

# Assessment and Management of Acute Low Back Pain

Acute low back pain is commonly treated by family physicians. In most cases, only conservative therapy is needed. However, the history and physical examination may elicit warning signals that indicate the need for further work-up and treatment. These "red flags" include a history of trauma, fever, incontinence, unexplained weight loss, a cancer history, long-term steroid use, parenteral drug abuse, and intense localized pain and an inability to get into a comfortable position. Treatment usually consists of nonsteroidal anti-inflammatory agents or acetaminophen and a gradual return to usual activities. Surgery is reserved for use in patients with severe neurologic deficits and, possibly, those with severe symptoms that persist despite adequate conservative treatment. (Am Fam Physician 1999;60:2299-308.)

Low back pain is a problem that family physicians confront in their patients almost daily. It is so prevalent that the Agency for Health Care Policy and Research (AHCPR) of the U.S. Department of Health and Human Services has developed and published national guidelines to assist primary care physicians in the appropriate care of affected patients.<sup>1</sup> A 23-member multidisciplinary committee compiled the guidelines, which focus on low back pain of less than three months' duration. This review incorporates many of that committee's recommendations.

## Epidemiology

Low back pain is one of the top 10 reasons patients seek care from a family physician.<sup>2</sup> In epidemiologic studies of different populations, the prevalence of low back pain has varied from 7.6 to 37 percent. Peak prevalence is in the group between 45 and 60 years of age,<sup>3</sup> although back pain is also reported by adolescents and by adults of all ages.

One third of all disability costs in the United States are related to low back pain.

Considering the overall expenses involved in treating low back pain, the condition has broad implications. Eighty percent of adults seek care at some time for acute low back pain, and one third of all disability costs in the United States are due to low back disorders.<sup>4</sup> The direct costs of diagnosing and treating low back pain in the United States were estimated in 1991 to be \$25 billion annually. Indirect costs, including lost earnings, are even higher.<sup>5</sup> Effective diagnosis and treatment of low back pain can save health care resources and relieve suffering in a multitude of patients.

## Duration of Symptoms

Back pain is classified into three categories based on the duration of symptoms. Acute back pain is arbitrarily defined as pain that has been present for six weeks or less. Subacute back pain has a six- to 12-week duration and chronic back pain lasts longer than 12 weeks.<sup>6</sup>

At least 60 percent of patients with acute low back pain return to work within one month.

Using these three categories, we can make predictions about prognosis. At least 60 percent of patients with acute low back pain return to work within one month, and 90 percent return within three months.<sup>7</sup> With minimal intervention, most patients improve in the first few weeks.

**TABLE 1**  
Causes of Low Back Pain

Condition	Clinical clues
Nonspecific back pain (mechanical back pain, facet joint pain, osteoarthritis, muscle sprains, spasms)	No nerve root compromise, localized pain over lumbosacral area
Sciatica (herniated disc)	Back-related lower extremity symptoms and spasm in radicular pattern, positive straight leg raising test
Spine fracture (compression fracture)	History of trauma, osteoporosis, localized pain over spine
Spondylolysis	Affects young athletes (gymnastics, football, weight lifting); pain with spine extension; oblique radiographs show defect of pars interarticularis
Malignant disease (multiple myeloma), metastatic disease	Unexplained weight loss, fever, abnormal serum protein electrophoresis pattern, history of malignant disease
Connective tissue disease (systemic lupus erythematosus)	Fever, increased erythrocyte sedimentation rate, positive for antinuclear antibodies, scleroderma, rheumatoid arthritis
Infection (disc space, spinal tuberculosis)	Fever, parenteral drug abuse, history of tuberculosis or positive tuberculin test
Abdominal aortic aneurysm	Inability to find position of comfort, back pain not relieved by rest, pulsatile mass in abdomen
Cauda equina syndrome (spinal stenosis)	Urinary retention, bladder or bowel incontinence, saddle anesthesia, severe and progressive weakness of lower extremities
Hyperparathyroidism	Insidious, associated with hypercalcemia, renal stones, constipation
Ankylosing spondylitis (morning stiffness)	Mostly men in their early 20s, positive for HLA-B27 antigen, positive family history, increased erythrocyte sedimentation rate
Nephrolithiasis	Colicky flank pain radiating to groin, hematuria, inability to find position of comfort

## Clinical Categories of Low Back Pain

Low back pain can be caused by many conditions, both serious and benign. Because of this, the AHCPR has grouped back pain into three categories: potentially serious spinal conditions, sciatica and nonspecific back symptoms.

