ClinicalEvidence

Low back pain (chronic)

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Roger Chou

ABSTRACT

INTRODUCTION: Over 70% of people in developed countries develop low back pain (LBP) at some time. But recovery is not always favourable: 82% of non recent-onset patients still experience pain 1 year later. Many patients with chronic LBP who were initially told that their natural history was good spend months or years seeking relief. METHODS AND OUTCOMES: We conducted a systematic review and aimed to answer the following clinical questions: What are the effects of oral drug treatments? What are the effects of injection therapy? What are the effects of non-drug treatments? What are the effects of non-surgical and surgical treatments? We searched: Medline, Embase, The Cochrane Library, and other important databases up to April 2009 (Clinical Evidence reviews are updated periodically; please check our website for the most up-to-date version of this review). We included harms alerts from relevant organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA). RESULTS: We found 64 systematic reviews or RCTs that met our inclusion criteria. We performed a GRADE evaluation of the quality of evidence for interventions. CONCLUSIONS: In this systematic review, we present information relating to the effectiveness and safety of the following interventions: acupuncture, analgesics, antidepressants, back schools, behavioural therapy, electromyographic biofeedback, exercise, injections (epidural corticosteroid injections, facet joint injections, local injections), intensive multidisciplinary treatment programmes, lumbar supports, massage, muscle relaxants, non-steroidal anti-inflammatory drugs (NSAIDs), non-surgical interventional therapies (intradiscal electrothermal therapy, radiofrequency denervation), spinal manipulative therapy, surgery, traction, and transcutaneous electrical nerve stimulation (TENS).

QUESTIONS

INTERVENTIONS

Key points

- Over 70% of people in developed countries develop low back pain at some time, which usually improves within 2 weeks, however about 10% remained off work and about 20% had persistent symptoms at 1 year.
- Non-steroidal anti-inflammatory drugs (NSAIDs) may be more effective than placebo at improving pain intensity in people with chronic low back pain.
- Opioid analgesics (with or without paracetamol) may improve pain and function compared with placebo. However, long-term use of NSAIDs or opioids may be associated with well-recognised adverse effects.

  We don't know whether antidepressants decrease chronic low back pain or improve function compared with placebo in people with or without depression.

  Benzodiazepines may improve pain, but studies of non-benzodiazepine muscle relaxants have given conflicting results.
- CAUTION: Since the last update of this review, a drug safety alert has been issued on increased suicidal behaviour with antidepressants (www.fda.gov/medwatch).
- We don't know whether epidural corticosteroid injections or local injections with corticosteroids and local anaesthetic improve chronic low back pain in people without sciatica.

  Facet-joint corticosteroid injections may be no more effective than placebo at reducing pain.
- Fusion surgery is more effective than standard rehabilitation for improving pain in people with chronic non-radicular low back pain, but it is no better than intensive rehabilitation with a cognitive behavioural component.
- Exercise improves pain and function compared with other conservative treatments.
- Intensive multidisciplinary treatment programmes improve pain and function compared with usual care, but less-intensive programmes do not seem beneficial.
- Acupuncture, back schools, behavioural therapy, and spinal manipulation may reduce pain in the short term, but effects on function are unclear.
- Massage may improve pain and function compared with sham or other active treatment.
- We don't know whether electromyographic biofeedback, lumbar supports, traction, or TENS improve pain relief.
- We also don't know whether intradiscal electrothermal therapy, radiofrequency denervation, or disc replacement improve pain relief or function.

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), [1] and is defined as chronic when it persists for 12 weeks or more (see definition of low back pain [acute]). [2] Non-specific low back pain is pain not attributed to a recognisable pathology (such as infection, tumour, osteoporosis, rheumatoid arthritis, fracture, or inflammation). [1] This review excludes chronic low back pain with symptoms or signs at presentation that suggest a specific underlying condition. People solely with sciatica (lumbosacral radicular syndrome) and pain due to herniated discs, or both, are also excluded. People in this review have chronic low back pain (>12 weeks' duration).

INCIDENCE/ PREVALENCE

Over 70% of people in developed countries will experience low back pain at some time in their lives. [3] Each year, between 15% and 45% of adults suffer low back pain, and 5% of people present to hospital with a new episode. [3] About 10% remained off work and about 20% had persistent symptoms at 1 year. [4]

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 among people with low back pain in primary care is about 1% to 3%. [3] Ankylosing spondylitis and spinal infections are less common. [5] This review only covers chronic low back pain where a definitive diagnosis cannot be made. Risk factors include heavy physical work; frequent bending, twisting, and lifting; and prolonged static postures. Psychosocial risk factors include anxiety, depression, and mental stress at work. [3] [6] Having a previous history of low back pain and a longer duration of the present episode are significant risk factors for chronicity. One systematic review of prospective cohort studies found that some psychological factors (distress, depressive mood, and somatisation) are associated with an increased risk of chronic low back pain. [7] Individual and workplace factors have also been reported to be associated with the transition to chronic low back pain. [8]

PROGNOSIS

Generally, the clinical course of an episode of low back pain appears favourable, but back pain among people in a primary-care setting typically has a recurrent course (characterised by variation and change), rather than an acute, self-limiting course. [9] Most people with back pain have expe-

rienced a previous episode, and acute attacks often occur as exacerbations of chronic low back pain. In general, recurrences will occur more frequently and be more severe if people have had frequent or long-lasting low back pain complaints in the past. The course of sick leave caused by low back pain can be favourable; however, the longer the period of sick leave, the less likely the return to work becomes. Less than 50% of people with low back pain who have been off work for 6 months will return to work. After 2 years of work absenteeism, the chance of returning to work is almost zero. [10]

AIMS OF INTERVENTION To relieve pain; to improve function; to return to work; to develop coping strategies for pain, with minimal adverse effects from treatment. [2] [11]

OUTCOMES **Symptom improvement:** Pain intensity (visual analogue [VAS] or numerical rating scale); overall improvement (self-reported or observed); **Functional improvement:** 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); adverse effects.

METHODS *Clinical Evidence* search and appraisal April 2009. The authors also searched Medline (1966 to May April 2009), Embase (1980 to April 2009), Psychlit (1984 to April 2009), and The Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Clinical Trials 2009, Issue 1. Additional searches were carried out using these websites: NHS Centre for Reviews and Dissemination (CRD) — for Database of Abstracts of Reviews of Effects (DARE) and Health Technology Assessment (HTA), Turning Research into Practice (TRIP), and National Institute for Health and Clinical Excellence (NICE), using the search strategy recommended by the Cochrane Back Review Group. [12] Most of the earlier RCTs of treatments for low back pain were small (<50 people/intervention group; range 9–169), short term (mostly <6 months' follow-up), and of low overall quality. 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. [13] The quality of the methods used by many recent RCTs is higher. Many early RCTs had incomplete descriptions of the study population (e.g., whether people had radiating symptoms or not, or the presence or absence of sciatica or nerve root symptoms). In this review, we have excluded studies undertaken solely in people with sciatica or disc herniation. We have included studies in people with chronic low back pain with no radiation, or studies that included people both with and without radiation, if the proportion of people with radiation was <50%. Study design criteria for inclusion in this review were: published systematic reviews and RCTs limited to English language journals only, at least single blinded, and containing >20 individuals of whom >80% were followed up. There was no minimum length of follow-up required to include studies. We excluded all studies described as "open", "open label", or not blinded, unless blinding was impossible. We excluded outdated systematic reviews, systematic reviews that pooled RCTs with observational studies, systematic reviews that did not evaluate RCT quality, and systematic reviews that did not focus on trials of people with low back pain. In addition, we use a regular surveillance protocol to capture harms alerts from organisations such as the US Food and Drug Administration (FDA) and the UK Medicines and Healthcare products Regulatory Agency (MHRA), which are added to the review as required. To aid readability of the numerical data in our reviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 36). The categorisation of the quality of the evidence (into high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the *Clinical Evidence* population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION What are the effects of oral drug treatments for people with chronic low back pain?

OPTION ANALGESICS (PARACETAMOL, OPIOIDS)

Symptom improvement

Tramadol compared with placebo Tramadol with or without paracetamol is more effective at decreasing pain at 3 months in people with chronic low back pain (high-quality evidence).

Opioids compared with placebo/control We don't know whether opioids are more effective at improving pain at 1 to 16 weeks in people with chronic low back pain (very low-quality evidence).

Sustained-release tramadol compared with placebo Sustained-release tramadol (200 or 300 mg) is more effective at maintaining pain relief at 12 weeks in people with chronic low back pain (high-quality evidence).

Different opioid treatments compared with each other We don't know how different opioids compare with each other at relieving pain in people with chronic low back pain (very low-quality evidence).

Paracetamol compared with traditional NSAIDs We don't know whether paracetamol is more effective than diflunisal at increasing the proportion of people with chronic low back pain rating their treatment as good or excellent at 4 weeks (very low-quality evidence).

Functional improvement
Tramadol compared with placebo Tramadol with or without paracetamol is more effective at improving function at 3 months (high-quality evidence).

Note
Opioid treatment has been associated with substance use disorders.

Note
The FDA issued a drug safety alert on the risk of rare but serious skin reactions with paracetamol (acetaminophen).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

Paracetamol versus placebo:
We found two systematic reviews comparing paracetamol with placebo in people with chronic low back pain. [14] [15] Both systematic reviews (search dates 2007) found no RCTs of paracetamol versus placebo for chronic low back pain. [14] [15]

Opioids versus placebo:
We found two systematic reviews [16] [17] and one subsequent RCT [18] comparing opioids with placebo in people with chronic low back pain.

The first review (search date 2005) compared opioids versus placebo or non-opioid control (non-opioid not defined). [16] It found no significant difference in pain relief for opioids (4 RCTs, 554 people; SMD –0.19, 95% CI –0.49 to +0.11; P value not reported) compared with placebo or non-opioid control over a period varying from 1 to 16 weeks. [16] The review reported that overall quality of included studies was weak.

The second review (search date 2007, 3 RCTs, one of which is also included in first review, 908 people with chronic low back pain) compared tramadol (alone or in combination with paracetamol) versus placebo. [17] The review included RCTs and quasi-randomised trials. The review found that tramadol significantly improved pain relief (3 RCTs, 908 people; SMD –0.71, 95% CI 0.39 to 1.02; P <0.0001) and function (3 RCTs, 878 people; SMD 0.17, 95% CI 0.04 to 0.30; P = 0.011) compared with placebo over a period varying from 4 weeks to 3 months. [17] The review reported the overall quality of included trials was fair.

The subsequent RCT (386 people with pain intensity visual analogue scale [VAS] scores of 40 or over, who completed a 3-week open-label run-in [100 mg once daily and titrated to 300 mg once daily]) compared extended-release tramadol (300 or 200 mg) versus placebo once daily for 12 weeks. [18] The RCT found that both 300 mg and 200 mg extended-release tramadol were significantly more effective than placebo at 12 weeks for maintaining pain relief (average increase in pain intensity: 5.2 with 300 mg *v* 7.8 with 200 mg *v* 12.2 with placebo; P = 0.009 with 300 mg *v* placebo; P = 0.052 with 200 mg *v* placebo). [18]

Opioids versus each other:
We found one systematic review (search date 2005) evaluating opioids in people with chronic low back pain. [16] The review compared different opioid treatments with each other for change in pain measurements from baseline to post-opioid treatment. The review found no significant difference in pain measurement between baseline scores compared with post opioid-treatment scores (5 RCTs, 336 people; SMD –0.93, 95% CI –1.89 to +0.03; P = 0.055). The review reported that overall quality of included trials was weak. [16]

Analgesics versus NSAIDs:
See review on NSAIDs.

Harms:

Paracetamol versus placebo:
We found no RCTs.

Opioids versus placebo:
The first review found that the prevalence of current substance use disorders in people with chronic back pain receiving opioids ranged from 3% to 43%, with a lifetime prevalence as high as 54%. [16] The review noted suboptimal methods and variability in how abuse behaviours were defined. [16]

The second review reported that opioids significantly increased the risk for nausea, somnolence, constipation, dry mouth, dizziness, pruritus, vomiting, anorexia, and increased sweating compared with placebo (nausea: 3 RCTs, 908 people; 52/455 [11%] with opioids *v* 5/453 [1%] with placebo; RD 0.09, 95% CI 0.06 to 0.12; P <0.0001; somnolence: 2 RCTs, 654 people; 35/328 [11%] with opioids *v* 5/326 [2%] with placebo; RD 0.09, 95% CI 0.05 to 0.13; P <0.00001; constipation (2 RCTs, 654 people; 35/328 [11%] with opioids *v* 10/326 [10%] with placebo; RD 0.8, 95% CI 0.04 to 0.12; P = 0.0004; dry mouth: 2 RCTs, 654 people; 24/328 [7%] with opioids *v* 1/326 [0.3%] with placebo; RD 0.07, 95% CI 0.04 to 0.10; P <0.00001; dizziness: 2 RCTs, 654 people; 30/328 [9%] with opioids *v* 1/326 [0.3%] with placebo; RD 0.08, 95% CI 0.04 to 0.12; P = 0.00003; pruritus: 1 RCT, 318 people; 11/161 [7%] with opioids *v* 2/157 [1%] with placebo; RD 0.06, 95% CI 0.01 to 0.10; P = 0.011; vomiting: 1 RCT, 336 people; 10/167 [6%] with opioids *v* 0/169 [0%] with placebo; RD 0.06, 95% CI 0.02 to 0.10; P = 0.00017; anorexia: 1 RCT, 336 people; 6/161 [4%] with opioids *v* 0/169 [0%] with placebo; RD 0.04, 95% CI 0.01 to 0.07; P = 0.02; increased sweating: 1 RCT, 336 people; 6/167 [3%] with opioids *v* 0/169 [0%] with placebo; RD 0.04, 95% CI 0.01 to 0.07; P = 0.02). [17] However, the review found no significant differences between groups for headache, fatigue, upper respiratory tract infection, sinusitis, and hot flushes (headache: 3 RCTs, 908 people; 31/455 [7%] with opioids *v* 17/453 [4%] with placebo; RD 0.03, 95% CI 0.00 to 0.06; P = 0.051; fatigue: 1 RCT, 318 people; 11/161 [7%] with opioids *v* 4/157 [2%] with placebo; RD 0.04, 95% CI 0.00 to 0.09; P = 0.069; upper respiratory tract infection: 1 RCT, 318 people; 9/161 [6%] with opioids *v* 12/157 [8%] with placebo; RD –0.02, 95% CI –0.08 to +0.03; P = 0.46; sinusitis: 1 RCT, 318 people; 8/161 [5%] with opioids *v* 5/157 [3%] with placebo; RD +0.02, 95% CI –0.03 to +0.06; P = 0.42; hot flushes: 1 RCT, 336 people; 6/167 [4%] with opioids *v* 0/169 [0%] with placebo; RD 0.20, 95% CI 0.00 to 0.08; P = 0.068). [17]

The subsequent RCT found that extended-release tramadol significantly increased the risk of adverse effects (97/128 [76%] with 300 mg *v* 79/129 [61%] with 200 mg *v* 72/129 [57%] with placebo; P = 0.003) compared with placebo, including nausea and constipation (nausea: 25/128 [20%] with 300 mg *v* 10/129 [8%] with 200 mg *v* 9/129 [7%] with placebo; P = 0.003; constipation: 19/128 [15%] with 300 mg *v* 7/129 [5%] with 200 mg *v* 1/129 [1%] with placebo; P <0.001). [18] However, the RCT reported no significant differences between groups for headache, dizziness, diarrhoea, or insomnia (headache: 19/128 [15%] with 300 mg *v* 15/129 [12%] with 200 mg *v* 14/129 [11%] with placebo; P = 0.6; dizziness: 18/128 [14%] with 300 mg *v* 13/129 [10%] with 200 mg *v* 12/129 [9%] with placebo; P = 0.4; diarrhoea: 5/128 [4%] with 300 mg *v* 9/129 [7%] with 200 mg *v* 7/129 [6%] with placebo; P = 0.5; insomnia: 13/128 [10%] with 300 mg *v* 5/129 [4%] with 200 mg *v* 6/129 [5%] with placebo; P = 0.09). [18]

Opioids versus each other:
See opioids versus placebo.

Analgesics versus NSAIDs:
See review on NSAIDs.

