Evaluation and Treatment of Acute Low Back Pain

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Acute low back pain with or without sciatica usually is self-limited and has no serious underlying pathology. For most patients, reassurance, pain medications, and advice to stay active are sufficient. A more thorough evaluation is required in selected patients with "red flag" findings associated with an increased risk of cauda equina syndrome, cancer, infection, or fracture. These patients also require closer follow-up and, in some cases, urgent referral to a surgeon. In patients with nonspecific mechanical low back pain, imaging can be delayed for at least four to six weeks, which usually allows the pain to improve. There is good evidence for the effectiveness of acetaminophen, nonsteroidal anti-inflammatory drugs, skeletal muscle relaxants, heat therapy, physical therapy, and advice to stay active. Spinal manipulative therapy may provide short-term benefits compared with sham therapy but not when compared with conventional treatments. Evidence for the benefit of acupuncture is conflicting, with higher-quality trials showing no benefit. Patient education should focus on the natural history of the back pain, its overall good prognosis, and recommendations for effective treatments. (Am Fam Physician 2007;75:1181-8, 1190-2. Copyright © 2007 American Academy of Family Physicians.)

ILLUSTRATION BY FLOYD HOSMER

▶ **Patient information:** A handout on low back pain, written by the author of this article and by Richard B. Sisson, a medical student at Georgetown University School of Medicine, is provided on page 1190.

Low back pain affects a reported 5.6 percent of U.S. adults each day,[1] and 18 percent report having had back pain in the previous month.[2] The lifetime prevalence of low back pain is estimated to be at least 60 to 70 percent.[3,4] Although most patients self-treat back pain and only 25 to 30 percent seek medical care,[5,6] back pain is one of the most common reasons for visits to family physicians. Family physicians treat more patients with back pain than any other subspecialist, and about as many as orthopedists and neurosurgeons combined.[3]

Diagnosis

Acute low back pain is defined as pain that occurs posteriorly in the region between the lower rib margin and the proximal thighs and that is of less than six weeks' duration. Sciatica is pain that radiates down the posterior or lateral leg beyond the knee. Knowing the prevalence of various etiologies of back pain, looking for "red flag" findings (which indicate a serious underlying condition) in the history and physical examination, and performing some basic physical examination maneuvers allow physicians to accurately and quickly classify most causes of back pain.

DIFFERENTIAL DIAGNOSIS

Serious conditions such as cancer, infection, and visceral disease account for only a small percentage of back pain cases, and vertebral compression fractures account for less than 5 percent *(Table 1*[3,7-13]*)*. Herniated disks, which are often managed initially like lumbar strains, account for only 4 percent of back pain cases.[3] Most back pain is nonspecific lumbar strain or idiopathic back pain. The prevalence of these disorders varies with age, with herniated disks being most common in patients between 20 and 50 years, and degenerative processes (e.g., spinal stenosis, osteoporotic fractures) more likely in older patients.[7,10]

The natural history of back pain is favorable overall; studies show that 30 to 60 percent of patients recover in one week, 60 to 90 percent recover in six weeks, and 95 percent recover in 12 weeks.[7,14] However,

SORT: KEY RECOMMENDATIONS FOR PRACTICE

Clinical recommendation	*Evidence rating*	*References*
In the absence of "red flag" findings or signs of cauda equina syndrome, four to six weeks of conservative care is appropriate for patients with acute low back pain.	C	16-20
Nonsteroidal anti-inflammatory drugs, acetaminophen, and skeletal muscle relaxants are effective first-line medications in the treatment of acute, nonspecific low back pain.	A	22, 24-26
Bed rest for more than two or three days in patients with acute low back pain is ineffective and may be harmful. Patients should be instructed to remain active.	A	32, 33
Education about activity, aggravating factors, natural history, and expected time course for improvement may speed recovery of patients with acute low back pain and prevent chronic back pain.	C	34, 37
Specific back exercises for patients with acute low back pain are not helpful.	A	39
Heat therapy may be helpful in reducing pain and increasing function in patients with acute low back pain.	B	45-50
Spinal manipulative therapy for acute low back pain may offer some short-term benefits but probably is no more effective than usual medical care.	B	51-54

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see page 1135 or http://www.aafp.org/afpsort.xml.

relapses and recurrences are common, occurring in about 40 percent of patients within six months.[15]

