

# **Acute Low Back Problems in Adult Patients: Diagnosis, Management, and Treatment Guidelines**

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## *Introduction*

Back pain has a significant impact on individuals and society. Various estimates of the total annual cost of back pain in the United States range from \$20 billion to \$50 billion.

Eighty to ninety percent of American adults suffer from an episode of back pain at least once in their lives, and more than 6 million are treated each day for low back pain. Low back problems are the second most common symptomatic reason expressed by patients for office visits to primary care physicians. They are the most common reason for office visits to orthopedic surgeons, neurosurgeons, and occupational medicine physicians and rank third among reasons for surgical procedures.

Back problems are extremely expensive in terms of medical care, time lost from work, and disability payments that may double or triple the medical treatment costs. Back pain is the second leading cause of absenteeism from work, after the common cold. It is the most common cause of disability for people under the age of 45. In addition, there are high nonmonetary costs such as decreased ability to perform usual activities and diminished quality of life.

Evidence indicates that one factor contributing to the cost of low back pain is that many patients may receive less than optimal care. Marked variations around the country in rates of diagnostic testing, hospitalization, and surgery for low back problems imply a lack of consensus about appropriate assessment and treatment. Furthermore, some patients appear to be more disabled *after* treatment than before. For example, despite extensive medical literature on failed back surgery and evidence that repeat surgical procedures rarely lead to improved outcome, there are documented examples of patients who have had as many as 20 spine operations. However, surgery is not the only treatment that can lead to increased disability; extended bed rest or extended use of high-dose opioids can prolong symptoms and further debilitate patients.

This text is intended as a concise reference for use in diagnosing and treating adult patients reporting acute low back pain. The goal is to help the patient return to a normal lifestyle, with a societal goal of more efficient and effective care. It is designed to help physicians detect serious conditions that occasionally cause low back symptoms. Treatment of these conditions is beyond the scope of this document. Note that these guidelines do not address patients younger than 18 years of age or those with chronic back problems (back-related activity limitations of greater than 3 months duration).

## **DEFINITION**

Acute nonspecific low back problems are defined as activity and lifestyle limitations due to lower back or back-related leg symptoms of less than 4 weeks' duration. The condition is unique, because the symptom is the diagnosis. About 90% of patients with acute low back problems recover spontaneously within 1 month. Each new episode in a patient with recurrent low back problems should be treated as a new episode.

### **Categories of acute low back symptoms**

*Potentially serious spinal condition:* tumor, infection, spinal fracture, or a major neurologic compromise.

*Sciatica:* back-related lower limb symptoms suggesting lumbosacral nerve root compromise.

*Nonspecific back symptoms:* occurring primarily in the back and suggesting neither nerve root compromise nor a serious underlying condition.

## **ASSESSMENT**

The diagnosis of nonspecific low back pain cannot be made without first ruling out other potentially serious underlying conditions through a current and past medical history and physical examination.

### **History**

The patient will tell you his or her chief complaint. The following questions can help the clinician gauge the need for more information:

**Symptoms:** Pain, numbness, weakness, stiffness? In back, leg, or both? When did symptoms start? How long have your activities been limited? More than 4 weeks? Have you had similar episodes in the past? Have you had previous testing or treatment for back problems?

**Limitations:** How do these symptoms limit you? How long can you sit, stand, walk? How much weight can you lift?

### **Red Flags**

*Fractures may be indicated by:* major trauma, or minor trauma in an older or potentially osteoporotic patient, or pain that worsens when supine.

*Cancer may be indicated by:* age more than 50 years, a history of cancer, constitutional symptoms such as recent fever or weight loss, or failure to improve after 4 to 6 weeks of conservative low back pain treatment.

*Spinal infection may be indicated by:* intravenous drug use, urinary infection, recent fever, and/or pain that worsens when supine or at night.

*Cauda equina involvement may be indicated by:* urinary retention, saddle anesthesia, or neurologic deficits in the lower extremity.

