**Low back pain (acute)**

**Search date November 2004**

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### QUESTIONS

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#### Unknown effectiveness

- Acupuncture ........................................ 7
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**Key Messages**

- Low back pain is pain, muscle tension, or stiffness localised below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica), and is defined as acute when it persists for less than 12 weeks.
  
  It affects about 70% of people in developed countries at some point in their lives.
  
  Acute low back pain is usually self-limiting (90% of people recover within 6 weeks), although 2–7% develop chronic pain. It has a high recurrence rate with symptoms recurring, to a lesser degree, in 50–80% of people within a year.

- Non-steroidal anti-inflammatory drugs have been shown to effectively improve symptoms compared with placebo.
  
  Muscle relaxants may also reduce pain and improve overall clinical assessment, but are associated with some severe adverse effects including drowsiness, dizziness, and nausea.
  
  The studies examining the effects of analgesics such as paracetamol or opioids were generally too small to detect any clinically important differences.
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- We did not find any studies examining whether epidural injections of steroids were effective in treating people with acute low back pain.

- With regard to non-drug treatments, advice to stay active, be it as a single treatment or in combination with other interventions such as back schools, a graded activity programme or behavioural counselling, appears to be the most effective.

  Spinal manipulation (in the short term) also appears to reduce pain, but not functional outcomes, compared with sham treatments.

  We did not find sufficient evidence to allow us to judge the effectiveness of acupuncture, back schools, behavioural therapy or massage in treating people with acute low back pain.

  We found no evidence examining the effectiveness of electromyographic biofeedback, lumbar supports, temperature treatments, traction or transcutaneous electrical nerve stimulation in the treatment of acute low back pain.

  Back exercises do not seem to increase recovery time compared with no treatment, although the studies have been rather heterogeneous with regard to their definitions of back exercise.

  Bed rest does not seem to improve symptoms any more effectively than other treatments, but does produce a number of adverse effects including joint stiffness, muscle wasting, loss of bone mineral density, pressure sores and venous thromboembolism.

DEFINITION
Low back pain is pain, muscle tension, or stiffness localised below the costal margin and above the inferior gluteal folds, with or without leg pain (sciatica), and is defined as acute when it persists for less than 12 weeks. Non-specific low back pain is low back pain not attributed to a recognisable pathology (such as infection, tumour, osteoporosis, rheumatoid arthritis, fracture, or inflammation). This review excludes acute low back pain with symptoms or signs at presentation that suggest a specific underlying condition. People with sciatica (lumbosacral radicular syndrome) and herniated discs are also excluded. Unless otherwise stated, people included in this review have acute back pain (i.e. of less than 12 weeks' duration). Some included RCTs further subdivided acute low back pain of less than 12 weeks' duration into acute (< 6 weeks' duration) or subacute (6–12 weeks' duration).

INCIDENCE/PREVALENCE
Over 70% of people in developed countries will experience low back pain at some time in their lives. Each year, 15–45% of adults suffer low back pain, and 1/20 (5%) people present to a health care professional with a new episode. Low back pain is most common between the ages of 35–55 years. About 30% of European workers reported that their work caused low back pain. Prevalence rates from different countries range from 13% to 44%. About 70% of people with sick leave due to low back pain return to work within 1 week, and 90% return within 2 months. However, the longer the period of sick leave, the less likely return to work becomes. Less than half of people with low back pain who have been off work for 6 months will return to work.

AETIOLOGY/RISK FACTORS
Symptoms, pathology, and radiological appearances are poorly correlated. Pain is non-specific in about 85% of people. About 4% of people with low back pain in primary care have compression fractures and about 1% have a tumour. The prevalence of prolapsed intervertebral disc is about 1–3%. Ankylosing spondylitis and spinal infections are less common. Risk factors for the development of back pain include heavy physical work, frequent bending, twisting, lifting, and prolonged static postures. Psychosocial risk factors include anxiety, depression, and mental stress at work.

PROGNOSIS
Acute low back pain is usually self limiting (90% of people recover within 6 weeks), although 2–7% develop chronic pain. Acute low back pain has a high recurrence rate with symptoms recurring, to a lesser degree, in 50–80% of people within a year.

AIMS OF INTERVENTION
To relieve pain; to improve function; to develop coping strategies for pain, with minimal adverse effects from treatment; and to prevent the development of chronic back pain (see definition under low back pain, p 00).

OUTCOMES
Pain intensity (visual analogue or numerical rating scale); overall improvement (self reported or observed); back pain specific functional status (such as Roland Morris questionnaire, Oswestry questionnaire); impact on employment (days of sick leave, number of people returned to work); medication use; intervention specific outcomes (such as coping and pain behaviour for behavioural treatment, strength and flexibility for exercise, and muscle spasm for muscle relaxants and electromyographic biofeedback).