A systematic review of RCTs of oral or transdermal opioids for chronic non-cancer pain found adverse effects with opioids in about 50% (51%, 95% CI 49% to 53%) of people. [19] The most common adverse effects were dry mouth, nausea, constipation, dizziness, drowsiness or somnolence, and pruritus (dry mouth: 25%, 95% CI 21% to 29%; nausea: 21%, 95% CI 20% to 22%; constipation: 15%, 95% CI 14% to 16%; dizziness: 14%, 95% CI 14% to 16%; drowsiness or somnolence: 14%, 95% CI 13% to 15%; pruritus: 13%, 95% CI 11% to 16%). [19]

Drug safety alert:
August 2013, paracetamol (acetaminophen) The Food and Drug Administration (FDA) has issued a drug safety alert on the risk of rare but serious skin reactions with paracetamol (acetaminophen). These skin reactions, known as Stevens–Johnson Syndrome (SJS), toxic epidermal necrolysis (TEN), and acute generalised exanthematous pustulosis (AGEP) can be fatal.(www.fda.gov/)

Comment: In one review, pharmaceutical companies sponsored 73% of the trials. [16] The review states that opioid efficacy is limited or inconclusive depending on comparison groups. [16] Evidence on long-term efficacy of opioid use is quite limited.

OPTION ANTIDEPRESSANTS

Symptom improvement

Antidepressants compared with placebo We don't know whether antidepressants are more effective at improving symptoms (including pain and depression) in people with chronic low back pain (very low-quality evidence).

Antidepressants compared with each other Maprotiline may be more effective than paroxetine at improving pain in people with chronic low back pain (low-quality evidence).

Functional improvement
Antidepressants compared with placebo We don't know whether antidepressants are more effective at improving function in people with chronic low back pain (low-quality evidence).

Note:
Antidepressants have been associated with increased suicidal behaviour and congenital malformations (paroxetine).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

Antidepressants versus placebo:
We found two systematic reviews comparing antidepressants versus placebo for chronic low back pain. [20] [21]

The first review (search date 2002; 7 RCTs, 440 people) did not statistically pool data because of heterogeneity of trial designs and outcome measures. [20] The review found that four out of five included RCTs on tricyclic/tetracyclic antidepressants reported positive outcomes on at least one relevant outcome measure (mainly pain). No benefit was found in the three included RCTs assessing SSRIs or trazodone. [20]

The second review (search date 2008; 10 RCTs, 5 of which were also included in the first review, 501 people) found no significant difference in pain relief (9 RCTs, 376 people; SMD –0.04, 95% CI –0.25 to +0.17; P = 0.70), depression (2 RCTs, 132 people; SMD +0.06, 95% CI –0.29 to +0.40; P = 0.75), or functional status (2 RCTs, 132 people; SMD –0.06, 95% CI –0.40 to +0.29; P = 0.75) with antidepressants compared with placebo. [21] Subgroup analysis also found no significant difference in pain relief for SSRIs (3 RCTs, 199 people; SMD +0.11, 95% CI –0.17 to +0.39) or tricyclic antidepressant (2 RCTs, 148 people; SMD –0.10, 95% CI –0.51 to +0.31; P = 0.64) compared with placebo. [21] Duration of follow-up in the trials included in the systematic reviews ranged from 4 to 8 weeks. Some of the trials included in the reviews had methodological shortcomings, including baseline differences between randomised groups. [22] [23]

Antidepressants versus each other:
One RCT (42 people) compared maprotiline (50 mg for 3 days, then 100 mg for 3 days, then 150 mg thereafter) versus paroxetine (10 mg for 3 days, then 20 mg for 3 days, then 30 mg thereafter for 8 weeks). [23] The RCT found that maprotiline significantly improved pain relief compared with paroxetine (mean decrease on 0–20 scale: 5.41 with maprotiline *v* 2.34 with paroxetine; P = 0.013). [23] However, these results are difficult to interpret because baseline pain scores differed in the two groups (12.2 with maprotiline *v* 10.5 with paroxetine). [23]

Harms:

Adverse effects of antidepressants include dry mouth, drowsiness, constipation, urinary retention, orthostatic hypotension, and mania. [2]

Antidepressants versus placebo:
The systematic reviews gave no information on adverse effects. [20] [21] One RCT included in both reviews reported that the prevalence of dry mouth, insomnia, sedation, and orthostatic symptoms was 60% to 80% with tricyclic antidepressants. [23] However, rates were only slightly lower in the placebo group and none of the differences were significant.

Antidepressants versus each other:
The RCT (42 people) reported that maprotiline is associated with more dry mouth, sedation, orthostatic symptoms, and constipation compared with paroxetine. [23]
Drug safety alert:
September 2005, paroxetine The Food and Drug Administration (FDA) has issued a drug safety alert on major congenital malformations with paroxetine (www.fda.gov). **July 2005, antidepressants** The FDA has issued a drug safety alert on increased suicidal behaviour with antidepressants (www.fda.gov).

Comment:

None.

OPTION **NSAIDS**

Symptom improvement

NSAIDs compared with placebo NSAIDs are more effective at improving pain intensity in people with chronic low back pain (moderate-quality evidence).

Different NSAIDs compared with each other Different NSAIDs seem equally effective at improving symptoms in people with chronic low back pain (moderate-quality evidence).

NSAIDs compared with analgesics Diflunisal may be more effective than paracetamol at increasing the proportion of people rating their treatment as good or excellent at 4 weeks (very low-quality evidence).

Functional improvement
NSAIDs compared with placebo Etoricoxib may be more effective at improving function in people with chronic low back pain at 12 weeks (moderate-quality evidence).

Note:
Both COX-2 inhibitors and traditional NSAIDs have been associated with an increased risk of myocardial infarction. NSAIDs may cause gastrointestinal and other well-recognised adverse effects.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

NSAIDs versus placebo:
We found one systematic review and one additional RCT comparing non-steroidal anti-inflammatory drugs (NSAIDs) versus placebo. [24] [25]

The review (search date 2007) found that NSAIDs significantly reduced pain intensity compared with placebo at follow-up of 2 to 12 weeks (4 RCTs, 1020 people; 0–100 mm visual analogue scale [VAS] WMD –12.4, 95% CI –15.5 to –9.3). [24] The systematic review reported that the methodological quality of the RCTs was acceptable. One of the RCTs included in the review evaluated traditional (non-COX-2 selective) NSAIDs and the other three evaluated COX-2-selective NSAIDs. There was no statistical heterogeneity among the trials. [24]

The additional RCT (325 people) found that the COX-2-selective NSAID etoricoxib 60 mg and 90 mg significantly decreased pain at 4 and 12 weeks, and significantly improved functioning at 12 weeks compared with placebo (reduction in pain at 4 weeks on 100-mm VAS: 15.2 mm for etoricoxib 60 mg and 13.0 mm for etoricoxib 90 mg *v* placebo, both comparisons P <0.001; improvement in function on Roland Morris Disability score [on a scale of 0–24 points]: 2.8 with etoricoxib 60 mg and 2.4 with etoricoxib 90 mg *v* placebo, both comparisons P <0.001). [25]

NSAIDs versus each other:
One systematic review (search date 2007) compared different types of NSAIDs with each other. [24] The review included 12 RCTs that compared different NSAIDs, four RCTs in people with chronic low back pain, and eight RCTs in people with acute/chronic or unspecified-duration low back pain. The review found no evidence of differences in efficacy between NSAIDs, but each trial evaluated a different comparison (no data reported). [24]

NSAIDs versus analgesics:
We found one systematic review (search date 2007, 1 RCT). [24] The small RCT (29 people with chronic low back pain) included in the review found that diflunisal significantly increased the proportion of people rating their treatment as good or excellent at 4 weeks (10/16 [62%] with diflunisal *v* 4/12 [33%] with paracetamol; P value not reported). [24]

Harms:

NSAIDs may cause gastrointestinal, cardiovascular, and other complications (see review on NSAIDs).

NSAIDs versus placebo:
The systematic review reported that NSAIDs significantly increased the risk of adverse effects compared with placebo (4 RCTs, 1020 people; RR 1.25, 95% CI 1.07 to 1.43). [24] Three of the four RCTs included in the systematic review evaluated COX-2-selective NSAIDs. [24] The additional RCT reported that drug-related adverse events occurred in 12% of people with placebo, in 26% of people with etoricoxib 60 mg, and in 25% of people with etoricoxib 90 mg (etoricoxib 60 mg *v* placebo; P = 0.01; etoricoxib 90 mg *v* placebo; P = 0.021). [25] The RCT reported that four people experienced a serious adverse event, one taking etoricoxib 60 mg (bladder trauma) and three taking etoricoxib 90 mg (cellulitis, major depression, and cerebrovascular accident/heart failure in one person with an active history of hypertension and chest pain). [25]

NSAIDs versus each other:
One RCT (196 people) included in the systematic review found that nimesulide has a similar rate of gastrointestinal adverse effects to diclofenac (both traditional NSAIDs). [26] Another RCT (446

people) included in the systematic review reported similar rates of overall clinical adverse effects with the COX-2 inhibitor etoricoxib and the traditional NSAID diclofenac (35% with etoricoxib *v* 39% with diclofenac; statistical significance not reported). [27] However, the RCT reported higher rates of gastrointestinal adverse effects (44/222 [20%] with diclofenac *v* 30/224 [13%] with etoricoxib; no significance assessment reported) for diclofenac compared with etoricoxib. [27]

Comment: COX-2 inhibitors have been shown to have fewer gastrointestinal adverse effects in osteoarthritic and rheumatoid arthritis studies, but rofecoxib (brand name Vioxx) and valdecoxib (brand name Bextra) have been removed from the market in some countries owing to concerns about possible increased risk of myocardial infarction and stroke. [28] A systematic review and meta-analysis of RCTs of NSAIDs for various conditions found an increased risk of myocardial infarction with both COX-2 inhibitors and traditional NSAIDs, with the exception of naproxen. [29]

OPTION MUSCLE RELAXANTS

Symptom improvement
Benzodiazepines compared with placebo Tetrazepam may be more effective at 10 to 14 days at reducing pain and at increasing overall improvement (low-quality evidence).

Non-benzodiazepines compared with placebo We don't know whether non-benzodiazepines are more effective at 7 to 21 days at improving symptoms (moderate-quality evidence).

Adverse effects
Adverse effects of muscle relaxants include dizziness and drowsiness.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review (search date 2002, 5 RCTs). [30] The review categorised included RCTs as being of higher or lower methodological quality (higher quality defined as a score of at least 6 on a scale of 0–11).

Benzodiazepines versus placebo:
The review (2 higher-quality RCTs, 222 people) found that tetrazepam 50 mg three times daily significantly reduced pain and increased overall improvement compared with placebo after 10 to 14 days (pain: RR 0.71, 95% CI 0.54 to 0.93; overall improvement: RR 0.63, 95% CI 0.42 to 0.97). [30]

Non-benzodiazepines versus placebo:
The review identified two higher-quality RCTs and one lower-quality RCT that compared non-benzodiazepines (flupirtine, tolperisone, cyclobenzaprine) versus placebo, and found differing results. [30] The first higher-quality RCT identified by the review (107 people) found that flupirtine reduced pain compared with placebo at 7 days, but the difference was not statistically significant (AR for reduction in pain intensity by 2 categories on 5-point scale: 54% with flupirtine *v* 33% with placebo; P value not reported). [31] However, the RCT found that flupirtine significantly improved overall assessment by physician compared with placebo at 7 days (physician rating "very good", "good", or "satisfactory": 85% with flupirtine *v* 54% with placebo; P value not reported).

The second higher-quality RCT identified by the review (112 people) found that tolperisone (100 mg three times daily) significantly increased the proportion of people reporting improvement measured by overall assessment of efficacy compared with placebo at 21 days, but found no significant difference between treatments for pain relief. [32] The third lower-quality RCT identified by the review (76 people) did not assess pain, global improvement, or function. [33]

Harms: The review found that central nervous system adverse effects of muscle relaxants (most commonly drowsiness or dizziness) were consistently reported with all benzodiazepines and non-benzodiazepines, but rates of adverse effects were only available from two RCTs of non-benzodiazepines, showing no difference versus placebo (246 people; RR 1.02, 95% CI 0.67 to 1.57). [30]
Drug safety alert:
April 2013, tetrazepam The European Medicines Agency (EMA) has issued a drug safety alert on the low but increased risk of serious skin reactions (including Stevens–Johnson syndrome, toxic epidermal necrolysis, and drug-rash-with-eosinophilia-and-systemic-symptoms [DRESS] syndrome) with tetrazepam compared with other benzodiazepines.(www.ema.europa.eu/ema/)

Comment: Benzodiazepines are associated with addiction and abuse potential and are scheduled by the US Food and Drug Administration (FDA).

QUESTION What are the effects of injection therapy for people with chronic low back pain?

OPTION EPIDURAL CORTICOSTEROID INJECTIONS

We found no clinically important results from RCTs about epidural corticosteroid injections in people with chronic back pain without sciatica.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: **Epidural corticosteroid injections versus placebo:**
We found one systematic review (search date 2008) comparing epidural corticosteroid injection versus placebo for chronic non-specific low back pain, which identified no RCTs. [34]

Harms: We found no RCTs.

Comment: **Clinical guide:**
Epidural corticosteroid injections may have serious adverse effects and should only be administered under specific indications. Epidural corticosteroid injections are indicated only for those with leg-dominant pain and nerve root irritation. Even in these cases, the injections give a short period of improvement but are ineffective in the long term.

OPTION LOCAL INJECTIONS

Symptom improvement
Local injections compared with placebo We don't know if local injections (local anaesthetic and corticosteroids) are more effective in the short term for relieving pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: **Local injections versus placebo:**
We found two systematic review (search dates 2007 [35] and 2008, [34] 3 RCTs, 97 people) comparing local injections versus placebo. [35] Two of the RCTs assessed corticosteroid injections versus placebo (the review reported that the first was a high-quality RCT and the second was a low-quality RCT), and the third RCT included in the reviews compared anaesthetic injections with placebo (reported as high quality). The reviews did not pool data owing to heterogeneity between trials; therefore the RCTs are reported separately here. [35] [34]

The first RCT included in the reviews (27 people with persistent non-radiating low-back pain [>4 weeks] who were able to localise a point of maximal tenderness) compared lidocaine versus placebo. It found no significant differences between groups for reported self-improvement (4/14 [28%] with lidocaine *v* 5/13 [38%] with placebo; RR 0.74, 95% CI 0.25 to 2.18). [35] [34]

The second RCT included in the reviews (30 people with low-back pain of duration >1 month with the exception of people with herniated disc lesions, osteoporosis, arachnoiditis, or ankylosing spondylitis) compared 5 mL lidocaine 1% mixed with 1 mL methylprednisolone versus placebo (5 mL isotonic saline). The RCT found that lidocaine mixed with methylprednisolone significantly improved self-reported improvement compared with placebo (9/14 [64%] with lidocaine plus methylprednisolone *v* 3/15 [19%] with placebo; RR 3.21, 95% CI 1.09 to 9.51); however, the review stated that this RCT was of low quality. [35] [34]

The third RCT included in the reviews (41 people with iliac crest pain syndrome — exclusion criteria were: diagnosis of sciatica, ankylosing spondylitis, malignancy, infection, spondylolysthesis, severe degenerative disc disease, or fibromyalgia) compared 5 mL lidocaine 0.5% versus placebo (5 mL isotonic saline). The RCT found no significant differences between groups for pain intensity or self-reported improvement (pain intensity: visual analogue scale; SMD –13.3, 95% CI –29.73 to +3.13; self-reported improvement: 11/21 [52%] with lidocaine *v* 6/20 [30%] with placebo; RR 1.75, 95% CI 0.80 to 3.82). [35] [34]

Harms: The review reported that adverse effects such as headache, dizziness, transient local pain, tingling and numbness, and nausea were reported in small numbers of people (no further data reported). [35]

Comment: The RCTs included in the systematic review assessed heterogeneous injection methods and populations (injection over the iliac crest for iliac crest pain, injection over the iliolumbar ligament for non-specific low back pain, and trigger point injections for myofascial pain syndrome). [35]

OPTION FACET JOINT INJECTIONS

Symptom improvement

Facet joint injections compared with placebo We don't know whether facet joint injections are more effective at decreasing pain in people with chronic low back pain (very low-quality evidence).

