The information contained in this ICSI Health Care Guideline is intended primarily for health professionals and the following expert audiences:

- physicians, nurses, and other health care professional and provider organizations;
- health plans, health systems, health care organizations, hospitals and integrated health care delivery systems;
- health care teaching institutions;
- health care information technology departments;
- medical specialty and professional societies;
- researchers;
- federal, state and local government health care policy makers and specialists; and
- employee benefit managers.

This ICSI Health Care Guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. If you are not one of the expert audiences listed above you are urged to consult a health care professional regarding your own situation and any specific medical questions you may have. In addition, you should seek assistance from a health care professional in interpreting this ICSI Health Care Guideline and applying it in your individual case.

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Patient calls/presents with LBP or sciatica/radiculopathy

2 Emergent or urgent?

Evaluation indicated?

Primary care evaluation

Is a serious underlying condition revealed?

Consult or refer

Has the patient failed conservative treatment?

Initiate or continue conservative treatment

Continued self-care program

Improving?

Consult or refer

Active rehabilitation

Patient education regarding primary prevention, including healthy lifestyle and general aerobic fitness.

Emphasis on:
- Patient responsibility for good back care
- Workplace ergonomics
- Home self-care treatment

Acute Low Back Pain
LBP that does NOT radiate past the knee for < six weeks

Acute Sciatica
LBP with radiation past the knee for < six weeks

Chronic Sciatica
Above symptoms for > six weeks

Chronic LBP
- Comprehensive physical and psychosocial re-evaluation
- Lumbar spine x-rays if indicated

Chronic Sciatica/Radiculopathy
- Comprehensive physical and psychosocial re-evaluation
- MRI or CT lumbar imaging indications when patient is potential surgical or therapeutic injection candidate

MRI/CT correlate with symptoms?

Consider epidural steroid injection prior to surgical intervention

Discuss options and consider possible surgical or non-surgical spine specialist (see also ICSI Chronic Pain guideline)
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Foreword

Scope and Target Population

Adult patients age 18 and over in primary care who have symptoms of low back pain or sciatica. The focus is on acute and chronic management, including indications for medical, non-surgical or surgical referral. For workers' compensation patients, check with state guidelines where the patient resides and where the injury took place: http://www.workerscompensation.com/workers_comp_by_state.php.

Clinical Highlights and Recommendations

• Back pain assessment should include a subjective pain rating, functional status, patient history including notation of presence or absence of "red flags" (Cauda Equina Syndrome or other conditions noted in Annotation #1) and psychosocial indicators, assessment of prior treatment and response, employment status, and clinician's objective assessment. (Annotations #1, 4, 16, 19; Aim #1)

• Reduce unnecessary imaging unless "red flag" indicators exist. (Annotations #4, 19; Aim #2)

• A conservative approach should be first-line treatment. Emphasize patient education and conservative home self-care, which includes limited bed rest, early ambulation, postural advice, resumption of light-duty activities, use of ice and heat, anti-inflammatory and analgesic over-the-counter medications, and early return to work or activities. (Annotation #5; Aim #3)

• Patients with acute low back pain should be advised to stay active and continue ordinary daily activity within the limits permitted by the pain. For chronic back pain, there is evidence that exercise therapy is effective. (Annotations #10, 17; Aim #3)

• Consult or refer to surgical spine specialist (neurosurgeon, orthopedic surgeon, or other) or non-surgical spine specialist (physical therapist, chiropractic provider, osteopathic or allopathic physician, or other) if conservative treatment fails. (Annotation #9)

Priority Aims

1. Improve the assessment and reassessment of adult patients with low back pain. (Annotations #1, 4, 16, 19)

2. Reduce unnecessary imaging with adult patients with low back pain in the absence of "red flag" indicators or progressive symptoms. (Annotation #4, 19)

3. Increase the use of recommended conservative approach as first-line treatment, such as activity, self-care and analgesics for adult patients with low back pain. (Annotation #5)
**Related ICSI Scientific Documents**

**Guidelines**
- Major Depression in Adults in Primary Care
- Assessment and Management of Acute Pain
- Assessment and Management of Chronic Pain

**Technology Assessment Reports**
- Intradiscal Electrothermal Therapy (IDET) for Low Back Pain. (#62, 2002)
- Fluoroscopically Guided Transforaminal Epidural Steroid Injections for Lumbar Radicular Pain. (#85, 2004)
- Lumbar Artificial Intervetebral Discs. (#92, 2005)

**Disclosure of Potential Conflict of Interest**
ICSII has adopted a policy of transparency, disclosing potential conflict and competing interests of all individuals who participate in the development, revision and approval of ICSI documents (guidelines, order sets and protocols). This applies to all work groups (guidelines, order sets and protocols) and committees (Committee on Evidence-Based Practice, Cardiovascular Steering Committee, Women's Health Steering Committee, Preventive & Health Maintenance Steering Committee and Respiratory Steering Committee).

Participants must disclose any potential conflict and competing interests they or their dependents (spouse, dependent children, or others claimed as dependents) may have with any organization with commercial, proprietary, or political interests relevant to the topics covered by ICSI documents. Such disclosures will be shared with all individuals who prepare, review and approve ICSI documents.

Michael Goertz, MD received speaker's fees from Boston Scientific and Pfizer.

Adam Locketz, MD received speaker's fees from Boston Scientific.

No other work group members have potential conflicts of interest to disclose.

**Introduction to ICSI Document Development**
This document was developed and/or revised by a multidisciplinary work group utilizing a defined process for literature search and review, document development and revision, as well as obtaining input from and responding to ICSI members.

Evidence Grading System

A. Primary Reports of New Data Collection:
   Class A: Randomized, controlled trial
   Class B: Cohort study
   Class C: Non-randomized trial with concurrent or historical controls
           Case-control study
           Study of sensitivity and specificity of a diagnostic test
           Population-based descriptive study
   Class D: Cross-sectional study
           Case series
           Case report

B. Reports that Synthesize or Reflect Upon Collections of Primary Reports:
   Class M: Meta-analysis
           Systematic review
           Decision analysis
           Cost-effectiveness analysis
   Class R: Consensus statement
           Consensus report
           Narrative review
   Class X: Medical opinion

Citations are listed in the guideline utilizing the format of *(Author, YYYY [report class])* . A full explanation of ICSI's Evidence Grading System can be found at http://www.icsi.org.
Algorithm Annotations

1. Patient Calls/Presents with Low Back Pain or Sciatica/Radiculopathy

Key Points:

- Medical screening for low back pain should be performed via triage evaluation.
- If low back pain may be related to a possible work-related injury or workers' compensation claim, it is important to follow the Workers' Compensation Treatment Guidelines.

The patient calls the clinic or presents as a walk-in at the clinic. A medical screening should be performed via triage evaluation for phone contact and via provider examination for walk-ins. Each medical group may modify this proposed movement as needed.

The triage evaluation should first rule out emergent conditions such as Cauda Equina Syndrome.

General Assessment:

- Recent back procedure or epidural anesthesia
- Location of pain:
  - Low back pain (does not radiate past the knee)
  - Sciatica (LBP with radiation past the knee)
- Duration of symptoms, including date of injury or onset of symptoms:
  - Six weeks or less is acute
  - More than six weeks is chronic
- If injury: How did injury occur?
- Unrelenting or severe pain
  - Scale of 0 to 10, with 10 indicating most severe pain
- Other medical conditions
- History of previous back pain or surgery
- Psychosocial indications (See Appendix D, "Psychosocial Screening and Assessment Tools")

For workers' compensation patients, check with state guidelines where the patient resides and where the injury took place: http://www.workerscompensation.com/workers_comp_by_state.php.

Patient Education Regarding Primary Prevention

Providers in clinic systems are encouraged to provide primary education through other community education institutions/businesses to develop and make available patient education materials concerning back pain prevention and care of the healthy back. Emphasis should be on patient responsibility, workplace ergonomics, and home self-care treatment of acute low back pain. Employer groups should also make available reasonable accommodations for modified duties or activities to allow early return to work and minimize the risk
of prolonged disability. Education is recommended for frontline supervisors in occupational strategies to facilitate an early return to work and to prevent prolonged disabilities.

(Snook, 1988 [R])

For other patient education resources, please see the Resources Available section of this guideline.

2. Emergent or Urgent?

Emergent – Refer to ER for Immediate Evaluation

- Sudden onset or otherwise unexplained loss or changes in bowel or bladder control (retention or incontinence)
- Sudden onset or otherwise unexplained bilateral leg weakness
- Saddle numbness

Urgent – Appointment within 24 Hours:

- Fever 38°C or 100.4°F for greater than 48 hours
- Unrelenting night pain or pain at rest
- New onset (less than six weeks) of progressive pain with distal (below the knee) numbness or weakness of leg(s)
- Leg weakness
- Progressive neurological deficit

If attempts to triage are unsuccessful and the patient still requests a same-day appointment, this should be facilitated if at all possible.

3. Evaluation Indicated?

Appointment within two to seven days if the answer to any of the following is positive:

- Exertion injury (e.g., lifting, digging, reaching)
- History of back symptoms – has been seen before, at least once
- Chronic back pain lasting longer than six weeks
- Unexplained weight loss (greater than 10 pounds in six months)
- Over age 50
- History of cancer

4. Primary Care Evaluation

Key Points:

- Fear, financial problems, anger, depression, job dissatisfaction, family problems or stress can contribute to prolonged disability.
- Generally AP and LAT X rays are not helpful in the acute setting.
The primary care evaluation includes a history and physical and consideration of psychosocial factors (Chou, 2007b [M]). See Appendices A-D for screening and assessment tools.

**If a serious underlying disease such as cancer, Cauda Equina Syndrome, significant or progressive neurologic deficit, or other systemic illness is present, consult or refer.**

**Patient history includes:**

**Cancer risk factors:**
- 50 years old or older
- History of cancer
- Unexplained weight loss
- Failure to improve after four to six weeks of conservative LBP therapy

If all four of the above risk factors for cancer are absent, studies suggest that cancer can be ruled out with 100% sensitivity.

**Risk factors for possible spinal infection:**
- IV drug use
- Immunosuppression
- Urinary infection

**Signs or symptoms of Cauda Equina Syndrome:**
- Urinary retention (if no urinary retention, the likelihood of Cauda Equina Syndrome is less than 1 in 10,000)
- Saddle anesthesia, unilateral or bilateral sciatica, sensory and motor deficits, and abnormal straight leg raising are all common

**Signs or symptoms of neurologic involvement:**
- Complaint of 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)
- Sciatica has such a high sensitivity (95%) that its absence makes lumbar disc herniation unlikely
- Disc herniation in a patient without sciatica would be unusual
- Because more than 95% of lumbar disc herniations occur at the L4-5 or L5-S1 levels, the neurologic exam should focus on the L5 and S1 nerve roots; however, upper lumbar nerve root involvement may be suggested when pain conforms to L2, L3 or L4 dermatomal distribution and is accompanied by anatomically congruent motor weakness or reflex changes.

**Psychosocial indications:**
- Belief that pain and activity are harmful
- "Sickness behaviors," such as extended rest
- Depressed or negative moods, social withdrawal
• Treatment that does not fit best practice
• Problems with claim and compensation
• History of back pain, time off or other claims
• Problems at work or low job satisfaction
• Heavy work, unsociable hours
• Overprotective family or lack of support

Psychosocial indications can be barriers to recovery. Consider factors such as fear, financial problems, anger, depression, job dissatisfaction, family problems or stress, which can contribute to prolonged disability (Bigos, 1991 [B]; Chan, 1993 [C]; Deyo, 1992 [R]; Fritz, 2001 [B]; Spitzer, 1987 [R]). Refer to the ICSI Major Depression in Adults in Primary Care guideline for more information.

For more information on psychosocial indications, see the New Zealand Acute Low Back Pain Guide: Incorporating the Guide to Assessing Psychosocial Yellow Flags in Acute Low Back Pain, 2003. See Appendix D, "Psychosocial Screening and Assessment Tools."

**Physical examination should document:**

• Palpation for spinal tenderness
• Neuromuscular testing to include:
  - Ankle dorsiflexion strength
  - Great toe dorsiflexion strength
  - Ankle reflexes
  - Knee reflexes
  - Knee extension
  - Hip flexors
  - Sensory exam with pinprick sensation in the medial, dorsal and lateral aspects of the foot
  - Significant or progressive neuromotor deficit requires surgical consultation.
• Straight leg raise (SLR) should be assessed bilaterally to evaluate for nerve root impingement, including but not limited to disc herniation.
  - Positive SLR, defined as pain in the posterior leg that radiates below the knee with the patient lying supine and the hip flexed 60 degrees or less, is suggestive of disc herniation.
  - Negative SLR rules out surgically significant disc herniation in 95% of cases.

**Laboratory evaluation**

Consider blood work as necessary if suspicion of cancer or infection (Deyo, 2001 [R]).

**Referral**

Early referral to physical therapy or another trained non-surgical spine specialist could be considered. (See Annotation #13, "Re-evaluate and Consider Redirection," and Annotation #23, "Discuss Options and Consider Possible Surgical or Non-Surgical Spine Specialist" for details on specialties and treatments.)
• Referral could be considered when patient presents with severe incapacitating, disabling back or leg pain; or

• Patient has significant limitation of functional or job activities.

**Lumbar spine x-ray (AP and LAT views) "red flag" indications**

Generally AP and LAT x-rays are *not* useful in the *acute* setting but *may* be warranted with:

- unrelenting night pain or pain at rest (increased incidence of clinically significant pathology),
- history of or suspicion of cancer (rule out metastatic disease),
- fever above 38°C (100.4°F) for greater than 48 hours,
- osteoporosis,
- other systemic diseases,
- neuromotor or sensory deficit,
- chronic oral steroids,
- immunosuppression,
- serious accident or injury (fall from heights, blunt trauma, motor vehicle accident) – this does not include twisting or lifting injury unless other risk factors are present (e.g., history of osteoporosis), and
- clinical suspicion of ankylosing spondylitis.

Other conditions that may warrant AP or LAT x-rays:

- Over 50 years old (increased risk of malignancy, compression fracture)
- Failure to respond to four to six weeks of conservative therapy
- Drug or alcohol abuse (increased incidence of osteomyelitis, trauma, fracture)

Oblique view x-rays are not recommended; they add only minimal information in a small percentage of cases, and more than double the exposure to radiation.

5. **Home Self-Care Treatment Program**

**Key Points:**

- Low back pain is common and most patients significantly improve in four to six weeks.
- The long-term course of low back pain is typically a return to previous activities, though often with incomplete recovery from pain.
- Patients should be re-evaluated if there is not significant improvement in one to three weeks or if symptoms progress.