METHODS
Clinical Evidence search and appraisal November 2004. In addition, the authors searched Medline (1966 to November 2004), Embase (1980 to November 2004), and Psychlit (1984 to November 2004), using the search strategy recommended by the Cochrane Back Review Group. Most earlier RCTs of treatments for low back pain were small (< 50 people/intervention group; range 9–169 people/intervention group), short term (mostly < 6 months' follow up), and of low overall quality.
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Problems included lack of power, no description of randomisation procedure, incomplete analysis with failure to account for people who withdrew from trials, and lack of blinding. The quality of many recent RCTs is higher. Many early RCTs also had incomplete description of the study population (for example, whether people had radiating symptoms or not, or the presence or absence of sciatica or nerve root symptoms). In this chapter, we have excluded studies undertaken solely in people with sciatica or disc herniation. We have included studies which are in people with acute low back pain with no radiation, in which the study does not describe whether people had radiation or not, or in which the study included people both with and without radiation. The authors have also included data based on their own searches to November 2004 from the process of updating their own Cochrane reviews.

**QUESTION** What are the effects of oral drug treatments?

**OPTION** NON-Steroidal ANTI-INFLAMMATORY DRUGS

One systematic review and one subsequent RCT found that non-steroidal anti-inflammatory drugs (NSAIDs) increased overall improvement after 1 week compared with placebo. One systematic review and additional RCTs found no significant difference among NSAIDs or between NSAIDs and other drug treatments (paracetamol [acetaminophen], opioids, muscle relaxants, NSAIDs plus muscle relaxants) in pain relief. One systematic review found insufficient evidence about effects of NSAIDs compared with non-drug treatments.

**Benefits:**

We found one systematic review (search date 1998, 45 RCTs, statistical pooling only for non-steroidal anti-inflammatory drugs [NSAIDs] v placebo), two additional RCTs, and two subsequent RCTs. 

**NSAIDs versus placebo:** We found one systematic review (search date 1998, 9 RCTs). The review found that NSAIDs significantly increased the proportion of people experiencing global improvement compared with placebo after 1 week (global improvement; 6 RCTs, 535 people: OR 2.0, 95% CI 1.4 to 3.0). However, the meta-analysis included a mixed population, that is, some studies included people only with sciatica. Two RCTs included in the review reported solely on acute low back pain without radiation. The first included RCT (282 people) found that piroxicam significantly reduced pain compared with placebo after 3 days, but found no significant difference between groups at 7 days (further details not reported). The second included RCT (73 people) found that tenoxicam significantly reduced mean pain intensity compared with placebo at 8 days (mean pain intensity measured by VAS: 1.9 with tenoxicam v 2.8 with placebo; P value not reported). One subsequent RCT (372 people) that compared diclofenac, ibuprofen, and placebo, found that both active treatments significantly improved global efficacy compared with placebo at 7 days (global efficacy measured on 5 point scale from 0 = poor to 4 = excellent: diclofenac v placebo; P < 0.01; ibuprofen v placebo; P < 0.05). It also compared diclofenac versus ibuprofen (see below). 

**NSAIDs versus each other:** We found one systematic review (search date 1998; 18 RCTs, 1982 people), one additional RCT, and two subsequent RCTs. The review found no significant difference among NSAIDs in outcomes. The additional RCT (194 people) found no significant difference between acemetacin and diclofenac in pain or global assessment (absolute numbers not provided; P value not reported). One subsequent RCT (104 people) found that nimesulide improved functional status compared with ibuprofen, but found no significant difference in pain relief after 10 days. The other subsequent RCT found no significant difference between diclofenac and ibuprofen in global efficacy at 7 days (P value not reported). NSAIDs versus paracetamol (acetaminophen): See benefits of analgesics (paracetamol, opioids), p 5. 

**NSAIDs versus muscle relaxants or opioid analgesics:** We found one systematic review (search date 1998, 5 RCTs, 399 people), which found no significant difference between NSAIDs and muscle relaxants or opioids in pain relief or overall improvement. NSAIDs versus non-drug treatments: We found one systematic review (search date 1998, 3 RCTs, 461 people). Two included RCTs provided inconclusive evidence about effects of NSAIDs and bed rest. The first RCT (110 people) found that NSAIDs significantly improved combined score on pain, disability, and range of movement compared with bed rest. The second RCT (241 people) found no significant difference between treatments in range of movement, and did not examine effects on pain or function. Two included RCTs (354 people) comparing NSAIDs versus physiotherapy or spinal manipulation found no significant difference in...
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pain relief or improvement in mobility. **NSAIDs versus NSAIDs plus adjuvant treatment:** The review identified three RCTs (232 people), which found no significant difference between NSAIDs alone and NSAIDs plus muscle relaxants in outcomes.11 One RCT identified by the review11 and one additional RCT13 found no significant difference between NSAIDs and NSAIDs plus vitamin B in pain relief, although one of the RCTs found that NSAIDs alone significantly reduced the proportion of people returning to work after 1 week compared with NSAIDs plus vitamin B combinations (78% of people with combination treatment v 35% with NSAIDs alone).

