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Regional Anaesthesia
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Luciano Calderone





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“La diagnostica strumentale e di imaging: quando e cosa chiediamo”

Giuseppe Strano
Dir. Medico UOSD Terapia del Dolore
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AGENDA

Imaging Studies

➤ **When...**

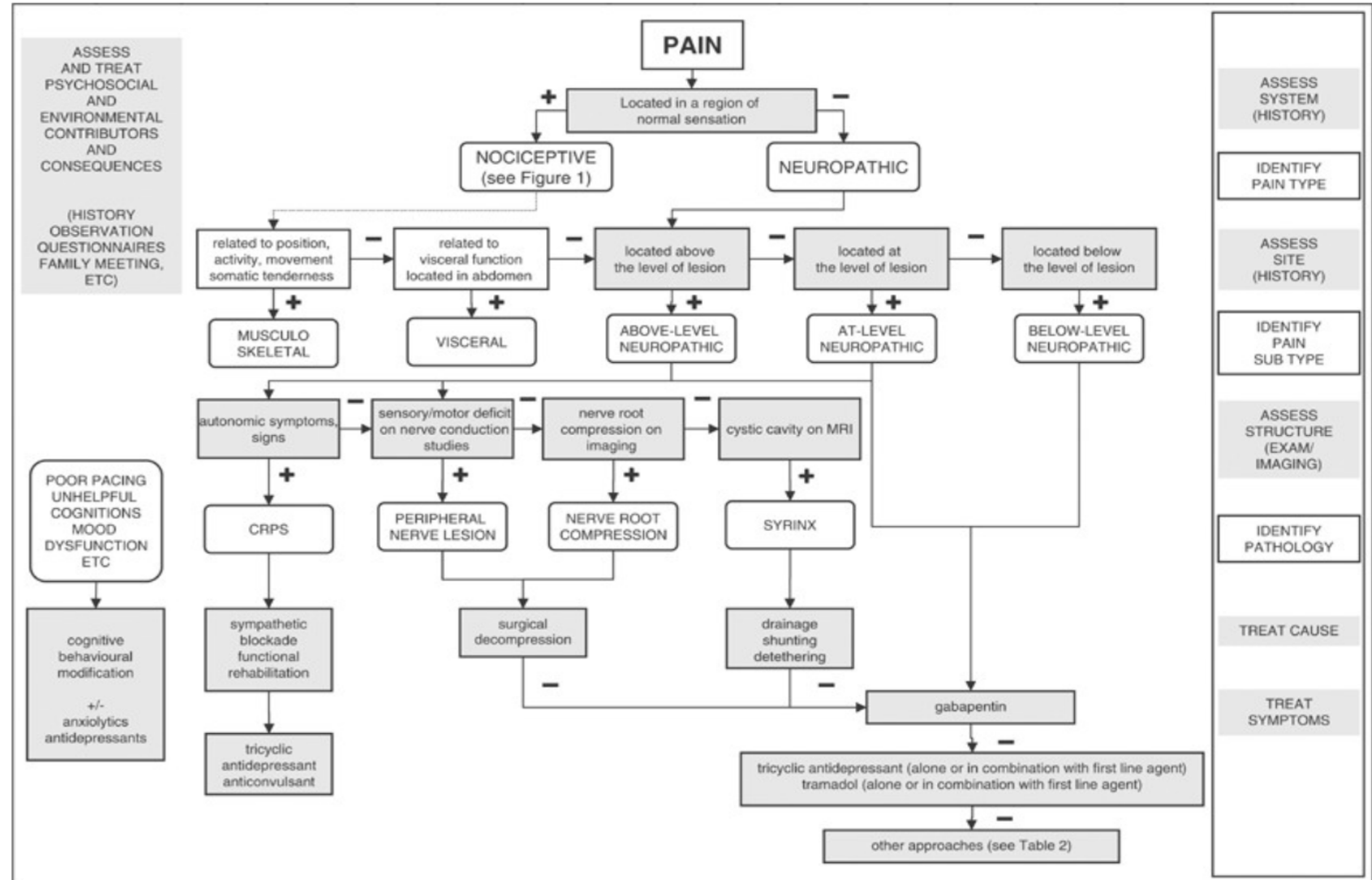
➤ **What...**



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➤ When





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11. Lumbosacral Radicular Pain

Koen Van Boxem, MD, FIPP*[†]; Jianguo Cheng, MD, PhD[‡];
Jacob Patijn, MD, PhD*[‡]; Maarten van Kleef, MD, PhD, FIPP*[‡];
Arno Lataster, MSc[§]; Nagy Mekhail, MD, PhD, FIPP[‡];
Jan Van Zundert, MD, PhD, FIPP*[¶]

Given that the natural course of lumbosacral radicular pain is favorable in 60% to 80% of patients and that the pain improves spontaneously or even disappears completely after 6 to 12 weeks the symptoms can disappear after a conservative therapy without a corresponding decrease in the volume of the herniated disc .

Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guideline from the American College of Physicians and the American Pain Society

Roger Chou, MD; Amir Qaseem, MD, PhD, MHA; Vincenza Snow, MD; Donald Casey, MD, MPH, MBA; J. Thomas Cross Jr., MD, MPH; Paul Shekelle, MD, PhD; and Douglas K. Owens, MD, MS, for the Clinical Efficacy Assessment Subcommittee of the American College of Physicians and the American College of Physicians/American Pain Society Low Back Pain Guidelines Panel*

Recommendation 1: Clinicians should conduct a focused history and physical examination to help place patients with low back pain into 1 of 3 broad categories: nonspecific low back pain, back pain potentially associated with radiculopathy or spinal stenosis, or back pain potentially associated with another specific spinal cause. The history should include assessment of psychosocial risk factors, which predict risk for chronic disabling back pain (strong recommendation, moderate-quality evidence).

Recommendation 2: Clinicians should not routinely obtain imaging or other diagnostic tests in patients with nonspecific low back pain (strong recommendation, moderate-quality evidence).

Recommendation 3: Clinicians should perform diagnostic imaging and testing for patients with low back pain when severe or progressive neurologic deficits are present or when serious underlying conditions are suspected on the basis of history and physical examination (strong recommendation, moderate-quality evidence).

Recommendation 4: Clinicians should evaluate patients with persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis with magnetic resonance imaging (preferred) or computed tomography only if they are potential candidates for surgery or epidural steroid injection (for suspected radiculopathy) (strong recommendation, moderate-quality evidence).

Recommendation 5: Clinicians should provide patients with evidence-based information on low back pain with regard to their expected course, advise patients to remain active, and provide information about effective self-care options (strong recommendation, moderate-quality evidence).

Recommendation 6: For patients with low back pain, clinicians should consider the use of medications with proven benefits in conjunction with back care information and self-care. Clinicians should assess severity of baseline pain and functional deficits, potential benefits, risks, and relative lack of long-term efficacy and safety data before initiating therapy (strong recommendation, moderate-quality evidence). For most patients, first-line medication options are acetaminophen or nonsteroidal anti-inflammatory drugs.

Recommendation 7: For patients who do not improve with self-care options, clinicians should consider the addition of nonpharmacologic therapy with proven benefits—for acute low back pain, spinal manipulation; for chronic or subacute low back pain, intensive interdisciplinary rehabilitation, exercise therapy, acupuncture, massage therapy, spinal manipulation, yoga, cognitive-behavioral therapy, or progressive relaxation (weak recommendation, moderate-quality evidence).

Ann Intern Med. 2007;147:478-491.
For author affiliations, see end of text.

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Diagnostic Imaging for Low Back Pain: Advice for High-Value Health Care From the American College of Physicians

Roger Chou, MD; Amir Qaseem, MD, PhD, MHA; Douglas K. Owens, MD, MS; and Paul Shekelle, MD, PhD, for the Clinical Guidelines Committee of the American College of Physicians*

A meta-analysis of 6 randomized trials (6), which comprised 1804 patients with primarily acute or subacute low back pain and no clinical or historical features that suggested a specific underlying condition, found no differences between routine lumbar imaging (radiography, MRI, or CT) and usual care without routine imaging in terms of pain, function, quality of life, or overall patient-rated improvement

Table 3. Results From Meta-analysis of Randomized, Controlled Trials of Routine Imaging Versus Usual Care Without Routine Imaging*

Outcome	Short Term (<3 Months)		Long Term (>6 Months to ≤1 Year)	
	Results, by Specific Scale	Analysis (95% CI)	Results, by Specific Scale	Analysis (95% CI)
Pain	SF-36 bodily pain (0 to 100 scale): 3.0 (−2.0 to 8.0), 2 trials; VAS (0 to 10 scale): 1.0 (0.46 to 1.54), 1 trial	Pooled SMD: 0.19 (−0.01 to 0.39); 3 trials	SF-36 bodily pain: −2.1 (−5.1 to 0.80), 3 trials; VAS: 0.08 (−0.02 to 0.18), 1 trial	Pooled SMD: −0.04 (−0.15 to 0.07); 4 trials
Function	RDQ (0 to 24 scale): 0.48 (−1.4 to 2.3), 3 trials	Pooled SMD: 0.11 (−0.29 to 0.50); 3 trials	RDQ: 0.34 (−0.65 to 1.3), 3 trials; Aberdeen low back score (0 to 100 scale): −3.1 (−4.2 to −2.0), 1 trial	Pooled SMD: 0.01 (−0.17 to 0.19); 4 trials
Quality of life	EQ-5D (0 to 1 scale): −0.10 (−0.17 to −0.03), 1 trial; EuroQoL subjective score (0 to 100 scale): 2.0 (−1.5 to 5.5), 1 trial	Pooled SMD: −0.10 (−0.53 to 0.34); 2 trials	EQ-5D: −0.005 (−0.06 to 0.05), 2 trials; EuroQoL subjective score: −7.0 (−10 to −3.7), 1 trial	Pooled SMD: −0.15 (−0.33 to 0.04); 3 trials
Mental health	SF-36 mental health (0 to 100 scale): 2.3 (−6.3 to 11), 2 trials	Pooled SMD: 0.12 (−0.37 to 0.62); 2 trials	SF-36 mental health: 0.61 (−4.4 to 5.6), 3 trials	Pooled SMD: 0.01 (−0.32 to 0.34); 3 trials
Overall improvement†	Risk difference: −7.8% (−14% to −1.3%)	Relative risk: 0.83 (0.65 to 1.06); 4 trials	Risk difference: −7.8% (−17% to 1.8%)	Relative risk: 0.82 (0.64 to 1.05); 1 trial