HISTORY AND PHYSICAL EXAMINATION

The goal of the clinical examination is to identify patients who require immediate surgical evaluation and those whose symptoms suggest a more serious underlying condition such as malignancy or infection. Patients with signs of cauda equina syndrome, such as progressive neurologic deficits, bowel or bladder dysfunction, bilateral sciatica or leg weakness, or numbness in a saddle distribution, require urgent surgical referral. Physicians should inquire about red flag findings and order appropriate imaging and laboratory studies if necessary *(Table 2*[16]*)*. Typical signs and symptoms of other causes of back pain are listed in *Table 1*.[3,7-13]

Screening tests to detect a herniated disk include asking about the presence of sciatica, the straight leg raise, the crossed straight leg raise (i.e., raising the contralateral, unaffected leg), and testing strength and reflexes in the lower extremities. Herniated disks are unlikely in patients with no history of sciatica (i.e., with pain that does not radiate beyond the knee). Four percent of patients with acute low back pain have a herniated disk, but 95 percent of patients with herniation have sciatica; therefore, the likelihood of a symptomatic herniated disk in a patient with acute back pain but no symptoms of sciatica is approximately one in 500. Physical examination findings are useful in localizing the level of the disk herniation *(Table 3)*.

IMAGING AND LABORATORY EVALUATION

Because acute low back pain typically does not have a serious etiology, and because most cases resolve with conservative treatment, immediate imaging is rarely indicated. All major guidelines on the treatment of acute low back pain have similar recommendations regarding imaging.[16-20] In the absence of red flag findings, four to six weeks of conservative care is safe and appropriate, and imaging is not indicated. Suggested evaluations for patients with red flag findings are outlined in *Table 2*.[16] Timing between the first- and second-line evaluations is guided by the patient's symptoms and the strength of clinical suspicion for the underlying disorder. If clinical suspicion is sufficiently high, it may be necessary to proceed directly to advanced imaging. If magnetic resonance imaging (MRI) is not readily available, or if the cost is prohibitive, computed tomography may be adequate.[16]

Diagnostic imaging of the spine has a high rate of abnormal findings in asymptomatic persons. In studies of lumbar spine MRI evaluation in asymptomatic adults, herniated disks were found in 9 to 76 percent of patients, bulging disks in 20 to 81 percent, degenerative disks in 46 to 93 percent, and annular tears in 14 to 56 percent.[21] Therefore, imaging should be used in carefully selected patients and interpreted with appropriate clinical correlation.

Treatment

Treatment methods for acute low back pain and the evidence to support them are reviewed in the following.

NSAIDS AND ACETAMINOPHEN

Oral nonsteroidal anti-inflammatory drugs (NSAIDs) are recommended for the treatment of acute low back pain. One systematic review of 51 randomized controlled trials

Table 1. Differential Diagnosis of Low Back Pain

Condition (prevalence)*	*Signs and symptoms*
Mechanical low back pain (97%)	
Lumbar strain or sprain (≥ 70%)	Diffuse pain in lumbar muscles; some radiation to buttocks
Degenerative disk or facet process (10%)	Localized lumbar pain; similar findings to lumbar strain
Herniated disk (4%)	Leg pain often worse than back pain; pain radiating below knee
Osteoporotic compression fracture (4%)	Spine tenderness; often history of trauma
Spinal stenosis (3%)	Pain better when spine is flexed or when seated, aggravated by walking downhill more than uphill; symptoms often bilateral
Spondylolisthesis (2%)	Pain with activity, usually better with rest; usually detected with imaging; controversial as cause of significant pain
Nonmechanical spinal conditions (1%)	
Neoplasia (0.7%)	Spine tenderness; weight loss
Inflammatory arthritis (0.3%)	Morning stiffness, improves with exercise
Infection (0.01%)	Spine tenderness; constitutional symptoms
Nonspinal/visceral disease (2%)	
Pelvic organs—prostatitis, pelvic inflammatory disease, endometriosis	Lower abdominal symptoms common
Renal organs—nephrolithiasis, pyelonephritis	Usually involves abdominal symptoms; abnormal urinalysis
Aortic aneurysm	Epigastric pain; pulsatile abdominal mass
Gastrointestinal system—pancreatitis, cholecystitis, peptic ulcer	Epigastric pain; nausea, vomiting
Shingles	Unilateral, dermatomal pain; distinctive rash

