



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE



MAR 6 1998

MEMORANDUM FOR SEE DISTRIBUTION

FROM: AFMOA/CC
110 Luke Avenue, Room 405
Bolling AFB, DC 20332-7050

SUBJECT: Interim Ergonomics Policy

Building Healthy Communities – Intervention to Prevention – is critical to maintaining well-being for optimal mission performance and quality of life. This includes all aspects of occupational safety and health, including ergonomics.

Currently, ergonomics related injuries and illnesses account for more than 40 percent of the Air Force's \$119M annual workman's compensation costs and untold amounts of pain, suffering and lost productivity. This directly affects the Air Force's ability to accomplish our mission.

To resolve this problem, I would like you to implement the attached Interim Ergonomics Policy. This initiative is the beginning of building a strong ergonomic component of our occupational health program. As more data becomes available, we will be better able to focus our program on risk-based prevention. A strong, fact-based ergonomics program promises substantial savings in both direct and indirect and improved productivity.

My point of contact for this initiative is Maj Art Kaminski, 110 Luke Avenue, Room 404, Bolling AFB, DC 20332-7050, DSN 297-4431.

EARL W. MABRY, II, Maj Gen, USAF, MC
Commander
Air Force Medical Operations Agency
Office of the Surgeon General

Attachment:
Interim Ergonomics Policy

DISTRIBUTION LIST:

HQ ACC/SG

HQ AFMC/SG

HQ AFSPC/SG

HQ AMC/SG

HQ AETC/SG

HQ PACAF/SG

HQ USAFE/SG

HQ AFPC/DPAM

HQ AFSOL/SG

HSC/CC

AL/AO

HQ AFRC/SG

HQ AFIA/SG

AFMSA/CC

NGB/SGP

HQ USAF/SG

HQ AIA/SG

USCENTCOM/CCSG

Attachment 1
Interim Ergonomics Policy
6 Mar 98

1.0 Purpose. The ability of the Air Force to conduct effective and sustain combat operations depends on the health of its personnel. Aerospace Medical Policy is aimed at identifying and preventing illness and injury in order to maintain a healthy and productive work environment. This plan provides the guidance to specifically and prudently address work-related musculo-skeletal disorders (WMSDs) and implement an integrated, risk-based ergonomics program.

2.0 Goals and Objectives. The goal of this plan is to minimize the effect of work-related musculoskeletal disorders (WMSD) throughout the Air Force. Specific objectives of this policy are to:

2.1 Ascertain the parameters of recordable cases of WMSDs in the Air Force as precisely as possible.

2.2 Develop and implement focused programs designed to prevent and eliminate the most significant causes of WMSDs

2.3 Integrate recognition, evaluation and control of WMSDs into established occupational health programs.

2.4 Use the Environment, Safety and Occupational Health (ESOH) Technical Planning Integrated Product Team (TPIPT) process to provide a needs-to-solution approach to continuously improve the Air Force Occupational Health Program and specifically the ergonomics program.

2.5 Ensure planning for resources to execute the ergonomics program is included in modernization guidance as published in the Air Force Medical Service Mission Support Plan.

2.6 Provide the line of the Air Force with an effective program that enhances mission accomplishment by reducing WMSDs and that focuses limited resources toward addressing hazards, that represent an unacceptable risk, to decision makers.

3.0 Responsibilities.

3.1 Air Force Medical Operations Agency (AFMOA)

3.1.1 Provide strategic direction and advocacy for ergonomics program development and execution.

3.1.2 Develop partnering arrangements with other professionals such as Safety and Civilian Personnel as needed to implement an integrated WMSD prevention program.

3.1.3 Update policy as necessary

3.2 Major Command Surgeons.

3.2.1 Support ergonomic initiatives and participate in the Goal 4 investment process by ensuring ergonomic requirements and technology needs are validated and solution options are reviewed. Include these in MAJCOM priorities and use the Mission Support Plan (MSP) and PPBS to acquire resources.

3.2.2 Use ESOH TPIPT solutions to prioritize MAJCOM programs with respect to hazards posing an unacceptable risk.

3.2.3 Review and forward program review data to AFMOA.

3.3 AFMC Surgeon.

3.3.1 The AFMC Surgeon is designated lead MAJCOM for the ergonomics program, as defined by the Goal 4 investment process.

3.3.2 Provide oversight and assistance for program execution and coordinates with other MAJCOMs to ensure standardized business practices that solve common problems while maintaining flexibility necessary for MAJCOM specific problems.

3.3.3 Assist centers of expertise in program execution.

3.3.4 Coordinate (with Safety, Civilian Personnel, and other organizations as necessary) the recognition, evaluation and control of back injuries. This component requires emphasis due to current data that indicates: a majority of Air Force ergonomic compensation claims are related to back injuries, and most of Air Force ergonomic compensation claims are clustered in AFMC.

3.4 HSC/XRE, ESOH TPIPT Secretariat

3.4.1 Collect and prioritize ESOH TPIPT submitted programmatic needs for ergonomics

3.4.2 Recommend solutions to meet programmatic needs for ergonomics.

3.4.3 Continue to assess future ergonomics requirements and needs and work with IERA to integrate solutions into existing plans, roadmaps, and budgets.

3.5 Institute for ESOH Risk Analysis (IERA)

3.5.1 Serve as agent for demonstration, validation and execution of ergonomic initiatives.

3.5.2 Use MAJCOM validated and prioritized solutions to build programmatic requirements, plans and roadmaps for program execution.

3.5.3 Recommend in roadmaps focused risk-based prevention methods to focus resources toward solving ergonomic problems characterized by unacceptable risks.

3.5.4 Provide quarterly program reviews through the lead MAJCOM to AFMOA.

3.6 Medical Group Commanders.

3.6.1 Ensure that recognition, evaluation and control and prevention of ergonomic hazards, especially back injuries, are incorporated into existing occupational health programs. A risk-based approach will be used to ensure maximum resource leverage, optimized operational effectiveness, and protection of our people's health. The following elements should be present: (a) workplace analysis, (b) hazard prevention and control, (c) prevention-focused health care management, (d) education and training, and (e) program evaluation and review.

3.6.2 Use the guidance in our 10 Oct 97 policy letter, Bioenvironmental Engineering Workplace Surveillance Strategy, to prioritize investigation of ergonomic hazards that present unacceptable risks on a "worst-first" basis.

3.6.3 Develop partnerships with other agencies such as Safety and Civilian Personnel whenever possible

3.6.4 Ensure Risk Assessment Codes (RAC) are assigned to ergonomic hazards.

3.6.5 Ensure occupational safety and health workers and providers are briefed that back support belts or wrist splints ARE NOT RECOGNIZED as personal protective equipment and should not be used in the prevention of back or wrist injuries. These devices are considered medical appliances, and may be prescribed by a credentialed health care provider who will assume responsibility for medical clearance, proper fit of the device, and treatment monitoring and supervision. Use of such devices must be in concert with appropriate training to be effective and safe.

3.6.6 Use the Goal 4 investment plan process to communicate ergonomic non-material, material and technology needs.

3.6.7 Report progress and lessons learned to AFMOA through MAJCOMs semiannually (Starting in November 1998)

Appendix 1 - Glossary of Key Terms

Ergonomics. The field of study that seeks to fit the job to the person, rather than the person to the job. This is achieved by the evaluation and design of workplaces, environments, jobs, tasks, equipment, and processes in relationship to human capabilities and interactions in the workplace.

Hazard Prevention and Control (Ergonomics). Effective design or redesign of a task or workstation is the preferred method of preventing and controlling exposure. The methods of intervention (in order of priority) to be used are: process elimination, engineering controls, substitution, work practices, and administrative controls (e.g., adjustment of work-rest cycles, slowing work pace, job broadening, task rotation).

Health Care Management. Written guidelines for early recognition, evaluation, treatment, light or restricted duty, and follow-up for employees with WMSDs. These guidelines shall be used at the local level to develop written health care management protocols.