Functional improvement

Corticosteroid injections compared with saline injections We don't know whether corticosteroid injections are more effective at improving disability at 1 and 3 months in people with chronic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

Facet joint injection versus placebo:

We found two systematic reviews (search dates 2008 [34] and 2007 [35]). The reviews both reported the same two RCTs, neither review pooled data owing to heterogeneity between trials, and both reported that the first RCT is of high quality, and the second RCT is of low quality. [34] [35]

The first RCT included in both reviews (101 people with chronic low back pain without sciatica, with positive response to an uncontrolled facet joint block, see comment below) found no significant difference in pain relief and disability between corticosteroid and saline injections after 1 and 3 months (1 month: RR 0.89, 95% CI 0.65 to 1.21; 3 months: RR 0.90, 95% CI 0.69 to 1.17). Although a significantly higher proportion of people in the corticosteroid-injection group experienced marked or very marked improvement in pain relief after 6 months (46% with corticosteroid *v* 15% with placebo; P = 0.002), half of the people in the corticosteroid-injection group with positive results at 6 months experienced no benefits at earlier time periods, and differences were attenuated after controlling for increased use of co-interventions in the corticosteroid-injection group. [34] [35]

The second RCT included in both reviews (109 people with chronic low back pain based on clinical criteria, positive response to diagnostic facet joint block not required, see comment below) compared corticosteroids injected intra-articularly versus corticosteroids injected peri-capsularly versus placebo injections. No significant differences were reported between the groups for pain, disability, and work attendance at 1 hour, 2 weeks, 6 weeks, and 3 months (reported as not significant; P value not reported). [34] [35]

Harms:

The reviews reported that adverse effects such as headache, dizziness, transient local pain, tingling and numbness, and nausea were reported in small numbers of people (no further data reported). [35] [34]

Comment:

Two other RCTs identified by the review did not distinguish between acute and chronic pain, and involved people with sciatica, so these RCTs have not been included here. The RCTs included in both reviews included people with pain arising from the facet joints. This is likely to indicate a definitive diagnosis for the source of low back pain. [34] [35]

QUESTION What are the effects of non-drug treatments for people with chronic low back pain?

OPTION BACK EXERCISES

Symptom improvement

Generic back exercise (other than the McKenzie method and yoga) compared with placebo/no treatment/other conservative interventions We don't know whether generic back exercises (other than the McKenzie method and yoga) are more effective at improving pain (very low-quality evidence).

Trunk-strengthening/stabilisation exercises compared with other back exercises or no exercise We don't know whether trunk-strengthening/stabilisation exercises are more effective at improving pain (very low-quality evidence).

McKenzie method compared with other back exercise We don't know whether the McKenzie method is more effective than flexion exercises or spinal-stabilisation exercises at reducing pain in the short or long term (low-quality evidence).

Yoga compared with other back exercises Yoga may be more effective than conventional therapeutic back exercises at decreasing pain at 26 weeks (very low-quality evidence).

Functional improvement

Generic back exercises (other than the McKenzie method and yoga) compared with placebo/no treatment/other conservative interventions Generic back exercises (other than the McKenzie method and yoga) may be no more effective at improving function (very low-quality evidence).

Trunk-strengthening/stabilisation exercises compared with other back exercises or no exercise We don't know whether trunk-strengthening/stabilisation exercises are more effective at improving function (very low-quality evidence).

McKenzie method compared with other back exercise We don't know whether the McKenzie method is more effective than flexion exercises or spinal-stabilisation exercises at decreasing disability or at improving function in the short or long term (low-quality evidence).

Yoga compared with other back exercises Yoga may be more effective than conventional therapeutic back exercises at improving function at 12 weeks but not at 26 weeks (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

We found 10 systematic reviews [36] [37] [38] [39] [40] [41] [42] [43] [44] [45] and 10 subsequent RCTs. [46] [47] [48] [49] [50] [51] [52] [53] [54] [55] The reviews had different inclusion and exclusion criteria and performed different analyses.

Generic back exercise (other than the McKenzie method and yoga) versus placebo or no treatment or other conservative interventions:

The first review (search date 2004, 43 RCTs, 3907 people; see comment) included RCTs of exercise therapy compared with placebo or no treatment, or other conservative therapies. The methodological quality of included studies was assessed by the adequacy of four criteria: randomisation, allocation concealment, follow-up, and outcome blinding. High-quality studies were defined as meeting all four criteria. Of the 43 included RCTs, six RCTs were categorised as high quality. [36] The review used both a qualitative rating system and a quantitative pooling of data where possible. The review found 33 exercise groups in RCTs that had non-exercise comparisons. [36]

Eleven exercise groups (2 high-quality, 9 low-quality RCTs) found that exercise was more effective than the comparison treatment. The RCTs were mostly conducted in healthcare settings; the exercise programmes were commonly individually designed and delivered, and usually included strengthening or trunk-stabilising exercises. The exercise interventions often included additional conservative therapy (behavioural, manual, advice to stay active, back school, education). [36]

One low-quality RCT found that a group receiving an aerobics and strengthening programme had less improvement in pain and function compared with behavioural therapy. Fourteen RCTs (2 high quality, 12 low quality) found no significant difference between exercise therapy and the comparison treatment. The review pooled data on pain and function. It found that exercise therapy significantly reduced pain measured at the earliest follow-up compared with placebo, sham, or no treatment (scale 0–100, 8 RCTs, 370 people; WMD –10.2, 95% CI –19.09 to –1.31; see comment). [36] The review found that exercise significantly reduced pain measured at the earliest follow-up compared with other conservative treatments (scale 0–100, 15 RCTs, 1697 people; WMD –5.93, 95% CI –9.65 to –2.21; see comment). The review found smaller improvements for functional outcomes; there were no significant difference between exercise and placebo, sham, or no treatment in function measured at the earliest follow-up (scale 0–100, 7 RCTs, 337 people; WMD –2.98, 95% CI –6.48 to +0.53). It found that exercise significantly improved function compared with other conservative treatments measured at the earliest follow-up (scale 0–100, 13 RCTs, 1373 people; WMD –2.37, 95% CI –4.00 to –0.74). The review found similar results for pain and function at short-term (6 weeks), intermediate (6 months), and long-term (12 months) follow-up. The review reported that there may be publication bias among the studies in chronic populations. [36]

The second review (search date 2006, 15 RCTs, 5 of which are included in the first review, 1695 people with chronic low back pain >12 weeks' duration) compared physiotherapy exercises (including general fitness, flexibility regimes, stretches, muscle strengthening, and spinal stabilisation) versus each other or placebo. [37] The review analysed results qualitatively and also concluded that exercise therapy is effective in reducing pain in people with chronic low back pain. [37]

The first subsequent RCT (234 people with chronic low back pain >20-mm visual analogue scale [VAS], >5 Roland Morris Disability Questionnaire [RMDQ], and >3 months' duration) compared a group programme of exercise plus education using a CBT approach versus advice on self-management. [46] Both groups received an educational pack containing a booklet and audio cassette by post which gave advice on self-management suitable for people with persistent low back pain. The comparison arm received no further intervention, but continued to be treated as usual by their general practitioner. Those randomised to the exercise arm received eight 2-hour group sessions over a 6-week period aimed at introducing and developing awareness of managing back pain with activity, independent control of back pain using physical exercise and psychological self-help techniques, encouragement return to work/normal activity, independently manage subsequent episodes of back pain, and improve activity levels. [46] The RCT found no significant difference between groups for pain at 3, 9, or 15 months (3 months: VAS mean difference –2.44, 95% CI

–8.43 to +3.56; 9 months: VAS mean difference –4.60, 95% CI –11.07 to +1.88; 15 months: VAS mean difference –5.49, 95% CI –12.43 to +1.23) follow-up. The RCT also found no significant difference between groups for disability at 3, 9, or 15 months follow-up (3 months: RMDQ mean difference –0.31, 95% –1.50 to 0.88; 9 months: RMDQ mean difference –1.09, 95% CI –2.28 to +0.09; 15 months: RMDQ mean difference –0.93, 95% CI –2.30 to +0.45). [46]

The second subsequent RCT (57 people with a non-specific low back pain for at least 3 years) compared a 3-month home-exercise programme supervised by a physiotherapist versus no exercise at 5 years' follow-up. [47] During the follow-up low back pain intensity (Borg CR-10 Scale: 0 = no pain to 11 = maximal pain) and the Oswestry Disability Index, for the ability to manage every day tasks (ODI) were evaluated. The RCT found that home exercise significantly decreased pain intensity (P <0.01; absolute figures not reported), but not disability (P <0.27; absolute figures not reported) compared with no exercise at 5 years. [47]

Trunk-strengthening/stabilisation versus other back exercises or no exercise:
The third review (search date 2004, 13 RCT, 903 people with chronic low back pain) compared trunk-strengthening exercises with no exercise, trunk-strengthening exercises plus motivation and other types of exercise programmes, or intensive trunk-strengthening exercises with other types of exercise programme. The review included only high-quality trials (6 or more out of 10 on the PEDro scale). [38] When possible, data were pooled to provide an overall effect estimate. Meta-analyses using random-effects modelling were performed. [38] The review split the included trials into non-surgery and post-surgery; only the non-surgery results are presented in this review. The review reported on two outcomes (pain and function) at short- (12 weeks) and long-term (52 weeks) follow-up for each comparison where possible. The review found that trunk-strengthening exercises did not significantly reduce pain (1 RCT: SMD +0.33, 95% CI –0.21 to +0.87) or increase function (1 RCT: SMD +0.01, 95% CI –0.53 to +0.55) at short- or long-term follow-up (long-term pain: 1 RCT, SMD +0.95, 95% CI –0.35 to +1.55; long-term function: 1 RCT: SMD +0.50, 95% CI –0.07 to +1.07) compared with no exercise. The review found that trunk-strengthening exercises did not significantly reduce pain or increase function at short-term follow-up (pain: 3 RCTs SMD +0.02, 95% CI, –0.35 to +0.40; function: 3 RCTs SMD 0, 95% CI –0.31 to +0.31) and long-term follow-up (pain: 3 RCTs SMD +0.10, 95% CI –0.27 to +0.48; function: 3 RCTs; SMD +0.22, 95% CI –0.10 to +0.54) compared with other types of exercise programmes. Intensive trunk-strengthening exercises significantly increased function at short-term follow-up (3 RCTs: SMD 0.58, 95% CI 0.22 to 0.94) but not at long-term follow-up (3 RCTs; SMD +0.77, 95% CI –0.33 to +1.20) compared with other types of exercise programme. [38]

The fourth review (search date 2004, 13 RCTs, sample sizes not reported) compared specific stabilisation exercise (SSE) with control/usual care or spinal manipulative therapy, and SSE plus physiotherapy compared with education or medical management, or SSE plus physiotherapy compared with physiotherapy alone. [39] Methodological quality was based on the PEDro scale out of 10. The mean PEDro score of included trials was 6.5 (1.1), range 4 to 8. Eight of the 13 RCTs involved chronic low back pain, but four trials used a different definition of chronicity than this review. [39]

In the review, all outcomes are reported with "effect sizes" that are between-group differences using a 0–100-point scale at short- and medium-term follow-up (undefined). The review found that SSE significantly reduced pain in the short term (2 RCTs; effect –21, 95% CI –32 to –9; P value not reported) and the medium term (2 RCTs; effect –24, 95% CI –38 to –11; P value not reported) compared with usual care, but did not significantly reduce disability in the short term (effect –5, 95% CI –12 to +1; P value not reported), nor significantly reduce disability in the medium term (effect –9, 95% CI –16 to +2; P value not reported) compared with usual care. The review found that SSE plus physiotherapy significantly reduced pain and disability compared with medical management or education in the short term (2 RCTs; effect on pain –11, 95% CI –13 to –9; effect on disability –20, 95% CI –27 to –13; P values not reported) and the medium term (2 RCTs; effect on pain –11, 95% CI –18 to –5; effect on disability –4, 95% CI –7 to –1; P values not reported). The review found no differences for pain or disability for SSE compared with spinal manipulative therapy (2 RCTs, results presented graphically), or SSE plus physiotherapy compared with conventional physiotherapy (3 RCTs, results presented graphically). [39]

The fifth review (search date 2004, 7 RCTs, all of which were also identified by the fourth review, [39] 551 people) compared segmental stabilising exercises versus GP treatment or other physiotherapy treatments, and segmental stabilising exercises plus other physiotherapy exercises versus GP treatment or other physiotherapy treatments. [40] The review found that segmental stabilising exercises significantly reduced pain and disability at 10 weeks to 30 months compared with GP treatment (1 RCT reported as high quality, 44 people; results presented graphically). The review found no differences between segmental stabilising exercises versus other physiotherapy exercises for pain and disability at 6 weeks to 12 months (1 RCT reported as low quality, 47 people; results

presented graphically). The review found that segmental stabilising exercises plus other physiotherapy significantly reduced pain and disability at 4 weeks to 12 months compared with other GP treatment alone (2 RCTs reported as high quality, 261 people; results presented graphically). For the final comparison the review found no significant difference between segmental stabilising exercises plus other physiotherapy treatment and other physiotherapy treatment for pain and disability (1 RCT reported as low quality, 99 people; results presented graphically). [40]

The seventh review (search date 2008, 14 RCTs, [41] 6 of which were also identified by the fourth review [39]) compared motor control exercises versus minimal intervention (7 RCTs), manual therapy (4 RCTs), other exercise (5 RCTs, including spinal manipulation), or lumbar fusion surgery (1 RCT, not reported here). [42] The review found that motor control exercise significantly reduced pain at <3 months (5 RCTs: WMD –14.3, 95% CI –20.4 to –8.1), intermediate follow up defined as >3 and <12 months (5 RCTs: WMD –13.6, 95% CI –22.4 to –4.1), and >12 months (5 RCTs: WMD –14.4, 95% CI –23.1 to –5.7) compared with minimal intervention. The review found that motor control exercises significantly reduced disability at >12 months (5 RCTs; WMD –10.8, 95% CI –18.7 to –2.8), but not at <3 months (5 RCTs; WMD –9.6, 95% CI –20.7 to +1.5) or intermediate follow-up (5 RCTs; WMD –7.7, 95% CI –15.7 to +0.3) compared with minimal interventions. It also found no significant difference between motor control exercises and minimal interventions for quality of life at <3 months (2 RCTs; WMD +6.3, 95 % CI –7.2 to +19.9), intermediate follow-up (2 RCTs; WMD –1.8, 95% CI –3.8 to +0.1), or >12 months (2 RCTS; WMD –0.6, 95% CI –2.6 to +1.3). [42]

The review found that motor control exercises significantly reduced pain at intermediate follow-up (4 RCTs; WMD –5.7, 95% CI –10.7 to –0.85) but not at <3 months (3 RCTs; WMD –3.7, 95% CI –9.1 to +1.8) or >12 months (4 RCTs; WMD –4.3, 95% CI –9.4 to +0.7) compared with spinal manipulation. The review found that motor control exercises also significantly reduced disability at intermediate follow-up (4 RCTs; WMD –4.0, 95% CI –7.6 to –0.4), but not at <3 months (3 RCTs; WMD –1.9, 95% CI –4.6 to +0.9), or >12 months (4 RCTs; WMD –2.0, 95 % CI –5.5 to +1.5) compared with spinal manipulation. The review found that motor control exercises significantly improved quality of life at intermediate follow-up (2 RCTs; WMD –6.0, 95% CI –11.2 to –0.8), but not at >12 months (2 RCTs; WMD +1.8, 95% CI –3.2 to +6.8). [42] Finally, the review found no significant difference for motor control exercises compared with other exercise at >3 months' follow-up (4 RCTs; WMD –6.0, 95% CI –15.0 to +3.1), intermediate follow-up (3 RCTs; WMD –5.0, 95% CI –10.7 to +0.8) or >12 months (3 RCTs; WMD –1.4, 95% CI –7.6 to +4.9). However, the review found that motor control exercises significantly reduced disability at >3 months' follow-up (4 RCTs; WMD –5.1, 95% CI –8.7 to –1.4) but not at intermediate follow-up (3 RCTs; WMD –1.5, 95% CI –6.4 to +3.5) or >12 months (3 RCTs; WMD +3.8, 95% CI –3.9 to +11.4). [42]

The third subsequent RCT (86 women with chronic lower back pain) compared rhythmic stabilisation (RST), a combination of isotonic exercises (COI), or control. [48] The RCT found that both RST and COI significantly improved function compared with control at 4 weeks' (P <0.05) and 8 weeks' (P <0.05) follow-up. The RCT reported that, despite improvements from baseline scores for the back pain intensity scale measurement in muscle mobility, endurance, and functional ability (scores not reported), the RCT found no significant differences between groups at 4 or 8 weeks' follow-up (data presented graphically). [48]

The fourth subsequent RCT (92 women with chronic low back pain) compared rhythmic stabilisation (alternating trunk flexion extension, 3 sets of 15 repetitions at maximal resistance provided by the physiotherapist) versus transcutaneous electrical nerve stimulation (TENS) (45-minute sessions while resting in a prone position using a 120Z unit), rhythmic stabilisation plus TENS, or placebo. [49] The RCT found that rhythmic stabilisation significantly reduced disability and pain compared with TENS, rhythmic stabilisation plus TENS, and placebo (P <0.05). [49]