**Harms:** NSAIDs may cause gastrointestinal complications (see non-steroidal anti-inflammatory drugs, p 01). One systematic review of harms of NSAIDs found that ibuprofen and diclofenac had the lowest gastrointestinal complication rate, mainly because of the low doses used in practice (pooled OR for adverse effects v placebo 1.30, 95% CI 0.91 to 1.80).16

**Comment:** None.

**OPTION MUSCLE RELAXANTS**

One systematic review found that muscle relaxants reduced pain and improved overall clinical assessment compared with placebo, but the review found no significant difference among different muscle relaxants. The review found that both benzodiazepine and non-benzodiazepine muscle relaxants increased adverse effects compared with placebo, particularly drowsiness, dizziness, and nausea.

**Benefits:**

**Benzodiazepines versus placebo:** We found one systematic review (search date 2001),17 which identified one poor quality RCT (68 people).18 The RCT found that intramuscular diazepam followed by oral diazepam for 5 days significantly reduced pain and increased the rate of overall improvement compared with placebo (overall effect rated good or very good: 21/33 [64%] with diazepam v 6/35 [17%] with placebo; P value not reported in the review; pain results not reported in the review). However, treatment groups were not comparable at baseline. **Non-benzodiazepines versus placebo:** We found one systematic review (search date 2001)17 and one subsequent RCT.19 The review identified nine RCTs comparing non-benzodiazepines (tizanidine, cyclobenzaprine, carisoprodol, baclofen, orphenadrine) versus placebo.17 Meta-analysis of RCTs with adequate data found that oral non-benzodiazepines (cyclobenzaprine, tizanidine, and orphenadrine) significantly reduced pain and improved global assessment after 2–4 days (presence of pain: 4 RCTs, 294 people; RR 0.80, 95% CI 0.71 to 0.89; global assessment at 2–4 days, dichotomous, assessed by patient: 4 RCTs, 222 people; RR 0.49, 95% CI 0.25 to 0.95). The subsequent RCT (192 people) compared chiropractic adjustments, muscle relaxants, and placebo, and found no significant difference among groups in disability at 4 weeks.19 It found a similar decrease in pain with muscle relaxants compared with placebo at 4 weeks (muscle relaxants v placebo; results presented graphically, P value not reported).19 **Muscle relaxants versus each other:** We found one systematic review (search date 2001),17 which identified three RCTs.20–22 The RCTs found no important differences in effect among muscle relaxants (cyclobenzaprine, carisoprodol, diazepam, and tizanidine), although the results were not pooled in the review. The first RCT (80 people) found that carisoprodol significantly increased overall improvement compared with diazepam but found no significant difference in pain at 7 days (improvement rated as very good or excellent: 70% with carisoprodol v 45% with diazepam; pain on 100 mm visual analogue scale: 58 mm with carisoprodol v 48 mm with diazepam; P values not reported in the review).20 The second RCT (78 people) found no significant difference between carisoprodol and cyclobenzaprine in pain or overall improvement after 8 days (pain on 100 mm visual analogue scale: 30 mm with carisoprodol v 28 mm with cyclobenzaprine; overall improvement good or excellent: 70% with carisoprodol v 70% with cyclobenzaprine; P values not reported in review).21 The third RCT (30 people with acute back pain, 20% with concomitant acute neck pain) was small and found no significant difference between diazepam and tizanidine in pain or function at 7 days (pain relief: 77.4% with tizanidine v 48% with diazepam; improvement in daily activities: 87% with tizanidine v 93% with diazepam; P values not reported in review).22
Harms: The review found that muscle relaxants (both benzodiazepines and non-benzodiazepines) significantly increased adverse effects, particularly central nervous system effects, compared with placebo (all adverse effects, 8 RCTs, 724 people: RR 1.50, 95% CI 1.14 to 1.98; nervous system effects, 8 RCTs, 724 people: RR 2.04, 95% CI 1.23 to 3.37). The most common adverse effects were drowsiness, dizziness, and nausea. The subsequent RCT did not report on harms.

Comment: None.

**OPTION ANALGESICS (PARACETAMOL, OPIOIDS)**

We found no placebo controlled RCTs. Three small RCTs identified by a systematic review found no significant difference in symptoms or return to work between an opioid analgesic, paracetamol (acetaminophen), and a non-steroidal anti-inflammatory drug. Two small RCTs of low quality identified by another systematic review found limited evidence that paracetamol and unspecified analgesics were less effective in achieving pain relief than electroacupuncture and ultrasound treatment, respectively.

**Benefits:**

We found two systematic reviews (search date 1995, search date 1998, no statistical pooling of data provided in either). Analgesics versus placebo: The reviews identified no RCTs. Analgesics versus non-steroidal anti-inflammatory drugs: The later review identified three small RCTs, none of which found a significant difference in clinical outcome between paracetamol (acetaminophen) or opioid analgesics and non-steroidal anti-inflammatory drugs. The first RCT (48 people) found that, after 10 weeks, 54% of people taking paracetamol were symptom free compared with 67% taking ibuprofen. The second RCT (45 people) found that return to work was similar among treatments (mean number of days until return to full activity: 5.7 with paracetamol, 6.5 with phenylbutazone, 5.7 with aspirin). The third RCT (60 people) identified by the review found that pain was similar among treatments (mean daily pain index measured on a 4 point ordinal scale: 1.7 with paracetamol, 1.4 with aspirin, 1.5 with indomethacin [indomethacin], 1.4 with mefenamic acid, 1.4 with phenylbutazone, 1.7 with dextropropoxyphene). Analgesics versus non-drug treatments: The earlier review identified one RCT (40 people), which found that electroacupuncture significantly increased pain relief compared with paracetamol after 6 weeks (pain scores on a 100 point visual analogue scale: 54.4 at baseline and 13.7 at 6 weeks with paracetamol v 52.7 at baseline and 3.3 at 6 weeks with electroacupuncture; P value not reported). The review identified a second RCT (73 people), which found that ultrasound treatment significantly increased the proportion of people who were pain free compared with analgesics (unspecified) after 4 weeks (41% with ultrasound v 7% with analgesics; P value not reported).