Workplace Analysis (Ergonomics). Systematic passive surveillance (defined below) used to identify work-related musculoskeletal disorders. If there is evidence that musculoskeletal hazards exist, active surveillance is used to identify, evaluate, and manage workplace risks.

a. Systematic passive surveillance includes analyzing data provided in existing reports and data sources such as routine injury and illness reports, log and summary of occupational injuries and illnesses, Federal Employees Compensation Act (FECA) claims, medical and safety records, and workforce reports, employee complaints, hazard reports, installation hazard abatement logs, physical examinations and suggestions. WMSDs are evaluated to determine occupational risk factors, potential for work relatedness, and to identify other workers potentially at risk.

b. Active surveillance includes identification of ergonomic risk factors during routine safety and health workplace surveillance, and more detailed analysis and intervention if warranted.

Workplace Ergonomic Risk Factors. Actions in the workplace, workplace conditions, or a combination thereof, that may cause or aggravate a work-related musculoskeletal disorder. Workplace risk factors include, but are not limited to, repetitive, forceful or prolonged exertions; frequent or heavy lifting; pushing, pulling, or carrying of heavy objects; a fixed or awkward work posture, contact stress; localized or whole-body vibration, cold temperatures and poor lighting (leading to awkward postures). These workplace risk factors can be intensified by work organization characteristics such as inadequate work-rest cycles, excessive work pace and/or duration, unaccustomed work, lack of task variability, machine work, inappropriate tools or work surfaces, and piece rate.

Work-related Musculoskeletal Disorder (WMSD). An injury or an illness of the muscles, tendons, ligaments, peripheral nerves, joints, cartilage (including intervertebral discs), bones and/or supporting blood vessels in either the upper or lower extremities, back, or neck, that is associated with musculoskeletal disorder workplace risk factors and are not limited to cumulative trauma disorders, repetitive strain injuries or illnesses, repetitive motion injuries or illnesses, and repetitive stress injuries or illnesses. Refers collectively to signs, or persistent symptoms, or clinically-diagnosed work-related musculoskeletal disorders when they are caused or aggravated by exposure to workplace risk factors.

APPENDIX 2

CLINICAL PRACTICE GUIDELINES – BACK INJURIES

Quick Reference Guide for Clinicians

Number 14

Acute Low Back Problems in Adults: Assessment and Treatment



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

Purpose and Scope

Low back problems affect virtually everyone at some time during their life. Surveys indicate a yearly prevalence of symptoms in 50 percent of working age adults; 15-20 percent seek medical care. Low back problems rank high among the reasons for physician office visits and are costly in terms of medical treatment, lost productivity, and nonmonetary costs such as diminished ability to perform or enjoy usual activities. In fact, for persons under age 45, low back problems are the most common cause of disability. Acute low back problems are defined as activity intolerance due to lower back or back-related leg symptoms of less than 3 months' duration. About 90 percent of patients with acute low back problems spontaneously recover activity tolerance within 1 month. The approach to a new episode in a patient with a recurrent low back problem is similar to that of a new acute episode.

The findings and recommendations included in the *Clinical Practice Guideline* define a paradigm shift away from focusing care exclusively on the pain and toward helping patients improve activity tolerance. The intent of this *Quick Reference Guide* is to bring to life this paradigm shift. The guide provides information on the detection of serious conditions that occasionally cause low back symptoms (conditions such as spinal fracture, tumor, infection, cauda equina syndrome, or non-spinal conditions). However, treatment of these conditions is beyond the scope of this guideline. In addition, the guideline does not address the care of patients younger than 18 years or those with chronic back problems (back-related activity limitations of greater than 3 months' duration).

Initial Assessment

- Seek potentially dangerous underlying conditions.
- In the absence of signs of dangerous conditions, there is no need for special studies since 90 percent of patients will recover spontaneously within 4 weeks.

A focused medical history and physical examination are sufficient to assess the patient with an acute or recurrent limitation due to low back symptoms of less than 4 weeks duration. Patient responses and findings on the history and physical examination, referred to as "red flags"(Table 1), raise suspicion of serious underlying spinal conditions. Their absence rules out the need for special studies during the first 4 weeks of symptoms when spontaneous recovery is expected. The medical history and physical examination can also alert the clinician to non-spinal pathology (abdominal, pelvic, thoracic) that can present as low back symptoms. Acute low back symptoms can then be classified into one of three working categories:

- *Potentially serious spinal condition:* tumor, infection, spinal fracture, or a major neurologic compromise, such as cauda equina syndrome, suggested by a red flag.
- *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.

Medical History

In addition to detecting serious conditions and categorizing back symptoms, the medical history establishes rapport between the clinician and patient. The patient's description of present symptoms and limitations, duration of symptoms, and history of previous episodes defines the problem. It also provides insight into concerns, expectations, and nonphysical (psychological and socioeconomic) issues that may alter the patient's response to treatment. Assessment tools such as pain drawings and visual analog pain-rating scales may help further document the patient's perceptions and progress.

A patient's estimate of personal activity intolerance due to low back symptoms contributes to the clinical assessment of the severity of the back problem, guides treatment, and establishes a baseline for recommending daily activities and evaluating progress.

Open-ended questions, such as those listed below, can gauge the need for further discussion or specific inquiries for more detailed information:

- What are your symptoms?
- Pain, numbness, weakness, stiffness?
- Located primarily in back, leg, or both?

- Constant or intermittent?
- How do these symptoms limit you?
- How long can you sit, stand, walk?
- How much weight can you lift?
- When did the current limitations begin?
- How long have your activities been limited? More than 4 weeks?
- Have you had similar episodes previously?
- Previous testing or treatment?
- What do you hope we can accomplish during this visit?

Physical Examination

Guided by the medical history, the physical examination includes:

- General observation of the patient.
- A regional back exam.
- Neurologic screening.
- Testing for sciatic nerve root tension.

The examination is mostly subjective since patient response or interpretation is required for all parts except reflex testing and circumferential measurements for atrophy.

Addressing Red Flags

Physical examination evidence of severe neurologic compromise that correlates with the medical history may indicate a need for immediate consultation. The examination may further modify suspicions of tumor, infection, or significant trauma. A medical history suggestive of non-spinal pathology mimicking a back problem may warrant examination of pulses, abdomen, pelvis, or other areas.

Observation and Regional Back Examination

Limping or coordination problems indicate the need for specific neurologic testing. Severe guarding of lumbar motion in all planes may support a suspected diagnosis of spinal infection, tumor, or fracture. However, given marked variations among persons with and without symptoms, range-of-motion measurements of the back are of limited value.

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

Neurologic Screening

The neurologic examination can focus on a few tests that seek evidence of nerve root impairment, peripheral neuropathy, or spinal cord dysfunction. Over 90 percent 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. The clinical features of nerve root compression are summarized in Figure 1.

Testing for Muscle Strength.

The patient's inability to toe walk (calf muscles, mostly S1 nerve root), heel walk (ankle and toe dorsiflexor muscles, L5 and some L4 nerve roots), or do a single squat and rise (quadriceps muscles, mostly L4 nerve root) may indicate muscle weakness. Specific testing of the dorsiflexor muscles of the ankle or great toe (suggestive of L5 or some L4 nerve root dysfunction), hamstrings and ankle evertors (L5-S1), and toe flexors (S1) is also important.

Circumferential Measurements.

Muscle atrophy can be detected by circumferential measurements of the calf and thigh bilaterally. Differences of less than 2 cm in measurements of the two limbs at the same level may be a normal variation. Symmetrical muscle bulk and strength are expected unless the patient has a neurologic impairment or a history of lower extremity muscle or joint problem.

Reflexes.

The ankle jerk reflex tests mostly the S1 nerve root and the knee jerk reflex tests mostly the L4 nerve root; neither tests the L5 nerve root. 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 plantar footpad (Babinski or plantar response) may indicate upper motor-neuron abnormalities (such as myelopathy or demyelinating disease) rather than a common low back problem.

Sensory Examination.

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

Clinical tests for sciatic tension

The straight leg raising (SLR) test (Figure 2) can detect tension on the L5 and/or S1 nerve root. SLR may reproduce leg pain by stretching nerve roots irritated by a disc herniation.

Pain below the knee at less than 70 degrees of straight leg raising, 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 straight raising of the patient's well 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 limb.

Sitting knee extension (Figure 3) can also test sciatic tension. The patient with significant nerve root irritation tends to complain or lean backward to reduce tension on the nerve.