The fifth subsequent RCT (579 people with chronic or recurrent low back pain) compared the Alexander technique (6 or 24 sessions) or massage versus normal care (half the people in each of these groups were also randomised to exercise prescription) at 3 months and 1 year. [50] The RCT found that 6 lessons of the Alexander technique significantly reduced disability (at 3 months: RMDQ score mean difference –1.71, 95% CI –2.95 to –0.47; P = 0.007; 1 year mean difference –1.40, 95% CI –2.77 to –0.03; P = 0.045) and number of days with back pain in the past 4 weeks (3 months mean difference –11, 95% CI –16 to –6; P <0.001; 1 year mean difference –10, 95% CI –15 to –5; P <0.001) compared with normal care at 3 months' and 1-year follow-up. The RCT also found that 24 lessons of the Alexander technique significant reduced disability and number of days with back pain at 3 months and 1 year (disability at 3 months –2.91, 95% CI –4.16 to –1.66; P = 0.001; disability at 1 year –3.40, 95% CI –4.76 to –2.03; P <0.001; back pain at 3 months: –16 days, 95% CI –21 days to –11 days; P <0.001; back pain at 1 year –18 days, 95% CI –23 days to –13 days; P <0.001). [50]

The sixth subsequent RCT (40 people with low back pain) compared isokinetic exercises versus standard exercise. [51] The RCT found no significant differences between groups for pain, disability, mobility, muscle strength, or depression at 1-month follow up (P >0.05 for all comparisons). [51]

The seventh subsequent RCT (65 army personnel with non-specific chronic low back pain) compared high-intensity training (10 sessions of 15 to 20 repetitions for the isolated lumbar extensor muscles) versus low-intensity training (non-progressive, low-intensity resistance protocol) versus waiting list control for 8 weeks. [52] The RCT found no significant difference for high-intensity training for global perceived improvement or strength compared with low-intensity training at 8 weeks (global perceived improvement: 8 weeks; mean difference +17, 95% CI –9 to +43; disability RMDQ mean difference –1.7, 95% CI –4.3 to +1.1; strength: mean difference –5, 95% CI –30 to +21). However the RCT found that high-intensity training significantly improved quality-of-life scores compared with low-intensity training (SF-36 total mean difference 7, 95% CI 1 to 13). [52] The RCT found no significant difference for high-intensity training disability or strength (disability: RMDQ mean difference –1.4, 95% CI –4.0 to +1.1; strength: mean difference +12, 95% CI –12 to +36) compared with waiting list control; however, high-intensity training significantly improved global perceived improvement (mean difference 39, 95% 14 to 69) and quality-of-life scores (SF-36 total mean difference 7, 95% CI 1 to 13) compared with waiting list control at 8 weeks. [52] The RCT also found no significant difference between low-intensity global perceived improvement, disability, quality of life, and strength compared with waiting list control at 8 weeks (global perceived improvement: mean difference +22, 95% CI –4 to +47; disability: RMDQ mean difference +0.3, 95% –2.3 to +2.8; quality of life: SF-36 total mean difference 0, 95% CI –6 to +6; strength: mean difference +16, 95% CI –9 to +42). [52] The RCT also assessed outcomes at 24 weeks and found no significant difference between high-intensity training for global perceived improvement (mean difference –3, 95% CI –22 to +16), disability (RMDQ mean difference +0.9, 95% CI –0.7 to +2.4), quality of life (SF-36 total mean difference 0, 95% CI –7 to +7), or strength (mean difference –15, 95% CI –10 to +40) compared with low-intensity training. [52]

McKenzie method versus other back exercise:

The eighth review (search date 2007, 6 RCTs, 1245 people) compared the McKenzie method versus passive therapy, advice, flexion exercises, spinal manipulation, back school, and strengthening. [43] However, only one RCT included in the review evaluated people with chronic low back pain. Methodological quality was based on the PEDro scale (high-quality trials = 6 or more out of 10). The fourth review included one RCT of people with chronic low back pain with or without leg pain. [43] It found that the McKenzie method significantly decreased absence from work (RR 0.91, 95% CI 0.33 to 2.50; P value not reported) compared with flexion exercises, but found no significant difference between groups in disability (mean effect –2.5, 95% CI –6.4 to +4.5; P value not reported). [43]

The ninth review (search date 2007, 6 RCTs, sample sizes not reported) evaluated the effect of unloaded exercises that facilitate lumbar spine movement versus no treatment or other treatment on outcomes for people with non-specific chronic low back pain, with or without a history of surgical intervention. [44] Methodological quality was based on the PEDro scale. Four of the six trials involved chronic samples. The review estimated effect sizes by using Hedges bias-corrected Effect Size (ES) index (SMD): the difference in mean outcome between intervention and comparison groups divided by the post-intervention control-group standard deviation (SD). When the SD was not reported, it was estimated by the average SD (weighted by sample size) of scores for comparable measures in other included studies. To facilitate comparisons across studies, median scores were entered into SMD calculations as best estimates of mean scores. Data were pooled and a meta-analysis conducted, but only individual trial results are presented here because of differing definitions of chronicity. [44] In the review, one RCT found no significant difference for short-term pain (SMD +0.63, 95% CI −0.11 to +1.38; P value not reported) or short-term function (SMD +0.47, 95% CI −0.27 to +1.20; P value not reported) with the McKenzie method compared with specific spinal stabilisation exercises in a population where surgery was not specified. [44] Another RCT included in the review compared the McKenzie method versus usual GP care in an acute phase of those with a history of recurrent non-specific chronic low back pain. The RCT found that the McKenzie method did not significantly reduce long-term pain (SMD +0.33, 95% CI −0.25 to +0.91) or long-term function compared with usual GP care. [44]

The tenth review (search date 2003, 11 RCTs, 1245 people with chronic, acute, or subacute lower back pain) compared the McKenzie method with passive therapy, advice to stay active, flexion exercises, spinal manipulative therapy, back school, and trunk-strengthening exercises. [45] The review only included two RCTs on people with chronic lower back pain, one of which had a mixed population and included people with chronic or subacute lower back pain. Both trials were small. Only one RCT met the inclusion criteria for this review; the other RCT is not discussed further. [45] The review reported one subgroup analysis on people with chronic lower back pain. It found that the McKenzie method was as effective as flexion exercises at 2 weeks for chronic pain (PEDro

scale 4/10; 1 low-quality RCT: 56 people: mean difference 0–100-point scale +2 points, 95% CI –4 points to +8 points). [45]

The eighth subsequent RCT (260 people with chronic low back pain), a long-term follow-up of an RCT included in the ninth and tenth reviews, [45] [44] compared the McKenzie method versus strengthening training at 1 year. [53] The RCT found no significant differences between groups for improvement in disability (mean difference +2, 95% CI –6.3 to +2.3; P = 0.44), improvement in pain (mean difference +2, 95% CI –5.6 to +0.9; P = 0.16), or number of people on sick leave (P = 0.35, no further data reported) at 14 months' follow-up. [53]

Yoga versus other back exercises:
The ninth subsequent RCT (101 people with chronic back pain) compared yoga versus conventional therapeutic exercise classes for chronic lower back pain over 12 to 26 weeks' follow-up using an intention-to-treat analysis. [54] During the intervention period, 11% of people in the yoga group reported making visits to healthcare providers for low back pain compared with 23% in the exercise group (RR 0.48, 95% CI 0.15 to 1.5). The RCT found that yoga significantly increased function (assessed on the RMDQ, range 0–24, higher scores indicate increased disability, change is significant with 2.5-point change in score) at 12 weeks (mean difference –1.8 RMDQ, 95% CI –3.5 to –0.1; P = 0.034), but not at 26 weeks (mean difference –1.5 RMDQ, 95% CI –3.2 to +0.2; P = 0.092) compared with exercise. The RCT found that yoga significantly decreased pain (assessed with a bothersomeness scale, 11-point numerical scale, change is significant for 1.5-point change in score) compared with exercise at 26 weeks (–1.4, 95% CI –2.5 to –0.2; P = 0.018). [54]

The tenth subsequent RCT (80 people with chronic low back pain) compared a 1-week residential yoga programme versus physical exercise (control). [55] The RCT found that yoga significantly reduced disability (P = 0.01), spinal flexibility (P = 0.008), spinal extension (P = 0.002), right lateral extension (P = 0.05), and left lateral extension (P = 0.006) compared with control at 1 week. [55]

Harms:

The first review reported that few included RCTs (about 23%) reported on harms. The first review reported mild negative reactions to the exercise programme, such as increased low back pain and soreness, in a minority of people. [36] This is often a natural and innocuous reaction, particularly in those starting an exercise programme for the first time, or after prolonged inactivity. The remaining reviews and RCTs gave no information on adverse effects. [37] [38] [39] [40] [41] [42] [43] [44] [45] [46] [47] [48] [49] [50] [51] [52] [53] [54] [55]

Comment:

The exercise programmes undertaken in included RCTs varied widely. The first review included RCTs of exercise, 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 0–100 points to allow the pooling of data. The first 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 first review categorised populations of included RCTs as either healthcare (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 (healthcare, occupational) from those in people who may not normally present for treatment. An indirect subgroup analysis in the review found significantly greater improvement in outcomes in pain and function in healthcare populations compared with studies from the general or mixed populations (scale 0–100; mean difference in improvement in pain 9.96, 95% CI 1.6 to 18.4; mean difference in improvement in function 5.52, 95% CI 0.6 to 10.4). [36] The first review noted that, overall, the methodological quality of included RCTs was poor, with only 54% adequately describing the exercise intervention. A meta-regression analysis conducted by the authors of the first review estimated that exercise therapy that incorporated all of the features associated with the best outcomes (individualised regimens, supervision, stretching, and strengthening) would improve pain scores by 18 points (95% CI 11 points to 25 points) compared with no treatment, and would improve function by 5 points (95% CI 0.5 points to 10 points). [56] However, trials of such an "ideal" exercise intervention versus no exercise therapy or compared with other types of exercise therapy are lacking.

A possible criticism of generic exercise studies is that all patients in the exercise groups receive the same treatment, regardless of a patient's preference for extension or flexion exercises. According to the McKenzie method, this type of pre-selection is essential to determine a directional preference for certain exercises. [45] However, no RCTs have shown the McKenzie or similar methods to be superior to exercises not based on directional preference.

OPTION MULTIDISCIPLINARY TREATMENT PROGRAMMES

Symptom improvement

Compared with waiting list control/usual care/non-multidisciplinary treatments Intensive multidisciplinary treatments seem more effective at reducing pain in people with chronic low back pain but we don't know how effective less intensive treatments are (low-quality evidence).

Functional improvement

Compared with waiting list control/usual care/non-multidisciplinary treatments Intensive multidisciplinary treatments seem more effective at reducing pain in people with chronic low back pain but we don't know how effective less intensive treatments are (low-quality evidence).

Return to work

Compared with no treatment/waiting list control, usual care/non-multidisciplinary treatments We don't know whether multidisciplinary treatment decreases time taken to return to work in people with chronic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

We found two systematic reviews [57] [58] and four subsequent RCTs. [59] [60] [61] [62]

The first review (search date 1998, 10 RCTs, 1964 people with chronic low back pain; see comment) compared multidisciplinary treatment versus control. The review did not pool data because of clinical heterogeneity. [57] It included three high-quality RCTs and one low-quality RCT of intensive (>100 hours) daily programmes of multidisciplinary biopsychosocial rehabilitation with functional restoration. It found that intensive (>100 hours of therapy) multidisciplinary biopsychosocial rehabilitation with functional restoration significantly reduced pain and improved function compared with inpatient or outpatient non-multidisciplinary treatments or usual care (results presented graphically). [57] The review included three high-quality RCTs and two low-quality RCTs of less-intensive (<30 hours) once- or twice-weekly outpatient multidisciplinary biopsychosocial rehabilitation. The review found no statistically significant difference in pain or function between less-intensive outpatient multidisciplinary treatments and non-multidisciplinary outpatient treatment or usual care (results presented graphically). [57]

The second review (search date 2003, 10 RCTs [5 high quality, 5 low quality], 1958 people with chronic low back pain) compared multidisciplinary treatment versus control (including no treatment, physical training, waiting list control, usual treatment, physiotherapy). The follow-up of the included studies ranged between 1 and 5 years. [58] The review did not pool data, and reported results qualitatively. The review found that multidisciplinary treatment improved work participation at 1 year (3/4 high-quality RCTs) compared with control. [58] The review also included seven RCTs (4 high quality, 3 low quality) that reported long-term pain and functional status. However, only one high-quality RCT found that multidisciplinary treatment improved pain and disability compared with control treatment; the other six RCTs found no differences between groups. [58]

The first subsequent RCT (163 people) found no significant difference between multidisciplinary treatment and usual care in function or health-related quality of life after 2 or 6 months. [59]

The second subsequent RCT (120 women with chronic low back pain) compared multidisciplinary rehabilitation (8-week, 70-hour, physiotherapist-supervised programme involving occupational physiotherapists, a psychologist, and a specialist physician in rehabilitation medicine) with individual physiotherapy (10 1-hour treatment sessions including passive pain treatment combinations of massage, spine traction, manual mobilisation, transcutaneous electrical nerve stimulation (TENS)/therapeutic ultrasound, and light active exercise [muscle stretching, spine mobilisation, and deep trunk-muscle exercises]) at 6, 12, and 24 months' follow-up. [60] The RCT found no significant difference between treatment groups in pain relief or disability at 6, 12, or 24 months (reported as not significant, RR, CI, or P values not reported). [60]

The third subsequent RCT (132 people with chronic low back pain, mean duration 180 days in the last 2 years) compared functional restoration programme (25 hours/week) versus active individual therapy (3 hours/week) for 5 weeks. [61] The RCT found no significant difference between groups for pain, function, or return to work after 5 weeks of treatment (reported as not significant; P value not reported). [61]

The fourth subsequent RCT (172 people with chronic low back pain) compared four treatment arms; combined treatment of active physical treatment plus CBT (CT), active physical treatment (APT), CBT, and waiting list control (WLT) for 10 weeks. [62] The review found that all active treatments significantly improved disability (measured by Roland Morris Disability Questionnaire [RMDQ] scale) (CT mean difference –2.56, 95% CI –4.27 to –0.85; P <0.01; APT mean difference –2.40, 95% CI –4.14 to –0.65; P <0.01; CBT mean difference –3.05, 95% CI –4.80 to –1.30; P <0.01) and pain (CT mean difference –8.23, 95% CI –16.37 to –0.10; P <0.01; APT mean difference –8.68,

95% CI –16.87 to –0.48; P <0.01; CBT mean difference –14.76, 95% CI –23.00 to –6.52; P <0.01) compared with waiting list control. [62] However, the review found no significant differences between CT and APT or CBT for disability or pain (disability: CT *v* APT: mean difference +0.16, 95% CI –1.52 to +1.85; CT *v* CBT: mean difference –0.49, 95% CI –2.17 to +1.19; pain: CT *v* APT: mean difference –0.45, 95% CI –8.41 to –7.51; CT *v* CBT: mean difference –6.53, 95% CI –14.48 to +1.43). [62]

Harms: The reviews [57] [58] and subsequent RCTs [59] [60] [61] [62] gave no information on adverse effects.

Comment: The review included people with disabling low back pain of >3 months' duration with or without sciatica. [57] The review categorised RCTs as being of higher (5 or more on a methodological scale of 0–10) or lower quality (0–4 out of 10). [57]

Clinical guide:
Multidisciplinary programmes are typically taken to comprise coordinated treatments provided by two or more healthcare providers with different professional training to obtain different perspectives and approaches to recovery. The term multidisciplinary does not imply a mandatory roster of specialists and does not dictate the nature of the treatment; however, most multidisciplinary programmes include some type of supervised exercise and behavioural therapy.

OPTION ACUPUNCTURE

Symptom improvement
Compared with no treatment Acupuncture may be more effective at reducing pain in the short term; however, we don't know whether acupuncture is more effective in the intermediate term in people with chronic low back pain (very low-quality evidence).

Compared with sham treatment We don't know whether acupuncture is more effective at reducing pain in the short or intermediate term in people with chronic low back pain (very low-quality evidence).

Compared with other interventions (including standard general practitioner care, manipulation, massage, and TENS) We don't know whether acupuncture is more effective at reducing pain in people with chronic low back pain (very low-quality evidence)

Adding acupuncture to other interventions compared with the intervention alone Adding acupuncture to other treatments such as exercises, non-steroid anti-inflammatory drugs (NSAIDs), aspirin, non-narcotic analgesics, mud packs, infrared heat therapy, back-care education, ergonomics, or behavioural modification may be more effective at improving pain in the short and intermediate term in people with chronic low back pain (very low-quality evidence).

Functional improvement
Compared with no treatment Acupuncture may be more effective at improving function at 8 weeks in people with chronic low back pain (very low-quality evidence).

Compared with sham treatment We don't know whether acupuncture is more effective at improving function in people with chronic low back pain (very low-quality evidence).

Compared with other treatments (including standard general practitioner care, manipulation, massage, and TENS) We don't know if acupuncture is more effective at improving function in people with chronic low back pain (very low-quality evidence).