**—Estimated percentage of patients with this condition among all adult patients with low back pain in primary care.*

Information from references 3 and 7 through 13.

comparing NSAIDs with placebo found strong evidence that NSAIDs significantly improve pain control.[22] There is strong evidence that various NSAIDs are equally effective.[22] Meta-analysis of common oral medications for acute pain has demonstrated that two or three patients need to be treated for one patient to feel at least a 50 percent improvement in pain over four to six hours (i.e., number needed to treat [NNT] = 2 or 3).[23]

There is conflicting evidence about whether NSAIDs are superior to acetaminophen for treatment of acute low back pain.[22] Acetaminophen in recommended dosages (i.e., up to 4 g per day in patients without liver problems) can be a helpful adjunct and avoids the renal and gastrointestinal toxicities of NSAIDs.

OPIOIDS

Some patients with acute low back pain, and more commonly those with sciatica, require oral opioids to control the pain. Opioids should be considered a second- or third-line analgesic option and should be used only for a short period for most patients. There is little evidence from well-designed studies regarding the benefits and harms of opioid use in acute low back pain, and there have been few comparisons with other pain relievers. Several small studies have shown no significant advantage of opioid use in symptom relief or return to work when compared with NSAIDs or acetaminophen.[22] Side effects of opioids include pruritus, constipation, drowsiness, and addiction.

MUSCLE RELAXANTS

Two meta-analyses provide strong evidence that muscle relaxants are helpful in the treatment of nonspecific acute low back pain.[24,25] For example, patients receiving cyclobenzaprine (Flexeril) were significantly more likely to report improvement in low back pain symptoms at two weeks than patients receiving placebo (NNT = 3).[24] Muscle relaxants are most beneficial in the first one or two weeks of treatment. There is some evidence that skeletal muscle relaxants lead to additional improvement when used with NSAIDs.[25,26] Various skeletal muscle relaxants are similar in effectiveness.[25,27]

Side effects of skeletal muscle relaxants include drowsiness and dizziness and may limit the usefulness of these drugs. Patients taking cyclobenzaprine at a dosage of 10 mg three times per day were nearly two times more likely to report side effects than those taking placebo (53 versus 28 percent, respectively).[24] Other muscle relaxants have similar rates of adverse events.[25] Carisoprodol (Soma) has been associated with abuse and dependence and is a schedule IV drug in some states. Metaxalone (Skelaxin) and low-dose cyclobenzaprine (i.e., 5 mg rather than 10 mg) provide good symptom relief with significantly decreased side effects.[28]

Table 2. "Red Flag" Findings and Evaluation Strategies for Patients with Low Back Pain

	Diagnosis of concern				*Evaluation strategy**		
Finding	*Cauda equina syndrome*	*Fracture*	*Cancer*	*Infection*	*CBC/ESR/ CRP*	*Plain radiography*	*MRI*
Age > 50 years		X	X		1†	1	2
Fevers, chills, recent urinary tract or skin infection, penetrating wound near spine				X	1	1	1
Significant trauma		X				1	2
Unrelenting night pain or pain at rest			X	X	1†	1	2
Progressive motor or sensory deficit	X		X				1E
Saddle anesthesia, bilateral sciatica or leg weakness, difficulty urinating, fecal incontinence	X						1E
Unexplained weight loss			X		1†	1	2
History of cancer or strong suspicion for current cancer			X		1†	1	2
History of osteoporosis		X				1	2
Immunosuppression				X	1	1	2
Chronic oral steroid use		X		X	1	1	2
Intravenous drug use				X	1	1	2
Substance abuse		X		X	1	1	2
Failure to improve after six weeks of conservative therapy			X	X	1†	1	2‡

CBC = complete blood count; ESR = erythrocyte sedimentation rate; CRP = C-reactive protein; MRI = magnetic resonance imaging.

NOTE: *"Red flag" findings indicate the possibility of a serious underlying condition.*

**—1 = first-line evaluation in most situations; 2 = follow-up evaluation; E = emergent evaluation required.*

†—*Prostate-specific antigen testing may be indicated in men in whom cancer is suspected.*

‡—*Or unnecessary.*

Information from reference 16.

