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Low back pain (chronic)

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ABSTRACT

INTRODUCTION: Over 70% of people in resource-rich countries develop low back pain (LBP) at some time. But recovery is not always favourable: 82% of non-recent-onset patients still experience pain one year later. Many chronic patients 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? We searched: Medline, Embase, The Cochrane Library, and other important databases up to May 2007 (BMJ 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 74 systematic reviews, RCTs, or observational studies 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 steroid injections, facet joint injections, local injections), intensive multidisciplinary treatment programmes, lumbar supports, massage, muscle relaxants, non-steroidal anti-inflammatory drugs (NSAIDs), spinal manipulative therapy, traction, and transcutaneous electrical nerve stimulation (TENS).

QUESTIONS

INTERVENTIONS

Key Points

- Over 70% of people in resource-rich countries develop low back pain at some time, which usually improves within 2 weeks, but up to 7% of affected people develop chronic low back pain.
- Opioid analgesics, with or without paracetamol, and NSAIDs may improve pain and function compared with placebo.

  Antidepressants decrease chronic low back pain compared with placebo in people with or without depression, but their effects on function are unclear.

  Muscle relaxants may improve pain, but studies 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, and on major congenital malformations with paroxetine (www.fda.gov/medwatch).

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- We don't know whether epidural steroid 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.

- 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 to be beneficial.

  Acupuncture , back schools , behavioural therapy , and spinal manipulation may reduce pain in the short term, but we don't know how they compare with other active treatments.

  We don't know whether electromyographic biofeedback , lumbar supports , massage , traction , or TENS improve pain relief.

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 that is 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 (greater than 12 weeks' duration).

INCIDENCE/ PREVALENCE

Over 70% of people in resource-rich countries will experience low back pain at some time in their lives. [3] Each year, 15–45% of adults suffer low back pain, and 1/20 people present to hospital with a new episode. About 2–7% of people with acute low back pain will go on to become chronic. Low back pain is most common between 35–55 years of age. [3]

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 1–3%. [3] Ankylosing spondylitis and spinal infections are less common. [4] This review only covers chronic low back pain where a definitive diagnosis cannot be made. Risk factors include heavy physical work, frequent bending, twisting, lifting, and prolonged static postures. Psychosocial risk factors include anxiety, depression, and mental stress at work. [3] [5] Having a previous history of low back pain and a longer duration of the present episode are significant risk factors for chronicity. A recently published 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. [6] Individual and workplace factors have also been reported to be associated with the transition to chronic low back pain. [7]

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. [8] Most people with back pain have experienced 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. [9]

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] [10]

OUTCOMES

Pain intensity (visual analogue [VAS] or numerical rating scale); overall improvement (self-reported or observed); back-pain specific functional status (such as Roland Morris Questionnaire, Oswestry questionnaire); impact on employment (days of sick leave, number of people returned to work); medication use.

METHODS

BMJ Clinical Evidence search and appraisal May 2007. The authors also searched Medline (1966 to May 2007), Embase (1980 to May 2007), Psychlit (1984 to May 2007), and The Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Clinical Trials 2007, Issue 2. 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

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Technology Assessment (HTA), Turning Research into Practice (TRIP), and NICE, using the search strategy recommended by the Cochrane Back Review Group. [11] Most of the earlier RCTs of treatments for low back pain were small (less than 50 people/intervention group; range 9–169), short term (mostly less than 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. [12] 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 which included people both with and without radiation, if the proportion of people with radiation was less than 50%. The authors have also included data based on their own searches to May 2007 from the process of updating their own files. 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 more than 20 individuals of whom more than 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. 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. We have performed a GRADE evaluation of the quality of evidence for interventions included in this review (see table, p 25).

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

OPTION ANALGESICS (PARACETAMOL, OPIOIDS)

Symptom improvement
Compared with placebo Tramadol plus paracetamol is more effective at decreasing pain at 3 months (low-quality evidence).

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

Opioids compared with opioids We don't know how opioids compare with each other at relieving pain (very low-quality evidence).

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

Functional improvement
Compared with placebo Tramadol plus paracetamol is more effective at improving function at 3 months (moderate-quality evidence).

Opioids compared with placebo Tramadol may be more effective at improving functional status at 7 days (low-quality evidence).