If the patient has not been previously evaluated, attempt to differentiate between untreated acute pain and ongoing chronic pain. If a patient's pain has persisted for six weeks (or longer than the anticipated healing time), a thorough evaluation for the cause of the chronic pain is warranted. See the ICSI Chronic Pain guideline for more information.
When patients are improving, they should continue self-care as outlined (Chou, 2007b [M]). Document the phone triage and home self-care treatment in the patient's medical record (e.g., no appointment is needed at this time, patient is improving with home self-care instructions and will call back if questions arise or condition changes).

**Etiology**

- Pain in the lower back is very common. It can be related to certain activities, poor posture, physical stress or psychological stress. Ninety percent of back pain patients improve within four to six weeks.

- Consider telling the patient that approximately two-thirds of the people who recover from a first episode of acute low back symptoms will have another episode within 12 months. Unless the back symptoms are very different from the first episode or the patient has a new medical condition, expect improvement to be similar for each episode (Hestbaek, 2003 [M]; Pengel, 2003 [M]).

- When pain or weakness lasts longer than six weeks, more specialized treatment(s) may be needed. For this reason it is important for the patient to keep the doctor informed of his or her progress.

- Other etiologies include pregnancy, labor, menstrual period, urinary tract problems, stomach upset with nausea, vomiting and diarrhea.

Instruct the patient to do the following:

- Carefully introduce activities back into his or her day as he or she begins to recover from the worst of the back pain episode. Light-duty activities and regular walking are good ways to get back into action.

- Apply ice packs or heat as preferred on the sore area to keep the inflammation down, and short duration in a position of comfort may be helpful.

- Use over-the-counter anti-inflammatory medication (e.g., aspirin, ibuprofen, naproxen sodium) or acetaminophen to help ease the pain and swelling in the lower back. If stomach complaints persist, call your provider.

- Encourage activity that does not worsen symptoms.

- Take time to relax. Tension will only make your back feel worse.

Instruct the patient to call back in one to three weeks if:

- No improvement with home management
- Significant pain persists beyond a week
- Symptoms persist, worsen or progress
- Improvement in symptoms, reinforcement of self-care program

**7. Continue Self-Care Program**

When patients are improving, they should continue self-care as outlined in Annotation #5, "Home Self-Care Treatment Program."

**8. Is a Serious Underlying Condition Revealed?**

Examples of serious conditions include cancer, Cauda Equina Syndrome, significant or progressive neurologic deficit or other systemic illness.
9. Consult or Refer

Complete a diagnostic workup or refer to the appropriate medical specialty for serious underlying conditions (e.g., cancer or other systemic illness). Each medical group may have other indications for specialty referral.

Consult or refer to surgical spine specialist (neurosurgeon, orthopedic surgeon, or other) if:

- The patient is a surgical candidate.
- Signs or symptoms of Cauda Equina Syndrome are present.
- Signs or symptoms of progressive or significant neuromotor deficit (e.g., foot drop, functional muscle weakness such as hip flexion weakness, or quadriceps weakness) are present.
- Neurogenic "pseudo" claudication (atypical leg pain) that is unresponsive to conservative treatment.

10. Has the Patient Failed Conservative Treatment?

Key Points:

- Most patients who experience low back pain will have a recurrence within 12 months.
- Remaining active leads to a more rapid recovery with less chronic pain.
- Bed rest is not recommended. If the patient must rest, bed rest should be limited to no more than two days.
- It is important to evaluate non-physical factors that may impact returning to work or ongoing disability.
- The longer-term course of low back pain is typically of a return to previous activities, though often with incomplete recovery from pain.

Conservative treatment:

- Most patients who seek attention for their back pain will improve within two weeks. Most patients experience significant improvement within four weeks (Atlas, 2001 [R]).
- Approximately two-thirds of the people who recover from a first episode of acute low back symptoms will have another episode within 12 months. Unless the back symptoms are very different from the first episode or the patient has a new medical condition, expect improvement to be similar for each episode (Hestbaek, 2003 [M]; Pengel, 2003 [M]).
- Recommend cold packs or heat as preferred by the patient (Nadler, 2002 [A]).
- Recommend analgesic medication for short-term (less than three months) symptom control. Clinicians should consider the risk and benefits of any medication and prescribe the lowest effective dose possible (Henry, 1996 [M]; Nadler, 2002 [A]; Silverstein, 2000 [A]).
- Muscle relaxants are sometimes helpful for a few days but can cause drowsiness (Deyo, 2001 [R]).
- Opioid analgesics are rarely indicated in the treatment of acute low back pain. There is insufficient evidence to support opioid use in early treatment (Chou, 2007a [M]). If used, it should be for only
short-term intervention (less than two weeks) and accompanied by a comprehensive treatment plan.

- If the patient has been involved in home care and has had an adequate trial prior to the first visit, consider referral to a spine therapy professional on the initial visit (Skargren, 1997 [A]). (See Annotation #13, "Re-Evaluate and Consider Redirection.")

- While the work group acknowledges it is common practice to prescribe oral steroids for some patients, at this time there is not significant primary evidence to support it (Chou, 2007a [M]).

(Deyo, 1990 [R]; Spitzer, 1987 [R])

Activity recommendations:

Patients with acute low back pain should be advised to stay active and continue ordinary activity within the limits permitted by the pain. Remaining active leads to more rapid recovery with less chronic disability and fewer recurrent problems than either bed rest or back mobilizing exercises. [Conclusion Grade I: See Conclusion Grading Worksheet A – Annotation #10 (Conservative Treatment)]

- Activity modification
  - Continue routine activity while paying attention to correct posture.
  - Patients with acute low back problems may be more comfortable if they temporarily limit or avoid specific activities known to increase mechanical stress on the spine, especially prolonged unsupported sitting, heavy lifting, and bending or twisting the back, especially while lifting (Hilde, 2002 [M]; Waddell, 1997 [M]).
  - Activity recommendations for the employed patient with acute low back symptoms should take into consideration the patient's age and general health, and the physical demands of the patient's job (Malmivaara, 1995 [A]).
  - Patients should discontinue any activity or exercise that causes spread of symptoms (peripheralization).

- Bed rest
  - Bed rest is not recommended. If the patient must rest, bed rest should be limited to no more than two days and only as an option for patients with severe initial symptoms of primary leg pain.
  - A gradual return to normal activities is more effective and leads to more rapid improvement with less chronic disability than prolonged bed rest for treating acute low back problems (Little, 2001 [A]).
  - Prolonged bed rest for more than four days may lead to debilitation and is not recommended for treating acute low back problems (New Zealand Guidelines Group, 2003 [R]).

- Exercise
  - Patients should discontinue any activity or exercise that causes spread of symptoms (peripheralization) (New Zealand Guidelines Group, 2003 [R]).
  - Advice to stay active and to continue ordinary activity as normally as possible is likely to give faster return to work, less chronic disability, and fewer recurrent problems (Waddell, 1997 [M]).
Consultation with a non-surgical spine specialist, who can evaluate individual characteristics and symptoms and establish a specific exercise program, is recommended (Brennan, 2006 [A]; Descarreaux, 2002 [A]; Hicks, 2005 [B]).

Self-care brochure (see Support for Implementation, "Resources Available"):

In general, brochures and information that place a greater emphasis on reducing fear and anxiety and promoting active self-management have a greater opportunity for improving outcomes than traditional brochures that emphasize anatomy, ergonomics and specific back exercises (Cherkin, 1998 [A]; Little, 2001 [A]).

Specific content recommendations include:

- Absence of serious disease is likely when "red flags" are not present.
- Hurt does not equal harm.
- There is a good prognosis for low back pain. The majority of patients experience significant improvements in two to four weeks (Atlas, 2001 [R]).
- Bed rest is not recommended and should be limited to no more than two days.
- Light activity will not further injure the spine and light activity typically helps speed recovery.
- A progressive resumption of work and activity levels leads to better short-term and long-term outcomes.
- Information and advice may be helpful regarding specific painful or limited activities, such as sitting, lifting, getting up from bed.

Return to work:

- Tell patients experiencing an episode of acute back pain that their pain is likely to improve and that a large majority of patients return to work quickly. They should understand that complete pain relief usually occurs after, rather than before, resumption of normal activities, and their return to work can be before they have complete pain relief. Working despite some residual discomfort poses no threat and will not harm them (Von Korff, 1994 [R]).
- All persons recovering from back pain should understand that episodes of back pain may recur but can be handled similarly to the one from which they are recovering.
- Patients can reduce the likelihood of back pain recurrence by making exercise and lifestyle changes, as noted elsewhere.
- Consider using the following questions to guide your discussion about non-physical factors that can significantly impact risk for ongoing disability and return to work (Bigos, 1992 [R]):
  - Do you enjoy the tasks involved in your job?
  - Do you get along with your closest or immediate supervisor?

Follow-up visit:

Because most patients with acute pain improve by two weeks, a conservative treatment approach is recommended (Atlas, 2001 [R]). Low back pain patients who are not improving or who experience significant limitation of daily activity at home or work should contact their provider within one to three weeks of the initial evaluation (Deyo, 2001 [R]). Patients who are improving should continue home self-care.
Red flag and psychosocial indicators should be reviewed and evaluated at each contact/visit (New Zealand Guidelines Group, 2003 [R]). It is the consensus of the work group that an assessment that includes a subjective pain rating, functional assessment, and a clinician's objective assessment should be done at each visit.

It is the consensus of the work group that patients who are improving should consider a follow-up with their provider. The benefit is to reinforce education and lifestyle changes that have enabled the patient to improve. This provides for outcome measures to be assessed as identified in the aims and measures sections of the guideline.

13. Re-Evaluate and Consider Redirection

Key Points:

- Request a non-surgical spine care specialist who demonstrates competency in providing therapies based on continuing education and effective techniques supported by literature.

Choice of the trained professional will be determined by availability and preference of individual medical providers and organization systems. The patient and/or physician should request a trained non-surgical spine specialist who demonstrates competency in providing therapies for patients with low back pain based on effective techniques supported by literature, as outlined in this guideline.

These therapies include education, exercise programs and appropriate use of manual/manipulative therapies (Nytendo, 2000 [C]; Nytendo, 2001 [B]). Participants should be in additional training and in ongoing continuing education courses in manual treatment of the spine. Individuals who may have training in these therapies include physical therapists, chiropractic providers, osteopathic or allopathic physicians.

The following should be considered when selecting a non-surgical spine specialist who will effectively evaluate and treat the lumbar spine, pelvic girdle (including SI joint), and muscle imbalances (piriformis) (Spitzer, 1987 [R]):

- Years of experience treating spine patients
- Volume of patients treated for spine dysfunction in the past year
- Number of referrals an individual provider receives on a regular basis
- Provides treatment interventions that include manipulation, exercise and education
- Average number of visits per episode of care for low back pain
- Percentage of patients who return to previous level of activity

Indications for referral include:

- Failure to make improvement with home self-care after two weeks (Shekelle, 1994 [R]);
- severe incapacitating and disabling back or leg pain
- significant limitation of functional or job activities

The professional's treatment plan should include both education and exercise. The treatment plan may include modalities, if necessary, to enable an individual to carry out an exercise program and self-care. It may also include limited passive treatments such as manual therapy (e.g., includes manipulation and mobilization), among others (Ottenbacher, 1995 [M]; Shekelle, 1992 [M]). Spinal manipulation should not be done if premanipulative testing peripheralizes symptoms.
Passive treatments are to be minimized and used only to progress an individual toward independence in exercise and self-care. Active treatment such as exercise must be introduced within a week of initiating passive treatments.

There are no studies the work group is aware of regarding time frames. There is work group consensus on the following:

- Within four visits, the patient must display documented improvement in order to continue therapy. If no improvement is noted, a comprehensive re-evaluation should be performed by the spine care professional for other causes of low back pain, including regional SI joint dysfunction.
- Continued improvement must be documented for continued therapy. Typically no more than four to six visits are needed.
- Somewhere between 9 and 12 visits or between 4 and 6 weeks the patient should be reassessed.

Consult or refer to non-surgical spine physician if:

- Neuromotor deficits persist after four to six weeks of conservative treatment (does not include minor sensory changes or reflex changes).
- The patient has chronic sciatica with positive SLR longer than six weeks.
- The patient has sciatica unresponsive with conservative treatment longer than six weeks.
- The patient has atypical chronic leg pain (negative SLR).
- The patient has new or progressive neuromotor deficits.

### 15. Is Pain Chronic (Greater Than Six Weeks)?

A patient with "recurrent acute" episodes will continue a trial of conservative treatment when the current symptoms are six weeks or less from onset. "Recurrent acute" means symptoms at some point improved, separating the current episode from previous episodes. When the current symptoms are more than six weeks from onset, the patient should be regarded as chronic and the provider should move to the corresponding sections of the algorithm (Annotation #16 and beyond).

If at initial evaluation the patient is identified as chronic low back pain see Annotation #16 and for chronic sciatica/radiculopathy see Annotation #19.

### 16. Chronic Low Back Pain

A comprehensive re-evaluation, including a general assessment (see Annotation #4, "Primary Care Evaluation"), should be done for patients not improving after six weeks. Most patients with acute back pain will improve within six weeks. Back pain and sciatica that persists longer than six weeks are defined as chronic.

An assessment that includes a subjective pain rating, functional assessment and a clinician's objective assessment should be done.

Psychosocial factors can contribute to prolonged disability as previously noted (Bigos, 1991 [B]; Fritz, 2001 [B]; New Zealand Guidelines Group, 2002 [R]; Pincus, 2002 [M]). See Appendix D, "Psychosocial Screening and Assessment Tools." See the ICSI Major Depression in Adults in Primary Care guideline for the diagnosis and treatment of depression.

For patients not improving after six weeks, see "Lumbar Spine X-Rays (AP and LAT views) If Indicated" in this annotation and Annotation #19, "Chronic Sciatica/Radiculopathy," for imaging considerations.
Of the 10% of patients with chronic symptoms, 90% fall into the chronic LBP category and only 10% fall into the chronic sciatica category.

Physical factors that may lead to delayed recovery or prolonged disability include malignancy, infection, metabolic or a bio-mechanical condition (e.g., sacroiliac joint dysfunction [SJD]) (Dreyfuss, 1994 [C]; Riddle, 2002 [C]; Schwarzer, 1995 [D]). Consider further evaluation for systematic problems.

If the patient is not better, consider other etiologies for low back pain such as:

- Fractures
- Spondylarthopathies
- Infection
- Tumor
- Abdominal/pelvic pathologies
- Other sites of origin for low back pain such as facet syndrome, piriformis syndrome, stenosis or claudication

**Lumbar Spine X-Rays (AP and LAT Views) If Indicated**

Patients with chronic LBP or acute low back pain who are not improving should be considered for further diagnostic testing. (See Annotation #4, "Primary Care Evaluation.") Oblique view x-rays are not recommended; they add only minimal information in a small percentage of cases, and more than double the exposure to radiation (Deyo, 1986 [C]; Liang, 1982 [M]).