Harms: See paracetamol (acetaminophen) poisoning, p 01. RCTs have found adverse effects (constipation and drowsiness) with analgesics in about 50% of people. One earlier systematic review (search date 1995) found that combinations of paracetamol plus weak opioids increased the risk of adverse effects compared with paracetamol alone (15 single dose studies; OR 1.1, 95% CI 0.8 to 1.5; 3 multiple dose studies; OR 2.5, 95% CI 1.5 to 4.2).

Comment: None.

**QUESTION** What are the effects of local injections?  

**OPTION EPIDURAL STEROID INJECTIONS**

One systematic review found no RCTs on the effects of epidural steroid injections in people with acute low back pain.

**Benefits:** We found one systematic review (search date 1998) which found no RCTs on the effects of epidural steroid injections in people with acute low back pain without sciatica.

**Harms:** We found no RCTs.
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Comment: None.

QUESTION What are the effects of non-drug treatments?

OPTION ADVICE TO STAY ACTIVE

One systematic review and two subsequent RCTs found that advice to stay active reduced sick leave and chronic disability compared with no advice or traditional medical treatment (including analgesics as required, advice to rest, and “let pain be your guide”). One systematic review found that advice to stay active reduced pain and improved functional outcome compared with advice to rest in bed after 3–4 weeks and 12 weeks.

Benefits: Advice to stay active versus no advice or traditional medical treatment: We found one systematic review (search date 1996, 6 RCTs, 1957 people) and two subsequent RCTs reported in four papers. The review did not pool results, but reported that it found consistent findings among included RCTs. The review compared advice to stay active with or without other treatments versus those other treatments alone and found that, in included RCTs, advice to stay active significantly reduced sick leave and reduced chronic disability compared with traditional medical treatment (including analgesics as required, advice to rest, and “let pain be your guide”) up to 1 year (see comment below). The first subsequent RCT (457 people, including 40% with a diagnosis of sciatica on their sickness certificate) found that advice to stay active significantly increased return to work compared with no advice (usual care) after 3, 6, and 12 months (AR at 3 months: 52% with advice v 36% with no advice; at 6 months: 61% v 45%; at 12 months: 68% v 56%). A longer term follow up report of this RCT found no significant difference between groups in the proportion of people who had returned to work at 2 years or at 3 years. The second subsequent RCT (211 people) examining a self management programme (including advice to minimise bed rest and stay active, understanding back pain, and dealing with fears and frustrations) found no significant difference between the programme and usual care in functional status at 4 months, but found the programme significantly improved functional status at 12 months compared with usual care (Roland Disability questionnaire: 4 months; P = 0.06; 12 months; P = 0.009). Follow up was 77% (163/211) at 4 months and 66% (139/211) at 12 months. Advice to stay active versus bed rest: See benefits of bed rest, p 11.

Harms: Advice to stay active versus no advice or traditional medical treatment: The review and subsequent RCTs did not report harms. Advice to stay active versus bed rest: See harms of bed rest, p 12.

Comment: Limitations in methods preclude meaningful quantification of effect sizes. Advice to stay active was provided either as a single treatment or in combination with other interventions such as back schools, a graded activity programme, or behavioural counselling.

OPTION MULTIDISCIPLINARY TREATMENT PROGRAMMES

We found no RCTs on the effects of multidisciplinary treatment programmes in people with acute low back pain. One systematic review in people with subacute low back pain found limited evidence that multidisciplinary treatment, including a workplace visit, reduced sick leave compared with usual care.

Benefits: We found no RCTs specifically in people with acute back pain. We found one systematic review (search date 2002, 2 RCTs, 233 people with subacute low back pain, duration > 4 weeks and < 3 months), which found that multidisciplinary treatment including a workplace visit, significantly reduced sick leave compared with usual care (time to return to work: 10 weeks with multidisciplinary treatment v 15 weeks with usual care in first RCT; RR for return to work rate 2.4, 95% CI 1.2 to 4.9 in second RCT).

Harms: The review did not report harms.
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Comment: The review included inpatient and outpatient programmes that were multidisciplinary. To be multidisciplinary they had to consist of a physician’s consultation plus either a psychological, social, or vocational intervention, or a combination of these. Trials in which rehabilitation was exclusively or predominantly medical were excluded, and back schools were also excluded from the review.

One systematic review and one subsequent RCT found that spinal manipulation slightly reduced pain within 6 weeks compared with sham treatment, but found no significant difference in functional outcomes. The review found no significant difference in pain or functional outcomes between spinal manipulative therapy and general practitioner care, physical therapy, exercises, or back school.