Adding acupuncture to other interventions compared with the intervention alone Adding acupuncture to other treatments such as exercises, NSAIDs, aspirin, non-narcotic analgesics, mud packs, infrared heat therapy, back-care education, ergonomics, or behavioural modification may be more effective at improving function in the short and intermediate term in people with chronic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found two systematic reviews (search dates 2003 [63] and 2008 [64]) comparing acupuncture versus no treatment, sham acupuncture, sham transcutaneous electrical nerve stimulation (TENS), Chinese herbal medicine, education, exercise, massage, moxibustion, non-steroid anti-inflammatory drugs (NSAIDs), physiotherapy, spinal manipulation, TENS, trigger point injections, and usual treatment by a general practitioner. [63] [64] The first review (24 RCTS, 1718 people) [63] did not include four more recent large RCTs (4794 people), therefore only the more recent review will be discussed here. [64]

The review (search date 2008, 23 RCTs, 6359 people) did not pool data, and assessed the methodological quality based on the 11-item Cochrane Back Review Group methods. To be clas-

sified as high quality, an RCT had to meet at least six criteria have at least 40 patients per group, and have <20% loss to follow-up through 1 year and <30% at at least 1 year. Six of 23 RCTs included in the review were classified as high quality.

Acupuncture versus no treatment:
The review included one high- and two lower-quality RCTs that compared acupuncture versus no treatment. [64] The review found that acupuncture is more effective than no treatment for short-term pain relief and found conflicting evidence for intermediate-term pain relief. The review also found evidence that acupuncture improved short-term function. [64] The high-quality RCT (298 people) included in the review found that acupuncture significantly improved pain intensity and pain disability index compared with waiting list control at 8 weeks (pain intensity: visual analogue scale [VAS] 0–100 mm: difference 21.7 mm, 95% CI 13.9 mm to 30.0 mm; P <0.01; pain disability index: difference –8.2, 95% CI –12.0 to –4.4 on a 0–100 scale; P <0.001). [64]

Acupuncture versus sham treatment:
The review included three high-quality RCTs (1650 people) that found no significant difference between acupuncture and sham acupuncture (superficial needle insertion at non-acupoints) for end-of-treatment, short-term, or intermediate-term pain relief and short-term or intermediate-term functional improvement. [64] The review found no significant difference between trigger point acupuncture compared with non-penetrating acupuncture (1 small RCT, 26 people) for pain or function. The review included four small (each with <40 people) lower-quality RCTs with inconsistent results to determine if acupuncture is more effective than sham TENS for pain and function. [64]

Acupuncture versus other interventions:
The review included six RCTs that compared acupuncture versus other treatments (including standard general practitioner care, manipulation, massage, and TENS). [64] The review could not reach strong conclusions regarding effectiveness as five of the RCTs were assessed as being low quality, and most trials were small (no more than 40 people). In addition, for the only comparison evaluated in more than one trial (TENS, evaluated in 3 RCTs), results were inconsistent between studies. [64]

Addition of acupuncture to other interventions:
The review also included two high-quality RCTs and five low-quality RCTs that provided strong evidence that acupuncture combined with other treatments (spinal manipulation, general practitioner care, exercise therapy, or simple analgesics) significantly improved pain relief and functional disability compared with other treatments alone at the end of treatment (pain relief: 5 RCTs; SMD ranged from –0.50 to –1.26; disability; 4 RCTs; SMD range –0.31 to –0.96) and with short-term (disability: 3 RCTs; SMD range –0.70 to –0.84), intermediate (pain relief: 4 RCTs; –0.23 to –1.48) follow-up. [64] The review also included two RCTs that provided insufficient evidence to determine if acupuncture plus conventional therapy is more effective than sham acupuncture plus conventional therapy for pain and function. [64]

Harms:

The first review found that serious and rare adverse effects included infections (HIV, hepatitis, and bacterial endocarditis) and visceral trauma (pneumothorax and cardiac tamponade). [63] The largest RCT included in the second review found that non life-threatening adverse effects, such as minor local bleeding or haematoma (54%), needling pain (17%), vegetative symptoms (8%), and other adverse effects (21%) were associated with acupuncture. [65] The second review gave no further information on adverse effects. [64]

Comment:

Although the analysis showed some positive results for acupuncture, the magnitude of the effects was generally small, and more pronounced with acupuncture compared with no acupuncture than with acupuncture compared with sham acupuncture, with some RCTs showing no differences between acupuncture and sham acupuncture.

OPTION BACK SCHOOLS

Symptom improvement
Compared with no treatment or inactive control treatments We don't know whether back schools are more effective than placebo gel, waiting list, no intervention, or written information at reducing pain (low-quality evidence).

Compared with other treatments We don't know whether back schools are more effective than spinal manipulation, non-steroidal anti-inflammatory drugs (NSAIDs), physiotherapy, callisthenics, or exercise at reducing pain (low-quality evidence).

Functional improvement
Compared with no treatment or inactive control treatments We don't know whether back schools are more effective than placebo gel, waiting list, no intervention, or written information at improving function (low-quality evidence).

Compared with other treatments We don't know whether back schools are more effective than spinal manipulation, NSAIDs, physiotherapy, callisthenics, or exercise at improving function (low-quality evidence).

Return to work

Compared with no treatment or inactive control treatments We don't know if back schools are more effective at reducing the amount of sick leave in people with chronic low back pain (very low-quality evidence).

Compared with other treatments We don't know whether back schools are more effective at reducing the amount of sick leave for people with chronic low back pain (very low-quality evidence).

Benefits:

We found two systematic reviews [66] [67] and two subsequent RCTs. [68] [69] The RCTs identified by the review used back school interventions of variable intensity. [66] The reviews did not pool data from the studies (see table 1, p 34).

The first review (search date 2004, 8 RCTs) [66] found conflicting evidence that back schools improved pain and disability compared with inactive treatments (placebo gel, waiting list, written information) in the short term (up to 6 months), and found evidence that benefits did not persist in the longer term (see table 1, p 34). [70] [71] [72] [73] [74] [75] [76] [77]

In the second review (search date 2006, 8 RCTs, 4 of which were also identified by the first review [66]), only six of the eight included RCTs compared back schools versus inactive control treatments. [67] Four of the six RCTs (342 people) found no significant differences between groups for pain, disability, recurrence, and sick leave, with follow-up ranging from 1 to 12 months (reported as not significant, absolute data and P value not reported). The fifth RCT included in the review (188 people) found that back schools significantly improved pain at 6 months but not at 12 months compared with no intervention. It also found that back schools significantly improved function at 6 and 12 months compared with no intervention; however, there was no significant difference between groups for sick leave at 6 and 12 months (absolute numbers and P values not reported). The sixth RCT included in the review (81 people) found that back schools significantly reduced recurrence at 5 months, 1 year, and 3 years compared with no intervention. It found no significant difference between groups for pain or disability at 5 months, but that back schools significantly improved pain and disability at 3 years compared with no intervention. The RCT also reported that back schools significantly reduced back-related sick leave at 1 and 3 years. [67]

The first subsequent RCT (60 people with chronic non-specific low back pain) compared back school versus control (3 medical visits within 4-week period) at 4 months. [69] The RCT found no significant difference between groups for pain (visual analogue scale [VAS]; P = 0.601), disability (Roland Morris Disability Questionnaire [RMDQ]; P = 0.73) and depression (Beck; P = 0.74) at 4 months' follow-up. [69]

Back schools versus other treatments:

Three RCTs identified by the first review compared back school versus other active treatments (spinal manipulation, non-steroidal anti-inflammatory drugs (NSAIDs), physiotherapy, callisthenics, and exercise) and found different results (see table 1, p 34). [73] [78] [79] The first RCT found that back school reduced pain compared with exercise at 16 weeks. [79] The second RCT found that back school was significantly less effective at reducing the duration of low back pain compared with callisthenics. [78] The third RCT found that back school improved pain at 2 and 6 months in a subgroup of people with chronic pain compared with controls, which included spinal manipulation, NSAIDs, and physiotherapy. [73]

The second review (2 RCTs, 391 people) compared back schools versus usual care or three sessions of exercise plus back leaflet. [67] The first RCT included in the review (92 people) found no difference between back school and three session of exercise for pain or disability at 6 or 16 weeks. The second RCT included in the review (299 people) found no significant differences between back schools and usual care for recurrence, pain, disability, or sick leave at 3 and 6 months (absolute numbers and P values not reported). [67]

The subsequent RCT (102 women with chronic low back pain) compared "back school programme plus medication" with clinic-group control (received only medication). Both groups received paracetamol, NSAIDs, and chlordiazepoxide. No direct comparisons were made between groups; therefore, only changes in score from baseline are reported. The RCT found that back school plus medication significantly increased function (P <0.001) and reduced pain (P <0.001) at 3-month follow-up compared with baseline scores. The RCT found that clinic control did not significantly improve function (P = 0.58) but did significantly reduce pain (P = 0.001) at 3-month follow-up compared with baseline scores. [68]

Harms:

The reviews [66] [67] and subsequent RCT [68] gave no information on adverse effects.

Comment: The systematic reviews included RCTs in which a back school-type intervention was examined. [66] In the first review 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. [66] In the second review, RCTs of back schools were included if instruction was given to groups of patients by a paramedical, or by physiotherapy or medical specialists, and if the back schools were the main part of the intervention. [67] The reviews assessed the methodological quality of included RCTs. In both reviews, less than one third of the included RCTs were rated high quality (high quality: RCT met at least half of the criteria on a scale of 0–10 or 0–11).

Clinical guide:
There is mixed evidence of limited effectiveness using the traditional, narrow definition of back school. With the explosion in the ways in which information can be disseminated, formal back schools are becoming far less common. The emphasis currently focuses more on general education, often through less-traditional methods such as the Internet. The concept of back school should be broadened to education, which may help with attitude and coping. [80] One of the reviews also reviewed RCTs of non back-school, brief-education interventions and found strong evidence of effectiveness from seven RCTs (6 of high quality) on sick leave and short-term disability compared with usual care. [67]

OPTION BEHAVIOURAL THERAPY

Symptom improvement
Compared with placebo/no treatment/waiting list control Behavioural therapy seems no more effective at reducing pain or improving behavioural outcomes in people with chronic low back pain (moderate-quality evidence).

Compared with other treatments Behavioural therapy alone or combined with other treatments (physiotherapy, back education, multidisciplinary treatment programmes, inpatient pain-management programmes, and back exercises) seems no more effective at reducing pain in people with chronic low back pain (moderate-quality evidence).

Functional improvement
Compared with placebo/no treatment/waiting list control Behavioural therapy may be more effective at improving disability in people with chronic low back pain (low-quality evidence).

Return to work
Different types of behavioural therapy compared with each other Different types of behavioural therapy don't seem to differ in effects on function in people with chronic low back pain (moderate-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review (search date 2003, 21 RCTs) [81] and one subsequent RCT. [82]

Behavioural therapy versus placebo, no treatment, or waiting list control:
The review (11 RCTs) compared behavioural treatment (either cognitive, operant, respondent, or CBT) versus waiting list control. [81] The review did not calculate an overall effect size for behavioural treatment versus waiting list control, but divided the 11 included RCTs into four comparisons; respondent therapy (progressive relaxation), respondent therapy (EMG biofeedback [see benefits of EMG biofeedback, p 22]), operant therapy, and combined respondent and cognitive therapy versus waiting list controls. [81]

For the first comparison the review included three RCTs, but only two could be pooled as it was unclear how many people in the third RCT suffered from chronic low back pain. The review found that progressive relaxation significantly improved post-treatment pain intensity and behavioural outcomes (pain: 2 RCTs, 39 people; pooled effect size 1.16, 95% CI 0.47 to 1.85; behaviour: 2 RCTs, 39 people; pooled effect size 1.3, 95% CI 0.61 to 2.01) compared with waiting list control. [81]

For the second comparison the review included three RCTs, although only two were included in the pooled analysis. The review found no significant difference between operant therapy and waiting list control for short-term pain intensity (2 RCTs, 87 people; pooled effect size +0.29, 95% CI –0.14 to +0.72). However, the third RCT (66 people), which was not included in the statistical pooling, found that operant therapy improved short-term pain intensity compared with waiting list control (no further data reported). The review also found no significant difference between groups for behavioural outcomes (2 RCTs, 87 people; pooled effect size +0.35, 95% CI –0.25 to +0.94). The RCT (66 people) not included in the statistical pooling also found no differences between the two treatment arms (no further data reported). [81]

For the third comparison the review included five RCTs, one of which could not be included in the pooled analysis as it was unclear how many people suffered from chronic low back pain. The review found that combined respondent–cognitive therapy significantly reduced pain intensity and improved behavioural outcomes compared with waiting list control (pain: 4 RCTs, 134 people; pooled effect size 0.62, 95% CI 0.25 to 0.98; behavioural outcomes: pooled effect size 0.40, 95% CI 0.10 to 0.70). [81]

The subsequent RCT (211 people with chronic lower back pain) compared cognitive behavioural treatment (CBT, operant, behavioural, graded activity, and problem solving training) with waiting list control. [82] The RCT found that CBT reduced disability and pain at 10 weeks' follow-up compared with waiting list control (disability: Roland Morris Disability Questionnaire [RMDQ] mean differences –3.09, 95% CI –4.89 to –1.28; P <0.01; pain: visual analogue scale [VAS] 100-mm scale mean differences –15.64, 95% CI –24.23 to –7.06; P <0.01). [82]

Different types of behavioural therapy versus each other:
The review (9 RCTs, 308 people) found no statistically significant difference between different types of behavioural therapy (CBT, operant behavioural treatments, and respondent behavioural treatment) in functional status, pain relief, or behavioural outcomes (including anxiety, depression, pain behaviour, and coping. [81]

Behavioural therapy versus other treatments:
Two RCTs (202 people) identified by the review found that behavioural therapy significantly increased the proportion of people who returned to work after 12 weeks compared with traditional care (rest, analgesics, or physiotherapy) or back exercises, but found no significant difference in pain or depression after 6 or 12 months (no statistical pooling of data). [81] Six RCTs (343 people) identified by the review compared behavioural therapy plus other treatments (physiotherapy and back education, multidisciplinary treatment programmes, inpatient pain-management programmes, and back exercises) versus the other treatment alone, and found that behavioural therapy plus the other treatments significantly improved functional status in the short term compared with other treatments alone, but found no significant difference in pain or behavioural outcomes.

Harms: The reviews and subsequent RCT gave no information on adverse effects. [81] [82]

Comment: The systematic review included RCTs that had used one or more types of behavioural treatments (treatments based on cognitive, operant, or respondent principles, or any combination). [81]

OPTION SPINAL MANIPULATIVE THERAPY

Symptom improvement
Compared with sham manipulation/no treatment/or other treatments Spinal manipulation may be as effective as general practitioner care, physiotherapy, exercises, back school, or chiropractic care (with or without physical modalities), but may be more effective than sham treatment, and other treatments judged ineffective or harmful at improving pain (moderate-quality evidence).

Functional improvement
Compared with sham manipulation/no treatment/or other treatments Spinal manipulation seems as effective as general practitioner care, physiotherapy, exercises, back school, chiropractic care (with or without physical modalities), and may be more effective than sham treatment and other treatments judged ineffective or harmful at improving function (moderate-quality evidence).

Return to work
Compared with exercise therapy Spinal manipulative therapy seems more effective at reducing the proportion of people partly or fully sick-listed at 12 months (moderate-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review (search date 2001, 14 RCTs, 1596 people; see comment), [83] and three subsequent RCTs. [84] [85] [86]

The review found that spinal manipulative therapy reduced pain in the short (<6 weeks) and long term (>6 weeks) compared with sham manipulation, and improved function in the short term (3 RCTs, 229 people; mean score improvement between groups in short term: 0–100 mm visual analogue scale [VAS]: 10 mm, 95% CI 3 mm to 17 mm; in long term 19 mm, 95% CI 3 mm to 35 mm; mean improvement between groups in function on Roland Morris Disability Questionnaire [RMDQ] scale: 3.3; 95% CI 0.6 to 6.0). [83] The review found no significant difference in short- or long-term pain or long-term function between spinal manipulative therapy and general practitioner care (4 RCTs, 428 people), physiotherapy, exercise (2 RCTs, 361 people), or back school (3 RCTs,

238 people). [83] Data were presented graphically in the review. The review found that spinal manipulative therapy reduced pain and improved function in the short term compared with treatments judged ineffective or harmful (traction, bed rest, home care, topical gel, no treatment, diathermy, or minimal massage; relative improvement in pain on VAS: 4 mm; 95% CI 0 mm to 8 mm; relative improvement in function on RMDQ: 2.6 points, 95% CI 0.5 points to 4.8 points).