Note
Opioid treatment has been associated with substance use disorders.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits:

Analgesics versus placebo:
We found one RCT comparing analgesics with placebo in people with chronic low back pain. The RCT (318 people) found that a combination of tramadol plus paracetamol significantly decreased pain and improved function compared with placebo at 3 months (pain score at baseline and 3 months on 100 mm visual analogue scale [VAS], 311 people: 71.1–44.4 mm with combination *v* 68.8–52.3 mm with placebo; P = 0.015 ; change in function on Roland Morris Disability Questionnaire, 297 people: –4.1 with combination *v* –2.6 with placebo; P = 0.023). [13]

Opioids versus placebo:
We found one systematic review and one additional RCT comparing opioids with placebo in people with chronic low back pain. [14] [15] The review (search date 2005) compared opioids versus placebo or non-opioid control (non-opioid not defined). The review did not find a significant difference in pain relief between opioids (4 RCTs, 554 people; SMD; –0.19, 95% CI –0.49 to 0.11; P value not reported) compared with placebo or non-opiod control over a period varying from 1–16 weeks.

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[14] . The review reported that overall quality of included studies was weak. The additional RCT (254 people) found that tramadol (an opioid) significantly decreased pain and improved functional status at 7 weeks compared with placebo (mean pain on a 10 cm VAS: 3.5 with tramadol *v* 5.1 with placebo; function using 0–24 point Roland Morris Disability Scale: 8.8 with tramadol *v* 10.2 with placebo). [15]

Opioids versus opioids:
We found one systematic review (search date 2005) evaluating opioids in people with chronic low back pain. [14] 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 studies was weak. [14]

Analgesics versus NSAIDs:
See NSAIDs.

Harms: The systematic review found that the prevalence of current substance use disorders in people with chronic back pain receiving opioids ranged from 3–43%, with a lifetime prevalence as high as 54%. [14] RCTs found adverse effects (constipation and drowsiness) with analgesics in about 50% of people. [2] [16] The RCT comparing tramadol plus paracetamol versus placebo found that combination treatment increased discontinuation due to adverse effects, and significantly increased nausea, somnolence, and constipation compared with placebo (discontinuation: 19% with combination *v* 6% with placebo, P value not reported; nausea: 13% *v* 3%, P = 0.001; somnolence: 12% *v* 1%, P less than 0.001; constipation: 11% *v* 5%, P = 0.003). [13] One systematic review (search date 1995) in people with different types of pain compared combinations of paracetamol plus weak opioids versus paracetamol alone. [16] The review found that combination treatment increased the risk of adverse effects in multiple-dose studies (single-dose studies OR 1.1, 95% CI 0.8 to 1.5; multiple-dose studies OR 2.5, 95% CI 1.5 to 4.2).

Comment: In the most recent review, pharmaceutical companies sponsored 73% of the trials. [14] The review states that opioid efficacy is limited or inconclusive depending on comparison groups. [14]

OPTION ANTIDEPRESSANTS

Symptom improvement
Compared with placebo We don't know whether antidepressants are more effective at improving symptoms (very low-quality evidence).

Compared with each other Maprotiline may be more effective than paroxetine at improving pain (low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: **Antidepressants versus placebo:**
We found one systematic review (search date 2002; 7 RCTs, 440 people). [17] The review did not statistically pool data because of heterogeneity of trial designs and outcome measures. [17] 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 evaluating SSRIs or trazodone. [17]
Antidepressants versus each other:
The two systematic reviews included the same RCT (67 people). [18] The included 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). [18]

Harms: Adverse effects of antidepressants include dry mouth, drowsiness, constipation, urinary retention, orthostatic hypotension, and mania. [2]
Antidepressants versus placebo:
The systematic review gave no information on adverse effects. [17]
Antidepressants versus each other:
One included RCT in the review found that the prevalence of dry mouth, insomnia, sedation, and orthostatic symptoms was 60–80% with tricyclic antidepressants. [19] However, rates were only slightly lower in the placebo group and none of the differences were significant.
Drug safety alert:
Since the last update of this review, a drug safety alert has been issued on increased suicidal behaviour with antidepressants (www.fda.gov/medwatch). Since the last update of this review, a

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drug safety alert has been issued on major congenital malformations with paroxetine (www.fda.gov/medwatch).

Comment: None.

OPTION NSAIDS

Symptom improvement
Traditional NSAIDs compared with each other Traditional NSAIDs seem to be equally effective at improving symptoms (moderate-quality evidence).

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

COX-2 inhibitors compared with placebo Etoricoxib is more effective at 4 and 12 weeks at decreasing pain (moderate-quality evidence).

COX-2 inhibitors compared with NSAIDs Etoricoxib and diclofenac seem to be equally effective at 4 weeks at reducing pain intensity (moderate-quality evidence).

Functional improvement
Traditional NSAIDs compared with each other We don't know whether nimesulide is more effective than diclofenac at improving functional status (very low-quality evidence).