Inconsistent Findings and Pain Behavior

The patient who embellishes a medical history, exaggerates pain drawings, or provides responses on physical examination inconsistent with known physiology can be particularly challenging. A strongly positive supine straight leg raising test without complaint on sitting knee extension and inconsistent responses on examination raise a suspicion that nonphysical factors may be affecting the patient's responses. "Pain behaviors" (verbal or nonverbal communication of distress or suffering) such as amplified grimacing, distorted gait or posture, moaning, and rubbing of painful body parts may also cloud medical issues and even evoke angry responses from the clinician.

Interpreting inconsistencies or pain behaviors as malingering does not benefit the patient or the clinician. It is more useful to view such behavior and inconsistencies as the patient's attempt to enlist the practitioner as an advocate, a plea for help. The patient could be trapped in a job where activity requirements are unrealistic relative to the person's age or health. In some cases, the patient may be negotiating with an insurer or be involved in legal actions. In patients with recurrent back problems, inconsistencies and amplifications may simply be habits learned during previous medical evaluations. In working with these patients, the clinician should attempt to identify any psychological or socioeconomic pressures that might be influenced in a positive manner. The overall goal should always be to facilitate the patient's recovery and avoid the development of chronic low back disability.

Initial Care

- Education and assurance.
- Patient comfort.
- Activity alterations.

Patient Education

If the initial assessment detects no serious condition, assure the patient that there is "no hint of a dangerous problem" and that "a rapid recovery can be expected." The need for education will vary among patients and during various stages of care. An obviously apprehensive patient may require a more detailed

explanation. Patients with sciatica may have a longer expected recovery time than patients with nonspecific back symptoms and thus may need more education and reassurance. Any patient who does not recover within a few weeks may need more extensive education about back problems and the reassurance that special studies may be considered if recovery is slow.

Patient Comfort

Comfort is often a patient's first concern. Nonprescription analgesics will provide sufficient pain relief for most patients with acute low back symptoms. If treatment response is inadequate, as evidenced by continued symptoms and activity limitations, prescribed pharmaceuticals or physical methods may be added. Comorbid conditions, side effects, cost, and provider/patient preference should guide the clinician's choice of recommendations. Table 2 summarizes comfort options.

Oral Pharmaceuticals

The safest effective medication for acute low back problems appears to be acetaminophen. Nonsteroidal anti-inflammatory drugs (NSAIDs), including aspirin and ibuprofen, are also effective although they can cause gastrointestinal irritation/ulceration or (less commonly) renal or allergic problems. Phenylbutazone is not recommended due to risks of bone marrow suppression. Acetaminophen may be used safely in combination with NSAIDs or other pharmacologic or physical therapeutics, especially in otherwise healthy patients.

Muscle relaxants seem no more effective than NSAIDs for treating patients with low back symptoms, and using them in combination with NSAIDs has no demonstrated benefit. Side effects including drowsiness have been reported in up to 30 percent of patients taking muscle relaxants.

Opioids appear no more effective than safer analgesics for managing low back symptoms. Opioids should be avoided if possible and, when chosen, used only for a short time. Poor patient tolerance and risks of drowsiness, decreased reaction time, clouded judgment, and potential misuse/dependence have been reported in up to 35 percent of patients. Patients should be warned of these potentially debilitating problems.

Physical Methods

Manipulation, defined as manual loading of the spine using short or long leverage methods, is safe and effective for patients in the first month of acute low back symptoms without radiculopathy. For patients with symptoms lasting longer than 1 month, manipulation is probably safe but its efficacy is unproven. If manipulation has not resulted in symptomatic and functional improvement after 4 weeks, it should be stopped and the patient reevaluated.

Traction applied to the spine has not been found effective for treating acute low back symptoms.

Physical modalities such as massage, diathermy, ultrasound, cutaneous laser treatment, biofeedback, and transcutaneous electrical nerve stimulation (TENS) also have no proven efficacy in the treatment of acute low back symptoms. If requested, the clinician may wish to provide the patient with instructions on self-application of heat or cold therapy for temporary symptom relief.

Invasive techniques such as needle acupuncture and injection procedures (injection of trigger points in the back; injection of facet joints; injection of steroids, lidocaine, or opioids in the epidural space) have no proven benefit in the treatment of acute low back symptoms.

Other miscellaneous therapies have been evaluated. No evidence indicates that shoe lifts are effective in treating acute low back symptoms or limitations, especially when the difference in lower limb length is less than 2 cm. Shoe insoles are a safe and inexpensive option if requested by patients with low back symptoms who must stand for prolonged periods. Low back corsets and back belts, however, do not appear beneficial for treating acute low back symptoms.

Activity Alteration

To avoid both undue back irritation and debilitation from inactivity, recommendations for alternate activity can be helpful. Most patients will not require bed rest. Prolonged bed rest (more than 4 days) has potential debilitating effects, and its efficacy in the treatment of acute low back problems is unproven.

Two to four days of bed rest are reserved for patients with the most severe limitations (due primarily to leg pain).

Avoiding undue back irritation.

Activities and postures that increase stress on the back also tend to aggravate back symptoms. Patients limited by back symptoms can minimize the stress of lifting by keeping any lifted object close to the body at the level of the navel. Twisting, bending, and reaching while lifting also increase stress on the back. Sitting, although safe, may aggravate symptoms for some patients. Advise these patients to avoid prolonged sitting and to change position often. A soft support placed at the small of the back, armrests to support some body weight, and a slight recline of the chair back may make required sitting more comfortable.

Avoiding debilitation.

Until the patient returns to normal activity, aerobic (endurance) conditioning exercise such as walking, stationary biking, swimming, and even light jogging may be recommended to help avoid debilitation from inactivity. An incremental, gradually increasing regimen of aerobic exercise (up to 20 to 30 minutes daily) can usually be started within the first 2 weeks of symptoms. Such conditioning activities have been found to stress the back no more than sitting for an equal time period on the side of the bed. Patients should be informed that exercise may increase symptoms slightly at first. If intolerable, some exercise alteration is usually helpful.

Conditioning exercises for trunk muscles are more mechanically stressful to the back than aerobic exercise. Such exercises are not recommended during the first few weeks of symptoms, although they may later help patients regain and maintain activity tolerance.

There is no evidence to indicate that back-specific exercise machines are effective for treating acute low back problems. Neither is there evidence that stretching of the back helps patients with acute symptoms.

Work Activities

When requested, clinicians may choose to offer specific instructions about activity at work for patients with acute limitations due to low back symptoms. The patient's age, general health, and perceptions of safe limits of sitting, standing, walking or lifting (noted on initial history) can help provide reasonable starting points for activity recommendations. Table 3 provides a guide for recommendations about sitting and 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 upon work requirements (no benefits apparent beyond 3 months).

Special Studies and Diagnostic Considerations

Routine testing (laboratory tests, plain x-rays of the lumbosacral spine) and imaging studies are not recommended during the first month of activity limitation due to back symptoms except when a red flag noted on history or examination raises suspicion of a dangerous low back or non-spinal condition. If a patient's limitations due to low back symptoms do not improve in 4 weeks, reassessment is recommended. After again reviewing the patient's activity limitations, history, and physical findings, the clinician may then consider further diagnostic studies, and discuss these with the patient.

Timing and Limits of Special Studies

Waiting 4 weeks before considering special tests allows 90 percent of patients to recover spontaneously and avoids unneeded procedures. This also reduces the potential confusion of falsely labeling age-related changes on imaging studies (commonly noted in patients older than 30 without back symptoms) as the cause of the acute symptoms. In the absence of either red flags or persistent activity limitations due to continuous limb symptoms, imaging studies (especially plain x-rays) rarely provide information that

changes the clinical approach to the acute low back problem.

Selection of Special Studies

Prior to ordering imaging studies the clinician should have noted either of the following:

- The emergence of a red flag.
- Physiologic evidence of tissue insult or neurologic dysfunction.