Benefits: We found one systematic review (search date 2000, 29 RCTs) and one subsequent RCT. Spinal manipulation versus placebo or sham treatment: The review found that spinal manipulative therapy significantly reduced pain in the short term (< 6 weeks) compared with sham therapy, but found no significant difference in the longer term (short term difference in pain on 100 mm visual analogue scale: 10 mm, 95% CI 2 mm to 17 mm). It found that spinal manipulation reduced disability in the short term compared with sham therapy but the difference was not statistically significant (difference in disability on Roland Disability questionnaire: +2.8 mm, 95% CI −0.1 mm to +5.6 mm). There was no significant difference in disability in the longer term (further data not reported). The subsequent RCT (192 people) compared chiropractic adjustments, muscle relaxants, and placebo, and found no significant difference among groups in disability at 4 weeks. It found that chiropractic adjustment significantly reduced pain compared with placebo (sham treatment) at 2 weeks and 4 weeks (both comparisons, P = 0.03). Spinal manipulation versus other treatments: The review found no significant difference in pain or function between spinal manipulative therapy and general practitioner care, physical therapy, exercises, or back school (results presented graphically).

Harms: The systematic review did not report on harms. A second systematic review assessed harms of spinal manipulation. In RCTs identified by the review that used a trained therapist to select people and perform spinal manipulation, the risk of serious complications was low (estimated risk: vertebrobasilar strokes 1/20 000–1/1 000 000 people; cauda equina syndrome < 1/1 000 000 people). The subsequent RCT did not report on harms.

Comment: Current guidelines do not advise spinal manipulation in people with severe or progressive neurological deficit. The review included RCTs that compared manipulation or mobilisation for low back pain with another treatment or control (it noted that manipulation differed from mobilisation in that it focused on a different range of motion of the involved joint – the review reported that both hands-on treatments were included in the review).

One systematic review found insufficient evidence on the effects of acupuncture in people with acute low back pain.

Benefits: We found one systematic review (search date 2003; see comment below), which found three RCTs of acupuncture in people with acute low back pain. The review did not pool data. The first included RCT (40 people) found no significant difference in pain or function between one session of acupuncture on the SI3 acupoint bilaterally and sham needling of the same point measured immediately after the session (see comment below). The second included RCT (60 people) found no significant difference in pain between acupuncture and naproxen. The third included RCT (100 people with low back pain, 5 days to 6 months duration, worse in cold or rainy weather) which was of poor methodological quality compared acupuncture plus moxibustion (burning a herb at the end of the needle) plus Chinese herbal medicine versus Chinese herbal medicine alone, making it difficult to draw reliable conclusions on the effects of acupuncture alone.
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Harms:  One systematic review (search date 1996) found that serious, rare, adverse effects included infections (HIV, hepatitis, bacterial endocarditis) and visceral trauma (pneumothorax, cardiac tamponade).\

Comment:  The first included RCT was reported in abstract form only and additional material was obtained from the authors of the RCT by the systematic review. The review concluded that because of the small sample sizes and low methodological quality of the studies, that the data did not allow firm conclusions about the effectiveness of acupuncture in acute low back pain.

Benefits:  One systematic review found insufficient evidence on the effects of back schools in people with acute low back pain.

Harms:  The review did not report harms.

Comment:  The systematic review included RCTs in which a back school type of intervention was included. A back school was defined as consisting of an educational and skills acquisition programme, including exercises, in which all lessons were given to groups of people and supervised by a paramedical therapist or medical specialist. The back school programmes in the four included RCTs varied considerably between trials, as did the included populations, making generalisations difficult. Three RCTs also included people with radiation of the back pain (not further defined), but subgroup analysis of back pain without radiation was not possible.

OPTION BACK SCHOOLS

One systematic review found insufficient evidence on the effects of back schools in people with acute low back pain.

Benefits:  We found one systematic review (search date 2003, 4 RCTs, see comment below). The review did not pool data due to data deficiencies and heterogeneity of trial design. The systematic review assessed the quality of included RCTs against standard criteria and categorised them as being of higher or lower methodological quality (high quality: score of 6 or more on a methodological scale of 0–10). The first included lower quality RCT (217 people working in a car factory, pain with or without radiation; see comment below) compared back school, combined physical therapy (including manual therapy), and placebo (short waves at the lowest intensity). It found that back school significantly reduced the duration of sick leave compared with placebo (mean days until recovery: 14.8 with back school v 28.7 with placebo; median days of absence from work: 20.5 v 26.5; P value not reported), but found no significant difference between groups in pain at 6 weeks or recurrences during 1 year (P values not reported). The second included high quality RCT (170 people attending a private outpatient clinic, with inability to work and receiving compensation) compared back school plus usual treatment versus usual treatment alone (including rest, analgesics, non-steroidal anti-inflammatory drugs as appropriate, daily physiotherapy) and measured outcomes at 8 weeks, 6 months, and 12 months. It found no significant differences between groups in pain, functional status, median time to return to work, or compensated recurrences over 1 year. The third included low quality RCT (56 people attending a general practitioner, pain with or without radiation to the thigh; see comment below) compared back school versus a control treatment (advice not to strain the back, analgesics when required). It found no significant difference between groups in the proportion of people pain free at 1, 3, or 6 weeks. The fourth included high quality RCT (975 people referred to a spine clinic, on sickness leave from work for 8–12 weeks, pain with or without radiation; see comment below) compared back school versus usual care. It found that back school significantly reduced sick leave compared with usual care at 200 days and 5 years (200 days: 30% with back school v 60% with usual care; 5 years:19% v 34%; P values not reported).