*Neurologic involvement may be indicated by:* numbness or weakness in the legs, sciatica with radiation past the knee (increases the likelihood of a true radiculopathy rather than pain radiating only to the posterior thigh).

*Psychosocial issues may be indicated by:* history of failed previous treatments, substance abuse, disability compensation, depression, or anxiety.

## **Physical Examination**

1. General observation of the patient: Limping or coordination problems indicate the need for specific neurologic testing. When a physician sees severe guarding of lumbar motion in all planes, he or she should suspect a diagnosis of spinal infection, tumor, or fracture. Note that range-of-motion measurements of the back are of limited value.

2. Regional back exam: Vertebral point tenderness to palpation, when associated with other signs or symptoms, may be suggestive of, but not specific to, spinal fracture or infection. Palpable soft-tissue tenderness is, by itself, an even less specific or reliable finding.

3. Neurologic screening: More than 90% of all clinically significant lower extremity radiculopathy due to disc herniation involves the L5 or S1 nerve root at the L4-5 or L5-S1 disc level. Four tests seek evidence of nerve root impairment, peripheral neuropathy, or spinal cord dysfunction:

### **a. Testing for Muscle Strength**

The patient's inability to toe walk, heel walk, or do a single squat and rise may indicate muscle weakness. Strength-test dorsiflexors of the ankle or great toe, hamstrings, and ankle evertors.

### **b. Circumferential Measurements**

Muscle atrophy can be detected by circumferential measurements of the calf and thigh bilaterally. Symmetrical muscle bulk and strength are expected, although differences of less than 2 cm may be a normal variation.

### **c. Reflexes**

The ankle-jerk reflex tests mostly the S1 nerve root, and the knee-jerk reflex tests mostly the L4 nerve root; the L5 reflex is tested by use of the biceps femoris tendon as the target tendon. The reliability of reflex testing can be diminished in the presence of adjacent joint or muscle problems. Up-going toes in response to stroking the sole of the foot may indicate upper motor-neuron abnormalities rather than a common low back problem.

### **d. Sensory Examination**

Testing light touch or pressure in the medial (L4), dorsal (L5), and lateral (S1) aspects of the foot is usually sufficient for sensory screening. ([Figure 1](#))

4. Testing for sciatic nerve root tension: The straight leg raising (SLR) test can detect tension on the L5 and/or S1 nerve root. ([Figure 2](#)) The SLR may reproduce leg pain by stretching nerve roots irritated by a disc herniation. Pain below the knee at less than 70° of SLR, aggravated by dorsiflexion of the ankle and relieved by ankle plantar flexion or external limb rotation, is most suggestive of tension on the L5 or S1 nerve root related to disc herniation. Reproducing back pain alone with SLR testing does not indicate significant nerve root tension. Crossover pain occurs when SLR of the patient's uninvolved limb elicits pain in the leg with sciatica. Crossover pain is a stronger indication of nerve root compression than pain elicited from raising the straight painful leg. Sitting knee extension can also test sciatic tension. With the patient sitting on a table, both hip and knees flexed at 90°, slowly extend the knee as if evaluating the

patella or bottom of the foot. This maneuver stretches nerve roots as much as a moderate degree of supine SLR. The patient with significant nerve root irritation will tend to protest or lean backward to reduce tension on the nerve.

More than 90% of all clinically significant lower extremity radiculopathy due to disc herniation involves the L5 or S1 nerve root at the L4-5 or L5-S1 disc level. See the clinical features of nerve root compression in [Figure 1](#).

### ***Inconsistent Findings and Pain Behavior***

You may have cases when you suspect a patient's complaints are caused by nonphysical factors. Indications might be exaggerated pain drawings, inconsistent responses on examination, or a strongly positive supine SLR test without complaint on sitting knee extension.