Several x-ray findings are of questionable clinical significance and may be unrelated to back pain. These findings include:

- Single disk space narrowing
- Spondylolysis
- Lumbarization
- Sacralization
- Schmorl nodes
- Spina bifida occulta
- Disk calcification
- Mild to moderate scoliosis

### 17. Active Rehabilitation

There is strong evidence that exercise therapy is effective for chronic low back pain. However, there is inconclusive evidence in favor of one exercise over the other – flexion, extension, fitness. [Conclusion Grade I: See Conclusion Grading Worksheet B – Annotation #17 (Active Rehabilitation)]. High-grade mobilization/manipulation has been shown to be effective early in treatment when followed by appropriate active rehabilitation.

The treatment of chronic low back pain should include:

- Written educational materials and advice by provider (Burton, 1999 [A])
- Active self-management
• Gradual resumption of normal light activities as tolerated
• Prevention – good body mechanics
• Exercise – many studies show the benefit of an exercise program with chronic low back pain
  - Inconclusive evidence in favor of one exercise over the other (flexion, extension or fitness)  
    (Abenhaim, 2000 [M]; Scheer, 1997 [M])
  - Consider a graded active exercise program (Lindstrom, 1992b [A])
  - Consider specific exercises to strengthen the core trunk stabilizing muscles (Lindstrom, 1992a [A])
  - Consider intensive exercise program (Manniche, 1988 [A])
• Assess and manage psychosocial factors
• Multidisciplinary approach (Hildebrandt, 1997 [D]; Pfingsten, 1997 [D])

See also the ICSI Assessment and Management of Chronic Pain guideline.

19. Chronic Sciatica/Radiculopathy

See Annotation #16, "Chronic Low Back Pain," for a comprehensive physical and psychosocial evaluation, including a subjective pain assessment functional assessment and a clinician's objective assessment.

MRI or Lumbar Spine CT Imaging Indications

MRI and CT generally are not useful in the early evaluation and treatment of low back pain or sciatica unless the patient has major or progressive neurological symptoms, or there is a suspicion of cancer or infection. Generally, cross-sectional imaging is indicated when initial non-invasive conservative regimens have failed and surgery or a therapeutic injection are considerations. If the primary care provider is uncertain whether an MRI or CT should be ordered, consultation with an appropriate consultant when the patient meets surgical referral criteria should be considered. (See Annotation #21, "Consider Epidural Steroid Injection Prior to Surgical Intervention.") Each medical group may have specific arrangements for ordering CT, MRI or other special diagnostic tests prior to referral to a surgical back specialist. See Appendix F, "General Guidelines for CT and MRI Order Sets for Adult Low Back Pain," for order set general guidelines.

When indicated, MRI is the preferred diagnostic test in the evaluation of patients with low back pain with or without radiculopathy.

CT myelography is a useful study in patients who have a contraindication to MRI, for whom MRI findings are inconclusive, or for whom there is a poor correlation between symptoms and MRI findings. CT myelography shows comparable accuracy and is complementary to MRI. CT myelography is invasive, however, and invokes the risk of allergic reaction to contrast and post-myelographic headache.

Plain CT is a useful study in patients who have a contraindication to MRI, for whom MRI findings are inconclusive, for whom there is a poor correlation between symptoms and MRI findings, and for whom CT myelogram is deemed inappropriate. CT can be used in the initial evaluation of patients with back pain and/or radiculopathy when high-quality MRI is not available.


The Adult Low Back Pain guideline work group has listed advantages for both CT and MRI imaging and a list of conditions for each. This list is not meant to be comprehensive but to aid the clinician in making a decision.
MRI indications:

- Major or progressive neurologic deficit (e.g., foot drop or functionally limiting weakness such as hip flexion or knee extension)
- Cauda Equina Syndrome (loss of bowel or bladder control or saddle anesthesia)
- Progressively severe pain and debility despite conservative therapy
- Severe or incapacitating back or leg pain (e.g., requiring hospitalization, precluding walking or significantly limiting the activities of daily living)
- Clinical or radiological suspicion of neoplasm (e.g., lytic or sclerotic lesion on plain radiographs, history of cancer, unexplained weight loss or systemic symptoms)
- Clinical or radiological suspicion of infection (e.g., endplate destruction of plain radiographs, history of drug or alcohol abuse, or systemic symptoms)
- Trauma (fracture with neurologic deficit, compression fracture evaluation in elderly patients with question of underlying malignancy, characterization in anticipation of vertebroplasty/kyphoplasty, stress fracture or subacute spondylosis in a patient less than 18 years of age)
- Severe low back pain or radicular pain, unresponsive to conservative therapy, with indications for surgical intervention or therapeutic injection

For patients with mild to moderate claustrophobia, benzodiazepines one hour prior to scan may be effective. The patient will need to be accompanied by a driver.

MRI advantages:

- Better visualization of soft tissue pathology; better soft tissue contrast
- Direct visualization of neurological structures
- Improved sensitivity for cord pathology and for intrathecal masses
- Improved sensitivity for infection and neoplasm
- No radiation exposure
- Safer for women who are pregnant, especially in the 1st trimester, due to no radiation exposure

CT indications:

- Major or progressive neurologic deficit (e.g., foot drop or functionally limiting weakness such as hip flexion or knee extension)
- Cauda Equina Syndrome (loss of bowel or bladder control or saddle anesthesia)
- Progressively severe pain and debility despite conservative therapy
- Clinical or radiological suspicion of neoplasm (e.g., lytic or sclerotic lesion on plain radiographs, history of cancer, unexplained weight loss or systemic symptoms)
- Bone tumors (to detect or characterize)
- Severe or incapacitating back or leg pain (e.g., requiring hospitalization, precluding walking or significantly limiting the activities of daily living)
• Severe low back pain or radicular pain, unresponsive to conservative therapy, with indications for surgical intervention or therapeutic injection
• Trauma (rule out or characterize fracture, evaluate for healing)

**CT advantages:**
• Better visualization of calcified structures
• Direct visualization of fractures
• Direct visualization of fracture healing and fusion mass
• More accurate in the assessment of certain borderline or active benign tumors
• More available and less costly
• Better accommodation for patients over 300 pounds and patients with claustrophobia
• Safer for patients with implanted electrical devices or metallic foreign bodies
• Less patient motion – particularly useful for patients who cannot lie still or for patients who cannot cooperate for an MRI

Other special diagnostic tests such as myelogram, EMG (electrorayography), RNS (radio nucleoid studies), and bone scan should be ordered as each medical group dictates and consider the preference of the specialist when referral is planned.

*(Deyo, 2001 [R]; Mazanec, 1991 [R]; Thornbury, 1993 [C])*

**Open Upright MRI**

Open Upright MRI systems, as currently configured with 0.5T and 0.63T magnets, are useful modalities for routine imaging of the lumbar spine, particularly for patients with severe claustrophobia, patients who cannot fit into conventional magnets, and patients who cannot lie flat because of severe pain. There is some evidence that imaging patients in the upright position or with axial loading (i.e., functional myelography, axial loaded CT or MRI, or Open Upright MRI) yields significant additional information in older patients with radiculopathy or neurogenic intermittent claudication. There is little to no evidence to support the use of Open Upright MRI in the detection of lumbar instability or in the evaluation of positional low back pain, and these applications should remain investigational.

See Appendix E, "Upright and Positional Imaging," for more information.

**21. Consider Epidural Steroid Injection Prior to Surgical Intervention**

**Key Points:**
• Epidural steroid injections should only be considered after initial appropriate conservative treatment program has failed.
• Successful epidural steroid injections may allow patients to advance in a conservative treatment program.
• Epidural steroid injects should be performed under fluoroscopy with contrast for best results.

There is limited evidence for epidural steroid injections; therefore, it is important that outcome data be gathered in order to grow the evidence.
The goal of epidural steroid injections in patients with back or leg pain and stenosis or a herniated disc on MRI or CT is pain control and functional improvement. Several studies have shown that a single epidural injection affords short-term relief from pain (Cannon, 2000 [R]; Weiner, 1997 [D]; Wilson-MacDonald, 2005 [M]) although in one randomized controlled trial, the steroid group seemed to experience a "rebound" phenomenon (Karpinnen, 2001 [A]).

There is limited evidence to support one or more epidural injections to control pain and advance appropriate conservative therapy in an attempt to avoid or decrease the incidence of surgical intervention. Butterman reported on 169 patients who presented for surgical consult with a large disc herniation on MRI (Buttermann, 2004 [A]). Sixty-nine of these patients responded to a six-week non-invasive conservative therapy program. The remaining 100 were randomized to discectomy and epidural steroid injection therapy (ESI). The ESI group received multiple (one to three) injections performed with interlaminar approach at or above the level of the disc herniation, and 76% of these were performed with fluoroscopy and contrast. 46% of the ESI therapy group had good or excellent results and experienced the same decrease in pain as the discectomy group. 54% of the ESI group crossed over and underwent surgery at an average of one to three months. This crossover group suffered no adverse outcome as a result of this delay.

Wang et al. studied 64 patients with symptomatic lumbar disc herniation on MRI and refractory symptoms who presented for surgery (Wang, 2002 [D]). They found that 77% of these patients avoided surgery with multiple fluoroscopically-guided contrast-enhanced transforaminal injections at the level of the herniation. Lutz et al., Botwin et al., and Vad et al., in less rigorous studies, also reported a 75%-85% success rate with a multiple fluoroscopically-guided transforaminal injection regimens in patients with refractory radicular pain (Botwin, 2002 [D]; Lutz, 1998 [D]; Vad, 2002 [C]).

Riew, et al., in a prospective double-blinded and randomized study, have shown that a series of injections – one to four over a period of weeks and months – can result in a decrease in the incidence of surgery (Riew, 2000 [A]). However, this was based on findings from only 55 subjects.

A randomized study by Arden et al., which enrolled 228 patients with sciatica, showed that up to three injections of lumbar epidural steroids (compared to sham treatment) showed a transient benefit at 3 weeks but not at 6 to 52 weeks, and there was no benefit of repeated epidural steroid injections over a single injection (Arden, 2005 [A]). The methods section of this paper does not indicate if the injection was done fluoroscopically or with contrast.

Based on limited data, the results appear promising. However, at this time there is insufficient evidence for the efficacy of epidural steroid injections (Institute for Clinical Systems Improvement, 2004 [R]). Epidural steroid injections should only be considered after initial appropriate conservative treatment program has failed. Successful epidural steroid injections may allow patients to advance in a conservative treatment program.

Injections should be performed under fluoroscopy and with contrast in order to deliver cortisone as close to the disc herniation, area of stenosis, or nerve root impingement as determined by MRI or CT, and with as little morbidity as possible (ICSI Technology Assessment Report #85, 2004 [R]). Failure of treatment may result from a failure to deliver medications to the treatment field.

No study has shown a clear advantage of one approach (interlaminar, caudal or transforaminal), type of cortisone or volume of injectate (Cannon, 2000 [R]; McLain, 2005 [R]). The approach needs to be individualized to each patient.

Procedural morbidity also varies with each approach (Cannon, 2000 [R]; McLain, 2005 [R]). With interlaminar injections there is a risk of intrathecal injection and subsequent arachnoiditis, as well as post-procedural headaches. With transforaminal injections, patients frequently report significant – although in most cases transient – leg pain and there is a risk of spinal cord infarction when injected above L2 (Botwin, 2000 [D]; Somayaji, 2005 [D]; Tiso, 2004 [D]).
Patient selection

- Patients should have, predominantly, complaints of leg pain in a dermatomal distribution with corroborative examination findings for radiculopathy (reflex changes, possible motor weakness, and root tension signs.) In addition, the pain should be of a severity that significantly limits function and quality of life, and that has not responded to oral analgesic medications and other conservative care measures.

- Corroborative neural axis imaging is required, either MRI or CT, with evidence of disk disease or bony stenosis that fits with the clinical syndrome.

- Patients should have no contraindications to injection therapy, including:
  - No signs or symptoms of active infection either systemically or locally
  - No history of bleeding disorders or current use of anticoagulants such as warfarin or clopidogral; allow the patient to "drift" to the lowest effective INR prior to procedure
  - No allergies to local anesthetic agents, contrast agents, or corticosteroids
  - No prior complications to corticosteroid injections

- Pregnancy is a contraindication for the use of fluoroscopy.

- Caution should be used in diabetic patients because of altered glycemic control, which is typically transient.

- Patients with congestive heart failure need to be aware of steroid-induced fluid retention.

- Though NSAID use is not a contraindication to injections, some practitioners discontinue NSAIDs several days prior to injection.

23. Discuss Options and Consider Possible Surgical or Non-Surgical Spine Specialist

Key Points:

- The appearance of a disc herniation does not rule out a course of conservative therapy. Unless "red flag" indications are present, all patients should undergo a trial of conservative therapy.

- The decision to operate is a clinical decision based on the presence of severe, uncontrolled pain, profound or progressive neurological symptoms, or a failure to respond to conservative therapy.

Indications for specialty referral may include:

Non-surgical spine specialist

- Back pain for longer than six weeks
- Sciatica for longer than six weeks
- New or progressive neuromotor deficit
- Atypical chronic leg pain
- Chronic pain syndrome
Rheumatology (limited special indications)

- Rule out inflammatory arthropathy
- Rule out fibrositis/fibromyalgia
- Rule out metabolic bone disease (e.g., osteoporosis)

Surgical spine specialist

- Patient is a surgical candidate
- Cauda Equina Syndrome
- Progressive or severe neuromotor deficit (e.g., foot drop or functional muscle weakness such as hip flexion weakness or quadriceps weakness)
- Persistent neuromotor deficit after four to six weeks of conservative treatment (does not include minor sensory changes or reflex changes)
- Chronic sciatica with positive SLR for longer than four to six weeks
- Uncontrolled pain

(\textit{Spitzer, 1987 [R]})

Special diagnostic tests can be used to help clinicians decide the appropriate referral to a specialist. To decide which test, consult with subspecialty physicians.

Patients with large, extruded, sequestered or high-signal-intensity disc herniations do not have a worse prognosis than do patients with smaller contained disc herniations or protrusions. The presence of a disc extrusion or sequestration is not an indication for immediate surgery (\textit{Deyo, 1990a [R]; Spitzer, 1987 [R]; Weber, 1983 [A]}).

- The appearance of a disc herniation on MRI/CT (including extruded/sequestered disc) does not determine whether an individual patient will respond to conservative therapy. Assuming that the patient's pain can be controlled and that no "red flags" or contraindications exist, all patients should undergo a trial of conservative therapy (\textit{Henmi, 2002 [D]; Saal, 1996 [R]}).

- The decision to operate is a clinical one, not a radiologic one, and is generally based on the presence of severe, uncontrolled pain, profound or progressive neurological symptoms, or a failure to respond to conservative therapy (\textit{Bozzao, 1992 [D]; Gundry, 1993 [D]}).