COX-2 inhibitors compared with placebo Etoricoxib is more effective at 12 weeks at improving functioning (moderate-quality evidence).

COX-2 inhibitors compared with NSAIDs Etoricoxib and diclofenac seem to be equally effective at 4 weeks at improving disability (moderate-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits:

Traditional NSAIDs versus placebo:
We found no systematic review or RCTS comparing NSAIDs versus placebo that met the inclusion criteria for this review.

Traditional NSAIDs versus each other:
We found one systematic review (search date 1998, 4 RCTs, 453 people) [20] and one subsequent RCT. [21] All four RCTs included in the review found no significant difference in symptoms between different NSAIDs. [20] The subsequent RCT (196 people) found no significant difference between nimesulide and diclofenac for pain relief or improved functional status. [21]

Traditional NSAIDs versus analgesics:
We found one systematic review (search date 1998, 1 RCT). [20] The small RCT (29 people) included in the review found a significant difference between diflunisal and paracetamol in 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). [20]

COX-2 inhibitors versus placebo:
We found no systematic review, but found two RCTs. [22] [23] The two RCTs found that COX-2 inhibitors decreased pain and improved function compared with placebo, but effects were small. The two RCTs compared etoricoxib versus placebo. The first RCT (319 people, low back pain with or without radiation to the knee) found that both etoricoxib 60 mg and 90 mg significantly decreased pain and improved functioning compared with placebo at 12 weeks (reduction in pain compared with placebo on 100 mm VAS: 10.5 mm for 60 mg etoricoxib, P less than or equal to 0.001; 7.5 mm for 90 mg etoricoxib, P less than or equal to 0.018; improvement in function compared with placebo on Roland Morris Disability score [on a scale of 0–24 points]: 2.42 with etoricoxib 60 mg, P less than or equal to 0.001; 2.06 with etoricoxib 90 mg; P less than or equal to 0.01). [22] The second RCT (325 people) found that 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 less than 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 less than 0.001). [23]

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COX-2 inhibitors versus NSAIDs:
We found one RCT (446 people with chronic low back pain) that compared etoricoxib (60 mg/day) with diclofenac (150 mg/day) at 4-week follow-up. [24] The RCT found no significant differences between groups for pain intensity (mean difference pain intensity scale: 2.51, 95% CI –1.50 to 6.51, P value not reported) or disability (mean difference Roland Morris Disability score: –0.23, 95% CI –1.14 to 0.67, P value not reported) at 4 weeks. [24]

Harms:

NSAIDs may cause gastrointestinal and other complications (see NSAIDs). Some RCTs in people with acute and chronic back pain have found that ibuprofen and diclofenac have the lowest gastrointestinal complication rates mainly because of the low doses used in practice (pooled OR for adverse effects *v* placebo 1.30, 95% CI 0.91 to 1.80). [2] [25] [26]

Traditional NSAIDs versus each other:
The subsequent RCT found that nimesulide has a similar rate of gastrointestinal adverse effects to diclofenac. [21]

COX-2 inhibitors versus placebo:
The first RCT found no significant difference between etoricoxib (60 mg and 90 mg) and placebo in overall adverse effects, or in headache, nausea, or diarrhoea at 12 weeks (overall: 47% with placebo *v* 58% with etoricoxib 60 mg *v* 52% with etoricoxib 90 mg; headache: 6% with placebo *v* 12% with etoricoxib 60 mg *v* 6% with etoricoxib 90 mg; nausea: 3% with placebo *v* 6% with etoricoxib 60 mg *v* 8% with etoricoxib 90 mg; diarrhoea: 2% with placebo *v* 4% with etoricoxib 60 mg *v* 8% with etoricoxib 90 mg). [22] The second RCT reported that drug-related adverse events occurred in 12% of people with placebo, 26% of people with etoricoxib 60 mg, and 25% of people with etoricoxib 90 mg (etoricoxib 60 mg *v* placebo, P = 0.01; etoricoxib 90 mg *v* placebo; P = 0.021). [23] 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 1 person with an active history of hypertension and chest pain). [23]

COX-2 inhibitors versus NSAIDs:
The RCT found that 166/446 (37%) of people included in the trial reported clinical adverse effects (35% with etoricoxib v 39% with diclofenac, no absolute figures or significance assessment reported). [24] The RCT reported higher rates of diarrhoea (5% with diclofenac *v* 1% with etoricoxib, no absolute figures or significance assessment reported), gastrointestinal adverse effects (44/222 [20%] with diclofenac *v* 30/224 [13%] with etoricoxib, no significance assessment reported) and hypertension-related adverse effects (12/222 [5%] with diclofenac v 6/224 [3%] with etoricoxib, no significance assessment reported) for diclofenac compared with etoricoxib. [24]

Comment:

COX-2 inhibitors have shown to have fewer gastrointestinal side effects in osteoarthritic and rheumatoid arthritis studies, but valdecoxib (brand name Bextra) was removed from the market in some countries due to concerns about possible increased risk of heart attack and stroke. [27]

OPTION MUSCLE RELAXANTS

Symptom improvement
Benzodiazepines compared with placebo Tetrazepam may be more effective at 10–14 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 7–21 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 25 .