The first subsequent RCT (49 people sick-listed for >8 weeks, with and without leg pain) compared spinal manipulative therapy with exercise therapy in a course of 16 treatments over 2 months. [84] The RCT found that spinal manipulation significantly decreased pain, and increased function and return to work, compared with exercise therapy at 12 months (pain on a 0–100 mm VAS: 21 mm with manipulation *v* 35 mm with exercise; P <0.01; disability on the 0–50 point Oswestry Disability Index: 17 with manipulation *v* 26 with exercise; P <0.01; partly or fully sick-listed: 19% with manipulation *v* 59% with exercise; RR 0.31, 95% CI 0.11 to 0.78). [84]

The second subsequent small RCT (47 people; pain lasting 6 weeks or more, with or without radiation to the knee) found no statistically significant differences in pain or function between manipulative therapy and stabilising exercises at 3 or 12 months. [85]

The third subsequent RCT (681 people with low back pain, mixed population 50% with back pain for >12 months) compared four groups: 1) chiropractic care without physical modalities (DC) (spinal manipulation or mobilisation, instruction in strengthening and flexibility exercises, and instruction in proper back care), 2) chiropractic care with physical modalities (DCPm) (all DC care plus heat or cold therapy, ultrasound, and electrical stimulation), 3) medical care without physiotherapy (MD) (one or more of the following; instruction in proper back care and strengthening and flexibility exercises, prescriptions for analgesics, muscle relaxants, or anti-inflammatory drugs, and lifestyle recommendations), and 4) medical care with physiotherapy (MDPt) (all MD plus instruction in proper back care and one or more of the following: heat or cold therapy, ultrasound, electric muscle stimulation, soft-tissue and joint manipulation, supervised therapeutic exercise, strengthening and flexibility exercises) at 18 months' follow-up. [86] The primary outcomes assessed were pain (severe and average, assessed using 0–10 rating scale) and disability (assessed using the Roland Morris scale). The RCT found that DC treatment did not significantly reduce pain (severe: mean difference +0.64, 95% CI –1.38 to +0.09; average: mean difference –0.50, 95% –1.09 to +0.08) or disability (mean difference –0.69, 95% CI –2.02 to +0.77) at 18 months compared with MD treatment. The RCT found that DCPm did not significantly reduce pain (severe; mean difference 0.25, 95% CI –0.49 to +0.98; average mean difference +0.12, 95% CI –0.46 to +0.71) or disability (mean difference –0.01, 95% CI –1.35 to +1.32) at 18 months compared with DC treatment. The RCT found no significant differences for clinical remission of low back pain between DC and MD (RR 1.29, 95% CI 0.80 to 2.07; P = 0.30) or DCPm and DC (RR 0.98, 95% CI 0.62 to 1.55; P = 0.95) at 18 months. [86]

For benefits spinal manipulative therapy *v* specific stabilisation exercises, see benefits of exercise, p 10 .

Harms:

In the 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 risks: vertebrobasilar strokes 1/20,000 to 1/1,000,000 people; cauda equina syndrome <1/1,000,000 people). [83] None of the subsequent RCTs assessed harms. [84] [86]

For harms of spinal manipulative therapy *v* specific stabilisation exercises, see harms of exercise, p 10 .

Comment:

The systematic review included RCTs that compared manipulation or mobilisation for low back pain with another treatment or control (the review noted that manipulation differed from mobilisation in that manipulation focused on a different range of motion of the involved joint — the review reported that both hands-on treatments were included in the review). [83] Many included RCTs on chronic low back pain (particularly in older RCTs) did not solely include people with symptoms for >12 weeks, but also included some people with subacute low back pain. However, the mean duration of pain at baseline was usually >12 weeks.

Clinical guide:
Current clinical guidelines for low back pain do not advise spinal manipulation in people with severe or progressive neurological deficit. [2] [87]

OPTION ELECTROMYOGRAPHIC BIOFEEDBACK

Symptom improvement

Compared with placebo/waiting list control We don't know whether electromyographic biofeedback is more effective at relieving pain in people with chronic low back pain (low-quality evidence).

Compared with other treatments We don't know whether electromyographic biofeedback is more effective than other types of behavioural therapy at relieving pain in people with chronic low back pain (low-quality evidence).

Functional improvement
Compared with placebo/waiting list control We don't know whether electromyographic biofeedback is more effective at improving functional status in people with chronic low back pain (low-quality evidence).

Compared with other treatments We don't know whether electromyographic biofeedback is more effective than other types of behavioural therapy at relieving pain in people with chronic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review (search date 2003, 4 RCTs, 132 people) comparing electromyographic feedback (EMG feedback) versus waiting list control or other treatments. [81]

EMG biofeedback versus placebo or waiting list control:
The review (4 RCTs, 108 people) found no that EMG feedback significantly improved pain intensity (3 RCTs, 64 people; pooled effect size 0.84, 95% CI 0.32 to 1.35), but not behavioural outcomes (2 RCTs, 44 people; pooled effect size +0.54, 95% CI –0.06 to +1.15) compared with waiting list control. One RCT included in the review that could not be pooled found no difference between groups for pain intensity or behavioural outcomes. The review found two RCTs (60 people) with conflicting results on general functional status and one RCT (28 people) that found EMG feedback improved back-specific functional status compared with waiting list control in the short term (no further data reported). [81]

EMG biofeedback versus other treatments:
The review found one RCT (44 people), which found no significant differences between EMG biofeedback compared with cognitive behavioural therapy for pain or any behavioural outcome at post-treatment or 6-month follow-up (reported as not significant, no further data reported). [81]

Harms: The review gave no information on adverse effects. [81]

Comment: None.

OPTION LUMBAR SUPPORTS

Symptom improvement
Compared with no intervention Lumbar supports may be no more effective at reducing short-term pain in people with chronic low back pain (low-quality evidence).

Functional improvement
Compared with no intervention Lumbar supports may be no more effective at improving short-term function in people with chronic low back pain (low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review (search date 2006, 1 RCT). [88] The review included one low-quality RCT (79 people with chronic low back pain) that found no significant differences between a lumbar support compared with no intervention for short-term pain or function. [88]

Harms: The review gave no information on adverse effects. [88] 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: Five RCTs (1200 people) identified by the review did not differentiate between acute and chronic pain. [88]

OPTION MASSAGE

Symptom improvement
Compared with placebo, sham, or waiting list control Massage may be more effective at improving short-term, but not long-term pain intensity in people with chronic low back pain (moderate-quality evidence).

Compared with other interventions Massage may be more effective than manipulation, acupuncture, and physiotherapy at improving short- and long-term pain intensity; however, massage seems more effective than exercise only in the short term, and not in the long term, in people with chronic low back pain (high-quality evidence).

Functional improvement
Compared with placebo, sham, or waiting list control Massage may be more effective for short- and long-term functional improvement in people with chronic low back pain (moderate-quality evidence).

Compared with other interventions Massage may be more effective than exercise and acupuncture at improving short- and long-term function in people with chronic low back pain (high-quality evidence).

Benefits: We found one systematic review (search date 2008,13 RCTs, 1596 people) comparing massage therapy versus sham or other active treatment. [89]

Massage versus placebo, sham, waiting list, or no treatment:
The review found that massage significantly improved short-term but not long-term pain intensity compared with sham treatment (short term: 2 RCTs, 91 people; SMD –0.92, 95% CI –1.35 to –0.48; P = 0.000036; long term: 1 RCT, 51 people; –0.49, 95% CI –1.05 to +0.06; P = 0.082). [89] The review also found that massage significantly improved both short- and long-term back-specific function compared with sham treatment (short term: 2 RCTs, 91 people; SMD –1.76, 95% CI –3.19 to –0.32; P = 0.016; long term: 1 RCT, 46 people; SMD –0.96, 95% CI –1.58 to –0.35; P = 0.0021). The review graded one of the RCTs as having low risk of bias and the other as having a high risk of bias. [89]

Massage versus other interventions:
The review found that massage therapy significantly improved pain intensity compared with manipulation/mobilisation (1 RCT, 35 people; SMD –0.94, 95% CI –1.76 to –0.12). [89] The review also found that massage significantly improved pain intensity compared with exercise in the short term but not the long term (1 RCT, 25 people; short term: SMD –0.60, 95% CI –1.03 to –0.17; long term: SMD –0.51, 95% CI –0.86 to +0.56), and also reported that massage significantly improved back-specific function in the short and long term compared with exercise (1 RCT, 25 people; short term: SMD –3.38, 95% CI –5.96 to –0.80; long term: SMD –2.28, 95% CI –5.28 to –0.42). The review included one RCT comparing massage versus acupuncture, which found that massage significantly improved pain intensity in the short term (10 weeks) and long term (52 weeks) (1 RCT, 78 people; short term: SMD –0.40, 95% CI –0.50 to –0.30; long term; SMD –1.30, 95% CI –1.42 to –1.18) and short and long term function compared with acupuncture (1 RCT, 78 people; short term: SMD –1.60, 95% CI –1.79 to –1.14; long term: SMD –1.20, 95% CI –1.41 to –0.99). The review included two RCTs comparing massage versus physiotherapy, which found that massage significantly improved pain intensity in the short and long term compared with physiotherapy (short term: 2 RCTS, 266 people; SMD –0.72, 95% CI –0.96 to –0.47; long term: 2 RCTs, 250 people; SMD –0.95, 95% CI –1.39 to –0.51). [89]

Harms: The review reported that the included RCTs found no serious adverse effects. [89] Some massage techniques reported temporary soreness after massage, with an incidence that is likely to vary depending on the technique used (range 11–13%). [89]

Comment: None.

OPTION TRACTION

We found no direct information from RCTs about the effects of traction in the treatment of chronic low back pain in people without sciatica.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review. [90] The review (search date 2006) did not identify any RCTs solely in people with chronic low back pain without sciatica. [90] We found no subsequent RCTs solely in people with chronic low back pain without sciatica.

Harms: We found no RCTs.

Comment: None.

OPTION TENS

Symptom improvement

Compared with placebo We don't know whether TENS is more effective at reducing pain in people with chronic low back pain (very low-quality evidence).

Compared with sham TENS plus massage TENS plus massage may be no more effective at reducing pain in people with chronic low back pain (low-quality evidence).

Functional improvement
Compared with placebo TENS may be no more effective at improving functional status in people with chronic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found one systematic review [91] and one additional RCT. [92]

The review (search date 2005, 2 RCTs, 176 people with chronic low back pain) compared transcutaneous electrical nerve stimulation (TENS) with placebo. [91] The RCTs included in the review were heterogeneous with respect to study design, methodological quality, sample size, study population, mode of TENS, treatment duration, method of administration, and concurrent interventions. Whereas one RCT included in the review systematically excluded people with sciatica or previous back surgery, the other RCT did not. Previous exposure to TENS served as a criterion for exclusion in one trial, but not the other trial. The low-quality RCT (30 people) included in the review found that TENS significantly decreased subjective pain intensity compared with placebo (RR, CI, and P value not reported). [91] The pain reduction seen at the end of stimulation was maintained for the entire 60-minute post-treatment time interval assessed; longer-term follow-up was not completed. The second, high-quality RCT (145 people) included in the review found no significant differences between TENS and placebo for any outcomes measured, including pain relief and functional status (reported as not significant, data presented graphically). [91] The additional RCT (28 people) found no significant difference between TENS using bidirectional modulated sine waves plus massage compared with sham TENS plus massage for pain intensity (reported as not significant; P value not reported). [92]

Harms: The review reported that one third of the people had minor skin irritation at the site of electrode placement. These adverse effects were observed equally in the TENS and placebo groups. Severe dermatitis was noted in one person 4 days after beginning therapy. The presence or absence of further adverse effects was not reported. [91] The subsequent RCT reported three cases of transient skin irritation. [92]

Comment: The results of the systematic review examining the effectiveness of TENS in the management of chronic low back pain are hampered by the small number of suitable RCTs. However, the largest and highest-quality RCT showed no difference between TENS and sham TENS. [91]

QUESTION What are the effects of non-surgical treatments for chronic low back pain?

OPTION INTRADISCAL ELECTROTHERMAL THERAPY (IDETT) New

Symptom improvement
Compared with placebo We don't know whether intradiscal electrothermal therapy is more effective at reducing pain in people with chronic low back pain (very low-quality evidence).

Functional improvement
Compared with placebo We don't know whether intradiscal electrothermal therapy is more effective at improving function in people with chronic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: **Intradiscal electrothermal therapy (IDETT) versus placebo:**
We found four systematic reviews comparing IDETT versus placebo (search dates 2005–2008). [93] [94] [95] [34]

All four reviews included the same two RCTs, so only the most recent review is reported here. [34] The review reported that both included RCTs enrolled people based on a positive response to provocative lumbar discography (see comment) and evaluated outcomes at 6 months.

The first RCT included in the review (64 people with chronic low back pain) found that IDETT significantly improved pain and function compared with sham IDETT (pain: mean visual analogue scale [VAS] pain scores on a 0–10 VAS; 2.4 with IDETT *v* 1.1 with placebo; P = 0.045; function: 0–100 Oswestry Disability Index [ODI]: 11 with IDETT *v* 4 with placebo; P = 0.05). [96] The review

reported that the RCT evaluated a highly selected subset of people and therefore may lack generalisability to a wider population. [34]

The second RCT included in the review (57 people with chronic low back pain) found no differences between IDETT compared with sham IDETT for pain or function (pain: low back outcome score; mean difference –1.7, 95% CI –3.82 to +0.40; P = 0.11; function: 0–100 ODI mean difference –2.15, 95% CI –8.36 to +4.05; P = 0.48). [97]

Harms: **Intradiscal electrothermal therapy (IDETT) versus placebo:**
The review reported that transient and mild adverse effects following IDETT such as radicular pain, paraesthesias, and numbness ranged in incidence from 0/58 (0%) to 5/33 (15%). [34] More serious but uncommon or rare adverse events include cerebrospinal fluid leak, cauda equina syndrome, and vertebral osteonecrosis. [34]

Comment: The RCTs in the reviews included people with pain presumably arising from the intervertebral disc. However, the accuracy of lumbar provocative discography for identifying people with discogenic pain is unknown.

OPTION RADIOFREQUENCY DENERVATION New

Symptom improvement
Compared with sham treatment or placebo We don't know whether radiofrequency denervation is more effective than placebo at reducing pain in people with presumed facet joint or discogenic low back pain (very low-quality evidence).

Functional improvement
Compared with sham treatment or placebo We don't know whether radiofrequency denervation is more effective at improving function in people with presumed facet joint or discogenic low back pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: **Radiofrequency denervation versus no treatment/sham treatment or usual care:**
We found one systematic review (search date 2008; 8 RCTs), which evaluated radiofrequency denervation for non-radicular low back pain. [34]

Six RCTs included in the review (322 people) evaluated radiofrequency denervation for presumed facet joint pain versus sham treatment, and one RCT (49 people) included in the review evaluated radiofrequency denervation for presumed discogenic back pain versus lidocaine injection. [34]

Four RCTs of radiofrequency denervation for presumed facet joint pain were rated higher quality by the review. [98] [99] [100] [101]

The first higher-quality RCT included in the review (40 people selected by controlled facet joint blocks and an ablation technique believed to be optimal) found that radiofrequency denervation improved generalised, back, and leg pain compared with sham treatment at 6 months (0–10 visual analogue scale [VAS]: –1.4 points to –1.6 points), but the difference was not statistically significant for back pain (the main symptom thought to be associated with facet pain). [99] The review reported that baseline scores in the radiofrequency denervation group were on average 1.6 points higher, which suggests inadequate randomisation. [34]

The review reported that the other three higher-quality RCTs used uncontrolled diagnostic facet joint blocks to select the people included in the trials, and, may have used suboptimal ablation techniques, and all reported conflicting results. [98] [100] [101]

The second higher-quality RCT (30 people) found that radiofrequency denervation moderately improved mean VAS pain and Oswestry Disability Index (ODI) scores through 2 months (pain: mean VAS score on a 0–10 VAS: –2.4 with radiofrequency *v* –0.4 with placebo; P <0.05; ODI: –11.1 with radiofrequency denervation *v* +1.7 with placebo; P <0.05). [100]

The third higher-quality RCT (70 people) found radiofrequency denervation superior to sham treatment for mean improvement in Roland Morris Disability Questionnaire (RMDQ) scores at 4 weeks (RMDQ scores: –8.4 with radiofrequency denervation *v* –2.2 with placebo; P = 0.05), but there were no statistically significant differences in ODI or VAS pain scores between groups (reported as not significant; P value not reported). However, the RCT found no significant difference between groups for RMDQ score at 12 weeks. [98]

The fourth higher-quality RCT (82 people) found no differences between radiofrequency denervation compared with sham treatment on any outcome (further data not reported). [101]

The first lower-quality RCT included in the review (60 people) found that conventional but not pulsed radiofrequency denervation improved pain (VAS 0–10 scale: 0.8–1.5 points, significance not reported) and function (4–6 points on the ODI; significance not reported) compared with sham treatment at 1 year. [34]

The review reported that the second lower-quality RCT had serious methodological shortcomings. including lack of intention-to-treat analysis, and therefore was not reported. [34]

The one RCT included in the review (49 people) that evaluated radiofrequency for presumed discogenic pain (based on positive lumbar provocative discography) found that radiofrequency denervation of the ramus communicans nerves significantly improved pain, SF-36 bodily pain, and SF-36 physical function scores compared with lidocaine injection after 4 months (pain: mean VAS [0–10 scale] pain scores: 3.8 with radiofrequency denervation *v* 6.3 with lidocaine injection; P <0.05; SF-36 bodily pain: 44 with radiofrequency denervation *v* 32 with lidocaine injection; P <0.05; SF-36 physical function: 59 with radiofrequency denervation *v* 46 with lidocaine injection; P <0.05). [34] The review reported that the RCT was of lower quality. [34]

Harms:

Radiofrequency denervation versus no treatment/sham treatment or usual care:
The review reported that one of the included RCTs found a case of mild, subjective, and transient lower limb weakness after radiofrequency denervation. [34] The review included two other RCTs that found no difference in adverse effects between radiofrequency denervation compared with sham treatment, although radiofrequency denervation was associated with trends towards increased post-procedural pain. [34]

Comment:

The RCTs in the review included people with pain presumably arising from the facet joint or intervertebral disc. However, the accuracy of methods for identifying patients with facet joint or discogenic pain is unknown. RCTs of radiofrequency denervation for presumed facet joint pain are difficult to interpret because higher-quality studies reported conflicting studies, some RCTs may have used suboptimal techniques, and the only RCT to use controlled facet joint diagnostic blocks to select patients for inclusions reported baseline differences between the treatment and sham groups.