- Even though it was not discussed above, it is important to emphasize the concept that a disc herniation on MRI/CT is of relevance only with respect to specific clinical symptoms. Disc herniations can be seen in asymptomatic patients, and one can surmise from the literature quoted that if a patient's symptoms resolve and the disc herniations do not resolve, it will be present on the next examination (\textit{Buttermann, 2002 [C]; Komori, 1996 [D]; Matsubara, 1995 [D]}).

See also the ICSI Assessment and Management of Chronic Pain guideline.
Appendix A – Oswestry Low Back Pain Scale

Section 1 – Pain Intensity
☐ I can tolerate the pain I have without having to use painkillers.
☐ The pain is bad but I manage without taking painkillers.
☐ Painkillers give complete relief from pain.
☐ Painkillers give moderate relief from pain.
☐ Painkillers give very little relief from pain.
☐ Painkillers have no effect on the pain and I do not use them.

Section 2 – Personal Care (Washing, Dressing, etc.)
☐ I can look after myself normally without causing extra pain.
☐ I can look after myself normally but it causes extra pain.
☐ It is painful to look after myself and I am slow and careful.
☐ I need some help but manage most of my personal care.
☐ I need help every day in most aspects of self-care.
☐ I do not get dressed, wash with difficulty and stay in bed.

Section 3 – Lifting
☐ I can lift heavy weights without extra pain.
☐ I can lift heavy weights but it gives extra pain.
☐ Pain prevents me from lifting heavy weights off the floor, but I can manage if they are conveniently positioned, e.g., on a table.
☐ Pain prevents me from lifting heavy weights but I can manage light to medium weights if they are conveniently positioned.
☐ I can lift only very light weights.
☐ I cannot lift or carry anything at all.

Section 4 – Walking
☐ Pain does not prevent me walking any distance.
☐ Pain prevents me walking more than 1 mile.
☐ Pain prevents me walking more than 1/2 mile.
☐ Pain prevents me from walking more than 1/4 mile.
☐ I can only walk using a stick or crutches.
☐ I am in bed most of the time and have to crawl to the toilet.

Section 5 – Sitting
☐ I can sit in any chair as long as I like.
☐ I can only sit in my favorite chair as long as I like.
☐ Pain prevents me sitting more than 1 hour.
☐ Pain prevents me from sitting more than 1/2 hour.
☐ Pain prevents me from sitting more than 10 minutes.
☐ Pain prevents me from sitting at all.

Section 6 – Standing
☐ I can stand as long as I want without extra pain.
☐ I can stand as long as I want but it gives me extra pain.
☐ Pain prevents me from standing for more than 1 hour.
☐ Pain prevents me from standing for more than 30 minutes.
☐ Pain prevents me from standing for more than 10 minutes.
☐ Pain prevents me from standing at all.

Section 7 – Sleeping
☐ Pain does not prevent me from sleeping well.
☐ I can sleep well only by using tablets.
☐ Even when I take tablets, I have fewer than six hours sleep.
☐ Even when I take tablets, I have fewer than four hours sleep.
☐ Even when I take tablets, I have fewer than two hours sleep.
☐ Pain prevents me from sleeping at all.

Section 8 – Sex Life
☐ My sex life is normal and causes no extra pain.
☐ My sex life is normal but causes some extra pain.
☐ My sex life is nearly normal but is very painful.
☐ My sex life is severely restricted by pain.
☐ My sex life is nearly absent because of pain.
☐ Pain prevents any sex life at all.

Section 9 – Social Life
☐ My social life is normal and gives me no extra pain.
☐ My social life is normal but increases the degree of pain.
☐ Pain has no significant effect on my social life apart from limiting my more energetic interests, e.g., dancing, etc.
☐ Pain has restricted my social life and I do not go out as often
☐ Pain has restricted my social life to my home.
☐ I have no social life because of pain.

Section 10 – Traveling
☐ I can travel anywhere without extra pain.
☐ I can travel anywhere but it gives me extra pain.
☐ Pain is bad but I manage journeys over two hours.
☐ Pain restricts me to journeys of less than one hour.
☐ Pain restricts me to short necessary journeys under 30 minutes.
☐ Pain prevents me from traveling except to the doctor or hospital.

See next page for scoring.
Scoring (not seen by patients)

For each section the total possible score is 5; if the first statement is marked, the section score = 0; if the last statement is marked, it = 5.

If all ten sections are completed, the score is calculated as follows:

Example: 16 (total scored) \times 100 = 32% 
50 (total possible score)

If one section is missed or not applicable, the score is calculated:

Example: 16 (total scored) \times 100 = 35.5% 
45 (total possible score)

Interpretation of Disability Scores

0%-20% Minimal disability 60%-80% Crippled
20%-40% Moderate disability 80%-100% Patients are either bed-bound or exaggerating symptoms. This can be
40%-60% Severe disability evaluated by careful observation during the medical examination.

Reprinted from Psychotherapy, 66, Fairbank JCT, Cooper J, Davies JB, O'Brien JP, the Oswestry Low Back Pain Disability Questionnaire, 271-73, Copyright 1980, with permission from Elsevier.
Appendix B – Roland-Morris Disability Questionnaire

When your back hurts, you may find it difficult to do some of the things you normally do. This list contains sentences that people have used to describe themselves when they have back pain. When you read them, you may find that some stand out because they describe you today.

As you read the list, think of yourself today. When you read a sentence that describes you today, put a tick against it. If the sentence does not describe you, then leave the space blank and go on to the next one. Remember, only tick the sentence if you are sure it describes you today.

1. I stay at home most of the time because of my back.
2. I change position frequently to try and get my back comfortable.
3. I walk more slowly than usual because of my back.
4. Because of my back I am not doing any of the jobs that I usually do around the house.
5. Because of my back, I use a handrail to get upstairs.
6. Because of my back, I lie down to rest more often.
7. Because of my back, I have to hold on to something to get out of an easy chair.
8. Because of my back, I try to get other people to do things for me.
9. I get dressed more slowly then usual because of my back.
10. I only stand for short periods of time because of my back.
11. Because of my back, I try not to bend or kneel down.
12. I find it difficult to get out of a chair because of my back.
13. My back is painful almost all the time.
14. I find it difficult to turn over in bed because of my back.
15. My appetite is not very good because of my back pain.
16. I have trouble putting on my socks (or stockings) because of the pain in my back.
17. I only walk short distances because of my back.
18. I sleep less well because of my back.
20. I sit down for most of the day because of my back.
21. I avoid heavy jobs around the house because of my back.
22. Because of my back pain, I am more irritable and bad tempered with people than usual.
23. Because of my back, I go upstairs more slowly than usual.
24. I stay in bed most of the time because of my back.

Note to users:

The score of the RDQ is the total number of items checked – i.e., from a minimum of 0 to a maximum of 24. The questionnaire may be adapted for use online or by telephone. Thirty-six translations and adaptations are available.

This questionnaire is from Roland MO, Morris RW. A study of the natural history of back pain. Part 1: Development of a reliable and sensitive measure of disability in low back pain. Spine 1983;8:141-44. The original questionnaire and all translations are in the public domain. No permission is required for their use or reproduction. More information can be found at: www.rmdq.org.
Appendix C – Physical Functional Ability Questionnaire (FAQ5)

A validation study is currently underway for this tool. At this time, work group consensus was to include it as an example due to lack of other validated and easy to use functional assessment tools available for low back pain.

**Instructions:** Circle the number (1-4) in each of the groups which best summarizes your ability. Add the numbers and multiply by 5 for total score out of 100.

**Self-care ability assessment**
1. Require total care – for bathing, toilet, dressing, moving and eating
2. Require frequent assistance
3. Require occasional assistance
4. Independent with self-care

**Family and social ability assessment**
1. Unable to perform any – chores, hobbies, driving, sex and social activities
2. Able to perform some
3. Able to perform many
4. Able to perform all

**Get up and go ability assessment**
1. Able to get up and walk with assistance, unable to climb stairs
2. Able to get up and walk independently, able to climb one flight of stairs
3. Able to walk short distances and climb more than one flight of stairs
4. Able to walk long distances and climb stairs without difficulty

**Lifting ability assessment**
1. Able to lift up to 10# occasionally
2. Able to lift up to 20# occasionally
3. Able to lift up to 50# occasionally
4. Able to lift over 50# occasionally

**Work ability assessment**
1. Unable to do any work
2. Able to work part-time and with physical limitations
3. Able to work part-time or with physical limitations
4. Able to perform normal work

Physical Functional Ability Score (FAQ5)

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Appendix D – Psychosocial Screening and Assessment Tools

The screening and assessment tools noted below may help identify psychosocial factors for prolonged disability and chronic pain. Treat OR refer to the appropriate mental health professional if indicated.

Waddell's Signs

Waddell's Signs (Waddell, 1980 [C]) assess the possibility of psychological distress or malingering or both by testing the consistency and reproducibility of patient responses to non-organic physical signs. Waddell demonstrates that when three of five tests are positive, there is a high probability of non-organic pathology. Three positive tests identify the individual who needs further psychological assessment.

1. **Tenderness**: Positive is generalized tenderness overlying the entire lumbar area when skin is lightly pinched or rolled.

2. **Simulation**: The object of these tests is to give the patient the impression that a specific test is being performed when in fact it is not.
   - Axial loading: Positive when LBP is reported on vertical loading over the standing patient's skull by the examiner's hands. Neck pain is common and should be discounted.
   - Rotation: Positive if LBP is reported when shoulders and pelvis are passively rotated in the same plane as the patient stands relaxed with feet together.

3. **Distraction**: The object of this test is to distract the patient in such a way that a positive result under normal testing circumstances becomes negative in the distracted patient. The most useful test involves Straight Leg Raising (see Annotation #4, "Primary Care Evaluation"). When the patient complains of pain doing SLR while supine but does not complain of pain doing SLR while sitting, the test is positive. This test is commonly referred to as the "flip test."

![Supine](straight_leg_raising_supine.png)

![Sitting](straight_leg_raising_sitting.png)

4. **Regionalization**: Pain distributions are a function of known anatomic pathways and structures. Interpretation of the exam depends on patient giving non-anatomic or non-physiologic responses to testing.
   - Weakness: Positive test is a voluntary muscle contraction accompanied by recurrent giving way, producing motions similar to a cogwheel. Patient may show weakness on testing but have adequate strength spontaneously.
   - Sensory: Alterations in sensibility to touch and pinprick occur in a non-anatomic pattern (stocking-glove distribution or diminished sensation over entire half or quadrant of body).

5. **Overreaction**: Disproportionate verbalization, facial expression, muscle tension, tremor, collapsing or sweating. Consider cultural variations.
Pain Drawing

The pain drawing allows the patient to assess his or her own pain:

Name: _______________________________ Date: _______________________________

Where is your pain now?

Mark the areas on your body where you feel the sensations described below, using the appropriate symbols. Mark the areas of radiation, including all affected areas. Please mark an X on the area where the pain is now worst.

Aching Numbness Pins and needles Burning Stabbing

\[ \Delta \Delta \Delta \quad = = = \quad O O O \quad X X X \quad /// \]

How bad is your pain?

On a scale of 1 to 10, circle your pain.

At its very worst 1 2 3 4 5 6 7 8 9 10

Now 1 2 3 4 5 6 7 8 9 10

Overall, is your pain generally: □ Improving □ Same □ Worsening

DSM-IV TR Diagnosis Criteria for Depression

Consider psychosocial factors. For a diagnosis of a major depressive episode, at least five of the symptoms listed below must be present nearly every day for at least two weeks and represent a change from previous functioning. At least one of the symptoms must be either depressed mood or loss of interest or pleasure.

1. Depressed mood
2. Markedly diminished interest or pleasure in all or almost all activities
3. Significant (greater than 5% body weight) weight loss or gain or decrease or increase in appetite
4. Insomnia or hypersomnia
5. Psychomotor agitation or retardation
6. Fatigue or loss of energy
7. Feeling of worthlessness or inappropriate guilt
8. Diminished concentration or indecisiveness
9. Recurrent thoughts of death or suicide

CAGE-AID Screen for Alcohol/Substance Abuse or Dependence

The CAGE-AID Screen broadens the CAGE to include other drug use.

<table>
<thead>
<tr>
<th>CAGE-AID Screen</th>
</tr>
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<tbody>
<tr>
<td>Have you ever:</td>
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<tr>
<td>C</td>
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<tr>
<td>A</td>
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<tr>
<td>G</td>
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<td>E</td>
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Each affirmative response earns one point. One point indicates a possible problem. Two points indicate a probable problem.
Modified Work APGAR (Adaptation, Partnership, Growth, Affection and Resolve)

1. I am satisfied that I can turn to a fellow worker for help when something is troubling me. □ □ □
2. I am satisfied with the way my fellow workers talk things over with me and share problems with me. □ □ □
3. I am satisfied that my fellow workers accept and support my new ideas or thoughts. □ □ □
4. I am satisfied with the way my fellow workers respond to my emotions, such as anger, sorrow or laughter. □ □ □
5. I am satisfied with the way my fellow workers and I share time together. □ □ □
*6. I enjoy the tasks involved in my job. □ □ □
*7. Please check the column that indicates how well you get along with your closest or immediate supervisor. □ □ □

* Modified Work APGAR score assesses job task enjoyment. A low score means that patient rarely enjoys job tasks. Negative responses often indicate a higher risk of chronic back pain/disability. Items 1-5 may be omitted. Items 6 and 7 usually are the most predictive for prolonged disability in low back pain patients.


Psychological Risk Factors

There is work group consensus that the following factors are important to note and consistently predict poor outcomes:

- Belief that pain and activity are harmful
- "Sickness behaviors," such as extended rest
- Depressed or negative moods, social withdrawal
- Treatment that does not fit best practice
- Problems with claim and compensation
- History of back pain, time off or other claims
- Problems at work or low job satisfaction
- Heavy work, unsociable hours
- Overprotective family or lack of support
Groups of Risk Factors

Clinical assessment of risk factors may identify the risk of long-term disability, distress and work loss due to:

- Attitudes and beliefs about back pain
- Emotions
- Behaviors
- Family
- Compensation issues
- Work
- Diagnostic and treatment issues

How to Judge If a Person Is at Risk

A person may be at risk if:

- there is a cluster of a few very salient factors, or
- there is a group of several less important factors that combine cumulatively.