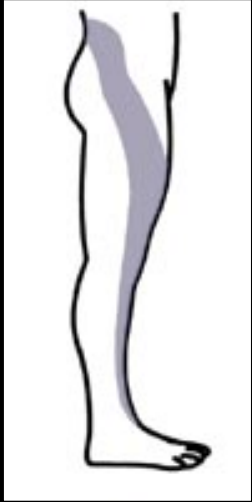
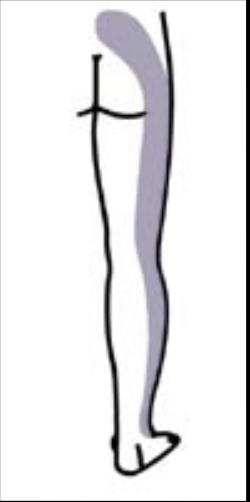
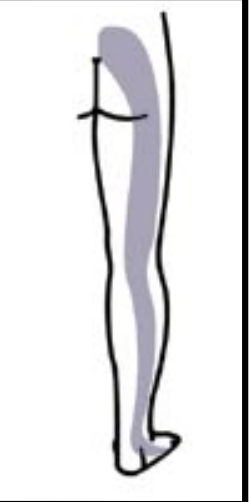
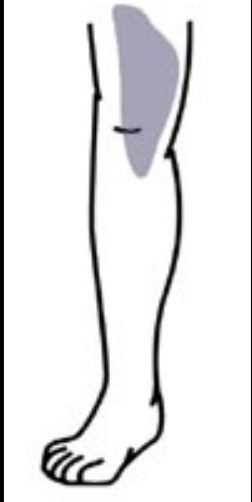
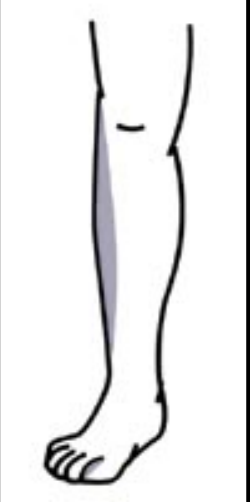
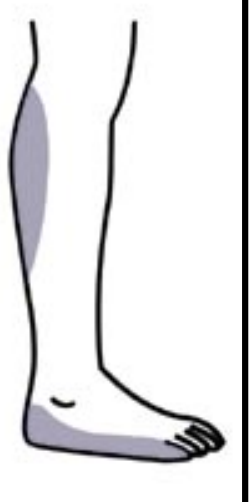
Inconsistencies or pain behaviors may be the patient's plea for help, and a response to psychologic or socioeconomic pressures. If possible, address these issues with counseling or referral—the overall goal should be to facilitate the patient's recovery and avoid the development of chronic low back disability.

### **Red Flag Testing**

In patients with the following conditions, further testing may be indicated, including an anterior/posterior or lateral x-ray and imaging studies:

- More than 50 years old (increased risk of malignancy, compression fracture)
- Pain at rest (increased incidence of clinically significant pathology)
- History of cancer (rule out metastatic disease)
- Fever above 38°C (100.4°F) for more than 48 hours without obvious cause
- Neuromotor deficit—progressive or new onset (computed tomography or magnetic resonance imaging may be the preferred study)
- Serious accident or injury (fall from heights, blunt trauma, motor vehicle accident—this does not include twisting or lifting injury unless other risk factors, eg, history of osteoporosis, are present)
- Failure to respond after 6 weeks of conservative therapy
- Clinical suspicion of ankylosing spondylitis
- Loss of bowel or bladder control

# Figure 1. Testing for lumbar nerve root compromise

Nerve Root	L4	L5	S1
Pain			
Numbness			
Motor Weakness	Extension of quadriceps	Dorsiflexion of great toe and foot	Plantar flexion of great toe and foot
Screening Exam	Squat & rise	Heel walking	Walking on toes
Reflexes	Knee jerk diminished	None reliable	Ankle jerk diminished