### Potentially Serious Spinal Conditions

Spinal tumor, infection, fracture and the cauda equina syndrome are potentially serious causes of acute low back pain. These conditions are suggested by characteristic findings from the history

and physical examination (*Table 1*). Immediate further work-up and treatment are usually needed.

### Sciatica

Back-related lower extremity symptoms suggest nerve root compromise. Sciatica is often debilitating but, in most cases, the pain abates with conservative therapy.

### Nonspecific Back Symptoms

Some patients have symptoms primarily in the back that suggest neither nerve root compromise nor a serious underlying condition.<sup>1</sup> Mechanical low back pain is in this category. These patients also usually improve with conservative treatment.

With this clinical classification, the examiner can use the history and physical findings to specify the type of back pain affecting the patient and properly treat patients who have potentially serious spinal conditions.

**TABLE 2**  
Differential Diagnosis of Low Back Pain

Primary mechanical derangements	
Ligamentous strain	
Muscle strain or spasm	
Facet joint disruption or degeneration	
Intervertebral disc degeneration or herniation	
Vertebral compression fracture	
Vertebral end-plate microfractures	
Spondylolisthesis	
Spinal stenosis	
Diffuse idiopathic skeletal hyperostosis	
Scheuermann's disease (vertebral epiphyseal aseptic necrosis)	
Infection	
Epidural abscess	
Vertebral osteomyelitis	
Septic discitis	
Pott's disease (tuberculosis)	
Nonspecific manifestation of systemic illness	
Bacterial endocarditis	
Influenza	
Neoplasia	
Epidural or vertebral carcinomatous metastases	
Multiple myeloma, lymphoma	
Primary epidural or intradural tumors	
	Metabolic disease
	Osteoporosis
	Osteomalacia
	Hemochromatosis
	Ochronosis
	Inflammatory rheumatologic disorders
	Ankylosing spondylitis
	Reactive spondyloarthropathies (including Reiter's syndrome)
	Psoriatic arthropathy
	Polymyalgia rheumatica
	Referred pain
	Abdominal or retroperitoneal visceral process
	Retroperitoneal vascular process
	Retroperitoneal malignancy
	Herpes zoster
	Paget's disease of bone
	Primary fibromyalgia
	Psychogenic pain
	Malingering

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## History

The diagnosis of low back pain requires a careful history to determine whether the causes are mechanical, or secondary and more threatening. Mechanical causes of acute low back pain include dysfunction of the musculoskeletal and ligamentous structures. Pain can originate from the disc, annulus, facet joints and muscle fibers. Mechanical low back pain generally has a favorable outcome, but back pain with a secondary cause requires treatment for the underlying condition.

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### TABLE 3 Red Flags for Acute Low Back Pain

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#### History

Cancer  
Unexplained weight loss  
Immunosuppression  
Prolonged use of steroids  
Intravenous drug use  
Urinary tract infection  
Pain that is increased or unrelieved by rest  
Fever  
Significant trauma related to age (e.g., fall from a height or motor vehicle accident in a young patient, minor fall or heavy lifting in a potentially osteoporotic or older patient or a person with possible osteoporosis)  
Bladder or bowel incontinence  
Urinary retention (with overflow incontinence)

#### Physical examination

Saddle anesthesia  
Loss of anal sphincter tone  
Major motor weakness in lower extremities  
Fever  
Vertebral tenderness  
Limited spinal range of motion  
Neurologic findings persisting beyond one month

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Information from Bigos SJ, Bowyer OR, Braen GR, Brown K, Deyo R, Haldeman S, et al. Acute low back problems in adults. Clinical practice guideline no. 14 (AHCPR publication no. 95-0642). Rockville, Md.:

Fortunately, secondary causes of low back pain are much less frequent than mechanical causes. An important consideration in the patient's history is age. Patients older than 50 and younger than 20 are more likely to have secondary causes. Clinical findings that may indicate an underlying disease are listed in *Table 1*.

U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research, December 1994.

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Less common secondary causes of acute low back pain include metabolic diseases, inflammatory rheumatologic disorders, referred pain from other sources, Paget's disease, fibromyalgia and psychogenic pain<sup>8,9</sup> (*Table 2*).

In general, clues to secondary causes of low back pain can be found in the history and physical examination. These are referred to as "red flags," and they warrant further diagnostic work-up and immediate treatment (*Table 3*).

## **Physical Examination**

The physical examination is not as important as the history in identifying secondary causes of acute low back pain. Nevertheless, certain aspects of the physical examination are considered important.