Benefits:

We found one systematic review (search date 2001, 5 RCTs). [28] 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 50 mg tetrazepam three times daily significantly reduced pain and increased overall improvement compared with placebo after 10–14 days (pain: RR 0.71, 95% CI 0.54 to 0.93; overall improvement: RR 0.63, 95% CI 0.42 to 0.97). [28]

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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. [28] 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). [29] 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. [30] The third lower-quality RCT identified by the review (76 people) did not assess pain, global improvement, or function. [31]

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 (rates of adverse effects were not reported in the review). [28]

Comment: None.

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

OPTION EPIDURAL STEROID INJECTIONS

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

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: **Epidural steroid injections versus placebo:**
We found one systematic review (search date 1996, 4 RCTs, 302 people) comparing epidural steroid injections versus placebo. [32] However, all identified RCTs included people solely with sciatica , which is not discussed in this review. We found no subsequent RCTs.

Harms: We found no RCTs.

Comment: **Clinical guide:**
Epidural steroid injections may have serious side effects and should only be administered under specific indications. Epidural steroid injections are indicated only for those with leg-dominant pain and root irritation. Epidural injections are most effective for potential surgical candidates but where surgery has been delayed for some reason. Even in these cases, the injections show marginal benefit; they give a short period of improvement but are ineffective in the long term. Epidural steroid injections have no value for those with back pain alone.

OPTION LOCAL INJECTIONS

Symptom improvement
Compared with placebo Local injections (local anaesthetic and corticosteroids) may be no more effective in the short term at relieving pain (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found one systematic review (search date 1996, 4 RCTs, see comment below). [32] The review found no significant difference between local injection therapy (local anaesthetic and corticosteroids) and placebo in short-term pain relief (3 RCTs, 121 people; RR 0.80, 95% CI 0.40 to 1.59; see comment below).

Harms: Of the three RCTs included in the meta-analysis, the first RCT (41 people) reported painful injection (2 with experimental *v* 3 with control), temporary paraesthesiae near the injection site (2 in both groups), and nausea (2 *v* 1). The second RCT (63 people) reported increased pain (1 with injection *v* 2 with dry needle stick) and fever, chills, and systemic upset (1 with dry needle stick). The third RCT did not report adverse effects. [32] Another review found that potential harms included nerve or other tissue damage, infection, and haemorrhage. [2]

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Comment: One study identified by the review compared local injection plus forceful manipulation with light manipulation plus placebo injection, and was not included. Of the three RCTs in the meta-analysis, one RCT used trigger point injections, another RCT used ligament injections, and the third RCT used local injections (not further defined). [32]

OPTION FACET JOINT INJECTIONS

Symptom improvement
Compared with placebo We don't know whether facet joint injections (sodium hyaluronate, and triamcinolone) are more effective at decreasing 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 (low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found one systematic review (search date 1996, 1 RCT, 101 people with chronic back pain and without sciatica , pain arising in the facetal joints; see comment below) [32] and one subsequent RCT. [33] The RCT included in the review 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). The subsequent RCT (60 people with chronic non-radicular lumbar pain) compared 10 mg sodium hyaluronate (SH) and 10 mg triamcinolone acetonide (TA) per facet joint with baseline. No direct comparisons were made between treatment groups. The RCT evaluated the mean intensity of pain using the VAS scale (0 mm = no pain, 100 mm= intolerable pain) over seven visits. The facet joints on both sides at levels L5–S1, L4–L5, and L3–L4 were treated weekly under computed tomographic guidance. The RCT found that the mean intensity of pain decreased in the SH group by 40% at visit five (from a mean baseline value of 69.2 mm) and by 45% from baseline by the end of the trial (no CIs, P values, or further data reported). The RCT found that mean pain intensity decreased in the TA group by 56% from a mean baseline value of 69% at visit 5, and by 52% at the end of the trial (no CIs, P values, or further data reported). [33]

Harms: The review reported that the RCT did not list adverse effects other than transient local pain at the injection sites. [32] Another review reported that rare but serious adverse effects associated with facet joint injection included pain at injection site, infection, haemorrhage, neurological damage, and chemical meningitis. [2] The subsequent RCT did not report any adverse effects. [33]

Comment: Two other RCTs identified by the review [32] did not distinguish between acute and chronic pain, and involved people with sciatica, so these RCTs have not been included here. The RCT in the review included people with pain arising from the facet joints. This is likely to indicate a definitive diagnosis for the source of low back pain. [32]

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 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 stablisation 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 exercise (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).