EQ-5D = European Quality of Life—5 Dimensions; EuroQoL = European Quality of Life; RDQ = Roland Disability Questionnaire; SF-36 = Short Form-36; SMD = standardized mean difference; VAS = visual analogue scale.

* From reference 6. Negative results favor routine imaging for pain and function, whereas positive results favor routine imaging for quality of life and mental health.

† Dichotomous outcome, defined as back pain resolved, normal activities resumed, and patient rating of "symptoms much improved" or at least "very pleased."



Diagnostic Imaging for Low Back Pain: Advice for High-Value Health Care From the American College of Physicians

Roger Chou, MD; Amir Qaseem, MD, PhD, MHA; Douglas K. Owens, MD, MS; and Paul Shekelle, MD, PhD, for the Clinical Guidelines Committee of the American College of Physicians*

Diagnostic imaging is indicated for patients with low back pain only if they have severe progressive neurologic deficits or signs or symptoms that suggest a serious or specific underlying condition. In other patients, evidence indicates that routine imaging is not associated with clinically meaningful benefits but can lead to harms. Addressing inefficiencies in diagnostic testing could minimize potential harms to patients and have a large effect on use of resources by reducing both direct and downstream costs. In this area, more

testing does not equate to better care. Implementing a selective approach to low back imaging, as suggested by the American College of Physicians and American Pain Society guideline on low back pain, would provide better care to patients, improve outcomes, and reduce costs.

Ann Intern Med. 2011;154:181-189.

For author affiliations, see end of text.

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Table 1. Costs of Low Back Imaging

Intervention	Reimbursement, \$*	Range of Estimated Charges, \$†
Lumbar spine radiography	50	204–286 (in network), 404–565 (out of network)
Lumbar spine computed tomography	381 (without contrast), 459 (with contrast)	1082–1517 (in network), 2091–2928 (out of network)
Lumbar spine magnetic resonance imaging	715 (without contrast), 863 (with contrast)	877–1226 (in network), 1762–2467 (out of network)



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Radiographic examination of the lumbar spine in a community hospital: an audit of current practice

Shawn F S Halpin, Lindsey Yeoman, Derek D Dundas

A review of 68 000 lumbar radiographs estimated that clinically unsuspected findings occurred in 1 of every 2500 patients between 20 and 50 years of age.



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Clinical Trial > [BMJ. 2001 Feb 17;322\(7283\):400-5. doi: 10.1136/bmj.322.7283.400.](#)

Radiography of the lumbar spine in primary care patients with low back pain: randomised controlled trial

D Kendrick ¹, K Fielding, E Bentley, R Kerslake, P Miller, M Pringle

Conclusions: Radiography of the lumbar spine in primary care patients with low back pain of at least six weeks' duration is not associated with improved patient functioning, severity of pain, or overall health status but is associated with an increase in doctor workload.



Low back pain and sciatica in over 16s: assessment and management

NICE guideline

Published: 30 November 2016

Last updated: 11 December 2020

Imaging

- 1.1.4 Do not routinely offer imaging in a non-specialist setting for people with low back pain with or without sciatica. **[2016]**
- 1.1.5 Explain to people with low back pain with or without sciatica that if they are being referred for specialist opinion, they may not need imaging. **[2016]**
- 1.1.6 Consider imaging in specialist settings of care (for example, a musculoskeletal interface clinic or hospital) for people with low back pain with or without sciatica only if the result is likely to change management. **[2016]**



“Anamnesi ed esame obiettivo sono spesso sufficienti per valutare il paziente con mal di schiena, porre diagnosi e definire il trattamento”

Diagnostica strumentale

La diagnostica strumentale, di solito, non è utile di fronte ad una lombalgia acuta.
Analisi delle evidenze :