Harms:  The review did not report harms.

Comment:  The systematic review included RCTs in which a back school type of intervention was included. A back school was defined as consisting of an educational and skills acquisition programme, including exercises, in which all lessons were given to groups of people and supervised by a paramedical therapist or medical specialist. The back school programmes in the four included RCTs varied considerably between trials, as did the included populations, making generalisations difficult. Three RCTs also included people with radiation of the back pain (not further defined), but subgroup analysis of back pain without radiation was not possible.

OPTION BEHAVIOURAL THERAPY

One RCT identified by a systematic review found limited evidence that cognitive behavioural therapy reduced acute low back pain and disability after 9–12 months compared with traditional care.
Benefits: We found one systematic review (search date 1995, 1 RCT, 107 people). The poor quality RCT identified by the review found that cognitive behavioural therapy significantly reduced pain and perceived disability compared with traditional care (analgesics plus back exercises until pain had subsided) after 9–12 months (mean score on pain drawing: 1.98 with cognitive behavioural therapy vs 3.06 with control; mean claimed impairment: 4.84 vs 6.25; scales not defined, P values not reported).

Harms: The review did not report on harms.

Comment: None.

**OPTION ELECTROMYOGRAPHIC BIOFEEDBACK**

We found no RCTs on the effects of electromyographic biofeedback.

Benefits: We found no systematic review or RCTs of electromyographic biofeedback in people with acute low back pain.

Harms: We found no evidence on harms.

Comment: None.

**OPTION LUMBAR SUPPORTS**

We found no RCTs on the effects of lumbar supports.

Benefits: We found no systematic review or RCTs specifically in people with acute low back pain.

Harms: Harms associated with prolonged lumbar support use include decreased strength of the trunk musculature, a false sense of security, heat, skin irritation, and general discomfort.

Comment: None.

**OPTION MASSAGE**

One RCT identified by a systematic review found insufficient evidence about the effects of massage compared with spinal manipulation or electrical stimulation.

Benefits: We found one systematic review (search date 2001, 1 RCT). It identified one RCT (90 people), which compared massage versus spinal manipulation or electrical stimulation and found no significant difference in pain relief, functional status, or mobility.

Harms: The review gave no information on harms.

Comment: The review defined massage as soft tissue manipulation using the hands or a mechanical device (examples include Shiatsu, Rolfing [soft tissue manipulation], Swedish massage, reflexology, craniosacral therapy, as part of physiotherapy, etc). Massage could be applied to any body part (lumbar region only or to the whole body) and any technique could be used (e.g. cyriax, friction, kneading, and hacking).

**OPTION TEMPERATURE TREATMENTS (SHORT WAVE DIATHERMY, ULTRASOUND, ICE, AND HEAT)**

Two systematic reviews identified no RCTs on the effects of temperature treatments.

Benefits: We found two systematic reviews (search date not reported and 1992), which found no RCTs.

Harms: The reviews did not report harms.

Comment: None.
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**OPTION TRACTION**

Three systematic reviews found no RCTs on the effects of traction in people with acute low back pain.

**Benefits:** We found three systematic reviews (search dates 1995 \cite{8,10} and 1992 \cite{39}) which identified no RCTs solely in people with acute low back pain without sciatica.\cite{43}

**Harms:** The reviews did not report on harms.\cite{8,10,39} Potential adverse effects of traction include debilitation, loss of muscle tone, bone demineralisation, and thrombophlebitis.\cite{2}

**Comment:** Of 16 RCTs identified by the reviews, 14 RCTs did not distinguish between acute and chronic low back pain, included only chronic low back pain, or included people with back pain of specific cause.\cite{8,10,39–43}

**OPTION TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION**

We found no RCTs on the effects of transcutaneous electrical nerve stimulation.

**Benefits:** We found no systematic review or RCTs specifically in people with acute low back pain.

**Harms:** We found no RCTs.

**Comment:** None.

**OPTION BACK EXERCISES**

One systematic review in acute low back pain (less than 6 weeks’ duration) found no significant difference in pain or function between exercise and no treatment, and found no significant difference in pain or function between exercise and other conservative treatments. It found limited evidence in subacute low back pain (6–12 weeks’ duration) that a graded activity exercise programme may reduce time off work in occupational settings compared with usual care, but found insufficient evidence in subacute low back pain otherwise.