Physiologic evidence may be in the form of definitive nerve findings on physical examination, electrodiagnostic studies (when evaluating sciatica), and a laboratory test or bone scan (when evaluating nonspecific low back symptoms). Unquestionable findings that identify specific nerve root compromise on the neurologic examination (see Figure 1) are sufficient physiologic evidence to warrant imaging. When the neurologic examination is less clear, however, further physiologic evidence of nerve root dysfunction should be considered before ordering an imaging study. Electromyography (EMG) including H-reflex tests may be useful to identify subtle focal neurologic dysfunction in patients with leg symptoms lasting longer than 3-4 weeks. Sensory evoked potentials (SEPs) may be added to the assessment if spinal stenosis or spinal cord myelopathy is suspected.

Laboratory tests such as erythrocyte sedimentation rate (ESR), complete blood count (CBC), and urinalysis (UA) can be useful to screen for nonspecific medical diseases (especially infection and tumor) of the low back. A bone scan can detect physiologic reactions to suspected spinal tumor, infection, or occult fracture.

Should physiologic evidence indicate tissue insult or nerve impairment, discuss with a consultant selection of an imaging test to define a potential anatomic cause (CT for bone, MRI for neural or other soft tissue). Anatomic definition is commonly needed to guide surgery or specific procedures. Selection of an imaging test should also take into consideration any patient allergies to contrast media (myelogram) or concerns about claustrophobia (MRI) and costs. A discussion with a specialist on selection of the most clinically valuable study can often assist the primary care clinician to avoid duplication. Table 4 provides a general comparison of the abilities of different techniques to identify physiologic insult and define anatomic defects. Missing from the table is discography, which is not recommended for assessing patients with acute low back symptoms.

In general, an imaging study may be an appropriate consideration for the patient whose limitations due to consistent symptoms have persisted for 1 month or more:

- When surgery is being considered for treatment of a specific detectable loss of neurologic function.
- To further evaluate potentially serious spinal pathology.

Reliance upon imaging studies alone to evaluate the source of low back symptoms, however, carries a significant risk of diagnostic confusion, given the possibility of falsely identifying a finding that was present before symptoms began.

Management Considerations After Special Studies

Definitive treatment for serious conditions (see Table 1) detected by special studies is beyond the scope of this guideline. When special studies fail to define the exact cause of symptoms, however, no patient should receive an impression that the clinician thinks "nothing is wrong" or that the problem could be "in their head." Assure the patient that a clinical workup is highly successful in detecting serious conditions, but does not reveal the precise cause of most low back symptoms.

Surgical Considerations

Within the first 3 months of acute low back symptoms, surgery is considered only when serious spinal pathology or nerve root dysfunction obviously due to a herniated lumbar disc is detected. A disc herniation, characterized by protrusion of the central nucleus pulposus through a defect in the outer annulus fibrosus, may trap a nerve root causing irritation, leg symptoms and nerve root dysfunction. The presence of a herniated lumbar disc on an imaging study, however, does not necessarily imply nerve root dysfunction. Studies of asymptomatic adults commonly demonstrate intervertebral disc herniations that apparently do not entrap a nerve root or cause symptoms.

Therefore, nerve root decompression can be considered for a patient if all of the following criteria exist:

- Sciatica is both severe and disabling.
- Symptoms of sciatica persist without improvement for longer than 4 weeks or with extreme progression.
- There is strong physiologic evidence of dysfunction of a specific nerve root with inter-vertebral disc herniation confirmed at the corresponding level and side by findings on an imaging study.

Patients with acute low back pain alone, without findings of serious conditions or significant nerve root compression, rarely benefit from a surgical consultation.

Many patients with strong clinical findings of nerve root dysfunction due to disc herniation recover activity tolerance within 1 month; no evidence indicates that delaying surgery for this period worsens outcomes. With or without an operation, more than 80 percent of patients with obvious surgical indications eventually recover. Surgery seems to be a luxury for speeding recovery of patients with obvious surgical indications but benefits fewer than 40 percent of patients with questionable physiologic findings. Moreover, surgery increases the chance of future procedures with higher complication rates. Overall, the incidence of first-time disc surgery complications, including infection and bleeding, is less than 1 percent. The figure increases dramatically with older patients or repeated procedures.

Direct and indirect nerve root decompression for herniated discs.

Direct methods of nerve root decompression include laminotomy (expansion of the interlaminar space for access to the nerve root and the offending disc fragments), microdiscectomy (laminotomy using a microscope), and laminectomy (total removal of laminae). Methods of indirect nerve root decompression include chemonucleolysis, the injection of chymopapain or other enzymes to dissolve the inner disc. Such chemical treatment methods are less efficacious than standard or microdiscectomy and have rare but serious complications. Any of these methods is preferable to percutaneous discectomy (indirect, mechanical disc removal through a lateral disc puncture).

Management of spinal stenosis.

Usually resulting from soft tissue and bony encroachment of the spinal canal and nerve roots, spinal stenosis typically has a gradual onset and begins in older adults. It is characterized by nonspecific limb symptoms, called *neurogenic claudication* or *pseudoclaudication*, that interfere with the duration of comfortable standing and walking. The symptoms are commonly bilateral and rarely associated with strong focal findings on examination. Neurogenic claudication, however, can be confused or coexist with *vascular claudication*, in which leg pain also limits walking. The symptoms of vascular insufficiency can be relieved by simply standing still while relief of neurogenic claudication symptoms usually require the patient to flex the lumbar spine or sit.

The surgical treatment for spinal stenosis is usually complete laminectomy for posterior decompression. Offending soft tissue and osteophytes that encroach upon nerve roots in the central spinal canal and foramen are removed. Fusion may be considered to stabilize a degenerative spondylolisthesis with motion between the slipped vertebra and adjacent vertebrae. Elderly patients with spinal stenosis who tolerate their daily activities usually need no surgery unless they develop new signs of bowel or bladder dysfunction. Decisions on treatment should take into account the patient's preference, lifestyle, other medical problems, and risks of surgery. Surgery for spinal stenosis is rarely considered in the first 3 months of symptoms.

Except for cases of trauma-related spinal fracture or dislocation, fusion alone is not usually considered in the first 3 months following onset of low back symptoms.

Further Management Consideration

Following diagnostic or surgical procedures, the management of most patients becomes focused on improving physical conditioning through an incrementally increased exercise program. The goal of this program is to build activity tolerance and overcome individual limitations due to back symptoms. At this point in treatment, symptom control methods are only an adjunct to making prescribed exercises more tolerable.

- Begin with low-stress aerobic activities to improve general stamina (walking, riding a bicycle,

- swimming, and eventually jogging).
- Exercises to condition specific trunk muscles can be added a few weeks after. The back muscles may need to be in better condition than before the problem occurred. Otherwise, the back may continue to be painful and easily irritated by even mild activity. Following back surgery, recovery of activity tolerance may be delayed until protective muscles are conditioned well enough to compensate for any remaining structural changes.
- Finally, specific training to perform activities required at home or work can begin. The objective of this program is to increase the patient's tolerance in carrying out actual daily duties.

When patients demonstrate difficulty regaining the ability to tolerate the activities they are required (or would like) to do, the clinician may pose the following diagnostic and treatment questions:

- Could the patient have a serious, undetected medical condition? A careful review of the medical history and physical examination is warranted.
- Are the patient's activity goals realistic? Exploring briefly the patient's expectations, both short- and long-term, of being able to perform specific activities at home, work, or recreation may help the patient assess whether such activity levels are actually achievable.
- If for any reason the achievement of activity goals seems unlikely, what are the patient's remaining options? To answer this question, the patient is often required to gather specific information from family, friends, employers, or others. If, on followup visits, the patient has made no effort to gather such information, the clinician has the opportunity to point out that low back symptoms alone rarely prevent a patient from addressing questions so important to his or her future. This observation can lead to an open, nonjudgmental discussion of common but complicated psychosocial problems or other issues that often can interfere with a patient's recovery from low back problems. The clinician can then help the patient address or arrange further evaluation of any specific problem limiting the patient's progress. This can usually be accomplished as the patient continues, with the clinician's encouragement, to build activity tolerance through safe, simple exercises.

Availability of Guidelines

For each clinical practice guideline developed under the sponsorship of the Agency for Health Care Policy and Research (AHCPR), several versions are produced to meet different needs.

The *Clinical Practice Guideline* presents recommendations for health care providers with brief supporting information, tables and figures, and pertinent references.