QUESTION What are the effects of surgical treatments for chronic low back pain?

OPTION FUSION SURGERY New

Symptom improvement
Compared with non-surgical treatment Fusion surgery may be more effective than standard rehabilitation for improving pain at 2 years, but may be no more effective than intensive rehabilitation with a cognitive behavioural component for improving pain at 1 to 2 years in people with or without prior discectomy (moderate-quality evidence).

Functional improvement
Compared with non-surgical treatment Fusion surgery may be more effective than standard rehabilitation for improving function at 2 years, but may be no more effective than intensive rehabilitation with a cognitive behavioural component for improving function at 1 to 2 years in people with or without prior discectomy (moderate-quality evidence).

Return to work
Compared with non-surgical treatment Fusion surgery may be more effective at increasing the proportion of people who returned to work at 2 years, but may be no more effective than intensive rehabilitation with a cognitive behavioural component in people with or without discectomy (moderate-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits:

Fusion surgery versus non-surgical therapy:
We found four systematic reviews comparing surgery versus non-surgical treatment for chronic low back pain. [93] [102] [103] [104]

All four reviews reported some or all of the same four RCTs. [93] [102] [103] [104] Therefore only the most recent review is reported here. [104]

The review (search date 2008) included four high-quality RCTs, which included people with moderate to severe pain (mean score: 63–65 on a scale of 0–100) or disability (mean Oswestry Disability Index [ODI] score: 45) for at least 1 year who had not responded to standard non-surgical therapy. The review found that all the trials reported inconsistent results. [104]

The first RCT included in the review (294 people) found that fusion significantly improved pain and disability compared with non-surgical treatment at 2 years (pain: mean change from baseline on 0–100 VAS pain score; 21.0 with fusion *v* 4.3 with non-surgical treatment; P = 0.002; disability: mean change ODI score from baseline: 11.6 with fusion *v* 2.8 with non-surgical treatment; P = 0.01). The RCT also reported that fusion significantly increased the proportion of people who returned to work (36% with fusion *v* 15% with non-surgical treatment; P = 0.002). [105]

The three other RCTs included in the review compared surgery with intensive rehabilitation that incorporated CBT (75 hours over 3 weeks, with subsequent follow-up visits).

The second and third smaller RCTs included in the review (60 and 64 people) found no significant difference between fusion and non-surgical treatment for pain, disability, or return to work at 1 year in people with [106] or without prior discectomy (reported as not significant; P values not reported). [107]

The fourth RCT included in the review (349 people) found that fusion significantly improved ODI scores compared with non-surgical treatment at 24 months (mean difference –4.1, 95% CI –9.1 to –0.1; P = 0.045), but the difference was not of clinical importance. [108]

Harms:

Fusion surgery versus non-surgical treatment:
The review reported no operative deaths in four RCTs of fusion versus non-surgical treatment. [104]

One RCT included in the review evaluated different fusion techniques, it found higher risks of complications with more technically difficult procedures at 2 years (total complication rates: 12% with non-instrumented posterolateral fusion *v* 22% with instrumented posterolateral fusion *v* 40% with circumferential fusion, significance assessment not performed). [105]

Major complications included deep wound infection, major bleeding during surgery, thrombosis, acute respiratory distress syndrome, pulmonary oedema, and heart failure.

Comment:

The applicability of the RCTs to people with significant psychiatric or medical co-morbidities is uncertain, as these people were excluded from enrolment. The surgical techniques involved some type of fusion procedures, though the specific methods varied. At this time, there is insufficient evidence to determine optimal fusion methods, including instrumentation. Artificial disc replacement, an alternative to fusion, has only been compared with fusion.

OPTION ARTIFICIAL DISC REPLACEMENT New

We found no direct evidence from RCTs about artificial disc replacement compared with no treatment or non-surgical intervention for the treatment of people with chronic low back pain.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 36 .

Benefits: We found no systematic review or RCTs.

Harms: We found no RCTs.

Comment: We found three trials comparing artificial disc replacement with fusion surgery. There were no clear differences in outcomes related to pain or function, but long-term safety data for artificial disc replacement is limited. [109] [110] [111]

GLOSSARY

Acupuncture Acupuncture is 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 Back school techniques vary widely, but essentially consist of repeated sessions of instruction about anatomy and function of the back and isometric exercises to strengthen the back.

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

Operant behavioural treatments Operant behavioural treatments include positive reinforcement of healthy behaviours and consequent withdrawal of attention from pain behaviours, time contingent instead of pain contingent pain management, and spouse involvement, while undergoing a programme aimed at increasing exercise tolerance towards a preset goal.

Sciatica Pain that radiates from the back into the buttock or leg and is most commonly caused by prolapse of an intervertebral disk; the term may also be used to describe pain anywhere along the course of the sciatic nerve.

Beck Depression Inventory Standardised scale to assess depression. This instrument consists of 21 items to assess the intensity of depression. Each item is a list of 4 statements (rated 0, 1, 2, or 3), arranged in increasing severity, about a particular symptom of depression. The range of scores possible are 0 = least severe depression to 63 = most severe depression. It is recommended for people aged 13 to 80 years. Scores of more than 12 or 13 indicate the presence of depression.

Low-quality evidence Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

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.

Moderate-quality evidence Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.

Multidisciplinary treatment Multidisciplinary programmes are typically taken to comprise treatments provided by two or more healthcare providers with different professional training to obtain different perspectives and approaches to recovery. The term multidisciplinary does not imply a mandatory roster of specialists and does not dictate the nature of the treatment.

Oswestry Disability Index Back-specific, self-reported questionnaire measuring pain and function in completing physical and social activities. The scale score ranges from 0 (no disability) to 100 (maximum disability).

Respondent behavioural treatment Respondent behavioural treatment aims to modify physiological responses directly (e.g., reducing muscle tension by explaining the relation between tension and pain, and using relaxation techniques).

Roland Morris Disability Questionnaire A 24-item, self-reported, disability scale specific to back pain recommended for use in primary care and community studies. Measures daily function in completing activities affected by back pain. The scale score ranges from 0 (no disability) to 24 (severe disability).

Transcutaneous electrical nerve stimulation (TENS) Electrodes are placed on the skin and different electrical pulse rates and intensities are used to stimulate the area. Low-frequency TENS (also referred to as acupuncture-like TENS) usually consists of pulses delivered at 1 to 4 Hz at high intensity, so they evoke visible muscle fibre contractions. High-frequency TENS (conventional TENS) usually consists of pulses delivered at 50 to 120 Hz at a low intensity, so there are no muscle contractions.

Very low-quality evidence Any estimate of effect is very uncertain.

SUBSTANTIVE CHANGES

Intradiscal electrothermal therapy (IDETT) We found four systematic reviews that all reported the same two RCTs. [93] [94] [95] [34] The RCTs included in the reviews [96] [97] reported conflicting results for IDETT compared with placebo for both pain and function outcomes. Categorised as Unknown effectiveness.

Radiofrequency denervation We found one systematic review comparing radiofrequency denervation versus sham treatment/placebo. [34] The RCTs included in the review found conflicting results for radiofrequency denervation for both pain and function in people with presumed facet joint or discogenic low back pain. [34] Categorised as Unknown effectiveness.

Fusion surgery We found four systematic reviews comparing fusion surgery with non-surgical treatment. [93] [102] [103] [104] All four reviews included the same four high-quality RCTs, which reported inconsistent results. The first and fourth RCTs found that fusion surgery improved pain and disability scores, and also increased the proportion of people who returned to work at 2 years compared with non-surgical therapy. The second and third RCTs found no significant difference between groups for any of those outcomes at 1 year in people with or without prior discectomy. Categorised as Likely to be beneficial.

Artificial disc replacement We found no RCTs on the effectiveness of disc replacement compared with no treatment or non-surgical treatment for people with chronic low back pain. Categorised as Unknown effectiveness.

Analgesics (paracetamol, opioids) Three systematic reviews and one subsequent RCT added. [14] [15] [17] [18] The first two reviews compared paracetamol versus placebo but found no RCTs. [14] [15] The third review and the subsequent RCT compared opioids versus placebo. [17] [18] The review found that tramadol with or without paracetamol improved pain and function at 4 weeks to 3 months compared with placebo. [17] The RCT found that sustained opioids improved pain-relief maintenance compared with placebo at 12 weeks. [18] Categorisation unchanged (Unknown effectiveness) as there remains insufficient consistent high-quality evidence to assess analgesics.

Back exercises Four systematic review [37] [40] [41] [42] and eight subsequent RCTs added. [46] [47] [49] [50] [51] [52] [53] [55] The trend of the evidence suggests that back exercise reduces pain and improves function in people with non-specific chronic low back pain. The evidence supports the categorisation of Beneficial.

Behavioural therapy One systematic review updated comparing behavioural therapy (including progressive relaxation, EMG biofeedback, operant therapy, and respondent plus cognitive therapy) versus waiting list controls. [81] The majority of the evidence included in the review found that behavioural therapy improved pain intensity and behavioural outcomes compared with waiting list control. [81] Categorisation unchanged (Likely to be beneficial).

Electromyographic biofeedback One systematic review updated. [81] The review found no significant differences between electromyographic biofeedback versus waiting list control or other treatments for pain or behavioural outcomes. [81] However, the review included two RCTs reporting conflicting results for general functional status and one RCT that found that electromyographic feedback improved back-specific functional status. Categorisation unchanged (Unknown effectiveness) as there remains insufficient high-quality evidence to assess the effects of electromyographic biofeedback.

Facet joint injections One systematic review updated and one review added. [34] [35] Both reviews included the same two RCTs comparing facet joint injections versus placebo/saline injection. The RCTs found no differences between groups for pain, disability, and work attendance. [34] [35] Categorisation unchanged (Unknown effectiveness) as there remains insufficient good-quality evidence to assess facet joint injections.

Local injections Two systematic reviews added. [35] [34] The reviews included three RCTs comparing local injections versus placebo. The review did not pool data owing to heterogeneity. Two RCTs found no difference between local injections and placebo in self-reported improvement or pain intensity. [35] [34] The third RCT found that corticosteroid injections significantly improved self-reported improvement compared with placebo; however, the review reported that this RCT was of low quality. [35] [34] Categorisation unchanged (Unknown effectiveness) as there remains insufficient good-quality evidence to assess the effects of local injections.

Lumbar supports One systematic review updated. [88] The review included one RCT comparing lumbar support versus no intervention. The RCT found no difference between groups for short-term pain or function. [88] Categorisation unchanged (Unknown effectiveness) as there remains insufficient high-quality evidence to assess the effects of lumbar supports in people with chronic low back pain.

Muscle relaxants One systematic review updated, which included no new RCTs. [30] Categorisation unchanged (Trade-off between benefits and harms).

NSAIDs One systematic review updated. [24] The review found that NSAIDs reduced pain intensity at 2 to 12 weeks compared with placebo. [24] Categorisation unchanged (Trade-off between benefits and harms).

TENS One additional RCT added, which compared TENS plus massage versus sham TENS plus massage. [92] It found no significant difference between groups in pain intensity. [92] Categorisation unchanged (Unknown effectiveness) as there remains insufficient high-quality evidence to assess the effects of TENS.

Acupuncture One systematic review added. [64] Overall the review found that acupuncture and acupuncture plus other treatment was more effective than no treatment for improving pain relief and function; however, there seemed to be no significant difference between acupuncture and sham or other active treatment in pain relief and function. [64] Categorisation changed from Unknown effectiveness to Likely to be beneficial.

Antidepressants One systematic review added comparing antidepressants with placebo. [21] The review found no significant difference between groups in pain relief, depression, or functional status. Subgroup analysis also found no significant difference in pain relief between either SSRIs or tricyclic antidepressants and placebo. [21] Categorisation changed from Trade-off between benefits and harms to Unknown effectiveness as methodological issues in the trials render the results inconclusive.

Back schools One systematic review [67] and one subsequent RCT [69] added comparing back school versus inactive control or other treatment. The review reported conflicting results for back school versus inactive control or other treatment, but the majority of the evidence included in the review and the subsequent RCT found no difference between groups for pain, disability, recurrence, sick leave, or depression. [67] [69] Categorisation changed from Likely to be beneficial to Unknown effectiveness owing to conflicting results and small effect sizes in the positive trials.

Massage One systematic review added. [89] It found that massage improved short- but not long-term pain intensity compared with sham treatment, and that massage improved back-specific function in the short and long term compared with sham treatment. Overall the review also found that massage improved pain and function compared with other active interventions (including exercise, physiotherapy, acupuncture, and manipulation) in the short and long term. [89] Categorisation changed from Unknown effectiveness to Likely to be beneficial.

Multidisciplinary programmes One systematic review [58] and two subsequent RCTs added. [61] [62] The review found no difference between multidisciplinary treatment and control for pain or function, but reported that multidisciplinary treatment improved work participation. [58] The first RCT found no difference between multidisciplinary treatment compared with active therapy for pain, function, or return to work. [61] The second RCT found that multidisciplinary treatment, CBT, and active physical treatment all improved pain and function compared with waiting list control; however, there was no difference for pain or function between the active treatment groups. [62] Categorisation changed from Beneficial to Likely to be beneficial as there is moderate evidence that intensive (but not less intensive) multidisciplinary programmes are more effective than waiting list control/usual care/non-multidisciplinary treatments.

Spinal manipulative therapy: Evidence reassessed, categorisation changed from Unknown effectiveness to Likely to be beneficial and the weight of evidence suggests improvement for spinal manipulation therapy compared with no treatment, sham treatment and other treatments judged ineffective or harmful.