- Non sottovalutare possibili danni da radiazione: **la radiografia del rachide lombare equivale a 65 radiografie del torace**, pari a 1.3 m Sv di dose radioattiva assorbita
 - poiché le **alterazioni del rachide sono piuttosto comuni nelle persone sane** (spazio discale ridotto, addensamento delle limitanti, ernie di Schmorl, anomalie vertebrali nel passaggio lombo-sacrale sono diagnosi radiologiche), la diagnostica strumentale identifica alterazioni radiografiche che sono “diagnosi radiologiche”, solo scarsamente associate alla sintomatologia presentata
 - la diagnostica per immagini avanzata (TC e RM) identifica con maggiore probabilità rispetto alla radiologia standard alterazioni del rachide in soggetti asintomatici. **L’uso spropositato di diagnostica per immagini avanzata può portare inevitabilmente all’esecuzione di ulteriori inutili esami e interventi**
 - **pazienti e curanti sono rassicurati dalla diagnostica per immagini** anche se i referti di solito non influenzano la successiva scelta terapeutica, dimostrando la loro inutilità se non per medicina difensiva..
- non è utile la radiologia tradizionale ai fini della diagnosi
 - non ci sono evidenze per una relazione causale fra reperti radiografici e lombalgia non specifica
 - non sono indicate TC e RM ai fini della diagnosi
 - non sono utili TC e RM per identificare l’origine del dolore

LG regione toscana



Red Flags – low back pain

- Indicate possible serious pathology
- Indicate the need for further investigation and, possibly, specialist referral

Possible fracture

- * Major trauma
- * Minor trauma in elderly or osteoporotic patient

Possible tumour/infection

- * Age < 20 or > 50 years
- * History of cancer
- * Constitutional symptoms (fever, chills, weight loss)
- * Recent bacterial infection
- * IV drug use
- * Immunosuppression
- * Pain worse at night or when supine

Possible significant neurological deficit

- * Severe or progressive sensory alteration or weakness
- * Bladder or bowel dysfunction

- * On physical examination: evidence of neurological deficit (in legs or perineum in the case of low back pain)

NB: Presence of red flags in acute low back pain suggests the need for further investigation and possible specialist referral as part of overall strategy. If no red flags present, it is safe to reassure the patient and move ahead with a multimodal management approach.



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AGENDA

Imaging Studies

➤ **When...**

➤ **What...**



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➤ What...

Plain radiography

Magnetic resonance imaging (MRI)

Computed tomography (CT)

Bone Scanning (SPECT)

Electrodiagnostics (electromyography (EMG) and
nerve conduction studies (NCS))



Plain Radiography

Low cost and ready availability make plain radiography the most common spinal imaging test. The anteroposterior and lateral views demonstrate alignment, disc and vertebral body height, and gross assessment of bone density and architecture; Other special views include flexion and extension views to assess instability, and angled views of the sacrum to assess sacroiliac joints for ankylosing spondylitis

however, soft tissue structures are not evaluated extensively by these views. Oblique views show the pars interarticularis in profile and are useful for diagnosing spondylolysis when clinical suspicion of this disorder exists.



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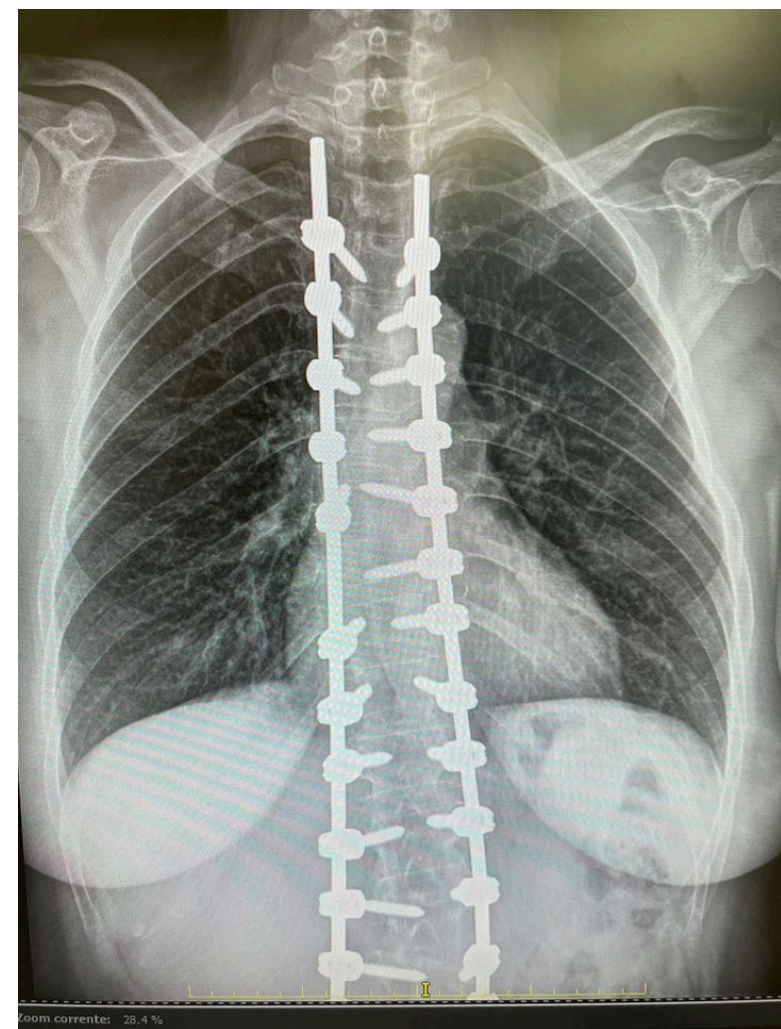
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Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging offers several advantages

Soft tissue contrast is better, which allows the different parts of the disc (the nucleus pulposus and annulus fibrosus) to be distinguished from one another and allows visualization of the ligaments.