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Trunk-strengthening/stabilisation 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 stablisation 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 25 .

Benefits:

We found six systematic reviews, [34] [35] [36] [37] [38] [39] and two subsequent RCTs comparing varying forms of generic back exercise with no exercise or other exercise programs. [40] [41]

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 having all four criteria. Of the 43 included RCTs, six RCTs were categorised as high quality. [34] The review used both a qualitative rating system and a quantitative pooling of data where possible.

The second 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 programs, or intensive trunk-strengthening exercises with other types of exercise program. The review included only high-quality trials (6 or more out of 10 on the PEDro scale). [35] When possible, data were pooled to provide an overall effect estimate. Meta-analyses using random-effects modeling were performed. [35] The review split the included trials into non-surgery and post-surgery; only the non-surgery results are presented in this review.

The third 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. [36] Methodological quality was based on the PEDro scale out of 10. The mean PEDro score of included trials was 6.5 (1.1), range 4–8. Eight of the 13 RCTs involved chronic low back pain, but 4 trials used a different definition of chronicity than this review. [36]

The fourth review (search date 2007, 6 RCTs, 1245 people) compared the McKenzie method versus passive therapy, advice, flexion exercises, spinal manipulation, back school, and strengthening. [37] 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 fifth 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. [38] 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. [38]

The sixth 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. [39] The review only included 2 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. [39]

Generic back exercise (other than the McKenzie method and Yoga) versus placebo or no treatment or other conservative interventions:
The first review found 33 exercise groups in RCTs that had non-exercise comparisons. [34] Eleven exercise groups (2 high-quality, 9 low-quality RCTs) found that exercise was more effective than

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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). [34] One low-quality RCT found that a group receiving an aerobics and strengthening programme had less improvement in pain and function than 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). [34] 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. [34]

Trunk-strengthening/stabilisation versus other back exercises or no exercise:
The second 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 0.00, 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 programs. 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 program. [35]

In the third systematic review, [36] 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). [36]

The first subsequent RCT (86 women with chronic lower back pain) compared rhythmic stabilisation (RST), a combination of isotonic exercises (COI), or control. [40] The RCT found that both RST and COI significantly improved function compared with control at 4 (P less than 0.05) and 8 (P less than 0.05) weeks' follow-up. The RCT reported that despite improvements from baseline scores for the back pain intensity scale measurement in muscle mobitlity, endurance, and functional ability (scores not reported), the RCT found no signficant differences between groups at 4 or 8 weeks' follow-up (data presented graphically). [40]

McKenzie method versus other back exercise:
The fourth review included one RCT of people with chronic low back pain with or without leg pain. [37] 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). [37]

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In the fifth 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. [38] 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 general practitioner care. [38]

The sixth 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 to 8). [39]

Yoga versus other back exercises:
The second subsequent RCT (101 people with chronic back pain) compared yoga versus conventional therapeutic exercise classes for chronic lower back pain over 12–26 weeks' follow-up using an intention-to-treat analysis. [41] 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 Roland Morris Questionnaire [RMQ], 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 RMQ, 95% CI –3.5 to –0.1, P = 0.034), but not at 26 weeks (mean difference –1.5 RMQ. 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 (1.4, 95% CI –2.5 to –0.2 , P = 0.018) at 26 weeks. [41]

Harms:

The first review reported that few included RCTs reported on harms (about 23% discussed 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. [34] This is often a natural and innocuous reaction, particularly in those starting an exercise program for the first time, or after prolonged inactivity. The remaining reviews and RCTs gave no information on adverse effects. [36] [35] [40] [41] [39] [37] [38]

Comment:

The exercise programmes undertaken in included RCTs varied widely. [34] [36] [35] [40] [39] [37] [38] [41] Subgroup meta-analysis for different specific types of exercise, or comparisons against specific individual conservative treatments, were not reported. [34] 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 health care (primary, secondary, or tertiary), occupational (occupational healthcare, in compensatory situations), and general or mixed (e.g. people recruited through advertisement for trials), to differentiate those studies in people in typical treatment settings (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). [34] The first review noted that, overall, the methodological quality of included RCTs was poor, with only 54% adequately describing the exercise intervention. The second review included a trial employing motivational strategies. [35]

In the sixth review, comparisons with flexion exercises and spinal manipulative therapy yielded statistically significant differences favouring the McKenzie method; however, no placebo-controlled trial was located. [39] 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. [39]

OPTION MULTIDISCIPLINARY TREATMENT PROGRAMMES

Symptom improvement

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Compared with usual care/non-multidisciplinary treatments Intensive (more than 100 hours of therapy) multidisciplinary biopsychosocial rehabilitation with functional restoration may be more effective at reducing pain in people with disabling low back pain of more than 3 months' duration (low-quality evidence).