CORTICOSTEROIDS

No studies support the use of oral steroids in patients with acute low back pain. Epidural steroid injections may be helpful in patients with radicular symptoms that do not respond to two to six weeks of conservative therapy. Randomized trials have demonstrated short-term (i.e., weeks to months) but not long-term improvement in pain and disability with epidural steroid injections.[29-31]

BED REST

Bed rest provides no benefit to patients who have acute low back pain with or without sciatica. For nonspecific low back pain, there is strong evidence that advice to stay active rather than rest in bed results in less time missed from work, improved functional status, and less pain.[32,33] For patients with sciatica, there is no difference in outcomes between staying active and resting in bed.[32,33] If bed rest is necessary, it typically should last no longer than two or three days.

PATIENT EDUCATION

There is limited evidence for the benefit of educating patients about low back pain.[34] Simple educational booklets have been proven effective in modifying patients'

Table 3. Physical Examination Findings in Nerve Root Impingements

Herniation	*Nerve root affected*	*Sensory loss*	*Motor weakness*	*Screening examination*	*Reflex*
L3-L4 disk	L4	Medial foot	Knee extension	Squat and rise	Patellar
L4-L5 disk	L5	Dorsal foot	Dorsiflexion ankle/great toe	Heel walking	None
L5-S1 disk	S1	Lateral foot	Plantarflexion ankle/toes	Walking on toes	Achilles

Table 4. Return-to-Work Guidelines for Patients with Acute Low Back Pain

	Expected return to unmodified work with:			
Activity level	*Mild low back pain*	*Severe low back pain*	*Sciatica*	*Typical modified duty*
Light work (i.e., mostly sitting, occasional standing and walking, lifting and carrying up to 20 lb [9 kg])	0 days	0 to 3 days	2 to 5 days	No lifting more than 5 lb (2.25 kg) three times per hour No prolonged sitting, standing, or walking without a five-minute break every 30 minutes
Medium work (i.e., equal standing, sitting, and walking; occasional bending, twisting, or stooping; lifting and carrying up to 50 lb [22.5 kg])	—	14 to 17 days	21 days	—
Heavy work (i.e., constant standing or walking; frequent bending, twisting, or stooping; lifting up to 100 lb [45 kg])	Up to 7 to 10 days	35 days	35 days	No lifting more than 25 lb (11.25 kg) 15 times per hour No prolonged standing or walking without a 10-minute break every hour Driving car or light truck up to six hours per day; driving heavy vehicle or equipment up to four hours per day

NOTE: *Times until return to full duty will vary with severity and role and are typical for ages 35 to 55 years. Times for younger workers are approximately 20 to 30 percent shorter.*

Information from reference 38.

beliefs and improving function; these booklets provide small additional benefits when compared with physical therapy and chiropractic care.[35,36]

Patient education focusing on activity, aggravating factors, the natural history of the disease, its relatively benign etiology, and expected time course for improvement may speed recovery and prevent chronic pain.[34,37] Patients should understand that pain does not always indicate harm. Recommendations should include staying active but avoiding heavy lifting, bending, twisting, and prolonged sitting. Modification of work duties may be required; however, patients should be encouraged to return to work at light duty rather than wait for complete resolution of the pain (see *Table 4*[38] for specific recommendations).

EXERCISE THERAPY

Specific back exercises for patients with acute low back pain are not helpful. A meta-analysis of 10 trials of structured exercise therapy compared with no exercise in patients with acute low back pain demonstrated no benefit with exercise programs.[39] There was no improvement with exercise in short-, intermediate-, or long-term outcomes of pain relief or function.

MASSAGE

Two systematic reviews found insufficient evidence to make a reliable recommendation regarding massage for acute low back pain.[40,41] Massage therapy is considered safe and may be preferred by some patients.