## Figure 2. Instructions for the straight leg raising (SLR) test

1. Ask the patient to lie on a table in the supine position, as straight as possible.

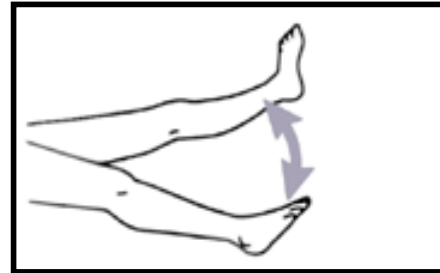


2. With one hand placed above the knee of the leg being examined, exert enough firm pressure to keep the knee fully extended. Ask the patient to relax.

3. With the other hand cupped under the heel, slowly raise the straight limb. Tell the patient, "If this bothers you, let me know, and I will stop."

4. Monitor for any movement of the pelvis before complaints are elicited. True sciatic tension should elicit complaints before the hamstrings are stretched enough to move the pelvis.

5. Estimate the degree of leg elevation that elicits complaint from the patient. Then determine the most distal area of discomfort: back, hip, thigh, knee, or below the knee.



6. While holding the leg at the limit of straight leg raising, dorsiflex the ankle. Note whether this aggravates the pain. Internal rotation of the limb can also increase the tension on the sciatic nerve roots.



## **TREATMENT PLAN**

Assuming that symptoms have not lasted longer than 4 weeks and do not indicate a serious underlying problem, a focused medical history and physical examination are usually sufficient. (See Algorithms 1 and 2.) Conservative treatment is recommended. The physician should reassure patients that these types of back problems usually resolve themselves within several weeks and provide them with information to facilitate their recovery (see “Caring For Your Back” for patients).

The management of most patients’ symptoms focuses on avoiding debilitation and improving physical conditioning through an incrementally increased exercise program. The goal is to build activity tolerance and overcome individual limitations. At this point in treatment, symptom control methods are only an adjunct to making rehabilitation exercises more tolerable. Prescribe low-stress activities to improve general stamina (eg, walking, biking, swimming). While exercise may increase symptoms at first, it will ultimately speed recovery.

No evidence exists to indicate that using any one type of back-specific exercise machine or stretching the back helps patients with acute symptoms. Conditioning exercises for trunk muscles are more mechanically stressful to the back than aerobic exercise and are not recommended during the first few weeks of symptoms. They may be useful later to help patients regain and maintain activity tolerance. You may also recommend physical or occupational therapy to train the patient to safely perform activities required at home or work.

