskeletal or soft tissues of the head, neck, or of an extremity is too limited to draw a conclusion regarding the efficacy or clinical utility of ultrasound for this application.

#### ***Head and Neck***

Shiri et al. (2007) explored the association between carotid intima-media thickness and low back pain, using high-resolution B-mode ultrasound to measure the intima of the right carotid artery in 1386 individuals. Patient interviews were conducted to gather historical data of known spinal conditions, and to acquire a severity rating of sciatica, prior to clinical examinations. The researchers found carotid intima-media thickness was associated with continuous radiating low back pain and with a positive unilateral clinical sign of sciatica in men only. Carotid intima thickness was not found to be associated with local low back pain. Results of this study suggest that sciatica may be a manifestation of atherosclerosis, or both conditions may share common risk factors. This study did not demonstrate that ultrasound can identify the underlying pathology for sciatica in these patients.

#### ***Extremities***

A comparative, cross-sectional study evaluated quantitative ultrasound (QUS) of the calcaneus for predicting degenerative changes in the lumbar spine in 117 patients with low back pain or pain in the lower extremity. Ultrasound parameters (i.e., speed of sound, broadband ultrasound attenuation, stiffness) of the calcaneus were compared with evidence of degenerative changes and stenosis that was found on magnetic resonance scans of the spine. Lumbar spine stenosis was associated with elevated calcaneus QUS "speed of sound." Narrowing of the lumbar spine dural sac was detected by QUS (89% sensitivity and 75% specificity) in males aged > 60 years. Significant correlation was also found between QUS (speed of sound and stiffness) and intervertebral disc degeneration. These findings suggest that in some patients, ultrasound examination of the calcaneus may indicate the presence of lumbar spine stenosis and/or disc degeneration. (Mariconda, 2004)

## U.S. FOOD AND DRUG ADMINISTRATION (FDA)

The use of musculoskeletal ultrasound to diagnose low back pain is a procedure and, as such, is not regulated by the FDA. However, the devices used to perform this procedure are regulated by the FDA and many ultrasound devices and probes have received FDA approval for marketing. Additional information, under product code IYO (subsequent product codes IXT and IYN), is available at: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfPMN/pmn.cfm>. (Accessed May 30, 2018)

## CENTERS FOR MEDICARE AND MEDICAID SERVICES (CMS)

Medicare does not have a National Coverage Determination (NCD) that specifically addresses spinal and paraspinal ultrasonography. Local Coverage Determinations (LCDs) do not exist at this time. (Accessed June 8, 2018)

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#### POLICY HISTORY/REVISION INFORMATION

Date	Action/Description
01/01/2019	<ul style="list-style-type: none"><li>Simplified coverage rationale (no change to guidelines)</li><li>Archived previous policy version 2018T0462P</li></ul>

#### INSTRUCTIONS FOR USE

This Medical Policy provides assistance in interpreting UnitedHealthcare standard benefit plans. When deciding coverage, the member specific benefit plan document must be referenced as the terms of the member specific benefit plan may differ from the standard plan. In the event of a conflict, the member specific benefit plan document governs. Before using this policy, please check the member specific benefit plan document and any applicable federal or state mandates. UnitedHealthcare reserves the right to modify its Policies and Guidelines as necessary. This Medical Policy is provided for informational purposes. It does not constitute medical advice.

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