ACUPUNCTURE

There is limited evidence about the use of acupuncture in the treatment of acute low back pain. Higher-quality trials provide moderate evidence that it is not beneficial.[42,43] One high-quality trial of acupuncture versus sham therapy for acute low back pain found no difference in pain or function, whereas a smaller trial in patients with

sciatica found acupuncture to be helpful.[42,43] A high-quality trial of acupuncture versus naproxen (Naprosyn) at a dosage of 500 mg two times per day found no difference in pain relief, although the acupuncture group used less pain medication. One lower-quality trial using a combination of acupuncture, herbs, and moxibustion versus herbal therapy alone found a small benefit with acupuncture, whereas another lower-quality trial of acupuncture versus moxibustion found no benefit.[42,43]

HEAT OR ICE

There is minimal evidence regarding the use of cold therapy in the treatment of acute low back pain.[44] Heat therapy has been found to be helpful in reducing pain and increasing function in patients with acute low back pain.[44-50] A Cochrane review found only one trial of ice massage versus heat packs in patients with acute or chronic back pain that showed equivalence between the therapies.[44] Six studies of the use of heat in treating acute low back pain found small to moderate benefits in the groups receiving heat therapy.[45-50] Because of the nature of the intervention, blinding was impossible for the patients, but in three studies the investigator was blinded.[46-48] Five of the six trials used a commercial disposable heat wrap and were funded by the maker of the device.[45-48,50]

MANIPULATION

Four good-quality systematic reviews of spinal manipulative therapy in acute low back pain are available.[51-54] There is some evidence that spinal manipulation results in short-term improvements in pain when compared with sham or ineffective treatments, but not when compared with usual care treatments (i.e., family physician–provided care, analgesics, physical therapy, or back school).[51,52,54] There is some evidence that spinal manipulation leads to short-term improvement in function when compared with placebo, but not when compared with usual care.[51,53,54] Spinal manipulation does not confer long-term benefits for acute low back pain.[51-53]

Newer studies that were not included in the reviews have mixed results. A study involving 102 patients with acute low back pain and sciatica found that patients receiving spinal manipulative therapy were significantly less likely to have pain at six months than those receiving sham manipulation.[55] A study of 131 patients showed that those meeting prespecified criteria, including short duration of back pain and no radicular symptoms, benefited from spinal manipulation compared with patients who were assigned to exercise or who did not meet the criteria.[56] Spinal manipulation was not found to be effective in two large studies involving 2,015 patients with varied durations of back pain; however, there is no way to discern whether it benefited the subset of patients with acute low back pain.[57,58] Two trials with a total of 592 patients with acute low back pain found that spinal manipulation was no better than treatment with muscle relaxants, sham treatments, or a brief pain management program.[59,60] Manipulative therapy of the lumbar spine is generally safe when provided by an appropriate practitioner, and it is used by many patients.

PHYSICAL THERAPY

Studies of physical therapy for acute low back pain are heterogeneous because the intervention method differs: it can include education, exercises, traction, manipulation, or massage, as well as modalities such as heat, ice, and ultrasonography. Two meta-analyses regarding the McKenzie method of physical therapy are available.[61,62] The McKenzie method is superior to other treatments with regard to short-term pain relief and disability; however, these benefits are not apparent in longer-term follow-up. Individualized education during physical therapy, particularly when it is focused on fear avoidance and staying active, appears to be helpful.[37] There is strong evidence that traction does not lead to improvement for patients with or without sciatica.[63]

Prevention

Because relapses of back pain are common and the societal burden of chronic back pain is large, strategies to prevent initial injuries or to prevent acute back pain from becoming chronic may be useful. The U.S. Preventive Services Task Force (USPSTF)[64] and the COST B13 Working Group on European Guidelines for Prevention in Low Back Pain[65] have synthesized the evidence on prevention.

The USPSTF concluded that there is insufficient evidence to recommend for or against the routine use of exercise interventions to prevent back pain. The European guidelines recommend exercise to prevent work absence and the occurrence or prolongation of further back pain episodes; the authors found stronger evidence of the effectiveness of exercise to prevent low back pain and recurrences in the subpopulation of workers. Recommendations are mixed regarding back schools, and neither of the guidelines recommends the use of lumbar supports or back belts for prevention of low back pain. There is strong evidence that lumbar supports do not prevent low back pain.[65]

There is strong evidence that several psychosocial factors correlate with the development of chronic back

Table 5. Psychosocial Factors Associated with an Increased Likelihood of Developing Chronic Back Pain

Disputed compensation claims
Fear avoidance (exaggerated pain or fear that activity will cause permanent damage)
Job dissatisfaction
Pending or past litigation related to the back pain
Psychological distress and depression
Reliance on passive treatments rather than active patient participation
Somatization

Information from references 66 through 69.

pain *(Table 5)*.[66-69] However, strategies aimed at screening for and addressing these risk factors have not been well studied.

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