The *Quick Reference Guide for Clinicians* is a distilled version of the *Clinical Practice Guideline*, with summary points for ready reference on a day-to-day basis.

The *Consumer Version*, available in English and Spanish, is an information booklet for the general public to increase patient knowledge and involvement in health care decisionmaking.

To order single copies of guideline products or to obtain further information on their availability, call the AHCPR Publications Clearinghouse toll-free at 800-358-9295 or write to: AHCPR Publications Clearinghouse, P.O. Box 8547, Silver Spring, MD 20907.

Single copies of the *Clinical Practice Guideline* are available for sale from the Government Printing Office, Superintendent of Documents, Washington, DC 20402, with a 25 percent discount given for bulk orders of 100 copies or more. The *Quick Reference Guide for Clinicians* and the *Consumer Version* in English are also available for sale in bulk quantities only. Call (202) 512-1800 for price and ordering information.

The *Guideline Technical Report* contains complete supporting materials for the *Clinical Practice Guideline*, including background information, methodology, literature review, scientific evidence tables, recommendations for research, and a comprehensive bibliography. It is available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. Call (703) 487-4650 for price and ordering information.

The full text of guideline documents for online retrieval may be accessed through a free, electronic service from the National Library of Medicine called HSTAT (Health Services/Technology Assessment Text). Guideline information is also available through some of the computer-based information systems of the National Technical Information Service, professional associations, nonprofit organizations, and

commercial enterprises.

A fact sheet describing Online Access for Clinical Practice Guidelines (AHCPR Publication No. 94-0075) and copies of the *Quick Reference Guide for Clinicians* and the *Consumer Version* of each guideline are available through AHCPR's InstantFAX, a fax-on-demand service that operates 24 hours a day, 7 days a week. AHCPR's InstantFAX is accessible to anyone using a facsimile machine equipped with a touchtone telephone handset: Dial (301) 594-2800, push "1," and then press the facsimile machine's start button for instructions and a list of currently available publications.

U.S. Department of Health and Human Services, Public Health Service Agency for Health Care Policy and Research, Executive Office Center, Suite 501 2101 East Jefferson Street, Rockville, MD 20852 AHCPR Publication No. 95-0643 December 1994.

Table 1. Red flags for potentially serious conditions

Possible fracture	Possible tumor or infection	Possible cauda equina syndrome
From medical history		
<p>Major trauma, such as vehicle accident or fall from height.</p> <p>Minor trauma or even strenuous lifting (in older or potentially osteoporotic patient).</p>	<p>Age over 50 or under 20.</p> <p>History of cancer.</p> <p>Constitutional symptoms, such as recent fever or chills or unexplained weight loss.</p> <p>Risk factors for spinal infection: recent bacterial infection (e.g., urinary tract infection); IV drug abuse; or immune suppression (from steroids, transplant, or HIV).</p> <p>Pain that worsens when supine; severe nighttime pain.</p>	<p>Saddle anesthesia.</p> <p>Recent onset of bladder dysfunction, such as urinary retention, increased frequency, or overflow incontinence.</p> <p>Severe or progressive neurologic deficit in the lower extremity.</p>
From physical examination		
		<p>Unexpected laxity of the anal sphincter.</p> <p>Perianal/perineal sensory loss.</p> <p>Major motor weakness: quadriceps (knee extension weakness); ankle plantar flexors, evertors, and dorsiflexors (foot drop).</p>

Table 2. Symptom control methods

Recommended		
Nonprescription analgesics		
Acetaminophen (safest) NSAIDs (Asprin[1],Ibuprofen[1])		
Prescribed pharmaceutical methods	Prescribed physical methods	
Nonspecific low back symptoms and/or sciatica	Nonspecific low back symptoms	Sciatica
Other NSAIDs[1]	Manipulation (in place of medication or a shorter trial if combined with NSAIDs)	
Options		
Nonspecific low back symptoms and/or sciatica	Nonspecific low back symptoms	Sciatica
Muscle relaxants [2,3,4]	Physical agents and modalities [2] (heat or cold modalities for home programs only)	Manipulation (in place of medication or a shorter trial if combined with NSAIDs)
Opioids [2,3,4]	Shoe insoles [2]	Physical agents and modalities [2] (heat or cold modalities for home programs only) Few days' rest [4] Shoe insoles [2]

1. Aspirin and other NSAIDs are not recommended for use in combination with one another due to the risk of GI complications.
2. Equivocal efficacy.
3. Significant potential for producing drowsiness and debilitation; potential for dependency.
4. Short course (few days only) for severe symptoms.

Table 3. Guidelines for sitting and unassisted lifting

Symptoms				
	Severe	Moderate	Mild	None
Sitting [1]	20 min			50 min
Unassisted lifting [2]				
Men	20 lbs	20 lbs	60 lbs	80 lbs
Women	20 lbs	20 lbs	35 lbs	40 lbs

1 Without getting up and moving around

2 Modification of NIOSH Lifting Guidelines, 1981, 1993. Gradually increase unassisted lifting limits to 60 lbs (men) and 35 lbs (women) by 3 months even with continued symptoms. Limit twisting, bending, and reaching. Always lift close to belly button.

Table 4. Ability of different techniques to identify and define pathology

Technique	Identify physiologic insult	Define anatomic defect
History	+	+
Physical examination:		
Circumference measurements	+	+
Reflexes	++	++
Straight leg raising (SLR)	++	+
Crossed SLR	+++	++
Motor	++	++
Sensory	++	++
Laboratory studies:		
(ESR, CBC, UA)	++	0
Bone scan[1]	+++	++
EMG/SEP	+++	++
X-ray[1]	0	+
CT[1]	0	++++[2]
MRI	0	++++[2]
Myelo-CT[1]	0	++++[2]
Myelography[1]	0	++++[2]

1 Risk of complications (radiation, infection, etc.): highest for myelo- CT, second highest for myelography, and relatively less risk for bone scan, x-ray, and CT

2 False-positive diagnostic findings in up to 30 percent of people without symptoms at age 30

Note: Number of plus signs indicates relative ability to identify or define.

Table 5. Summary of Guideline Recommendations

	Recommend	Option	Recommend against
History and physical exam 34 studies	<ul style="list-style-type: none"> • Basic history (B). • History of cancer/ infection (B). • Signs/symptoms of cauda equina syndrome (C). • History of significant trauma (C). • Psychosocial history (C). • Straight leg raising text (B). • Focused neurological exam (B). 	Pain drawing and visual analog scale (D).	
Patient education 14 studies	<ul style="list-style-type: none"> • Patient education about low back symptoms (B). • Back school in occupational settings (C). 	Back school in nonoccupational settings (C).	
Medication 23 studies	Acetaminophen (C). NSAIDs (B).	Muscle relaxants (C). Opioids, short course (C).	Opioids used > 2wks (C). Phenylbutazone (C). Oral steroids (C). Colchicine (B). Antidepressants (C).
Physical treatment methods 42 methods	Manipulation of low back during first month of symptoms (B).	<ul style="list-style-type: none"> • Manipulation for patients with radiculopathy (C). • Manipulation for patients with symptoms > 1 month (C). • Self-application of heat or cold to low back.(no rating) • Shoe insoles (C). • Corset for prevention in occupational setting (C). 	<ul style="list-style-type: none"> • Manipulation for patients with undiagnosed neurologic deficits (D). • Prolonged course of manipulation (D). • Traction (B). • TENS (C). • Biofeedback (C). • Shoe lifts (D). • Corset for treatment (D).
Injections 26 studies		Epidural steroid injections for radicular pain to avoid surgery (C).	<ul style="list-style-type: none"> • Epidural injections for back pain without radiculopathy (D). • Trigger point injections (C). • Ligamentous injections (C). • Facet joint injections (C). • Needle acupuncture (D).
Bed rest 4 studies		Bed rest of 2-4 days for severe radiulopathy (D).	Bed rest > 4 days (B).
Activities and exercise 20 studies	<ul style="list-style-type: none"> • Temporary avoidance of activities that increase mechanical stress on spine (D). • Gradual return to normal activities (B). • Low-stress aerobic exercise (C). 		<ul style="list-style-type: none"> • Back-specific exercise machines (D). • Therapeutic stretching of back muscles (D).