Six Specific Screening Questions

Suggested questions (to be phrased in treatment provider's own words):

- Have you had time off work in the past with back pain?
- What do you understand is the cause of your back pain?
- What are you expecting will help you?
- How is your employer responding to your back pain? Your co-workers? Your family?
- What are you doing to cope with back pain?
- Do you think you will return to work? When?
Appendix E – Upright and Positional Imaging

Open Upright MRI is an evolving modality using a 0.63T solid magnet and an architecture that allows imaging with the patient lying flat, sitting or standing in the neutral, extended and/or flexed positions. This system can be and is often used for routine MRI imaging of the spine. Merl, et al., in a prospective study, compared the accuracy of MRI on a low field strength 0.2T system to that on conventional high field strength systems and found no significant difference in accuracy (Merl, 1999 [C]). Open Upright MRI is also very useful for imaging patients with severe claustrophobia, patients who are too large to fit into conventional closed MRI systems, or in patients who have difficulty lying flat because of severe pain. Open Upright MRI may also be useful in patients with dynamic spondylolisthesis and dynamic stenosis.

Evaluation of Dynamic Stenosis

Functional myelography. Initial reports of dynamic narrowing of the central canal were made with standing flexion and extension radiographs following myelography, which has been referred to as functional myelography. Sortland, et al. reported the results of static and dynamic myelography in patients with a clinical diagnosis of spinal stenosis, and compared these findings to those in a control group of patients with back pain or sciatica without a diagnosis of spinal stenosis. In this study, patients with a clinical diagnosis of spinal stenosis frequently demonstrated narrowing of the canal that worsened significantly in extension. In 8/36 stenosis patients, a complete myelographic block was seen on the images obtained in extension but not on images with the patient in the neutral position. Only small differences in canal dimensions with flexion and extension were noted in the control group.

Zander, et al. noted significant dynamic changes in 33 of 210 patients with back pain, radiculopathy or neurogenic claudication who underwent functional myelography and CT myelography. At five levels, stenosis of 70% or more seen on flexion-extension myelography measured less than 50% on supine CT scans (Zander, 1998 [D]). Similar findings were reported in other studies (Ping, 1994 [D]; Sortland, 1997 [D]; Wilmink, 1983 [D]).

Axial loaded MRI. Several studies have reported on the presence of additional findings on patients who have undergone MRI, CTM or CT with axial loading applied to simulate weight bearing (Danielson, 1998 [D]; Manenti, 2003 [D]; Willen, 1997 [D]). Willen et al., in a study of 172 patients, reported significant changes on axial CT in 69% of patients with neurogenic intermittent claudication, 14% of patients with sciatica and 0% of patients with isolated back pain (Willen, 2001 [D]).

Hiwatashi, et al., in a study of 20 patients, showed that the additional information obtained with axial loading on MRI can influence treatment decisions by neurosurgeons. In five of these patients, all three neurosurgeons changed their treatment plans from conservative therapy to surgical decompression after reviewing the findings on the axial loaded exams. One or two of the neurosurgeons changed their treatment plan in another five patients (Hiwatashi, 2004 [D]). The significance of these findings relative to the patients' outcome has not been addressed.

Open Upright MRI. Open Upright MRI can image patients in anatomic positions of axial loading such as sitting and standing, in flexion and extension, and in positions that might reproduce pain.

Zamani, et al., examined 30 patients with open upright MRI using sitting neutral and sitting flexion and extension images. Fifteen of these patients also underwent conventional high field strength imaging. The authors noted a decrease in the size of the central canal in 50% of patients and the foraminal canal in 27% of patients with extension. These changes were most notable at levels with disc dessication. The authors also noted some decrease in image quality compared with the conventional images. They did not quantitate or determine the significance of the changes on Upright MRI relative to the patients' symptoms. Patients were not consecutive, and interpretation of the images were not blinded to the results of the high field strength exams (Zamani, 1998 [D]).
Wildermuth, et al. examined 30 consecutive patients with functional myelography and Upright flexion and extension MRI. They found a high correlation of the measured AP dural sac diameter on the two techniques. The authors also reported positional changes in foraminal size in a small number of patients. Patients were recruited in a consecutive manner after completion of the myelographic examination (Wildermuth, 1998 [D]).

Weishaupt, et al. examined 30 patients with chronic low back or leg pain unresponsive to conservative therapy and disc protrusions and/or extrusions without neural compression on routine supine MRI. The authors found that positional dependent changes in nerve root impingement and foraminal size were frequent, and correlated with the severity of patient symptoms. Patients were not consecutive and were recruited after completion of the supine recumbent exam. Blinding of results of the conventional imaging is not noted (Weishaupt, 2000 [D]).

Ferriro Perez, et al. evaluated the differences in findings between supine recumbent and upright sitting neutral images in 89 patients, 45 of whom underwent studies of the lumbar spine. 24 disc herniations were seen in the lumbar spine, 2 (8%) of which were only seen on the upright exam, and 14 (58%) of which increased in size on the upright exam. Anterior spondylolisthesis was seen in 13 lumbar spine cases, was only seen on the upright exam in 4 (31%), and increased in severity on the upright exam in 7 (54%). Patients were not consecutive, and findings were not correlated with symptoms. Motion artifact prohibited accurate measurements in 20% of images. Blinding of results of the conventional imaging is not noted (Ferriro Perez, 2007 [D]).

Vitzthum, et al. studied 50 healthy volunteers and 50 patients who suffered from symptoms correlating to monosegmental disease awaiting surgical decompression (41 disc herniations, 5 lateral recess stenosis, 4 degenerative spondylolisthesis). The authors felt that the dynamic open upright flexion-extension MRI added important additional information in 32 patients. Rotational examinations contributed important additional information in 5 patients. The authors did not note whether the patients were consecutive, and did not detail the nature of the important additional information. They did not an increase in the rotation at degenerated segments with a decrease segmental flexion-extension (Vitzthum, 2000 [D]).
Appendix F – General Guidelines for CT and MRI Order Sets for Adult Low Back Pain

The primary purpose of the initial order sheet is to provide patient identification and the exam requested. Secondary purposes are to provide clinical information to support the appropriateness of the request and to assist the radiologist in the interpretation of the exam. Information on the initial order should assist the radiology department to determine whether the patient has contraindications to the exam or special needs, and to prompt the radiology department to address these needs prior to the patient's appointment.

The initial order sheet should include:

I. Patient Info
   a. Name
   b. Gender
   c. Birth date
   d. Weight and height
   e. Contact information

II. Physician information
   a. Requesting provider
   b. Primary caregiver
   c. Clinic or hospital
   d. Contact information including telephone number and fax.

III. Exam requested from list of offered studies

IV. Insurance information, workers' comp, auto, etc.

V. Clinical symptoms such as
   a. Pain, severity and location (pain diagram is very useful but is easier to obtain on the clinical information form filled out by the patient on check-in; VAS would also be very useful on intake)
   b. Neurogenic intermittent claudication
   c. Neurologic loss
   d. Weakness or difficulty walking
   e. Urinary or fecal incontinence
   f. Functional limitations: e.g., work status, difficulty caring for oneself (Oswestry score would also be very useful to obtain at patient check-in and may be required for future appropriateness reviews)

VI. Suspected diagnosis such as
   a. discogenic pain
   b. disc herniation
   c. stenosis
d. Cauda Equina Syndrome
e. infection
f. tumor
g. fracture

VII. Response to and duration of prior conservative care
   a. Chiropractic care
   b. Physical therapy
c. Oral medications

VIII. Relevant history
   a. History and date of previous injury
   b. Prior imaging of the area in question
c. History of prior surgery in the examined area
d. Red flags including
   i. history of trauma
   ii. IV drug abuse
   iii. immunosuppression
   iv. long-term steroid use
   v. cancer
e. Claustrophobia
f. Contraindications to contrast including
   i. history of renal failure
   ii. diabetes
   iii. allergy to iodine or contrast

IX. Special requests
   a. Sedation for claustrophobia, pain control or pediatric imaging
   b. Transportation assistance
c. Image delivery
   i. Films
   ii. Copy with patient
   iii. CD-Rom
   iv. Electronic only
Supporting Evidence:
Adult Low Back Pain

Original Work Group Members

<table>
<thead>
<tr>
<th>Mark DePaolis, MD</th>
<th>Michael Koopmeiners, MD</th>
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<tbody>
<tr>
<td>Family Practice</td>
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<td>Dominic Korbuly, MD</td>
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<td>Radiology</td>
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<td>George Kramer, MD</td>
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<td>Park Nicollet Medical Center</td>
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<tr>
<td>Occupational Medicine, Work Group Leader</td>
<td>Kathy Kurdelmeier, PT</td>
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<tr>
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<td>Steven Lewis, DC</td>
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The next scheduled revision will occur within 24 months.

Availability of references

References cited are available to ICSI participating member groups on request from the ICSI office. Please fill out the reference request sheet included with your guideline and send it to ICSI.

Contact ICSI at:
8009 34th Avenue South, Suite 1200; Bloomington, MN 55425; (952) 814-7060; (952) 858-9675 (fax)
Online at http://www.ICSI.org

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Brief Description of Evidence Grading

Individual research reports are assigned a letter indicating the class of report based on design type: A, B, C, D, M, R, X.

A full explanation of these designators is found in the Foreword of the guideline.

II. CONCLUSION GRADES

Key conclusions (as determined by the work group) are supported by a conclusion grading worksheet that summarizes the important studies pertaining to the conclusion. Individual studies are classed according to the system defined in the Foreword and are assigned a designator of +, -, or ø to reflect the study quality. Conclusion grades are determined by the work group based on the following definitions:

**Grade I:** The evidence consists of results from studies of strong design for answering the question addressed. The results are both clinically important and consistent with minor exceptions at most. The results are free of any significant doubts about generalizability, bias, and flaws in research design. Studies with negative results have sufficiently large samples to have adequate statistical power.

**Grade II:** The evidence consists of results from studies of strong design for answering the question addressed, but there is some uncertainty attached to the conclusion because of inconsistencies among the results from the studies or because of minor doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from weaker designs for the question addressed, but the results have been confirmed in separate studies and are consistent with minor exceptions at most.

**Grade III:** The evidence consists of results from studies of strong design for answering the question addressed, but there is substantial uncertainty attached to the conclusion because of inconsistencies among the results from different studies or because of serious doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from a limited number of studies of weak design for answering the question addressed.

**Grade Not Assignable:** There is no evidence available that directly supports or refutes the conclusion.

The symbols +, –, ø, and N/A found on the conclusion grading worksheets are used to designate the quality of the primary research reports and systematic reviews:

+ indicates that the report or review has clearly addressed issues of inclusion/exclusion, bias, generalizability, and data collection and analysis;

– indicates that these issues have not been adequately addressed;

ø indicates that the report or review is neither exceptionally strong or exceptionally weak;

N/A indicates that the report is not a primary reference or a systematic review and therefore the quality has not been assessed.
References


American College of Radiology, The. Practice guideline for the performance of magnetic resonance imaging (MRI) of the adult spine. *ACR Practice Guideline* 2006;229-36. (Class R)


Burton AK, Waddell G, Tillotson KM, Summerston N. Information and advice to patients with back pain can have a positive effect: a randomized controlled trial of a novel educational booklet in primary care. *Spine* 1999;24:2484-91. (Class A)

Buttermann GR. Lumbar disc herniation regression after successful epidural steroid injection. *J of Spinal Dis & Tech* 2002;15:469-76. (Class C)


References


Deyo RA, Rainville J, Kent DL. What can the history and physical examination tell us about low back pain? *JAMA* 1992;268:760-65. (Class R)


Fritz JM, George SZ, Delitto A. The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status. *Pain* 2001;94:7-15. (Class B)


Hicks GE, Fritz JM, Delitto A, McGill SM. Preliminary development of a clinical prediction rule for determining which patients with low back pain will respond to a stabilization exercise program. *Arch Phys Med Rehabil* 2005;86:1753-62. (Class B)


Institute for Clinical Systems Improvement. Fluoroscopically guided transforaminal epidural steroid injections for lumbar radicular pain. #85, 2004. (Class R)

Institute for Clinical Systems Improvement. Intradiscal Electrothermal Therapy (IDET) for Low Back Pain. #62, 2002. (Class R)

Institute for Clinical Systems Improvement. Lumbar artificial intervertebral discs. #92, 2005. (Class R)


Little P, Roberts L, Blowers H, et al. Should we give detailed advice and information booklets to patients with back pain?: a randomized controlled factorial trial of a self-management booklet and doctor advice to take exercise for back pain. *Spine* 2001;26:2065-72. (Class A)


McLain RF, Kapural L, Mekhail NA. Epidural steroid therapy for back and leg pain: mechanisms of action and efficacy. *Spine J* 2005;5:191-201. (Class R)


Nadler SF, Steiner DJ, Erasala GN, et al. Continuous, low-level heat wrap therapy provides more efficacy than ibuprofen and acetaminophen for acute low back pain. *Spine* 2002;27:1012-17. (Class A)


North American Spine Society. Diagnosis and treatment of degenerative lumbar spinal stenosis. 2007. (Class R)


Riddle DL, Freburger JK. Evaluation of the presence of sacroiliac joint region dysfunction using a combination of tests: a multicenter intertester reliability study. *Phys Ther* 2002;82:772-81. (Class C)


Vitzthum HE, König A, Seifert V. Dynamic examination of the lumbar spine by using vertical, open magnetic resonance imaging. *J Neurosurg* 2000;93:58-64. (Class D)


Waddell G, Feder G, Lewis M. Systematic reviews of bed rest and advice to stay active for acute low back pain. *Br J Gen Pract* 1997;47:647-52. (Class M)


Willén J, Danielson B. The diagnostic effect from axial loading of the lumbar spine during computed tomography and magnetic resonance imaging in patients with degenerative disorders. *Spine* 2001;26:2607-14. (Class D)


Work Group's Conclusion: Patients with acute low back pain should be advised to stay active and continue ordinary activity within the limits permitted by the pain. Remaining active leads to more rapid recovery with less chronic disability and fewer recurrent problems than either bed rest or back mobilizing exercises.