**Benefits:** We found one systematic review (search date 2004, 17 RCTs; see comment below).\cite{44}

The review included RCTs of exercise therapy versus placebo or no treatment or versus other conservative treatments. The methodological quality of included RCTs was assessed by the adequacy of four criteria, namely, randomisation, allocation concealment, follow up, and outcome blinding. A study was defined as being of high quality if all four criteria were met. It divided RCTs into acute low back pain (less than 6 weeks’ duration) and subacute low back pain (6–12 weeks’ duration). Of 11 acute RCTs and six subacute RCTs, one RCT in each group was categorised as being of high quality. The review used both a qualitative rating system and a quantitative pooling of data where possible. Acute low back pain (less than 6 weeks’ duration): The review reported that 10 of 11 included RCTs had non-exercise comparisons. One high quality RCT in an occupational setting found that mobilising home exercises were less effective than usual care, and one low quality RCT in a healthcare setting found that a therapist delivered endurance programme improved short term functioning more than no treatment. Of the remaining eight RCTs, six RCTs found no statistically significant or clinically important difference between exercise therapy and usual care or no treatment, and the results of two RCTs were unclear. The review pooled data on pain and function. It found no significant difference between exercise and no treatment in pain or function measured at the earliest follow up (scale 0–100; pain: 3 RCTs, 491 people, WMD –0.59, 95% CI –12.9 to +11.51; function: 3 RCTs, 491 people, WMD –2.82, 95% CI –15.35 to +9.71; see comment below).\cite{44} It found no significant difference between exercise and other conservative treatments in pain or function measured at the earliest follow up (scale 0–100; pain: 7 RCTs, 606 people, WMD +0.31, 95% CI –0.10 to +0.72; function: 6 RCTs, 534 people, WMD –1.34, 95% CI –5.5 to +2.81).\cite{44} Other conservative treatments included advice to stay active, education, and usual care, amongst others. Results were similar at intermediate and long term follow up. Subacute low back pain (6–12 weeks’ duration): The review reported that in six included RCTs,
seven exercise groups had a non-exercise comparison. One high and one low quality RCT found that a graded activity intervention reduced absenteeism outcomes in the workplace compared with usual care, and one low quality RCT found improved functioning with exercise plus behavioural therapy compared with usual care. Two poor quality RCTs found no significant difference in outcomes between exercise and the comparative treatments (including usual care), and one poor quality RCT reported unclear results. The review pooled data. It found no significant difference between exercise and all other comparisons (including no treatment, usual care, advice to stay active, education, amongst others) in pain or function measured at the earliest follow up (scale 0–100; pain: 5 RCTs, 608 people, WMD –1.89, 95% CI –4.91 to +1.13; function: 4 RCTs, 579 people, WMD –1.07, 95% CI –5.32 to +3.18). Results were similar at intermediate follow up. The review concluded that there was insufficient evidence to support or refute the effectiveness of exercise therapy on pain or function in subacute low back pain.

Harms:
The review reported that few included RCTs reported on harms (about 26%). Overall in the review (including RCTs on acute, subacute, and chronic low back pain), 12 RCTs reported mild negative reactions to the exercise programme such as increased low back pain and soreness in a minority of people. No further details were provided.

Comment:
The exercise programmes undertaken in included RCTs varied widely. Subgroup meta-analysis for different specific types of exercise, or comparisons against specific individual conservative treatments were not reported. The review included RCTs of exercise, this being defined as “a series of specific movements with the aim of training or developing the body by a routine practice or as physical training to promote good physical health”. Individual RCT outcome data for pain and functioning were converted to a scale from 0 to 100 points to allow the pooling of data. The review considered that a 20 point (out of 100) improvement in pain and a 10 point (out of 100) improvement in functional outcomes were clinically important differences. The review categorised populations of included RCTs as being health care (primary, secondary, or tertiary), occupational (occupational healthcare, in compensatory situations), and general or mixed (e.g. people recruited through advertisement for trials), to differentiate those studies in people in typical treatment settings (health care, occupational) from those in people who may not normally present for treatment. The review noted that overall, the methodological quality of included RCTs was poor, with only 54% adequately describing the exercise intervention.

**OPTION BED REST**

One systematic review found increased pain and poorer functional outcomes with advice to rest in bed compared with advice to stay active after 3–4 weeks and 12 weeks. RCTs in the review found limited evidence of no significant difference in outcomes between advice to rest in bed and exercise, or in outcomes between 3 days and 7 days of bed rest. One included RCT found limited evidence of no significant difference in pain between advice to rest in bed, exercise plus education, and no advice; whereas another included RCT found limited evidence of no significant difference in improvement between bed rest and manipulation, drug therapy, physiotherapy, back school, or placebo. One systematic review found that adverse effects of bed rest included joint stiffness, muscle wasting, loss of bone mineral density, pressure sores, and venous thromboembolism.