	Recommend	Option	Recommend against
	<ul style="list-style-type: none"> • Conditioning exercises for trunk muscles after 2 weeks (C). • Exercise quotas (C). 		
Detection of physiologic abnormalities 14 studies	<ul style="list-style-type: none"> • If no improvement after 1 month, consider: • Bone scan (C). • Needle EMG and H-reflex tests to clarify nerve root dysfunction (C). • SEP to assess spinal stenosis (C). 		<ul style="list-style-type: none"> • EMG for clinically obvious radiculopathy (D). • Surface EMG and F-wave tests (C). • Thermography (C).
X-rays of L-S spine 18 studies	When red flags for fracture present (C). When red flags for cancer or infection present (C).		Routine use in first month of symptoms in absence of red flags (B). Routine oblique views (B).
Imaging 18 studies	<ul style="list-style-type: none"> • CT or MRI when cauda equina, tumor, infection, or fracture strongly suspected (C). • MRI text of choice for patients with prior back surgery (D). • Assure quality criteria for imaging tests (B). 	Myelography or CT-myleography for preoperative planning (D).	Use of imaging test before one month in absence red flags (B). Discography or CT-discography (C).
Surgical considerations 14 studies	<ul style="list-style-type: none"> • Discuss surgical options with patients with persistent and severe sciatica and clinical evidence of nerve root compromise after 1 month of conservative therapy (B). • Standard discectomy and microdiscectomy of similar efficacy in treatment of herniated disc (B). • Chymopapain, used after ruling out allergic sensitivity, acceptable but less efficacious than discectomy to treat herniated disc (C). 		<ul style="list-style-type: none"> • Disc surgery in patients with back pain alone, no red flags, and no nerve root compression (D). • Percutaneous discectomy less efficacious than chymopapain (C). • Surgery for spinal stenosis within the first 3 months of symptoms (D). • Stenosis surgery when justified by imaging test rather than patient's functional status (D). • Spinal fusion during the first 3 months of symptoms in the absence of fracture, dislocation, complications of tumor or infection (C).
Psychosocial factors	Social, economic, and psychological factors can alter patient response to symptoms and treatment (D).		Referral for extensive evaluation/treatment prior to exploring patient expectations or psychosocial factors (D).

The ratings in parentheses indicate the scientific evidence supporting each recommendation according to the following scale

A = strong research-based evidence (multiple relevant and high-quality scientific studies)

B = moderate research-based evidence (one relevant, high-quality scientific study or multiple adequate scientific studies).

C = limited research-based evidence (at least one adequate scientific study in patients with low back pain).
 D = panel interpretation of evidence not meeting inclusion criteria for research-based evidence.
 The number of studies meeting panel review criteria is noted for each category.

Figure 1. Testing for lumbar nerve root compromise.

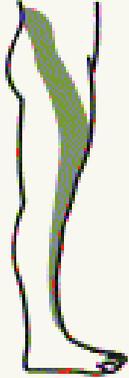
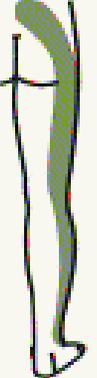
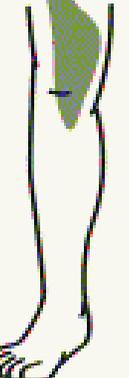
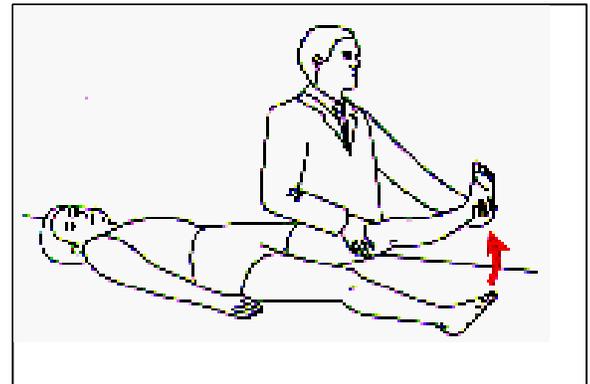
Nerve root	L4	L5	S1
Pain			
Numbness			
Motor weakness	Extension of quadriceps.	Dorsiflexion of great toe and foot.	Plantar flexion of great toe and foot.
Screening exam	Squat & rise.	Heel walking.	Walking on toes.
Reflexes	Knee jerk diminished.	None reliable.	Ankle jerk diminished.

Figure 2. Instructions for the Straight Leg Raising (SLR) Test.

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

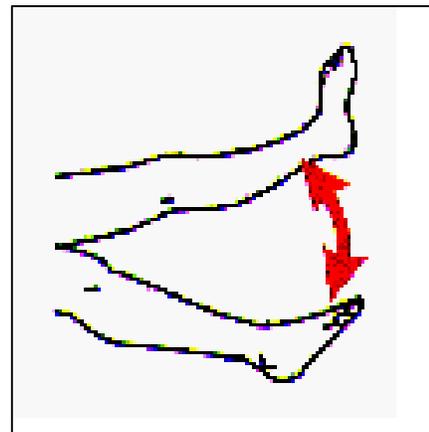
(2) With one hand placed above the knee of the leg being examined, exert enough firm pressure to keep the knee fully extended. Ask the patient to relax.

(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.

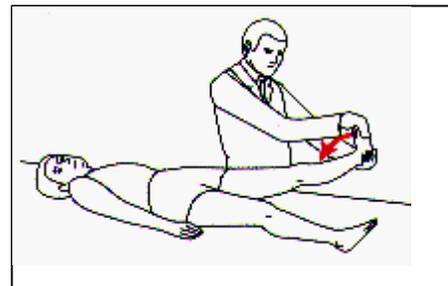
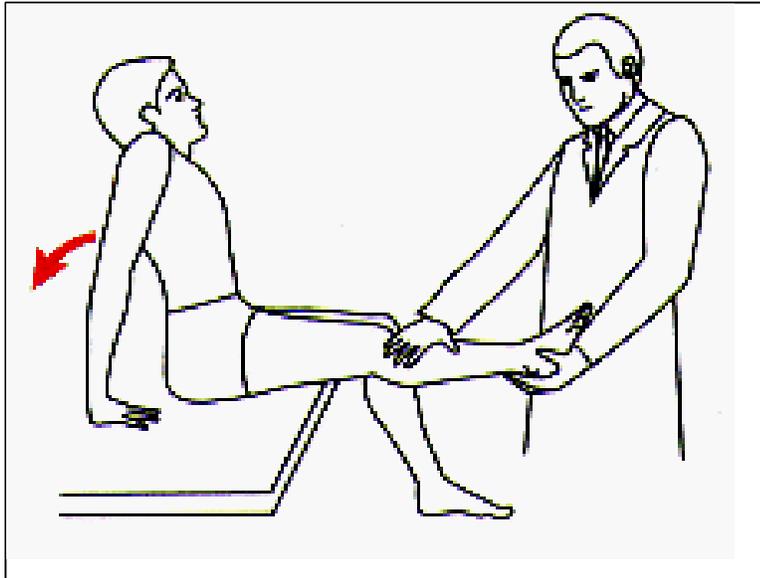
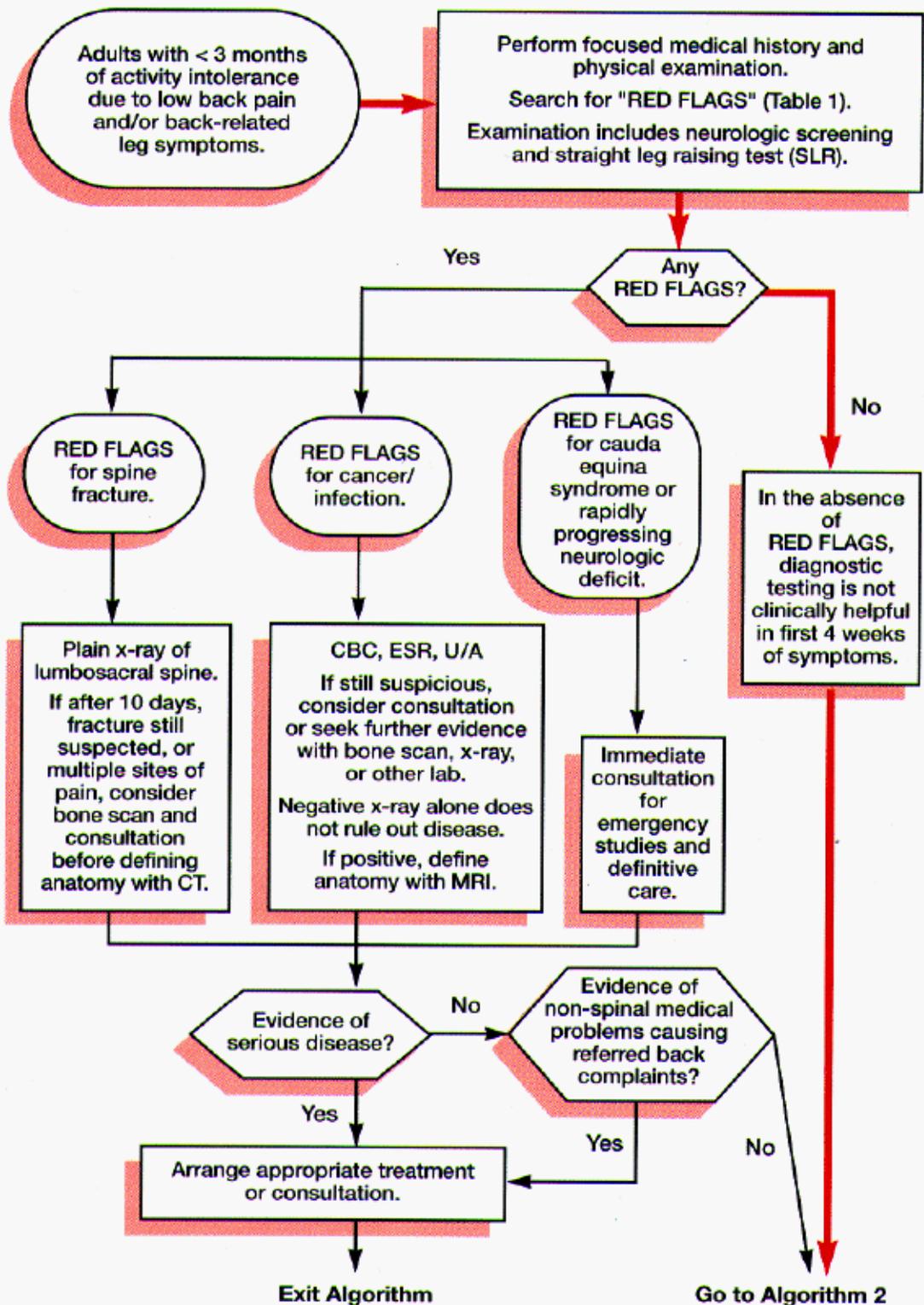