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Low back pain (chronic)

Roger Chou
Associate professor of medicine
Oregon Health & Science University
Portland
USA

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Disclaimer

TABLE 1 **RCTs of back schools in people with chronic back pain included in a systematic review.** [66]

Ref	Population	Interventions	Results
[71]	40 people with back pain for >6 months' duration	Maastricht back school (7 sessions of 2.5 hours plus refresher at 8 weeks) *v* waiting list control	10 people withdrew No significant difference for most outcomes measured after the programme (e.g., pain on VAS: 28.9 with back school *v* 31.9 with control; P value not reported in review)
[72]	66 nurses who had been sick-listed for back pain in previous 2 years	Back school (5 weeks in back clinic, 8 hours/day) plus individual physiotherapy programmes plus behavioural therapy *v* waiting list control	Back school significantly reduced pain at 6 weeks and 6 months compared with waiting list control (data presented graphically; P value not reported in review)
[73]	239 people with continuous back pain for >2 months' duration or an acute or chronic episode of back pain	Back school based on Canadian Back Education Unit (four 1-hour sessions over 1 week) *v* spinal manipulation by chiropractor daily for 1 week, then twice weekly for 6 weeks *v* NSAID for 15–20 days; physiotherapy; light massage; electrical stimulation, and diathermy daily for 3 weeks *v* physiotherapy; light massage; electrical stimulation, and diathermy daily for 3 weeks *v* placebo gel twice daily for 2 weeks	Back school improved pain and disability compared with other interventions at 2 and 6 months (combined pain disability and spinal mobility score at 2 months: 4.6 with back school *v* 2.6 with spinal manipulation *v* 2.2 with NSAIDs *v* 4.2 with physiotherapy *v* 1.2 with placebo; 6 months: 8.9 with back school *v* 4.3 with manipulation *v* 4.0 with NSAIDs *v* 6.0 with physiotherapy *v* 2.0 with placebo; details of scoring system not reported in review; P value not reported in review)
[78]	142 hospital employees	Back school (4 sessions, 90 minutes each over 2 weeks with further session at 2 months) *v* callisthenics (45-minute sessions twice weekly for 3 months) *v* waiting list control	Calisthenics reduced duration of low back pain compared with back school and waiting list control at 1 year (7.3 months with back school *v* 4.5 months with callisthenics *v* 7.4 months with waiting list control; P value not reported in review)
[79]	92 people with and without leg pain	Swedish back school (3 sessions on anatomy, body mechanics, ergonomic counselling, and exercises *v* exercises alone	Back school reduced pain and improved function compared with exercises alone at 16 weeks (data presented graphically; P value not reported in review)
[74]	476 people with reduced physical capacity and sick leave in previous 2 years	Inpatient back school (3 weeks rehabilitation with modified Swedish back school, exercises, relaxation, heat, massage) *v* outpatient back school (15 sessions over 2 months with modified Swedish back school, exercises, relaxation, heat, massage) *v* written and oral advice on back exercises and ergonomics	Back school (inpatient and outpatient) significantly reduced pain and disability compared with no back school at 3 months, but no significant difference at 2.5 years (data presented graphically; P values not reported in review)

Ref	Population	Interventions	Results
[75]	204 women	Back school (six 60-minute education and exercise sessions over 3 weeks with refresher sessions at 6 months) *v* written information about back school	Back school significantly reduced pain and disability compared with written information at 6 months, but no significant difference at 1 year (data presented graphically)
[76]	90 people, mean duration of back pain 7.5 years	Maastricht back school, education, skills programme (7 sessions of 2.5 hours each plus refresher at 6 months) *v* waiting list control	No significant difference between back school and control in pain and function at 2 and 6 months (pain on VAS, 2 months: 5.4 with back school *v* 5.2 with control; 6 months: 5.4 with back school *v* 4.6 with control; P value not reported in review; data for function not reported in review)
[70]	120 building industry workers	Back school (6 sessions of 90 minutes in 8 weeks, including education and exercises) *v* waiting list control	Back school significantly reduced pain at 2 months and 6 months (2 months: 3.5 with back school *v* 4.5 with control; 6 months: 2.5 with back school *v* 4.9 with control; P values not reported; details of the scoring system not reported in the review)
[77]	81 people with at least 1 episode of back pain in the last year, not on sick leave	Active back school (20 sessions of 1 hour each in 13 weeks, consisting of education and exercise) *v* no treatment	No significant difference at 5, 12, and 36 months in overall experienced pain. Back school significantly improved general low back function (baseline, 5, 12, 36 months: 4.7, 7.0, 6.7, 7.1 with back school *v* 4.1, 6.1, 5.2, 6.1 with no treatment; scale not reported; P values not reported) and significantly reduced mean days of sick leave at 12 and 36 months (12 months: 10.4 with back school *v* 37.8 with no treatment; 36 months: 14.4 with back school *v* 63.9 with no treatment; P values not reported)

Ref, reference; VAS, visual analogue scale.

TABLE **GRADE evaluation of interventions for low back pain (chronic)**

Important outcomes	**Symptom improvement, functional improvement, return to work, adverse effects**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of oral drug treatments for people with chronic low back pain?									
1 SR (3 RCTs, 908 people) [17]	Symptom improvement	Tramadol with or without paracetamol *v* placebo	4	0	0	0	0	High	
2 RCTs (591) [112] [18]	Symptom improvement	Sustained release opioids *v* placebo	4	0	0	0	0	High	
5 (808) [16] [113]	Symptom improvement	Opioids *v* placebo/control	4	−3	−1	0	0	Very low	Quality points deducted for incomplete reporting of results, inclusion of weak studies, and not defining control. Consistency point deducted for conflicting results
1 SR, 3 RCTs (878) [17]	Functional improvement	Tramadol with or without paracetamol *v* placebo	4	0	0	0	0	High	
5 (336) [16]	Symptom improvement	Opioids *v* opioids	4	−2	0	−1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of weak studies. Directness point deducted for uncertainty about benefit
17 (941) [20] [21]	Symptom improvement	Antidepressants *v* placebo	4	−1	−2	0	0	Very low	Quality point deducted for incomplete reporting of results. Consistency points deducted for heterogeneity among RCTs and conflicting results
1 (42) [23]	Symptom improvement	Antidepressants *v* each other	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
1 SR, 2 RCTs (132) [21]	Functional improvement	Antidepressants *v* placebo	4	–2	0	0	0	Low	Quality points deducted for sparse data and methodological weaknesses (including baselines differences between groups)
5 (1345) [24] [25]	Symptom improvement	NSAIDs *v* placebo	4	–1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
12 (unclear) [24]	Symptom improvement	NSAIDs *v* each other	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (29) [24]	Symptom improvement	NSAIDs *v* analgesics	4	−2	0	−1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for narrow range of comparators
1 (325) [25]	Functional improvement	NSAIDs *v* placebo	4	–1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
2 (222) [30]	Symptom improvement	Benzodiazepines *v* placebo	4	−1	0	−1	0	Low	Quality point deducted for incomplete reporting of results. Directness point deducted for narrow range of comparators
2 (219) [31] [32]	Symptom improvement	Non-benzodiazepines *v* placebo	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
What are the effects of injection therapy for people with chronic low back pain?									
3 (97) [35] [34]	Symptom improvement	Local injections *v* placebo	4	−2	–1	−1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Consistency point deducted for conflicting results. Directness point deducted for disparity in injections given

Important outcomes	**Symptom improvement, functional improvement, return to work, adverse effects**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
2 (210) [34] [35]	Symptom improvement	Facet joint injections *v* placebo	4	−2	0	–1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for ungeneraliseable population.
1 (101) [34] [35]	Functional improvement	Facet joint injections *v* saline injections	4	−2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
What are the effects of non-drug treatments for people with chronic low back pain?									
4 (at least 2336 people) [36] [37] [46] [47]	Symptom improvement	Generic back exercise (other than McKenzie exercise and yoga) *v* placebo/ no treatment/ other conservative interventions	4	−3	−1	−2	0	Very low	Quality points deducted for incomplete reporting of results, inclusion of poor-quality RCTs, and uncertainty about bias. Consistency point deducted for conflicting results. Directness points deducted for variations in exercise programmes and inclusion of additional interventions
3 (at least 1628 people) [36] [46] [47]	Functional improvement	Generic back exercise (other than McKenzie exercise and Yoga) *v* placebo/ no treatment/ other conservative interventions	4	−3	0	−2	0	Very low	Quality points deducted for incomplete reporting of results, inclusion of poor-quality RCTs, and uncertainty about bias. Directness points deducted for variations in exercise programmes and inclusion of additional interventions
At least 9 RCTs (at least 1940 people) [38] [39] [40] [41] [42] [48] [49] [51] [52]	Symptom improvement	Trunk-strengthening/stabilisation *v* other back exercises or no exercise	4	−1	−2	−1	0	Very low	Quality point deducted for incomplete reporting of results. Consistency points deducted for conflicting results and different results at different end points. Directness points deducted for variations in exercise programmes
At least 9 RCTs (at least 1940 people) [38] [39] [40] [41] [42] [48] [49] [51] [52]	Functional improvement	Trunk-strengthening/stabilisation *v* other back exercises or no exercise	4	−1	−2	−1	0	Very low	Quality point deducted for incomplete reporting of results. Consistency points deducted for conflicting results and different results at different end points. Directness point deducted for variations in exercise programmes
2 (at least 56 people) [44] [45]	Symptom improvement	McKenzie method *v* other back exercise	4	−1	0	−1	0	Low	Quality point deducted for incomplete reporting of results. Directness point deducted for variations in exercise programmes
4 (at least 260) [43] [44] [45] [53]	Functional improvement	McKenzie method *v* other back exercise	4	−1	0	−1	0	Low	Quality point deducted for incomplete reporting of results. Directness point deducted for variations in exercise programmes
1 (101) [54]	Symptom improvement	Yoga *v* other back exercises	4	−2	0	−1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for variations in exercise programmes
1 (181) [54] [55]	Functional improvement	Yoga *v* other back exercises	4	−2	0	−1	0	Very low	Quality points deducted for sparse data and incomplete reporting of results. Directness point deducted for variations in exercise programmes
At least 7 RCTs (at least 576 people) [57] [59] [60] [61] [62] [58]	Symptom improvement	Multidisciplinary treatment programmes *v* waiting list control/usual care/non-multidisciplinary treatments	4	−1	−1	0	0	Low	Quality point deducted for incomplete reporting of results. Consistency point deducted for lack of consistent beneficial effects

Important outcomes	**Symptom improvement, functional improvement, return to work, adverse effects**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
At least 7 RCTs (at least 576 people) [57] [59] [60] [61] [62] [58]	Functional improvement	Multidisciplinary treatment programmes *v* waiting list control/usual care/non-multidisciplinary treatments	4	−1	−1	0	0	Low	Quality point deducted for incomplete reporting of results. Consistency point deducted for lack of consistent beneficial effects
At least 5 RCTs (at least 120 people) [61] [58]	Return to work	Multidisciplinary treatment programmes *v* waiting list control/usual care/non-multidisciplinary treatments	4	–1	–1	0	0	Very low	Quality point deducted for incomplete reporting of results. Consistency point deducted for lack of consistent beneficial effects
3 RCTs (at least 298) [64]	Symptom improvement	Acupuncture *v* no treatment	4	−2	–1	−1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
3 RCTs (298) [64]	Functional improvement	Acupuncture *v* no treatment	4	−2	–1	−1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
3 (1650) [64]	Symptom improvement	Acupuncture *v* sham treatment	4	−2	−1	–1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
3 (1650) [64]	Functional improvement	Acupuncture *v* sham treatment	4	−2	–1	–1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
6 (at least 200 people) [64]	Symptom improvement	Acupuncture *v* other treatment	4	–2	–1	–1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
6 (at least 200 people) [64]	Functional improvement	Acupuncture *v* other treatment	4	–2	–1	–1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
5 RCTs (not reported) [64]	Symptom improvement	Addition of acupuncture to other interventions *v* intervention alone	4	−2	–1	–1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT
5 RCTs (not reported) [64]	Functional improvement	Addition of acupuncture to other interventions *v* intervention alone	4	−2	–1	–1	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality RCTs. Consistency point deducted for conflicting results. Directness point deducted for inclusion of other interventions in large RCT

Important outcomes	**Symptom improvement, functional improvement, return to work, adverse effects**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
9 (1458) [70] [71] [72] [73] [74] [75] [76] [77] [114] [69]	Symptom improvement	Back schools *v* no treatment or inactive control treatments	4	−2	0	0	0	Low	Quality points deducted for incomplete reporting of results and for inclusion of poor-quality studies
6 (1200) [73] [79] [74] [75] [76] [77] [114] [69]	Functional improvement	Back schools *v* no treatment or inactive control treatments	4	−2	0	0	0	Low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality studies
4 (575) [73] [78] [79] [68] [114]	Symptom improvement	Back schools *v* other treatments	4	−2	0	0	0	Low	Quality points deducted for incomplete reporting and no direct comparison between groups
4 (433) [73] [78] [79] [114]	Functional improvement	Back schools *v* other treatments	4	−2	0	0	0	Low	Quality points deducted for incomplete reporting and no direct comparison between groups
6 (611) [114]	Return to work	Back schools *v* no treatment or inactive control	4	–2	–1	0	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality studies. Consistency point deducted for conflicting results
6 (611) [114]	Return to work	Back schools *v* other treatments	4	–2	–1	0	0	Very low	Quality points deducted for incomplete reporting of results and inclusion of poor-quality studies. Consistency point deducted for conflicting results
11 (at least 579 people) [81] [82]	Symptom improvement	Behavioural therapy *v* placebo/no treatment/waiting list control	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (211) [82] [81]	Functional improvement	Behavioural therapy *v* placebo/no treatment/waiting list control	4	−1	−1	0	0	Low	Quality point deducted for incomplete reporting of results. Consistency point deducted for conflicting results
9 (308) [81]	Symptom improvement	Different types of behavioural therapy *v* each other	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
9 (308) [81]	Functional improvement	Different types of behavioural therapy *v* each other	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (84) [115]	Return to work	Different types of behavioural therapy *v* each other	4	−3	0	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results, and for baseline differences between groups
8 (545) [81]	Symptom improvement	Behavioural therapy *v* other treatments	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
At least 7 RCTs (at least 1205 people) [83] [84] [85] [86]	Symptom improvement	Spinal manipulative therapy *v* placebo/no treatment/waiting list control/sham/other treatments	4	−1	−1	0	0	Moderate	Quality point deducted for incomplete reporting of results. Consistency point deducted for conflicting results.
at least 7 RCTs (at least 1205 people) [83] [84] [85] [86]	Functional improvement	Spinal manipulative therapy *v* placebo/no treatment/waiting list control/sham/ other treatments	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results.
1 (49) [84]	Return to work	Spinal manipulative therapy *v* exercise therapy	4	−1	−1	0	+1	Moderate	Quality points deducted for sparse data and incomplete reporting of results. Effect-size point added for RR 0.2–0.5
4 (108) [81]	Symptom improvement	Electromyographic biofeedback *v* placebo/waiting list control	4	−2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
4 (108) [81]	Functional improvement	Electromyographic biofeedback *v* placebo/ waiting list control	4	−2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results

Important outcomes	Symptom improvement, functional improvement, return to work, adverse effects								
Number of studies (participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
1 (44) [81]	Symptom improvement	Electromyographic biofeedback *v* other treatments	4	−2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
3 (44) [81]	Functional improvement	Electromyographic biofeedback *v* other treatments	4	−2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
1 (79) [88]	Symptom improvement	Lumbar support *v* no intervention	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
1 (79) [88]	Functional improvement	Lumbar support *v* no intervention	4	–2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
2 (91) [89]	Symptom improvement	Massage *v* sham treatment	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
2 (91) [89]	Functional improvement	Massage *v* sham treatment	4	–1	0	0	0	Moderate	Quality point deducted for sparse data
5 (404) [89]	Symptom improvement	Massage *v* other interventions	4	0	0	0	0	High	
4 (369) [89]	Functional improvement	Massage *v* other interventions	4	0	0	0	0	High	
2 (175) [91]	Symptom improvement	TENS *v* placebo	4	−3	−2	0	0	Very low	Quality points deducted for incomplete reporting of results, poor follow-up, and sparse data. Consistency points deducted for conflicting results and heterogeneity among RCTs
1 (145) [91]	Functional improvement	TENS *v* placebo	4	−2	0	0	0	Low	Quality points deducted for incomplete reporting of results and sparse data.
1 (28) [92]	Symptom improvement	TENS plus massage *v* sham TENS plus massage	4	–2	0	0	0	Low	Quality points deducted sparse data and incomplete results
What are the effects of non surgical treatment for chronic low back pain?									
2 (121) [34]	Symptom improvement	IDETT *v* sham IDETT	4	–1	–1	–1	0	Very low	Quality point deducted for sparse data. Consistency point deducted for conflicting results. Directness point deducted for the lack of generalisability of population
2 (121) [34]	Functional improvement	IDETT *v* sham IDETT	4	–1	–1	–1	0	Very low	Quality point deducted for sparse data. Consistency point deducted for conflicting results. Directness point deducted for the lack of generalisability of population
6 (371) [34]	Symptom improvement	Radiofrequency denervation *v* sham/placebo	4	–3	–1	0	0	Very low	Quality points deducted for incomplete reporting of results, including low-quality studies, and inadequate randomisation. Consistency point deducted for conflicting results.
6 (371) [34]	Functional improvement	Radiofrequency denervation *v* sham/placebo	4	–3	–1	0	0	Very low	Quality points deducted for incomplete reporting of results, including low-quality studies, and inadequate randomisation. Consistency point deducted for conflicting results
What are the effects of surgical treatments for chronic low back pain?									
4 (767) [104]	Symptom improvement	Fusion surgery *v* non-surgical treatment	4	0	–1	0	0	Moderate	Consistency point deducted for conflicting results
4 (767) [104]	Functional improvement	Fusion surgery *v* non-surgical treatment	4	0	–1	0	0	Moderate	Consistency point deducted for conflicting results

Important outcomes	Symptom improvement, functional improvement, return to work, adverse effects								
Number of studies (participants)	Outcome	Comparison	Type of evidence	Quality	Consistency	Directness	Effect size	GRADE	Comment
3 (418) [104]	Return to work	Fusion surgery *v* non-surgical treatment	4	0	–1	0	0	Moderate	Consistency point deducted for conflicting results

Type of evidence: 4 = RCT; 2 = Observational
Consistency: similarity of results across studies
Directness: generalisability of population or outcomes
Effect size: based on relative risk or odds ratio