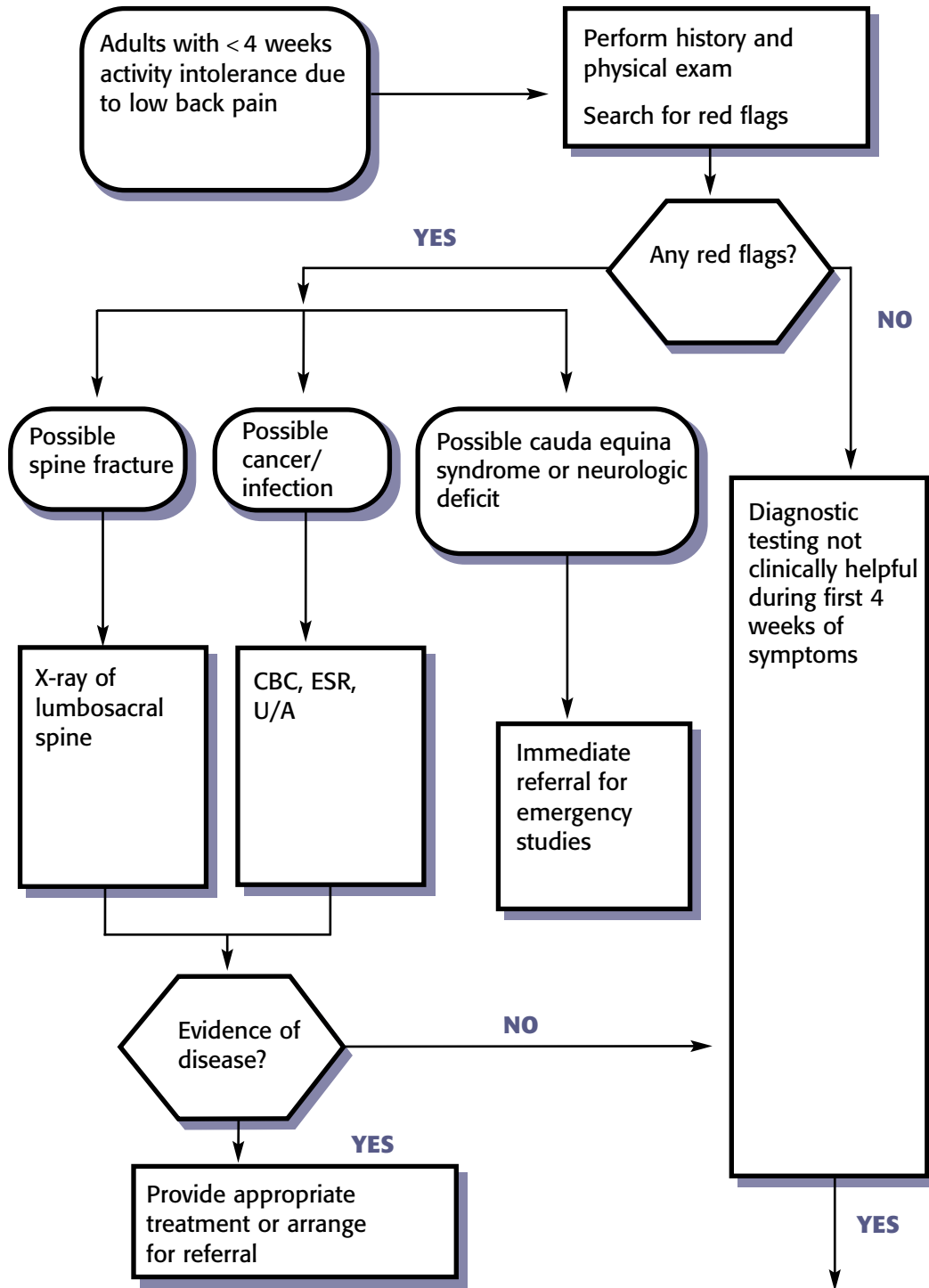
### **Pharmaceutical Pain Control**

Most patients are worried about pain control and may ask for a prescription pain reliever or muscle relaxant. Your first and often best line of treatment should be over-the-counter medication, but you may have to educate patients regarding the effectiveness of nonprescription analgesics, such as ibuprofen, acetaminophen, or aspirin. Aspirin and other NSAIDs are not recommended for use in combination with one another due to the risk of GI complications. A short course of muscle relaxants and opioids should be options only if the patient continues to have severe symptoms and activity limitations.