Conclusion Grade: I

<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Design Type</th>
<th>Class</th>
<th>Quality</th>
<th>Population Studied/Sample Size</th>
<th>Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)</th>
<th>Authors' Conclusions/Work Group's Comments (italicized)</th>
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<tr>
<td>Lindström et al. (1992)</td>
<td>RCT</td>
<td>A</td>
<td>ø</td>
<td>- Industrial blue-collar workers who were sick-listed 6 wks due to any low back pain diagnosis and no sick leave due to low back pain in the wks before the current episode (sub-acute); examined by orthopedic surgeon</td>
<td>96% follow-up at 1 year (see NOTES) - No differences at baseline in age, range of motion, forward bending pain, pain behavior, or disability. - After treatment (vs. baseline) - activity group improved in spinal mobility (modified Schober, backward bending, lumbar range of motion, rotation, &amp; active leg-lift); strength (arm, back muscle endurance, &amp; lifting capacity); and cardiovascular fitness (all p&lt;0.01) - At one year (vs. baseline) - activity group improved in spinal mobility (finger-floor distance, modified Schober, &amp; lumbar range of motion), strength (abdominal endurance time &amp; lifting capacity), and cardiovascular fitness (all p&lt;0.01) - At one year activity group had greater spinal mobility (modified Schober, backward bending, lumbar range of motion, lateral bend, rotation), greater strength (abdominal muscle endurance, back muscle endurance, &amp; several lifting tasks), and greater cardiovascular fitness (all p&lt;0.01) - Number of sick days before return to work correlated with activity group pre-treatment spinal rotation (r=−0.47), abdominal muscle endurance (r=−0.45), and lifting capacity (r=−0.58) - Activity group returned to work significantly earlier than control group (10 wks vs. 15.1 wks) (p value not reported)</td>
<td>- The graded activity program improved mobility, strength and fitness in the activity group before return to work. The program proved to be a successful method of regaining occupational function and facilitating return to work in patients with sub-acute (8 wks) low back pain.</td>
</tr>
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<td>- Excluded: low back pain due to disk herniation, spondylothesis, stenosis, instability, previous back surgery, vertebral fracture, inflammatory diseases, pregnancy, defined medical or psychiatric diagnoses, drug abuse</td>
<td>- After 8 wks of sick leave randomized to activity (evaluation by physical therapist and measurement of functional capacity, work-place visit, back school education, and individual submaximal graded exercise program with goal of returning to work) or control</td>
<td>- Both groups evaluated by orthopedic surgeon, social worker and physical therapist at one year</td>
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NOTES: no specific number of weeks for activity program; patients continually encouraged to return to work; 2 patients in activity group did not participate in exercise program and did not attend 1 yr follow-up but returned to work after 15 and 29 days; 3 patients in control group did not attend 1-yr follow-up (2 returned to work at 13 and 59 days; one did not return to work)
<table>
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<tr>
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<th>Authors’ Conclusions/Work Group’s Comments (italized)</th>
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<tbody>
<tr>
<td>Faas, Chavannes, van Eijk, &amp; Gubbels (1993)</td>
<td>RCT</td>
<td>A</td>
<td>ø</td>
<td>473 patients with new back pain episode who consulted general practitioner</td>
<td>- Visual analog pain scale for pain at that moment and maximum pain (previous month); functional health status questionnaire for perceived health (6 dimensions) &amp; influence of perceived health on 7 areas (for condition at that moment and previous month) - Primary outcomes - number and duration of pain episodes and recurrences, change in functional status, mobility problems, and influence on daily life - Groups were comparable at baseline - 60 dropped - equal numbers per group, no differences in reasons for or time of dropping out - Did intention to treat analysis, on treatment analysis, and best cases analysis - During treatment 118 of 156 (76%) in exercise group complied as did 145 of 162 (90%) in placebo group; at 3 months 82% of patients said they did exercises in last 2 months and at 12 months this was 54%; 50% stated they had done exercises for ≥7 mos; 50% stated they had applied advice for ≥7 mos - 322 had 1 recurrence (mean of 1.6 per patient) - Usual Care Placebo Exercise Mean duration of pain 57 days 54 days 58 days Duration of recurrence 53 days 41 days 45 days* *p&lt;0.02 vs. usual care No effect modification and no differences with on treatment or best cases analyses - Pain, mobility problems and tiredness improved for all 3 groups; exercise group was significantly different from usual care on tiredness during 1st 3 mos and on emotional problems during the 1st month - No differences between groups on mobility problems, influence on daily life, or between follow-up consultations with physician; more physiotherapy referrals in the usual care group (not significant)</td>
<td>- No positive effects of exercise therapy could be shown on the number of recurrences, functional health status, perceived problems in daily life, and on medical care usage - Since exercise group did not differ from placebo group, positive benefits are a result of the physiotherapist's attention to patient - Patients referred to physiotherapist or to back school receive a lot of needless, expensive attention for complaints that in most cases would have disappeared spontaneously; too much attention to condition is undesirable - Exercise therapy should not be recommended for nonspecific acute back pain</td>
</tr>
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</table>

**Work Group’s Comments:**
- Did sample size estimation
- Data was mostly self-reported
- There was lower use of therapy and analgesics in exercise group
- Little information on other activities (e.g., occupational) of patients
<table>
<thead>
<tr>
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<tr>
<td>Malmivaara, Häkkinen, Aro, et al. (1995)</td>
<td>RCT</td>
<td>A</td>
<td>ø</td>
<td>Municipal employees presenting with low back pain as main symptom (acute or exacerbations of chronic pain lasting &lt;3 wks) - Included pain radiating below knee - Excluded: sciatic syndrome, pregnant, history of cancer, lumbar spine fracture, urinary tract disease - Baseline and outcomes researchers were unaware of treatment - Randomized to bed rest (2 days), exercise (1 session of instruction with exercises to be done at home every other hour during the day until pain subsided), or control (usual activities within limits due to pain) - Follow-up visits: 3 and 12 wks - Economic analysis at 12 wks - Use and costs of health care services and help at home</td>
<td>186 were randomized (67 to bed rest, 52 to exercise, 67 to usual activity); 3 wk follow-up from 165 (89%) and 12 wk follow-up from 162 (87%); no baseline differences between those with follow-up and those lost to follow-up - Groups were similar at baseline except more engaged in heavy physical work in control group, more with pain below the knee in bed rest group, and more with prolonged pain in last 12 months in exercise group - Compliance data: Daytime bed rest (hr) 22 5 2 Exercise sessions (%) 8 61 3 Prescribed drugs (%) 93 91 93</td>
<td>Avoiding bed rest and maintaining ordinary activity as tolerated lead to the most rapid recovery NOTES: was not possible for health care personnel to remain completely unaware of treatment assignments; degree of satisfaction with treatment did not differ among the three groups; compliance was adequate but may have been overestimated (self-report)</td>
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**Biased text:...**
<table>
<thead>
<tr>
<th>Author/Year</th>
<th>Design Type</th>
<th>Class Quality</th>
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<th>Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)</th>
<th>Authors’ Conclusions/Work Group’s Comments (italicized)</th>
</tr>
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<tbody>
<tr>
<td>Ljunggren, Weber, Kogstad, Thom, &amp; Kirk-esola (1997)</td>
<td>RCT</td>
<td>A</td>
<td>Patients with &quot;back problems&quot; referred to physiotherapy by general practitioners; all were occupationally active, ages 18-65 years, history of back problems; excluded patients for whom any of the exercises was contraindicated including root affections, spinal stenosis, spondylolysis, inflammatory rheumatic diseases; randomized to 2 treatment groups: physiotherapist-designed exercise program (PT) or program on a TerapiMaster apparatus (TM); instructed by a therapist and followed for 6 wks (4 telephone contacts and 4 personal visits); asked to exercise for 15-30 min 3X per wk; 9 exercises with 3 series of 10 repetitions of each; weights were added if appropriate.</td>
<td>Recorded absenteeism from work, amount of exercise and satisfaction with exercise program. -Baseline: difference in gender distribution between the 2 groups (more males in PT program, more females in TM program); height and weight were greater in the PT group; more absenteeism in past 12 months in the PT group (82.5 days vs. 61.6 days, NS); more previous back episodes in TM group (84% vs. 69%, NS); more sick leave in last 12 months in PT group (88% vs. 68%, NS); more on sick leave at inclusion in TM group (27% vs. 14%, NS). -Significant reduction in absenteeism was observed from 82.5 days to 5.7 days (over 12 months unsupervised study) for the PT group and from 61.6 days to 5.6 days for the TM group; non-significant difference between groups. -Compliance and patient satisfaction equally good in both groups; amount of exercise and patient satisfaction both decreased during the unsupervised part of the study (compared to the supervised part).</td>
<td>Work Group’s Comments: -69% of the patients in the conventional training group and 84% in the TerapiMaster group had previous back episodes resulting in absenteeism. -There were differences between groups at baseline that, although not significant, were substantial.</td>
</tr>
</tbody>
</table>

NOTES: need more attention to exercise compliance; frequent follow-ups by physiotherapists are probably a prerequisite for good compliance; did not standardize exercise regimens because the ability to tolerate exercises was not uniform among participants; exercises were tailored to individual's strength, endurance, fitness.
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| Skargren, Öberg, Carlsson, & Gade (1997) | RCT | A | – | Patients with low back or neck pain referred for treatment from primary care  
- Included those with no active treatment for low back or neck pain within the past month and no contraindication to manipulation  
- Excluded those with affected nerve root, osteopenia, suspected infection, another disease, involved in accident in past 10 days, pregnancy, treatments considered irrelevant  
- Randomized to chiropractic (CP) care or physiotherapy (PT) | 219 randomized to CP and 192 to PT; 179 in CP and 144 in PT participated (323 total)  
- Baseline: PT group reported greater pain intensity (p≤0.05) and worse general health (p≤0.01)  
- CP group received primarily manipulation; PT group received variety of treatments; mean number of sessions during treatment period was higher for PT group (6.4 vs. 4.9, p≤0.001); all had completed treatment before 6 month follow-up questionnaire  
- After treatment 13% of CP group and 4% of PT group went back for follow-up visit; 13% of CP group received additional PT treatment and 6% of PT group received CP; the PT group received mean of 7.9 treatment sessions (combined PT and CP) with 7.0 for the CP group  
- 20% of patients in both group used additional health services during treatment; during follow-up additional services were used by 37% of the CP group and 30% of the PT group  
- No complications due to treatment were reported  
- Highly significant improvement in pain, function, and general health related to the back or neck problems immediately after treatment and at 6 months (no difference between groups)  
- Equal numbers of patients reported recurrence  
- 41% of CP group and 24% of PT group reported that treatment fulfilled their expectations (p<0.01)  
- No differences in direct or indirect costs | - No difference in outcome or costs between the 2 groups was identified, nor in subgroups defined as duration, history, or severity of symptoms.  
Work Group's Comments:  
- There was no "control" group (i.e., no treatment or usual care)  
- No distinction was made between patients with low back pain and those with neck pain  
- Patients were asked to complete questionnaire and contact therapist themselves - 76 never contacted therapist or withdrew before 1st treatment and 12 withdrew after first treatment |
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| Waddell, Feder, Lewis (1997) | Systematic Review | M | ø       | -Reviewed all randomized controlled trials of bed rest and or medical advice to stay active for acute back pain  
-Included trials where main symptom was back pain of up to 3 months duration, all trials of bed rest, trials where the intervention or control was either bed rest or advice on maintaining normal activity levels, subjects ≥18 yrs  
-Assessed methodological quality (2 independent reviewers) | -10 trials of bed rest and 8 trials of advice to stay active (2 compared bed rest and advice to stay active and were included in both reviews)  
-5 of 10 trials of bed rest had methodology score >50% as did 6 of 8 trials of advice to stay active  
-8 of 10 trials of bed rest showed that bed rest was not effective; 1 of the other trials used young male army recruits in tightly controlled setting and the other compared bed rest with continuous traction vs. bed rest with sham traction and didn’t address effect of bed rest itself  
-8 of 8 trials of advice to stay active showed positive outcomes (with different outcome measures); no evidence of any harmful effect or increased recurrences with early activity  
-2 trials compared advice to stay active with bed rest and found faster recovery with ordinary activity | -Multiple trials show that bed rest is not an effective treatment but may delay recovery  
-Advice to stay active and to continue ordinary activity as normally as possible is likely to give faster return to work, less chronic disability, and fewer recurrent problems  
NOTES: difficult to identify all relevant studies due to indexing in databases; quality of trials was “reasonable” - small sample sizes, insufficient info. about randomization and co-interventions, unblinded assessment of outcomes and no intention-to-treat analysis are limitations |
| Underwood & Morgan (1998) | RCT          | A     | –       | -Patients with back pain in a general practice  
-Included: pain for <28 days at time treatment would be given, symptom-free for ≥28 days before this episode, pain from 12th thoracic vert. to buttock folds, ages 16-70, bilateral pain, no peripheralization of pain with 10 repeated extension exercises in standing position  
-Excluded: inflammatory joint disease, metatases or infection, spondylolthesis, neurological deficit, osteoporosis, pregnancy, visceral pathology with pain referred to lower back, previous trial entry, intention to seek treatment elsewhere | -Outcomes were Oswestry Low Back Disability Score, visual analog scale for pain, use of pain killers, other therapies, days of back pain over previous 6 months (52 wk questionnaire only)  
-78 referred for assessment, 3 subsequently excluded (didn’t meet eligibility requirements)  
-35 randomized to treatment of which 32 (91%) attended; both groups returned 84% of possible follow-up questionnaires  
-Baseline: control group was more likely to have taken pain killers in previous 24 hours (p=0.03); control group had higher scores for disability and pain (NS)  
-No significant differences between groups in numbers of patients with a “good” outcome on the disability score or pain score at any point in study  
-No differences in proportions reporting they were unable to work at any point in study  
-At one year more of treated patients recorded that their backs had been no problem to them in preceding 6 months (p<0.007)  
-Number of back pain consultations was same for both groups with more consultations for conditions other than back pain in the control group (p<0.01) | -Early intervention with a small class teaching McKenzie back extension exercises did not reduce long-term disability  
-There was a suggestion that more of the treatment group were free of back problems at 1 year |
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| Hides et al. (2001) | RCT         | A     | ø       | -39 patients; ages 18-45 yrs; males & females; first episode of unilateral mechanical low back pain (<3 wks)  
- Randomized to 1) Control (medical management with advice on bed rest, absence from work, prescription of medication, and advice to resume normal activity or 2) Specific Exercise (same as Control plus specific localized exercises for multifidus)  
- 4 wk intervention; exercise 2x/wk  
- Assessment: McGill Pain Questionnaire, Visual Analog Scale (pain), Roland Morris Disability Index, range of motion, habitual activity levels, muscle cross-sectional area (with ultrasound)  
- Telephone interview for 1- and 3-year follow-up of recurrence of low back pain | -19 in control group; 20 in specific exercise group  
- Groups comparable at baseline in age, gender distribution, height, weight, duration of symptoms, smokers, workers' compensation, pre-morbid activity levels  
- Weeks 1-4: multifidus size was recovered more completely in the exercise group at 4 wks and at 10 wks (p<0.01); pain and disability had completely resolved in 90% of patients (2 groups similar)  
- 39 responses (100%) at 1 yr; 36 (92%) at 3 yrs  
- Control group 12.4 times more likely to experience recurrences of low back pain in the 1st year after initial episode and 9 times more likely in years 2-3 (p<0.001)  
- 19% of control group reported traumatic incidence related to recurrence in 1st yr (vs. 67% of exercise group)  
- Treatment sought by 42% of control group and 15% of the exercise group during 1st yr | - Subjects with acute, first-episode low back pain who received specific exercise therapy in addition to medical management and resumption of normal activity experienced fewer recurrences of low back pain in the long-term than subjects who received medical management only and resumed normal activity.  
NOTES: assessors were blinded to group allocation and patient presentation; complete short-term results presented in another report |
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<tr>
<td>Little et al. (2001)</td>
<td>RCT</td>
<td>A</td>
<td>–</td>
<td>Consecutive patients seeking treatment for new low back pain episode (duration less than 3 months or exacerbation of chronic low back pain) – Excluded: stable chronic back pain; age &lt;16 or &gt;80; dementia or other major psychiatric illness; progressive or multilevel neurologic deficit; cauda equina, previous history of cancer or prolonged use of oral steroids, pregnancy, inability to walk 50 yds - Randomized to control, educational booklet, exercise advice, booklet and exercise advice - All groups told to keep as mobile as possible; exercise group told to aim for regular exercise (20 minutes at least 3 times/wk); booklet had information on anatomy, self-management, exercise advice, practical tips for activities of daily living - Pain and function assessed by telephone at 1 wk and 3 wks after entry; questionnaire (for pain, function, satisfaction, and knowledge) given to patients to return after 1 wk</td>
<td>-78 randomized to control group, 81 to booklet, 75 to exercise advice, and 77 to booklet + exercise - Pain/Function score reduced by 8.7% in booklet group (p=0.05), 7.9% in exercise group (p=0.08), and 0.1% in booklet + exercise group; at 3 wks mean changes were 6.3%, 1.4%, and 4.0%, respectively (no differences between groups) - Aberdeen scale results were similar - lower in booklet group (p=0.06) and exercise group (p=0.01) but not booklet+exercise group: - No differences in percentage of patients reporting &quot;back to normal&quot; - Overall satisfaction improved by booklet (p=0.02) and advice to exercise (p=0.03); booklet improved satisfaction with amount of information (p=0.003) and content of information (p=0.005) but not with visit or management of back pain; exercise advice improved satisfaction with management of back pain (p=0.03), amount of information (p=0.02), and content of information (p=0.03) - Knowledge was higher for those receiving booklet or booklet and advice than those in control group or advice along group</td>
<td>- Advice to exercise or a booklet is likely to increase satisfaction and make modest changes to pain and function, over and above advice to mobilize and use simple analgesia, during the first week after seeking treatment for back pain. It may not be helpful to provide a detailed information booklet and advice together. NOTES: of 315 eligible, 311 participated; assessment was blinded; sample size estimation; combined pain/function score was validated for this study; Aberdeen pain and function scale also used</td>
</tr>
</tbody>
</table>