**Benefits:**
We found one systematic review (search date 2003, 11 RCTs, 1963 people; see comment below). The systematic review assessed the methodological quality of included RCTs against standard criteria and categorised them as being of low, moderate, or high risk of bias. Bed rest versus advice to stay active: The systematic review included two RCTs at moderate and low risk of bias in a meta-analysis (see comment below). The review found that advice to stay active significantly reduced pain compared with bed rest at 3–4 weeks and 12 weeks (2 RCTs, 400 people; 3–4 weeks: SMD 0.22, 95% CI 0.02 to 0.41; 12 weeks: SMD 0.25, 95% CI 0.05 to 0.45). It also found that advice to stay active significantly improved functional status compared with bed rest at 3–4 weeks and 12 weeks (2 RCTs, 400 people; 3–4 weeks: SMD 0.29, 95% CI 0.09 to 0.49; 12 weeks: SMD 0.24, 95% CI 0.04 to 0.44). The first included RCT found that advice to stay active significantly reduced sick leave compared with bed rest at
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3–4 weeks and 12 weeks (3–4 weeks: WMD 3.4 days, 95% CI 1.64 days to 5.16 days; 12 weeks: WMD 4.5 days, 95% CI 1.37 days to 7.63 days). The second included RCT found in a subgroup of people (employees with complete 12 week follow up) that bed rest increased initial sick leave compared with advice to stay active (86% v 52%; P < 0.001). Different lengths of bed rest: One included RCT (47 people) at low risk of bias found no significant difference in pain intensity between 3 days and 7 days of bed rest measured 2 days after the end of treatment. Bed rest versus exercise: The review included two RCTs at low risk of bias. The review reported that the first RCT found no significant difference between advice to rest in bed and exercise in pain or restrictions in activities of daily living at 6 weeks, 12 weeks, or 1 year follow up. It reported that the second RCT found no significant difference between advice to rest in bed and exercise in pain, functional status, or sick leave at 3 and 12 weeks follow up. Bed rest versus other treatments: One included RCT at low risk of bias also compared advice to rest in bed with bed rest plus exercise plus education and a no instructions group. The review reported that it found no significant difference in pain or restrictions of daily activities between any of the treatment groups (statistical analysis not reported). The review reported that one other included RCT at high risk of bias found no difference in improvement on a combined pain, disability, and physical exam score between bed rest and manipulation, drug therapy, physiotherapy, back school, or placebo (statistical analysis not reported).

Harms: The review did not report on harms. One previous systematic review assessed harms. It found that adverse effects of bed rest included joint stiffness, muscle wasting, loss of bone mineral density, pressure sores, and venous thromboembolism (see thromboembolism, p 01).

Comment: The review separately analysed RCTs that had included people with acute low back pain with or without radiating pain but that had excluded people with neurological deficits (called the acute simple low back pain group); RCTs that had included people with verified neurological deficits (called the sciatica group); and RCTs that had included people with and without verified neurological deficits (called the mixed low back pain group). We have only reported the results for the acute simple low back pain group here. However, within this group the proportion of people with radiating pain to the legs varied from none in some RCTs to 30% of the study population in others. Bed rest versus advice to stay active: In the analysis comparing advice to stay active versus bed rest for pain, the review excluded one RCT from the meta-analysis which found significantly better pain outcomes for bed rest compared with advice to stay active as the RCT was categorised as being of high risk of bias, and the applicability of the included population (80 male combat trainees in an army hospital) to the general population was questionable. This RCT also found that bed rest significantly reduced length of sick leave compared with advice to stay active.

GLOSSARY

Acupuncture Needle puncture of the skin at traditional “meridian” acupuncture points. Modern acupuncturists also use non-meridian points and trigger points (tender sites occurring in the most painful areas). The needles may be stimulated manually or electrically. Placebo acupuncture is needling of traditionally unimportant sites or non-stimulation of the needles once placed.

Back school Traditionally, this is a series of group education sessions on low back pain. Sessions are usually supervised by a physiotherapist or physician and often include information on an exercise programme.

Cognitive behavioural therapy This aims to identify and modify people’s understanding of their pain and disability using cognitive restructuring techniques (such as imagery and attention diversion) or by modifying maladaptive thoughts, feelings, and beliefs.

Electromyographic biofeedback A person receives external feedback of their own electromyogram (using visual or auditory scales), and uses this to learn how to control the electromyogram and hence the tension within their own muscles. Electromyogram biofeedback for low back pain aims to relax the paraspinal muscles.

Massage Massage is manipulation of soft tissues (i.e. muscle and fascia) using the hands or a mechanical device, to promote circulation and relaxation of muscle spasm or tension. Different types of soft tissue massage include Shiatsu, Swedish, friction, trigger point, or neuromuscular massage.

Multidisciplinary treatment Intensive physical and psychosocial training by a team (e.g. a physician,
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Musculoskeletal disorders

Physiotherapist, psychologist, social worker, and occupational therapist. Training is usually given in groups and does not involve passive physiotherapy.

**Sciatica** Pain that radiates from the back into the buttock or leg and may also be used to describe pain anywhere along the course of the sciatic nerve.

**REFERENCES**


33. Waddell G, Feder G, McIntosh A, et al. Low back pain evidence review. London: Royal College of General Practitioners, 1999. Search date 1999; primary sources Medline, Embase, Science Citation Index, Social Sciences Citation Index, correspondence with experts and researchers, and hand searches of references.

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2003; primary sources Medline, Embase, Cochrane Complementary Medicine Field trials register, Cochrane Controlled Trials Register, Science Citation Index, and hand searches of references.


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