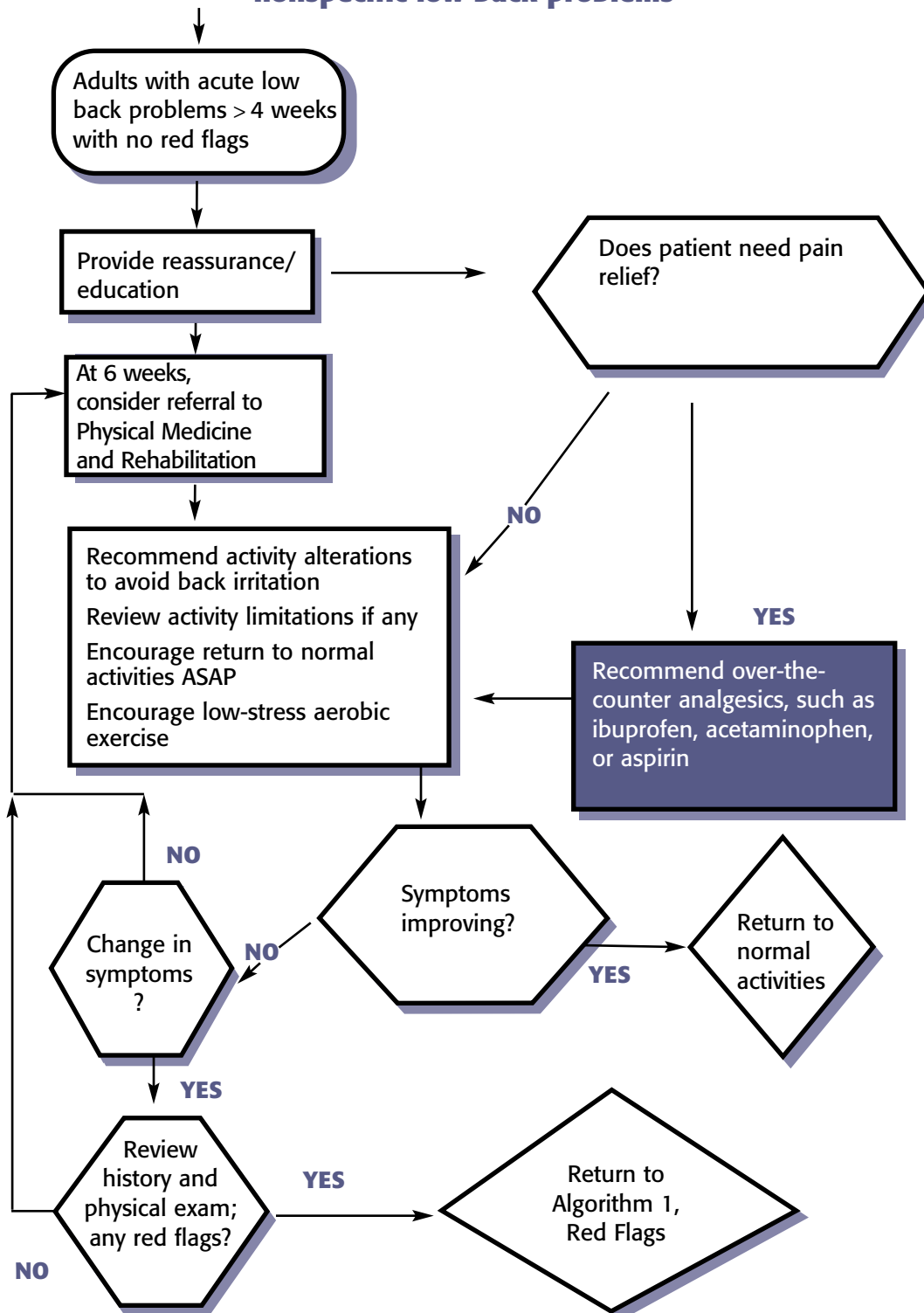
### **Physical Methods of Symptom Relief**

Muscle spasm is a response of the body to a stressor. During the first 4 weeks of low back pain, physical modalities are usually not medically necessary or beneficial. However, some techniques may provide temporary relief, such as the application of heat or cold or using shoe insoles. Instruct patients on safe lifting techniques: limit twisting, bending, and reaching, and keep the object close to the navel. Few patients will benefit from bed rest, and prolonged bed rest can be debilitating. Two to 4 days of bed rest are reserved for patients with the most severe limitations, primarily due to leg pain. If the patient has severe incapacitating or disabling pain, or has significant functional limitations, you may consider early referral to a trained spine therapy professional and/or physical therapy.