Figure 3. Instructions for sitting knee extension test.



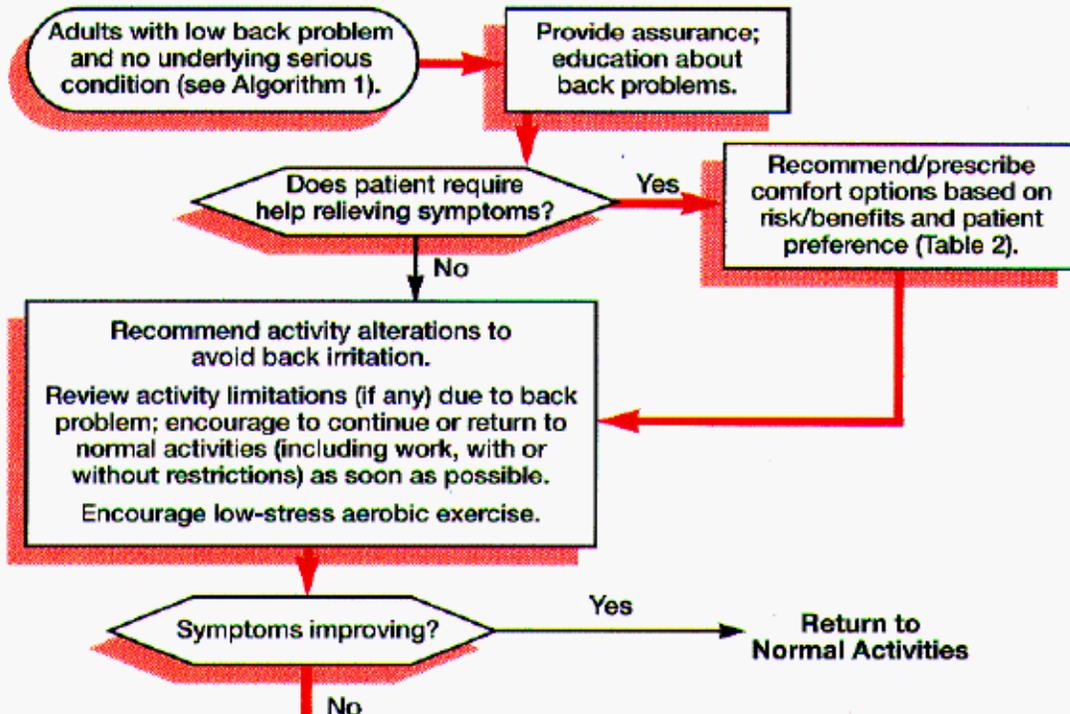
With the patient sitting on a table, both hip and knees flexed at 90 degrees, slowly extend the knee as if evaluating the patella or bottom of the foot. This maneuver stretches nerve roots as much as a moderate degree of supine SLR.