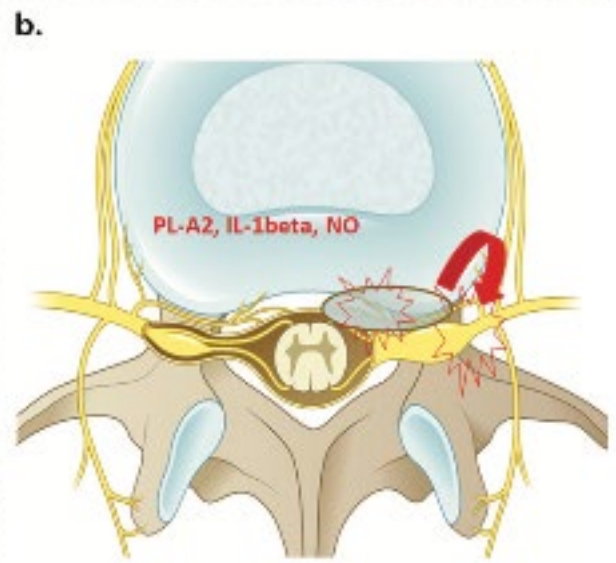
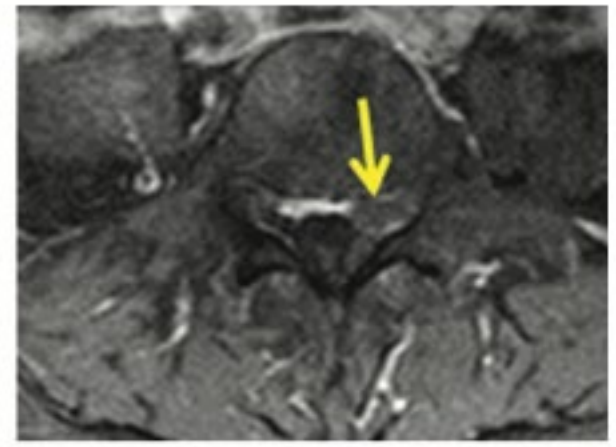
Magnetic resonance imaging also offers better visualization of the vertebral marrow and the contents of the spinal canal. It does not rely on reconstructed images because the sagittal and coronal images can be obtained directly.

Finally, MRI uses no ionizing radiation.

A disadvantage of MRI is that it cannot be used to visualize cortical bone directly.



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MR image shows prominent enhancement of the L4 and L5 vertebral bodies the L4–L5 disk, and the ventral epidural space at the same level suggesting infection



Computed Tomography (CT)

Computed tomography continues to play a vital role in spinal imaging.

Computed tomography uses X-rays to generate cross-sectional images of the spine.

Although spine images can be obtained only in the frontal or slightly off- frontal plane, sagittal and coronal reconstructions can be made.

Computed tomography can accurately depict the foraminal and extraforaminal nerve root because surrounding fat provides natural contrast.



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A lumbar CT confirmed the loss of disc height at all lumbar levels and sclerotic changes, particularly at L1–2 and L2–3





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Bone Scanning (SPECT)