Functional improvement
Compared with usual care/non-multidisciplinary treatments Intensive (more than 100 hours of therapy) multidisciplinary biopsychosocial rehabilitation with functional restoration may be more effective at improving function in people with disabling low back pain of more than 3 months' duration (low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found one systematic review (search date 1998, 10 RCTs, 1964 people; see comment) [42] and one subsequent RCT [43] which compared multidisciplinary treatment versus a control treatment, and a second subsequent RCT which compared multidisciplinary treatment with individual physiotherapy. [44] The review did not pool data because of clinical heterogeneity. The review included three high-quality RCTs and one low-quality RCT of intensive (more than 100 hours) daily programmes of multidisciplinary biopsychosocial rehabilitation with functional restoration. It found that intensive (more than 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). [42] The review included three high-quality RCTs and two low-quality RCTs of less-intensive (less than 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). [42] 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. [43] The second subsequent RCT (120 women with chronic low back pain) compared multidisciplinary rehabilitation (8-week, 70-hour, physiotherapist-supervised program involving occupational physiotherapists, a psychologist, and a physician specialised in the rehabilitation medicine) with individual physiotherapy (10 1-hour treatment sessions including passive pain treatment combinations of massage, spine traction, manual mobilisation, TENS/therapeutic ultrasound, and light active exercise [muscle stretching, spine mobilisation, and deep trunk-muscle exercises]) at 6, 12, and 24 months' follow-up. [44] The RCT found no significant differences between treatment groups in pain relief or disabilty at 6, 12, or 24 months (reported as non-significant, no RR, CI, or P value reported). [44]

Harms: The review [42] and subsequent RCTs [43] [44] did not report on harms.

Comment: The review included people with disabling low back pain of more than 3 months' duration with or without sciatica . [42] The review categorised RCTs as being of higher (5 or more on a methodological scale of 0–10) or lower quality (0–4/10). [42]

Clinical guide: 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.

OPTION ACUPUNCTURE

Symptom improvement
Compared with no treatment Acupuncture may be more effective at 3 months at reducing pain (very low-quality evidence).

Compared with sham treatment Acupuncture may be more effective immediately after the treatment session and at 3 months at reducing pain (low-quality evidence).

Addition of 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 seems to be more effective at improving pain immediately after the session and at 3–12 months (moderate-quality evidence).

Functional improvement
Compared with no treatment Acupuncture may be more effective at 6 months at improving function (very low-quality evidence).

Compared with sham treatment Acupuncture seems to be no more effective immediately or at 3–12 months at improving function (moderate-quality evidence).

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Addition of 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 seems to be more effective at improving function immediately after the session and at 3–12 months (moderate-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits:

We found one systematic review (search date 2003) [45] and the two subsequent RCTs. [46] [47] The review identified 24 RCTs (1718 people) comparing acupuncture versus no treatment, sham acupuncture, sham TENS, Chinese herbal medicine, education, exercise, massage , moxibustion, NSAIDs, physiotherapy, spinal manipulation, TENS, trigger point injections, and usual treatment by a general practitioner. [45] Six studies compared the effectiveness of two different acupuncture techniques. [45]

Acupuncture versus no treatment:
The review included two lower-quality RCTs that compared acupuncture with no treatment. [45] It found that acupuncture significantly reduced short-term pain (less than 12 weeks) and improved short-term function compared with no treatment (pain: 2 RCTs, 90 people, SMD 0.73, 95% CI 0.28 to 1.19; function: effect size 0.63, 95% CI 0.19 to 1.08). [45] However, the first RCT (50 people) included people with abnormal x rays (38/43) and sciatica (27/49); the second RCT (40 people) also included people with disc disease and sciatica (absolute numbers not reported). The first subsequent RCT (2726 people with chronic low back pain) compared acupuncture with no acupuncture. [46] All people included in the RCT were allowed to receive routine medical care in addition to the study treatment. The RCT found that acupuncture significantly improved function (mean difference HFAQ score: 9.4, 95% CI 8.3 to 10.5, P less than 0.001) and decreased pain (mean difference lower back pain rating scale: 27.2, 95% CI 24.5 to 20.9, P less than 0.001) compared with no treatment at 3 months, and significantly improved function (mean difference HFAQ score: 3.7, 95% CI 0.7 to 6.7, P = 0.015), but not pain compared with no treatment (mean difference low back pain rating scale: 2.7, 95% CI –0.3 to 5.7, P = 0.082) at 6 months . [46]