Algorithm 1. Initial evaluation of acute low back problem

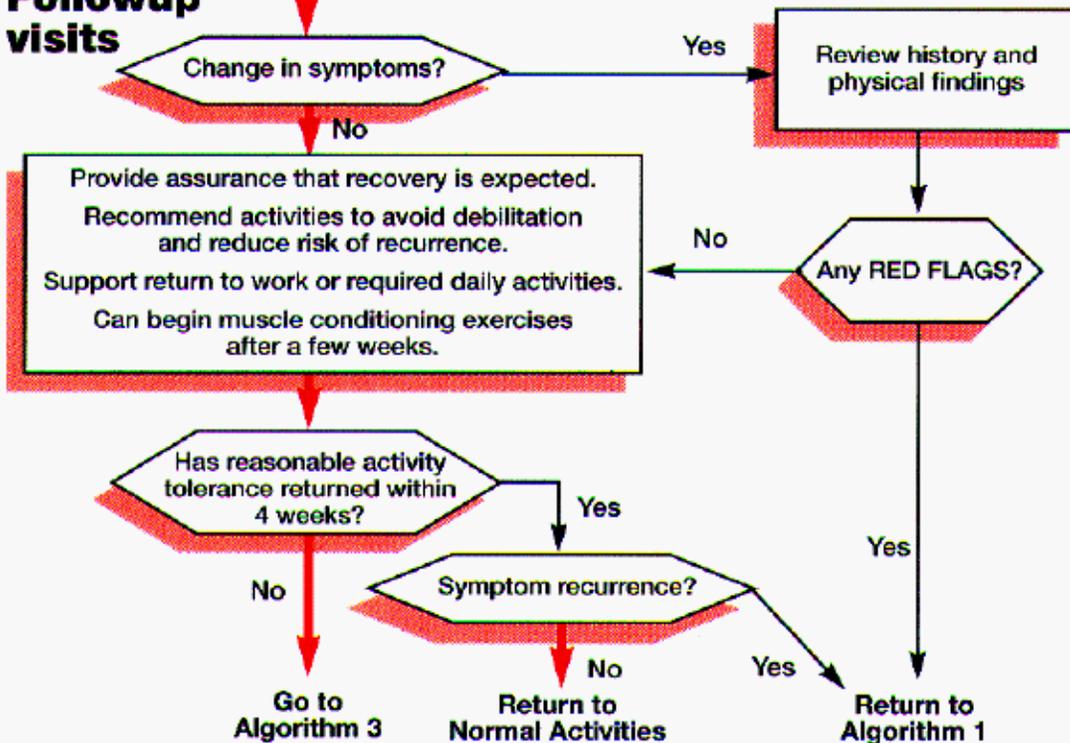


Algorithm 2. Treatment of acute low back problem on initial and followup visits

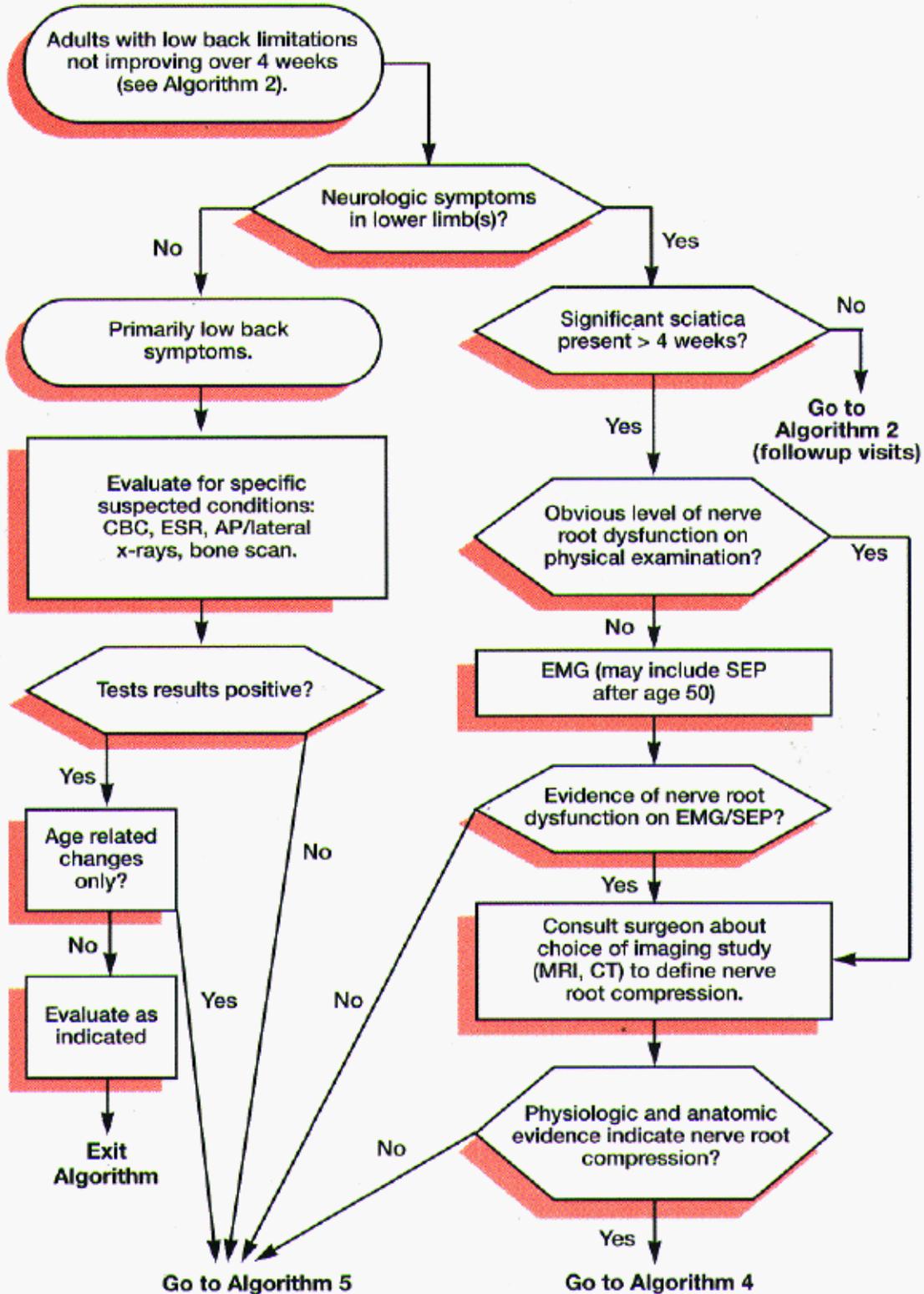
Initial visit



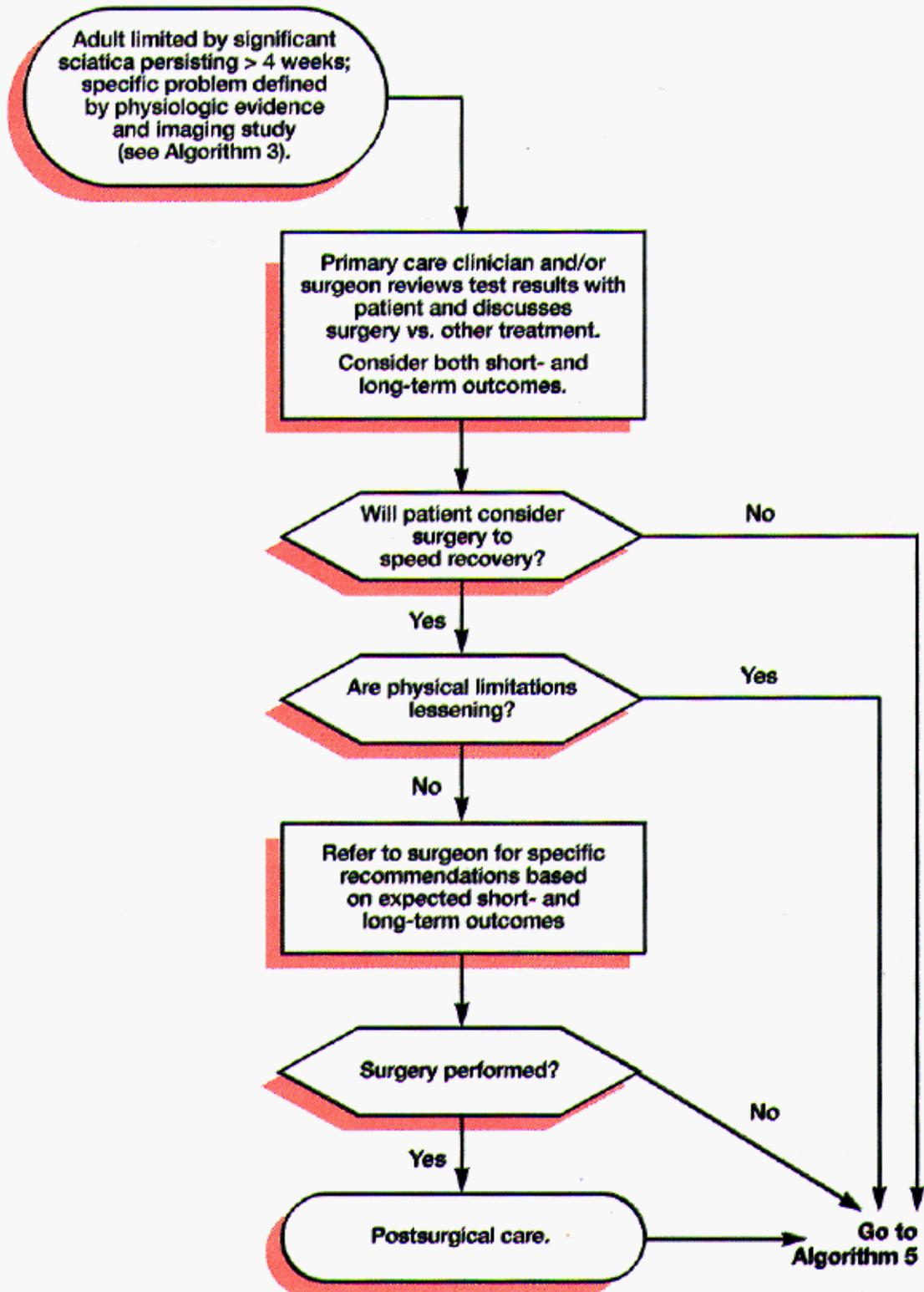
Followup visits



Algorithm 3. Evaluation of the slow-to-recover patient (symptoms > 4 weeks)



Algorithm 4. Surgical considerations for patients with persistent sciatica



Algorithm 5. Further management of acute low back problem