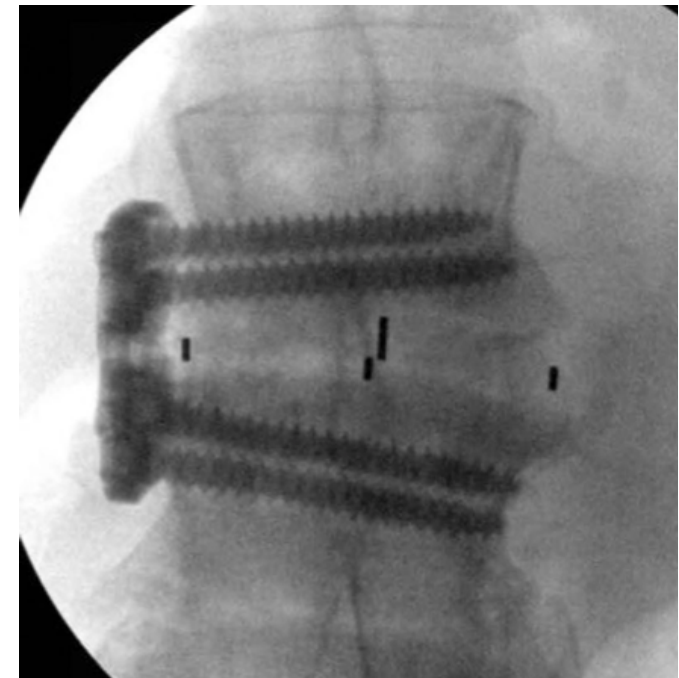
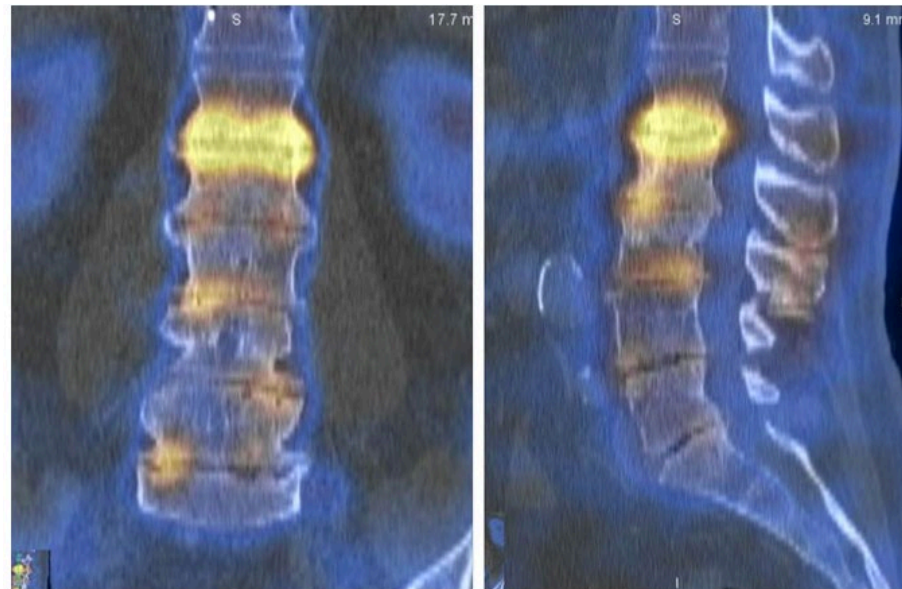
Bone scanning involves intravenous injection of radioactive compounds that adhere to metabolically active bone. Since 1971, technetium-99m–labeled phosphate complexes have been the agents of choice.

The primary objective of bone scanning is to detect occult fractures, infections, or bony metastases and to differentiate them from degenerative changes



Primary pain generator identification by CT-SPECT in a patient with low back pain: a case report

Gabriel Tender^{1*}, Adriana Constantinescu², Andrew Conger¹ and Anthony DiGiorgio¹





Electrodiagnostics (EMG e NCS)

The primary objectives of electrodiagnostics for low back pain are to confirm the presence of a radiculopathy and to exclude other peripheral nerve conditions that may mimic radiculopathy, such as plexopathy, polyneuropathy, or entrapment neuropathy.

Electrodiagnostics is a useful tool in the assessment of lumbosacral radiculopathy in the setting of low back pain.

It serves as an extension of the clinical history and physical examination.

Patients who would likely benefit the most from electrodiagnostic

Several studies have determined that the sensitivity of EMG in diagnosing radiculopathy is comparable to that of computed tomography (CT), magnetic resonance imaging (MRI) with sensitivities ranging from 50% to 85%

Wilbourn A, Aminoff M. AAEM minimonograph 32: the electrodiagnostic examination in patients with radiculopathies. *Muscle Nerve* 1998;21:1612–31.

Khatri BO, Baruah J, McQuillen MP. Correlation of electromyography with computed tomography in evaluation of lower back pain. *Arch Neurol* 1984; 41(6):594–7.

Nardin RA, Patel MR, Gudas TF, et al. Electromyography and magnetic resonance imaging in the evaluation of radiculopathy. *Muscle Nerve* 1999;22(2): 151–5.



ACR Appropriateness Criteria Low Back Pain

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The 30 references cited in the ACR Appropriateness Criteria Low Back Pain document were published from 1990-2015.

Variant 1. Acute, subacute, or chronic uncomplicated low back pain or radiculopathy; no red flags; no prior management

Variant 2. Acute, subacute, or chronic uncomplicated low back pain or radiculopathy; one or more of the following: low-velocity trauma, osteoporosis, elderly individual, or chronic steroid use

Variant 3. Acute, subacute, or chronic low back pain or radiculopathy; one or more of the following: suspicion of cancer, infection, or immunosuppression

Variant 4. Acute, subacute, or chronic low back pain or radiculopathy; surgery or intervention candidate with persistent or progressive symptoms during or after 6 weeks of conservative management

Variant 5. Low back pain or radiculopathy; new or progressing symptoms or clinical findings with history of prior lumbar surgery

Variant 6. Low back pain with suspected cauda equina syndrome or rapidly progressive neurologic deficit

- Radiologic procedure
- Rating
- Relative Radiation Level



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Variant 1. Acute, subacute, or chronic uncomplicated low back pain or radiculopathy; no red flags; no prior management

Radiologic Procedure	Rating	Comments	Relative Radiation Level
MRI lumbar spine without IV contrast	2		○
X-ray lumbar spine	2		●●●●
X-ray myelography and postmyelography CT lumbar spine	2		●●●●●
^{99m} Tc bone scan with SPECT spine	2	If there is concern for spondylolysis in a young patient, SPECT/CT remains the gold standard.	●●●●
CT lumbar spine without IV contrast	2		●●●●
CT lumbar spine with IV contrast	2		●●●●
MRI lumbar spine without and with IV contrast	2		○
CT lumbar spine without and with IV contrast	1		●●●●●

Note: Rating scale: 1, 2, and 3 = usually not appropriate; 4, 5, and 6 = may be appropriate; 7, 8, and 9 = usually appropriate. IV = intravenous; SPECT = single-photon emission computed tomography.