Acupuncture versus sham treatment:
The review pooled results for two higher- and two lower-quality RCTs. The review found that acupuncture was significantly more effective in reducing pain immediately after the treatment session compared with sham treatment (4 RCTs, 314 people, WMD –10.21, 95% CI –14.99 to –5.44). [45] It found that acupuncture significantly reduced pain at short-term follow-up (less than 3 months) compared with sham treatment (2 higher quality RCTs, 138 people, WMD –17.9, 95% CI –25.5 to –10.07), but found no significant difference between groups in pain at intermediate (3–12 month) follow-up (1 higher- and 1 lower-quality RCT, 96 people, WMD –5.74, 95% CI –14.72 to +3.25). The review found no difference between acupuncture and sham treatment for measures of function assessed immediately after treatment or at intermediate (3–12 months) follow-up.

Acupuncture versus other interventions:
The review included two lower- and two higher-quality RCTs that compared acupuncture with a variety of other treatments, including spinal manipulation, massage, NSAIDs/paracetamol, TENS, or self-care education. The review did not pool results, but found limited evidence of no significant difference between acupuncture and the other treatments in the RCTs included in the review. [45]

Addition of acupuncture to other interventions:
The review included four higher-quality RCTs (289 people) that compared the addition of acupuncture to another treatment versus the other treatment alone. The other treatments included exercises, NSAIDs, aspirin, non-narcotic analgesics, mud packs, infrared heat therapy, back-care education, ergonomics, and behavioural modification. The review found that the addition of acupuncture to the other interventions was significantly more effective than the other intervention alone for pain (measured immediately after the end of the sessions: 4 RCTs, 289 people, SMD –0.76, 95% CI –1.02 to –0.5; short term [less than 3 months]: 3 RCTs, 183 people, SMD –1.1, 95% CI –1.62 to –0.58; intermediate [3–12 months]: 2 RCTs, 115 people, SMD –0.76, 95% CI –1.14 to –0.38), and function (measured immediately after the end of the sessions: 3 RCTs, 173 people, SMD –0.95, 95% CI –1.27 to –0.63; short term [less than 3 months]: 2 RCTs, 99 people, SMD –0.95, 95% CI –1.37 to –0.54; intermediate [3–12 months]: 2 RCTs, 115 people, SMD –0.55, 95% CI –0.92 to –0.18).

Harms:

One systematic review found that serious and rare adverse effects included infections (HIV, hepatitis, and bacterial endocarditis) and visceral trauma (pneumothorax and cardiac tamponade). [45] The first subsequent RCT reported that non-life-threatening adverse effects, such as minor local bleeding or haematoma (54%), needling pain (17%), vegatative symptoms (8%), and other side effects (21%) were associated with acupuncture. [46]

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Comment: The review concluded that, in general, many of the included RCTs were of poor methodological quality and there was a need for future higher-quality studies. It noted that, although the analysis showed some positive results for acupuncture, the magnitude of the effects were generally small.

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, 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, NSAIDs, physiotherapy, callisthenics, and 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, 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, and exercise at improving function (low-quality evidence).

Benefits: We found one systematic review and one subsequent RCT. [48] [49] RCTs identified by the review used back school interventions of variable intensity. [48] The review did not pool data from the studies (see table 1, p 23).

Back schools versus no treatment or inactive control treatments:
The first review (search date 2003, 8 RCTs) provided limited evidence that back schools improved pain and disability compared with inactive treatments (placebo gel, waiting list, written information) in the short term (6 months or less), but suggested that benefits did not persist in the longer term (see table 1, p 23). [50] [51] [52] [53] [54] [55] [56] [57]

Back schools versus other treatments:
Three RCTs identified by the review compared back school versus other active treatments (spinal manipulation, NSAIDs, physiotherapy, callisthenics, and exercise) and found different results (see table 1, p 23). [53] [58] [59] The first RCT found that back school reduced pain compared with exercise at 16 weeks. [59] The second RCT found that back school was significantly less effective at reducing the duration of low back pain compared with callisthenics. [58] The third RCT found that back school improved pain at 2 and 6 months compared with controls, which included spinal manipulation, NSAIDs, and physiotherapy in a subgroup of people with chronic pain. [53] 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 acetaminophen, 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 less than 0.001) and reduced pain (P less than 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. [49]