Work Group’s Comments: included both acute and chronic cases; analysis was not by intention-to-treat
Work Group's Conclusion: There is strong evidence that exercise therapy is effective for chronic low back pain. However, there is inconclusive evidence in favor of one exercise over the other – flexion, extension, or fitness.

**Conclusion Grade:** I

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<tr>
<td>Nelson, O'Reilly, Miller, Hogan, Wegner, &amp; Kelly</td>
<td>Case Series</td>
<td>D</td>
<td>-</td>
<td>-895 referred: 627 completed program, 107 recommended for inclusion but didn't enroll (control group), 161 began but dropped out</td>
<td>-Patients referred for rehabilitation -Ages 14 to 65 years -Patients had tried an average of 6 different treatments; 89% had failed a &quot;supervised exercise program&quot; -Testing and rehabilitation using a lumbar-extension machine and a torso-rotation machine; average of 2x per wk for 1 hr (also did aerobic exercise and other muscle strengthening) -Watched videos, learned body mechanics and read literature -Given home program and exercise device at end of program -Treatment ended when patient was pain-free (or nearly) and near normal function level, no longer making objective gains, or refused to cooperate or give good effort -Did isometric and dynamic testing, rated back and/or leg pain, rated functional ability -Follow-up questionnaire at 7 to 18 months after discharge</td>
<td>-Data support the use of specific intensive exercise for chronic back pain patients (regardless of underlying condition); program was successful even though majority had previously tried some form of exercise</td>
</tr>
<tr>
<td>Scheer, Watanabe, &amp; Radack</td>
<td>Systematic Review</td>
<td>M</td>
<td>ø</td>
<td>-629 referred: 627 completed program, 107 recommended for inclusion but didn't enroll (control group), 161 began but dropped out</td>
<td>-Patients referred: 627 completed program, 107 recommended for inclusion but didn't enroll (control group), 161 began but dropped out -Average of 18 visits -Improvements in static strength (p&lt;0.001), sagittal range of motion (17%, p&lt;0.001), dynamic strength (sagittal and rotational planes, p&lt;0.001) -602 listed low back pain as a significant complaint at baseline; 64% of patients reported substantial decrease in perception of pain (with 12% unchanged, 3% worse) -429 listed leg pain as a significant complaint at baseline; 62% of patients reported substantial decrease in pain (with 13% unchanged, 2% worse) -Correlation between isometric strength and change in low back pain was low (r=0.32) -Overall response to treatments was graded as excellent by 46%, good by 30%, fair by 14%, and poor by 8% (excellent or good indicated both substantial pain relief and substantial strength improvement) -Results did not differ for subgroups based on diagnosis; psychosocial factors did affect results with fewer excellent or good results in workers' compensation and/or litigation cases -Data from 495 (79%) of patients at average of 13 months: of those with good or excellent initial results 94% maintained improvement; of those with initial fair or poor results 25% improved -53% reported using home exercise device -Greater utilization of health care system by the control group (p&lt;0.001); control group also was less likely to have gotten lasting relief from treatment (p&lt;0.001); groups were similar in percent employed</td>
<td>-No indication of what percent were judged to have completed program based on the three criteria -It is not clear how many patients rated the overall response to treatment</td>
</tr>
</tbody>
</table>

**NOTES:** control group is not a true control group because selection was not random and treatment was not controlled; possible selection bias in that patients were referred to program; average cost (including all physician fees and home equipment) was $2250

**Work Group's Comments:**

-161 dropped out; data from 122 of those who dropped (76%) indicated that 41% felt the program wasn't helping (authors noted that improvements were often noted only after several weeks of exercise)

-No indication of what percent were judged to have completed program based on the three criteria

-It is not clear how many patients rated the overall response to treatment

-Scheer, Watanabe, & Radack

**Systematic Review**

-1975-1993 -Review of RCTs with concurrent controlled subjects that included return-to-work (RTW) outcomes -Used 26-point abstraction system for methodologic rigor -Identified 4 dealing with exercise and chronic low back pain

-2 of the 4 studies were of too low quality to permit inference on vocational effects

-1 of the studies included too few subjects missing work

-1 of the studies had an inexplicably prolonged effect over 1 year from only 4 weeks of individualized exercise

-Could not draw conclusions for the value of exercise from such a limited group of studies
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<tr>
<td>van Tulder, Koes, &amp; Bouter (1997)</td>
<td>Systematic Review</td>
<td>M</td>
<td>+</td>
<td>-Literature search through 1995 -Included trials: true RCTs, treatment included therapeutic interventions selected for study (including exercise), results concerned acute or chronic low back pain, and article was published in English -Chronic pain was pain persisting for ≥12 wks -Used 100-point methodologic evaluation (2 reviewers)</td>
<td>-Positive studies: Intervention was more effective than reference treatment with regard to at least one important outcome measure -Negative studies: Intervention was no different from or less effective than the reference treatment on at least one important outcome measure -No conclusion if intervention was more effective on one outcome measure but less effective on another -16 RCTs pertaining to exercise and chronic low back pain; methodologic scores ranged from 24 to 61 (3 &gt;50) -8 had positive outcomes (including the 3 with scores &gt;50; see Deyo et al., Hansen et al., &amp; Manniche et al., below) and 8 had negative outcomes</td>
<td>-There is strong evidence that exercise therapy is effective for chronic low back pain. -There is no evidence in favor of one of the exercise programs due to the contradictory results.</td>
</tr>
</tbody>
</table>
### Author/Year
Deyo, Walsh, Martin, Schoenfeld, & Ramamurthy (1990)

### Design Type
RCT

### Class
A

### Quality
0

### Population Studied/Sample Size
- Patients (18-70 yrs old) with low back pain >3 mos duration; recruit via newspaper advertisement
  - Excluded: history of cancer, use of corticosteroids or anticoagulants, max. pain above T-12, use of pacemaker, heart disease, severe coexisting disease, previously unevaluated neurologic deficit, previous TENS use, those seeking or receiving disability compensation; also excluded for factors that would impair follow-up
  - Randomized to 4 groups: TENS + exercise, TENS only, exercise + sham TENS, sham TENS only; other treatments were uniform
  - Monitored compliance
  - TENS: conventional high-freq. for 2 wks, instruction in acupuncuture-like TENS, self-selected mode for final 2 wks (same instructions given to sham TENS group)
  - Exercise: 12 sequential exercises - relaxation and flexibility
  - Interventions for 4 wks; visits 2x per wk for heat treatment, adjustment of TENS electrodes and advice on posture for various activities; home heating pads were used 2x per day for 10 min

### Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)
- 543 responded to advertisement; 145 were enrolled and randomized; 20 (14%) dropped out by 4 wk assessment; 23 (16%) dropped by 2 months after treatment
- Assessment: Physical exams and questionnaires at baseline, after 2 and 4 wks of therapy, and 2 months after end of treatment; included functional status, pain ratings, physical measures, and use of medical services
- Baseline: Differences between groups in proportion with neurologic deficit and previous TENS use, those seeking or receiving disability compensation; also excluded for factors that would impair follow-up
- Randomized to 4 groups: TENS + exercise, TENS only, exercise + sham TENS, sham TENS only; other treatments were uniform
- Monitored compliance
- TENS: conventional high-freq. for 2 wks, instruction in acupuncture-like TENS, self-selected mode for final 2 wks (same instructions given to sham TENS group)
- Exercise: 12 sequential exercises - relaxation and flexibility
- Interventions for 4 wks; visits 2x per wk for heat treatment, adjustment of TENS electrodes and advice on posture for various activities; home heating pads were used 2x per day for 10 min

### Authors' Conclusions
- There was no apparent benefit of TENS.
- There appear to be modest subjective benefits from stretching exercises but few short-term effects on actual behavior.
- Treatment with TENS is no more effective than treatment with placebo and TENS adds no apparent benefit to that of exercise alone

### Work Group's Comments
- Analysis was not by intention-to-treat
- Sample sizes per group were <35 each

### Notes
- Protocol provided for all patients to have equal time and attention from the research staff; most patients reported moderate or mild pain with previous medical care for low back pain

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**Conclusion Grading Worksheet B – Adult Low Back Pain**