ACR Appropriateness Criteria Low
 Back Pain

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Variant 2. Acute, subacute, or chronic uncomplicated low back pain or radiculopathy; one or more of the following: low-velocity trauma, osteoporosis, elderly individual, or chronic steroid use

Radiologic Procedure	Rating	Comments	Relative Radiation Level
X-ray lumbar spine	7	This procedure is recommended as the initial imaging study, especially in patients with osteoporosis or history of steroid use.	☼☼☼
CT lumbar spine without IV contrast	7	If there remains concern for vertebral body fracture, detailed osseous analysis with CT can be performed for further evaluation.	☼☼☼
MRI lumbar spine without IV contrast	7	CT is preferred. MRI can be useful to evaluate for ligamentous injury or worsening neurologic deficit. MRI can depict marrow edema in these scenarios.	○
^{99m} Tc bone scan with SPECT spine	3	Bone scan with SPECT/CT can be useful for radiographically occult fractures and problem solving.	☼☼☼
CT lumbar spine with IV contrast	3		☼☼☼
CT lumbar spine without and with IV contrast	1		☼☼☼☼
X-ray myelography and postmyelography CT lumbar spine	1		☼☼☼☼
X-ray discography and postdiscography CT lumbar spine	1		☼☼☼

Note: Rating scale: 1, 2, and 3 = usually not appropriate; 4, 5, and 6 = may be appropriate; 7, 8, and 9 = usually appropriate. IV = intravenous; SPECT = single-photon emission computed tomography.

ACR Appropriateness Criteria Low
Back Pain

Nandini D. Patel, MD*, Daniel F. Broderick, MD*, Judah Burns, MD*, Tjwanini K. Dehmakh, MB, BS*, Ian Blair Fries, MD*, H. Benjamin Harvey, MD*, Langston Holly, MD*, Christopher H. Hunt, MD*, Blawie D. Jagtap, MD*, Taharim A. Kamil, MD*, John E. O'Toole, MD*, Joel S. Perlmutter, MD*, Brown Palomo, MD*, Joshua M. Romano, MD*, Jean W. Schroeder, MD*, Matthew T. Whithead, MD*, Rebecca S. Cornelius, MR*, Amanda S. Cery, MD*



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Variant 3. Acute, subacute, or chronic low back pain or radiculopathy; one or more of the following: suspicion of cancer, infection, or immunosuppression

Radiologic Procedure	Rating	Comments	Relative Radiation Level
MRI lumbar spine without and with IV contrast	8	Contrast is useful for neoplasia patients suspected of epidural or intraspinal disease.	○
MRI lumbar spine without IV contrast	7	Noncontrast MRI can be sufficient if there is low risk of epidural and/or intraspinal disease.	○
CT lumbar spine with IV contrast	6	MRI is preferred. CT is useful if MRI is contraindicated or unavailable and/or for problem solving.	●●●●
CT lumbar spine without IV contrast	6	MRI is preferred. CT is useful if MRI is contraindicated or unavailable and/or for problem solving.	●●●●
X-ray lumbar spine	5		●●●●
^{99m} Tc bone scan whole body with SPECT spine	4	SPECT/CT can be useful for anatomic localization and problem solving, in particular if looking for widespread tumor burden. It is valuable when multifocal metastases are suspected.	●●●●
FDG PET/CT whole body	4	MRI is preferred. This procedure can be indicated if MRI is contraindicated or nondiagnostic. It can distinguish benign versus malignant compression fractures.	●●●●●
CT lumbar spine without and with IV contrast	3	MRI is preferred. This procedure can be indicated if MRI is contraindicated or nondiagnostic.	●●●●●
X-ray myelography and postmyelography CT lumbar spine	3	MRI is preferred. This procedure can be indicated if MRI is contraindicated or nondiagnostic and can be useful for anatomic localization and problem solving.	●●●●●

Note: Rating scale: 1, 2, and 3 = usually not appropriate; 4, 5, and 6 = may be appropriate; 7, 8, and 9 = usually appropriate. FDG = ¹⁸F-2-fluoro-2-deoxy-D-glucose; IV = intravenous; SPECT = single-photon emission computed tomography.