### **Gait and Posture**

Observation of the patient's walk and overall posture is suggested for all patients with low back pain. Scoliosis may be functional and may indicate underlying muscle spasm or neurogenic involvement.

### **Range of Motion**

The examiner should record the patient's forward flexion, extension, lateral flexion and lateral rotation of the upper torso. Pain with forward flexion is the most common response and usually reflects mechanical causes. If pain is induced by back extension, spinal stenosis should be considered. Unfortunately, the evaluation of spinal range of motion has limited diagnostic use,<sup>10</sup> although it may be helpful in planning and monitoring treatment.

### **Palpation or Percussion of the Spine**

Point tenderness over the spine with palpation or percussion may indicate fracture or an infection involving the spine. Palpating the paraspinous region may help delineate tender areas or muscle spasm.

### **Heel-Toe Walk and Squat and Rise**

A patient unable to walk heel to toe, and squat and rise may have severe cauda equina syndrome or neurologic compromise.

### **Palpation of the Sciatic Notch**

Tenderness over the sciatic notch with radiation to the leg often indicates irritation of the sciatic nerve or nerve roots.

### **Straight Leg Raising Test**

With the patient in the supine position, each leg is raised separately until pain occurs. The angle between the bed and the leg should be recorded. Pain occurring when the angle is between 30 and 60 degrees is a provocative sign of nerve root irritation (*Figure 1*, top). Bending the knee while maintaining hip flexion should relieve the pain, and pressure in the popliteal region should worsen it (popliteal compression test).<sup>11</sup> If placing the knee back in full extension during straight leg raising and dorsiflexing the ankle also increase the pain (Lasègue's sign), nerve root and sciatic nerve irritation is likely.

The result of the straight leg raising test is positive in 95 percent of patients with a herniated disc, but it is also positive in 80 to 90 percent of patients without disc disease and symptoms of low back pain.

The result of straight leg raising is positive in 95 percent of patients with a proven herniated disc at surgery, but it is also positive in 80 to 90 percent of patients without any form of disc protrusion at surgery.<sup>12</sup> In contrast, crossed straight leg raising is less sensitive but much more specific for disc herniation. In the crossed straight leg raising test, the contralateral, uninvolved leg is raised (*Figure 1*, bottom). The test result is positive when pain is produced.

### **Reflexes and Motor and Sensory Testing**

Testing knee and ankle reflexes in patients with radicular symptoms often helps determine the level of spinal cord compromise. An altered knee or ankle reflex alone does not suggest the need for invasive management because this finding is generally transient and fully reversible.<sup>8</sup>

Weakness with dorsiflexion of the great toes and ankle may indicate L5 and some L4 root dysfunction. Sensory testing of the medial (L4), dorsal (L5) and lateral (S1) aspects of the foot may also detect nerve root dysfunction.<sup>1</sup>

### **Limited Neurologic Testing**

In the primary care of patients with low back pain and leg symptoms, the neurologic examination can be limited to just a few tests. These include the testing of dorsiflexion strength of the ankle and great toe, ankle reflexes and light touch over aspects of the foot, as well as the straight leg raising test. This abbreviated neurologic examination of the lower extremities allows the detection of most clinically important radiculopathy related to lumbar disc herniation. If patients with abnormal findings on these tests do not show improvement by one month, further diagnostic work-up or referral to a specialist is necessary.<sup>8</sup> Those with progressive symptoms should undergo further evaluation without delay.

### **Laboratory Tests**

Laboratory tests generally are not necessary in the initial evaluation of acute low back pain. If tumor or infection is suspected, a complete blood cell count and erythrocyte sedimentation rate should be obtained.<sup>1</sup> Other blood studies, such as testing for HLA-B27 antigen (present in ankylosing spondylitis) and serum protein electrophoresis (results abnormal in multiple myeloma), are not recommended unless clinically warranted. Additional laboratory tests, such as urinalysis, should be tailored to the possible diagnoses suggested by the history and physical findings.

## Radiographic Evaluation

Plain radiographs are not recommended for the routine evaluation of acute low back pain within the first month unless a finding from the history and clinical examination raises concern (*Table 4*).<sup>13</sup> If red flags suggest cauda equina syndrome or progressive major motor weakness, the prompt use of computed tomography (CT), magnetic resonance imaging, myelography or combined CT and myelography is recommended. In the absence of red flags after one month of symptoms, it is reasonable to obtain an imaging study if surgery is being considered.<sup>1</sup>

## Treatment

Most patients require only symptomatic treatment for acute low back pain. In fact, about 60 percent of patients with low back pain report improvement in seven days with conservative therapy, and most note improvement within four weeks.<sup>14</sup> Patients should be instructed to watch for worsening symptoms such as an increasing loss of motor or sensory functions, increasing pain and the loss of bladder or bowel function. Should any of these occur, the patient should undergo further evaluation and treatment immediately, with weekly follow-up.