**Annotation #17 (Active Rehabilitation)**

**Thirteenth Edition/November 2008**
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<td>Hansen, Bendix, Skov, et al. (1993)</td>
<td>RCT</td>
<td>A</td>
<td>ø</td>
<td>Patients ages 21-64 with chronic (current episode of pain lasting 3 mos) or subchronic (24 wks with at least 2 pain episodes per month for past year) pain - Excluded those with specific disease (e.g., spondylolisthesis, root compression, collagenosis, osteoporosis, previous spinal fusion, neuromuscular disease of the trunk, malignant disease, uncompensated hypertension, pregnancy or lactation, any disease or malfunction that would hinder treatment - Randomized (blocking on 8 variables) to: a. intensive dynamic back-muscle training (DYN) - 3 exercises, 300 total contractions per session b. standard physical therapy (PT) - standard program (exercises, counseling) plus individual program c. placebo-control (CTRL) - hot packs, traction - All treatments were 1 hour, 2x per wk for 4 weeks</td>
<td>-180 were randomized, 11 never started treatment, 19 dropped out during treatment and 13 dropped out during follow-up period; post-treatment evaluation of 150, 1-month evaluation of 146, 6-month evaluation of 143, 12-month evaluation of 137 (76% of those randomized) - Pain: All groups showed significant (p&lt;0.01) reduction in pain (for those completing all follow-ups); both groups responded well to PT (p&lt;0.01 for males and p=0.02 for females); males also responded to CTRL (p&lt;0.01); females also responded to DYN (p&lt;0.01); those with moderate/heavy work occupations responded to all treatments (p&lt;0.05), those with sedentary/light work occupations responded to DYN &amp; PT (p&lt;0.01) - Overall Treatment Effect (self assessment on visual analog scale): No significant differences between DYN and PT but both were significantly more effective than CTRL (p&lt;0.01) - Functional Status: number of days with pain during the 1-yr observation period was reduced in all treatment groups compared to the 1 yr prior to treatment; no differences between groups</td>
<td>- Patients were successfully treated with PT and DYN; those in the control group had less successful therapy results - There were differences between males and females; DYN had a negative effect for men compared to other treatments; females had a better response to DYN than to placebo - Those with lighter job functions responded better to DYN than those with moderate/hard job functions (who responded better to PT) NOTE: All patients were employed in the Scandinavian Airline System (SAS); pain level in those who were randomized but did not complete treatment was significantly higher than for those who did complete treatment (p=0.03)</td>
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Work Group's Comments: - Analysis was not by intention-to-treat - No report of compliance with treatment
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<td>Manniche, Bentzen, Hessel-søe, Christensen, &amp; Lundberg (1988) AND Manniche, Lundberg, Christensen, Bentzen, &amp; Hessel-søe (1991)</td>
<td>RCT</td>
<td>A</td>
<td>ø</td>
<td>Patients with chronic low back pain were referred - Included: chronic low back pain at rest or associated with back strain for ≥ 12 mos; acute pain ≥ 3x in past 6 mos with or without sciatica, ages 20-70; radiological exam of lumbar spine in last 2 yrs - Excluded: evidence of root pressure, spondylolysis, painful hip arthritis, osteomalacia of spine, malignant disease with poor prognosis, inflammatory disease of joints, mental illness, somatic disease that might interfere with training, inability to cooperate - Randomized to: A. hot compresses, massage, isometric exercises for lumbar spine; 8 sessions over 1 month then no treatment for 2 months B. placebo with modified back strengthening (same exercises as C but 20 reps); 30 sessions over 3 months C. Intensive back strengthening with 3 exercises each done 100 times; 30 sessions over 3 months</td>
<td>Of 140 referred, 105 were randomized - Measured pain, disability, and physical impairment at baseline, end of treatment (3 months), and 6 months after start of treatment (1988 study); included 1-year follow-up of selected components (1991 study) - Qualitative Assessment (after treatment): more responders (satisfactory evaluation) for group C than group A (p&lt;0.00005) or group B (p&lt;0.05) with no difference between A and B (p=0.08) - Quantitative Assessment (low back pain rating scale): group C was superior both at end of treatment and at 3 months after treatment; scores improved from baseline for groups B and C but not A; at 1 year, those who continued with intensive exercise had a significantly better outcome than those who did not continue; group was also significantly better than group A and tended to be better than group B - Subjective outcome was highly correlated (r=0.75) with quantitative outcomes - 15 of 105 randomized dropped out before end of treatment and were not included in the statistical tests; if the 6 who dropped because of side effects were assigned the poorest qualitative outcome and included in the analysis, the results would not change</td>
<td>The results consistently favored intensive exercise. The intensive exercise regimen was safe with a low frequency of side effects requiring withdrawal (6 patients total, 1 in group A, 3 in group B, and 2 in group C). - Intensive back training ought to continue in a longer and continuous course if lasting result is desired. Notes: The duration of exercise treatment may explain why this study found pronounced differences between groups; cannot say which exercises account for the benefit seen Work Group's Comments: - Analysis was not by intention-to-treat - Compliance was not reported except that those who were absent more than 30% were to have been excluded - 1-year follow-up was done by mail</td>
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<thead>
<tr>
<th>Author/Year</th>
<th>Design Type</th>
<th>Class</th>
<th>Quality</th>
<th>Population Studied/Sample Size</th>
<th>Primary Outcome Measure(s)/Results (e.g., p-value, confidence interval, relative risk, odds ratio, likelihood ratio, number needed to treat)</th>
<th>Authors' Conclusions/Work Group's Comments (italicized)</th>
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<tbody>
<tr>
<td>Pfingsten, Hildebrandt, Lebing, Franz, &amp; Saur (1997)</td>
<td>Case Series</td>
<td>D</td>
<td>ø</td>
<td>-90 chronic low back pain patients admitted to 8-wk outpatient program: 3 wks of prepromgram (education, stretching and calisthenics for 4 hours/day 3x per wk) and 5 wks of intensive treatment (aerobic, functional strength and endurance exercises, back school, cognitive behavioral therapy, relaxation training, vocational counseling for 7 hours/day) -Monitored pain, treatments, time off work, strength and range of motion, depression, disability, coping -Assessed at end of program and 6 and 12 months later</td>
<td>-Significant (p&lt;0.001) improvements from baseline in flexibility, strength and endurance -Significant reductions (p&lt;0.001) in pain, disability and depression -56/90 (62%) reported significant reduction in subjective pain intensity after program (others had unchanged or greater pain) -“Catastrophizing” and &quot;search for information” (coping activities) were both significantly reduced by 6 months after treatment -42% reduction in use of analgesics; significant reduction in consultation of physicians and physiotherapists in the year following discharge from the program (p&lt;0.001) -60% rated the program's success as good or very good, 32% as moderate, and 6% as a complete failure -Probability of a return to work was most likely when patients (prior to treatment) had not applied for pension, had positive outlook concerning return to work, and were not out of work for more than 6 mos -Return to work was more likely if treatment resulted in reduced disability and reduced depression</td>
<td>-Combined functional and psychological treatment resulted in significant improvements among patients. The results were generally maintained at the 6 and 12 month evaluations. Biographical and medical data and a patient's previous medical history did not appear to have an impact on therapeutic success. NOTE: no control group and therefore cannot determine if outcome results were a result of treatment procedures, confounding variables, or the influence of time; cannot differentiate between various forms of treatment</td>
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<tr>
<td>Hildebrandt, Pfingsten, Saur, &amp; Jansen (1997)</td>
<td>Case Series</td>
<td>D</td>
<td>ø</td>
<td>Same as Pfingsten et al. (above) -Continued identification of factors related to treatment success</td>
<td>-A subjective reduction in pain intensity is more likely if a patient has not already applied for a pension, absence from work is &lt; 6 mos, previous hospital treatments for back pain were short, patients underwent fewer medical consultations, and patients demonstrated improved performance of trunk extension -Reduction in pain intensity is more likely if disability can be reduced and better trunk flexion and leg press performances are achieved -A subjective rating of successful treatment is more likely if medical consultations were infrequent, overall trunk flexibility was greater, and coping with the disease was less catastrophizing before treatment -A favorable estimation of success was more likely if disability was reduced</td>
<td>-The most important variable in determining a successful treatment of chronic low back pain is the reduction of subjective feelings of disability; physical variables had only limited predictive value</td>
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<tr>
<td>Author/Year</td>
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| Frost, Lamb, Klaber Moffet, Fairbank, Moser (1998) | RCT | A | 0 | Patients referred to a hospital orthopaedic outpatient dept. | - Oswestry Low Back Pain Disability Index (questionnaire) to assess limitations of daily activities  
- Owestry index (where lower score = less disability), n=31 per group:  
  Baseline 2 years  
  Treatment Group 23.1 15.4  
  Control Group 24.9 22.5  
  Difference between groups was significant (p=0.04) | - A general, non-specific fitness program designed for patients with chronic low back pain had beneficial outcomes. Patients were supervised and exercising in groups which were likely to help improve their motivation and compliance.  
- It is most likely that the specific exercises themselves are not as important as the general philosophy of encouraging normal movement without unduly stressing the spine.  
NOTES:  more variables were assessed at baseline (were not able to assess at follow-up): limited sample size; many patients were not available for follow-up; did not measure adherence to home exercise program; results may be due to supervised exercise program or to affect of additional treatment sessions  
Work Group's Comments:  
- Questionnaire was administered in person at baseline and through the mail at follow-up  
- Did not do a true intention-to-treat analysis |
| Abenhaim et al. for the Paris Task Force (2000) | Systematic Review | M | 0 | Literature search from 1966-1997; reference lists from review articles; personal knowledge of the research (unpublished data)  
- Evaluated 150 (of 1,141 relevant abstracts) randomized trials, other studies with control groups and case series: 47 articles selected based on epidemiologic methodology and clinical significance  
- Chronic low back pain defined as >12 wks  
- 10 randomized trials pertaining to chronic low back pain; variety of exercise programs studied; duration of 4 weeks to 3 months  
- 7 studies found active management superior to control* in range of motion, strength, pain, functional status, stamina  
- 2 studies found exercise no better than control  
- 1 study compared TENS + exercise with placebo TENS + exercise and found no difference  
- Control group not clearly defined in one study | - There is sufficient scientific evidence to support the prescription of physical, therapeutic, or recreational exercise in cases of chronic low back pain except for pain radiating to a precise and entire leg dermatome. No technique has been shown to be clearly superior but there is evidence that programs should combine strength training, stretching and/or fitness.  
NOTES: also developed recommendations pertaining to activities of daily living and occupational tasks; chronic studies included Deyo et al (1990), Manniche et al. (1991) & Frost et al. (post-tx data) (1998)
This section provides resources, strategies and measurement specifications for use in closing the gap between current clinical practice and the recommendations set forth in the guideline.

The subdivisions of this section are:

- Priority Aims and Suggested Measures
  - Measurement Specifications
- Knowledge Resources
- Resources Available
Priority Aims and Suggested Measures

1. Improve the assessment and reassessment of adult patients with low back pain. (Annotations #1, 4, 16, 19).

Possible measures for accomplishing this aim:

a. Percentage of patients with a diagnosis of back pain who have medical record documentation of all of the following on the date of the initial visit to the physician (NCQA):
   - Pain assessment (NCQA)
   - Functional status (NCQA)
   - Patient history, including notation of presence or absence of "red flags" (NCQA)
   - Assessment of prior treatment and response, and (NCQA)
   - Employment status (NCQA)
   - Psychosocial screening that includes depression and chemical dependency screening (ICSI)

b. Percentage of adult patients diagnosed with low back pain with documentation in the medical record of a reassessment at each follow-up visit that includes:
   - Pain assessment (subjective pain rating)
   - Functional assessment (Oswestry Low Back Index)
   - Clinician's objective assessment, and
   - Psychosocial screening that includes depression and chemical dependency screening

2. Reduce unnecessary imaging with adult patients with low back pain in the absence of "red flag" indicators or progressive symptoms. (Annotations #4, 19)

Possible measures for accomplishing this aim:

a. Percentage of patients 18 to 50 years of age with a primary diagnosis of low back pain who did not have an imaging study (plain x-ray, MRI, CT scan) within 28 days of the diagnosis. (NCQA)

   *ICSI Adult Low Back Pain guideline defines target population as adult patients age 18 and over.

b. Percentage of adult patients with a diagnosis of acute low back pain without "red flag" indicators who did not receive an imaging study (plain x-ray, MRI, CT scan) within the 28 days of the diagnosis.

c. Percentage of patients with a diagnosis of back pain for whom the physician ordered imaging studies during the six weeks after pain onset, in the absence of "red flags." (NCQA overuse measure, lower performance is better.)

   *ICSI Adult Low Back Pain guideline defines target population as adult patients age 18 and over.

d. Percentage of patients who received inappropriate repeat imaging studies in the absence of "red flags" or progressive symptoms. (NCQA overuse measure, lower performance is better.)

   *ICSI Adult Low Back Pain guideline defines target population as adult patients age 18 and over.
3. Increase the use of recommended conservative approach as first-line treatment, such as activity, self-care and analgesics for adult patients with low back pain. (Annotation #5)

Possible measures for accomplishing this aim:

a. Percentage of patients with medical record documentation that a physician advised them to maintain or resume normal activities. (NCQA)

b. Percentage of patients with medical record documentation that a physician advised them against bed rest lasting four days or longer. (NCQA)

*ICSI Adult Low Back Pain guideline defines target population as adult patients age 18 and over with low back pain or sciatica.

c. Percentage of adult patients with low back pain with documentation in the medical record of patient receiving patient education regarding low back pain self-care and the importance of maintaining an active lifestyle.

d. Percentage of adult patients with low back pain returning to their primary care provider for one to three-week follow-up for reinforcement of treatment recommendations.

e. Percentage of adult low back pain patients with documentation in the medical record of recommendation to take an anti-inflammatory or analgesic medication.
Measurement Specifications

Possible Success Measure #2a

Percentage of patients with a diagnosis of back pain for whom the physician ordered imaging studies during the six weeks after pain onset, in the absence of "red flag." (NCQA overuse measure; see notes below.)

Population Definition

Adult patients age 18 and over in primary care who have symptoms of acute low back pain or sciatica (see codes below).

Data of Interest

- # of patients with acute low back pain or sciatica receiving imaging studies (see definitions below)
- # of patients with acute low back pain who present to clinic with low back pain six weeks or less from onset of pain without "red flag" indicators (see notes below)

Numerator/Denominator Definitions

Numerator: Acute low back pain patients receiving imaging studies AP or LAT x-ray, CT scan and MRI.

Denominator: Patients who are within six weeks of onset of low back pain, and related symptoms as identified by the following ICD-9 codes: 720.x, 721.x, 722.x, 724.xx, 847.2, 738.4, 738.5, 738.6, 846.x, 847.2, 847.2, 847.3, 847.4, 847.9.

Method/Source of Data Collection

Identify patients with acute low back pain using the above diagnosis codes. Patients should be included if the onset of symptoms was six weeks or less.

The medical record of each patient is reviewed to determine if the patient meets any of the "red flag" indicators. If none of the "red flag" indicators is present, the chart is further reviewed for use of AP or LAT x-ray, CT scan or MRI.

Time Frame Pertaining to Data Collection

The suggested time period is a calendar month.

Notes

MRI and CT generally are not useful in the early evaluation and treatment of low back pain or sciatica unless the patient has major or progressive neurological symptoms, or there is a suspicion of cancer or infection.

Generally AP and LAT x-rays are not useful in the acute setting but may be warranted with:

- unrelenting night pain or pain at rest (increased incidence of clinically significant pathology);
- history of or suspicion of cancer (rule out metastatic disease);
- fever above 38° (100.4° F) for greater than 48 hours;
- osteoporosis;
- other systemic diseases;
• neuromotor or sensory deficit;
• chronic oral steroids;
• immunosuppression;
• serious accident or injury (fall from heights, blunt trauma, motor vehicle accident) – this does not include twisting or lifting injury unless other risk factors are present (e.g., history of osteoporosis), and
• clinical suspicion of ankylosing spondylitis.

Other conditions that may warrant AP or LAT x-rays:
• Over 50 years old (increased risk of malignancy, compression fracture)
• Failure to respond after six weeks of conservative therapy
• Drug or alcohol abuse (increased incidence of osteomyelitis, trauma, fracture)
Knowledge Resources

Criteria for Selecting Resources

The following resources were selected by the Adult Low Back Pain guideline work group as additional resources for providers and/or patients. The following criteria were considered in selecting these resources.

- The site contains information specific to the topic of the guideline.
- The content is supported by evidence-based research.
- The content includes the source/author and contact information.
- The content clearly states revision dates or the date the information was published.
- The content is clear about potential biases, noting conflict of interest and/or disclaimers as appropriate.

Resources Available to ICSI Members Only

ICSI has a wide variety of knowledge resources that are only available to ICSI members (these are indicated with an asterisk in far left-hand column of the Resources Available table). In addition to the resources listed in the table, ICSI members have access to a broad range of materials including tool kits on CQI processes and Rapid Cycling that can be helpful. To obtain copies of these or other Knowledge Resources, go to http://www.icsi.org/improvement_resources. To access these materials on the Web site, you must be logged in as an ICSI member.

The resources in the table on the next page that are not reserved for ICSI members are available to the public free-of-charge.
## Resources Available

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<tr>
<th>*</th>
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<th>Title/Description</th>
<th>Audience</th>
<th>Web sites/Order Information</th>
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<tbody>
<tr>
<td></td>
<td>Center for the Advancement of Health</td>
<td>This Web site contains a series of studies on health behavior change in the clinical setting for chronic back pain.</td>
<td>Health Care Professionals</td>
<td><a href="http://www.cfah.org/">http://www.cfah.org/</a></td>
</tr>
<tr>
<td></td>
<td>MayoClinic.com</td>
<td>Consumer information on back pain. Topics include definition, causes, risk factors and other topics.</td>
<td>Patients and Families</td>
<td><a href="http://www.mayoclinic.com">http://www.mayoclinic.com</a></td>
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<td></td>
<td>NIAMS: National Institute of Arthritis and Musculoskeletal and Skin Diseases</td>
<td>Web site provides a PDF document entitled Handout or Health: Back. The booklet is for patients and families who have back pain and want to learn more about it.</td>
<td>Patients and Families</td>
<td><a href="http://www.niams.nih.gov">http://www.niams.nih.gov</a></td>
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<tr>
<td></td>
<td>* Park Nicollet</td>
<td>Low Back Pain; brochure</td>
<td>Patients and Families</td>
<td><a href="http://www.icsi.org/knowledge/Listed">http://www.icsi.org/knowledge/Listed</a> under Patient Education Resources</td>
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<td></td>
<td>Spine-Health</td>
<td>Web site provides patients and families with comprehensive, highly informative and useful information for understanding, preventing and seeking appropriate treatment for back and neck pain.</td>
<td>Patients and Families</td>
<td><a href="http://www.spine-health.com">http://www.spine-health.com</a></td>
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<tr>
<td></td>
<td>WebMD</td>
<td>WebMD provides services for physicians and consumers on clinical processes and education.</td>
<td>Health Care Professionals Patients and Families</td>
<td><a href="http://www.webmd.com">http://www.webmd.com</a></td>
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* Available to ICSI members only.