ACR Appropriateness Criteria Low Back Pain

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Variant 4. Acute, subacute, or chronic low back pain or radiculopathy; surgery or intervention candidate with persistent or progressive symptoms during or after 6 weeks of conservative management

Radiologic Procedure	Rating	Comments	Relative Radiation Level
MRI lumbar spine without IV contrast	8		○
CT lumbar spine with IV contrast	5	MRI is preferred. CT is useful if MRI is contraindicated or unavailable and/or for problem solving.	☆☆☆
CT lumbar spine without IV contrast	5	MRI is preferred. CT is useful if MRI is contraindicated or unavailable and/or for problem solving.	☆☆☆
MRI lumbar spine without and with IV contrast	5	This procedure is indicated if noncontrast MRI is nondiagnostic or indeterminate. Contrast is indicated if patient has history of prior lumbar surgery. See Variant 5.	○
X-ray myelography and postmyelography CT lumbar spine	5	MRI is preferred. This procedure can be indicated if MRI is contraindicated or nondiagnostic.	☆☆☆☆
X-ray lumbar spine	4	This procedure is usually not sufficient for decision making without MR and/or CT imaging but can be helpful in surgical planning.	☆☆☆
^{99m} Tc bone scan with SPECT spine	4	This procedure can be particularly useful for facet arthropathy or stress fracture. SPECT/CT can be useful for anatomic localization and problem solving.	☆☆☆
X-ray discography and postdiscography CT lumbar spine	3	Although controversial, this can be useful in patients with > 3 mo of LBP (chronic LBP patients).	☆☆☆
CT lumbar spine without and with IV contrast	3		☆☆☆☆

Note: Rating scale: 1, 2, and 3 = usually not appropriate; 4, 5, and 6 = may be appropriate; 7, 8, and 9 = usually appropriate. IV = intravenous; LBP = low back pain; SPECT = single-photon emission computed tomography.

**ACR Appropriateness Criteria Low
 Back Pain**

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Variant 5. Low back pain or radiculopathy; new or progressing symptoms or clinical findings with history of prior lumbar surgery

Radiologic Procedure	Rating	Comments	Relative Radiation Level
MRI lumbar spine without and with IV contrast	8	This procedure can differentiate disc from scar.	○
CT lumbar spine with IV contrast	6	This is most useful in postfusion patients or when MRI is contraindicated or indeterminate.	☼☼☼
CT lumbar spine without IV contrast	6	This is most useful in postfusion patients or when MRI is contraindicated or indeterminate.	☼☼☼
MRI lumbar spine without IV contrast	6	Contrast is often necessary.	○
X-ray myelography and postmyelography CT lumbar spine	5		☼☼☼☼
X-ray lumbar spine	5	Flexion and extension views can be useful.	☼☼☼
^{99m} Tc bone scan with SPECT spine	5	This procedure helps detect and localize painful pseudarthrosis. SPECT/CT can be useful for anatomic localization and problem solving.	☼☼☼
X-ray discography and postdiscography CT lumbar spine	5		☼☼☼
CT lumbar spine without and with IV contrast	3		☼☼☼☼

Note: Rating scale: 1, 2, and 3 = usually not appropriate; 4, 5, and 6 = may be appropriate; 7, 8, and 9 = usually appropriate. IV = intravenous; SPECT = single-photon emission computed tomography.

ACR Appropriateness Criteria Low
Back Pain

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Variant 6. Low back pain with suspected cauda equina syndrome or rapidly progressive neurologic deficit

Radiologic Procedure	Rating	Comments	Relative Radiation Level
MRI lumbar spine without IV contrast	9	Use of contrast depends on clinical circumstances.	○
MRI lumbar spine without and with IV contrast	8	Use of contrast depends on clinical circumstances.	○
X-ray myelography and postmyelography CT lumbar spine	6	This procedure is useful if MRI is nondiagnostic or contraindicated.	●●●●●
CT lumbar spine with IV contrast	5		●●●●
CT lumbar spine without IV contrast	5		●●●●
X-ray lumbar spine	3		●●●●
CT lumbar spine without and with IV contrast	3		●●●●●
^{99m} Tc bone scan with SPECT spine	2		●●●●

ACR Appropriateness Criteria Low Back Pain

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TAKE-HOME POINTS

- Uncomplicated acute LBP and/or radiculopathy are benign, self-limited conditions that do not warrant any imaging studies.
- MRI of the lumbar spine should be considered for those patients presenting with red flags raising suspicion for a serious underlying condition, such as CES, malignancy, or infection.
- In patients with histories of low-velocity trauma, osteoporosis, or chronic steroid use, initial evaluation with radiography is recommended.
- In the absence of red flags, first-line treatment for chronic LBP remains conservative therapy with both pharmacologic and nonpharmacologic (eg, exercise, remaining active) therapy.
- If there are persistent or progressive symptoms during or after 6 weeks of conservative management and the patient is a surgery or intervention candidate or diagnostic uncertainty remains, MRI of the lumbar spine has become the initial imaging modality of choice in evaluating complicated LBP.
- MRI is the imaging procedure of choice in patients suspected of having cord compression or spinal cord injury.



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Thanks...