Patients should gradually return to their normal activities, as tolerated. Continuing ordinary activities within the limits permitted by pain leads to a more rapid recovery than either bed rest or back-mobilizing exercises.<sup>15</sup>

Patients with acute low back problems benefit from exercise programs, if started early and if the exercises cause minimal mechanical stress on the back. The goal of an exercise program is, first, to prevent debilitation related to inactivity and, second, to improve activity tolerance and return patients to their highest level of functioning as soon as possible.<sup>1</sup>

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**TABLE 4**  
Selective Indications for Radiography in Acute Low Back Pain

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Age >50 years  
Significant trauma  
Neuromotor deficits  
Unexplained weight loss (10 lb in six months)  
Suspicion of ankylosing spondylitis  
Drug or alcohol abuse  
History of cancer  
Use of corticosteroids  
Temperature  $\geq 37.8^{\circ}\text{C}$  ( $100.0^{\circ}\text{F}$ )  
Recent visit (within 1 month) for same problem and no improvement  
Patient seeking compensation for back pain

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Adapted with permission from Deyo RA, Diehl AK. Lumbar spine films in primary care: current use and effects of selective ordering criteria. *J Gen Intern Med* 1986;1:20-5.

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**TABLE 5**  
Waddell's Tests for Nonorganic Physical Signs

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Test	Inappropriate response
Tenderness	Superficial, nonanatomic tenderness to light touch
Simulation	Axial loading Vertical loading on a

Medications commonly used for the treatment of acute low back pain include aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen and, possibly, muscle relaxants. Patients taking opioid analgesic drugs, often used in the first few days after the development of acute low back pain, do not return to full activity sooner than patients taking NSAIDs or acetaminophen.<sup>16</sup> Muscle relaxants are more effective than placebo but no better than NSAIDs in relieving acute low back pain. Oral corticosteroids and antidepressants do not appear to be effective in patients with acute low back pain, and their use is not recommended.<sup>1</sup>

Spinal manipulation has been shown in several randomized trials to be beneficial.<sup>17</sup> Shoe insoles--over-the-counter foam or rubber inserts and custom-made orthotics--may also be beneficial in some patients. Spinal traction, transcutaneous electrical nerve stimulation, biofeedback, trigger-point injections, facet joint injections and acupuncture are usually not helpful in the management of acute low back pain.<sup>1</sup> Surgery may be indicated in selected patients who are not helped by conservative treatment and who have debilitating symptoms after one month of therapy. Patients with red flags noted at the initial evaluation may be candidates for immediate surgery.

Rotation	standing patient's skull produces low back pain Passive rotation of shoulders and pelvis in same plane causes low back pain
Distraction	Discrepancy between findings on sitting and supine straight leg raising tests
Regional disturbances	
Weakness	"Cogwheel" (give-way) weakness
Sensory	Nondermatomal sensory loss
Overreaction	Disproportionate facial expression, verbalization or tremor during examination

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\*--Three or more inappropriate responses suggest complicating psychosocial issues in patients with low back pain.  
Adapted from Waddell G, McCulloch JA, Kummel E, Venner RM. Nonorganic physical signs in low-back pain. *Spine* 1980;5:117-25.

## Difficulties in Diagnosing Acute Low Back Pain

Nonorganic factors are sometimes important contributors to the symptoms of acute low back pain. Psychosocial factors can be economic (e.g., greater financial compensation when not working) or social (e.g., job dissatisfaction). Another factor is pending litigation. To determine whether psychosocial factors are relevant, the examiner can obtain "pain drawings" by asking the patient to mark the type and distribution of the pain on a figure of the human body. If the distribution is nonanatomic, a psychogenic cause is highly likely.<sup>18</sup> The Waddell tests, a set of five maneuvers easily performed during a routine physical examination, identify patients in whom nonorganic issues play an important role in the persistence of symptoms (*Table 5*).<sup>19</sup>

Copies of the Clinical Practice Guideline no. 14, Acute Low Back Problems in Adults: Assessment and Treatment, are available (cost: \$5) from the Agency for Health Care Policy and Research Publications Clearinghouse, P.O. Box 8547, Silver Spring, MD 20907; telephone: 1-800-358-2925; Web site: <http://www.ahcpr.gov>.

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