### Algorithm 1: Initial evaluation and treatment of acute low back problems



## Algorithm 2: Initial and follow-up treatment of acute, nonspecific low back problems



## **Work Activities**

Depending on the patient's age, general health, perceptions of safe activities, and occupation, the clinician can suggest limits of sitting, standing, walking, or lifting. The clinician should make clear to patients and employers that:

- Even moderately heavy unassisted lifting may aggravate back symptoms
- Any restrictions are intended to allow for spontaneous recovery or time to build activity tolerance through exercise
- Activity restrictions are prescribed for a short time period only, depending on work requirements (no benefits apparent beyond 3 months)

## **Special Studies and Referral**

Because 90% of patients suffering from acute low back pain will recover on their own, routine testing and imaging studies are not recommended during the first month of back symptoms except when an underlying condition is suspected as a result of history or examination. If a patient's limitations due to low back symptoms do not improve within 4 weeks, or if an indicator of serious disease is found at any time, the primary care clinician should refer the patient for special diagnostic studies.

### *Neurosurgery or Surgical Orthopedics Consultation:*

Patient is surgical candidate

Cauda equina syndrome

Progressive or significant neuromotor deficit (eg, foot drop or functional muscle weakness such as hip flexion weakness or quadriceps weakness)

Persistent neuromotor deficit after >4 to 6 weeks of conservative treatment (does not include minor sensory changes or reflex changes)

Chronic sciatica with positive SLR >4 to 6 weeks

### *Neurology Consultation:*

Chronic sciatica >6 weeks

Atypical chronic leg pain (negative SLR)

New or progressive neuromotor deficit

### *Magnetic Resonance Imaging Indications:*

Refractory radiculopathy

Focal motor deficit

Myelopathy

Suspected metastasis

Tumor

Osteomyelitis

Discitis

Paraspinal abscess/fluid collection

Vascular malformation

Bone marrow replacement processes

Congenital spinal anomalies (spina bifida)

### *Computed Tomography Indications:*

Acute trauma (allows for rapid assessment):

To further characterize extent of fracture, fracture fragments, or subluxation evident on conventional radiographs

To exclude clinically suspected fracture or alignment abnormality not visualized on conventional radiographs

Assessment of presence and location of foreign bodies, eg, bullet fragments

Fracture follow-up; assessment of healing versus nonunion

Postoperative assessment; assessment of fusion, alignment, location and integrity of metallic fusion screws and devices

Assessment of suspected congenital/developmental fractures or osseous abnormalities, eg, primary bone tumors

Magnetic resonance imaging contraindicated; pacemaker, implants, etc.

Magnetic resonance imaging claustrophobia issues

Preoperative assessment; three-dimensional computed tomography rendering

### **Comprehensive Physical and Psychosocial Reevaluation**

A comprehensive reevaluation including a general assessment should be done for patients not improving by 6 weeks. Back pain and sciatica that persist longer than 6 weeks are defined as chronic. Consider physical medicine and rehabilitation consultation if no underlying causes have been identified.

### **The following texts served as primary resources for these guidelines:**

Institute for Clinical Systems Improvement (ICSI). *Adult Low Back Pain*.  
Bloomington, Minn. May 2001.

Bigos S, Bowyer O, Braen G, et al. *Acute Low Back Problems in Adults*. Clinical Practice Guidelines, Quick Reference Guide Number 14. Rockville, Md: U.S. Department of Health and Human Services, Public Health Service, Agency for Healthcare Research and Quality (formerly the Agency for Health Care Policy and Research); 1994 AHCPH Publication 95-0643.

Deyo R, Rainville J, Kent D. What can the history and physical examination tell us about low back pain? *JAMA*. 1992;268:760-765.

Haig A. Low-back pain. In: Grabois M, Garrison S, Hart K, Lehmkuhl L, eds. *Physical Medicine and Rehabilitation: The Complete Approach*. Malden: Blackwell Science; 2000:1035-1049.

Steven I, Fraser R. Spine update: clinical practice guidelines. Particular reference to the management of pain in the lumbosacral spine. *Spine*. 1996;21:1593-1596.