Harms: The review and subsequent RCT gave no information on adverse effects. [48] [49]

Comment: The systematic review included RCTs in which a back school type of intervention was examined. [48] A back school was defined as consisting of an educational and skills acquisition programme, including exercises, in which all lessons were given to groups of people and supervised by a paramedical therapist or medical specialist. [48] The review assessed the methodological quality of included RCTs. Of the included RCTs, three were of high quality and seven were of low quality (high quality: methodological score of 6 or more on a scale of 0–11). We found another systematic review (search date 2000, 18 RCTs) that combined randomised and non-randomised studies, compared back schools, no treatment, and other active treatments in the same meta-analysis, but did not take the methods of the studies into account. [60] This systematic review found that back schools significantly increased pain relief after 3 months compared with no treatment or any other treatment, but found no significant difference in outcomes in the long term. [60]

Clinical guide: There is little evidence of the effectiveness of the traditional, narrow defintion of back school . With the explosion in the ways in which information can be disseminated, formal back schools are far less common than in previous years. The emphasis currently focuses more on

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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. [61]

OPTION BEHAVIOURAL THERAPY

Symptom improvement
Compared with placebo/ no treatment/waiting list control Behavioural therapy seems to be more effective at reducing 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 to be no more effective at reducing pain (moderate-quality evidence).

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

Return to work
Different types of behavioural therapy compared with each other We don't know whether problem solving therapy is more effective than group education at 6–12 months at increasing return to work rates (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found one systematic review (search date 1999; 20 RCTs) [62] and two subsequent RCTs. [63] [64]

Behavioural therapy versus placebo, no treatment, or waiting list control:
The review (7 RCTs, 419 people) found that behavioural therapy significantly reduced pain intensity and behavioural outcomes (e.g. pain behaviour, cognitive errors, perceived or observed levels of tension, anxiety, depression) compared with no treatment, placebo, or waiting list control (pain: 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). [62] The review found that behavioural therapy increased function, but the difference was not statistically significant (pooled effect size 0.35, 95% CI –0.04 to 0.74). 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. [64] The RCT found that CBT reduced disability (RDQ mean differences: –3.09, 95% CI –4.89 to –1.28, P less than 0.01) and pain (VAS 100 mm scale mean differences: –15.64, 95% CI –24.23 to –7.06, P less than 0.01) at 10 weeks' follow-up compared with waiting list control. [64]

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. [62] The subsequent RCT (84 people recently on sick leave with low back pain) compared problem solving therapy versus group education. [63] All participants received behavioural graded activity . The RCT found that problem solving therapy significantly reduced total sick leave compared with group education at 6 and 12 months' follow-up (8.3 days at baseline to 18.5 days with problem solving *v* 10.4 days at baseline to 37.9 days with group education; P less than 0.05). [63] However, at baseline, people in the problem solving group had fewer days sick leave and fewer had returned to work than people allocated to group education; therefore, results of the RCT may have been confounded by these factors, and not due to difference in relative effectiveness of the treatments. The RCT found no significant difference between problem solving therapy and group education in return to work rates at 1 year (return to normal work: 9% at baseline to 75% at 6 months and 85% at 12 months with problem solving *v* 21% at baseline to 70% at 6 months and 63% at 12 months with group education; P value not reported).

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). [62] 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. [62]

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Harms: The review and two subsequent RCTs gave no information on adverse effects. [63] [62] [64]

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). [62]

OPTION SPINAL MANIPULATIVE THERAPY

Symptom improvement
Compared with sham manipulation/no treatment/or other treatments We don't know whether spinal manipulation is more effective than general practitioner care, physiotherapy, exercises, or back school, or whether chiropractic care (with or without physical modalities) is more effective than medical care at improving pain (very low-quality evidence).

Functional improvement
Compared with sham manipulation/no treatment/or other treatments We don't know whether spinal manipulation is more effective than general practitioner care, physiothearpy, exercises, or back school, or whether chiropractic care (with or without physical modalities) is more effective than medical care at improving function (very low-quality evidence).

Return to work
Compared with exercise therapy Spinal manipulative therapy seems to be 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 25 .

Benefits: We found one systematic review (search date 2001, 14 RCTs, 1596 people; see comment), [65] and three subsequent RCTs. [66] [67] [68]

The review found that spinal manipulative therapy reduced pain in the short (less than 6 weeks) and long term (greater than 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 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 Scale: 3.3; 95% CI 0.6 to 6.0). [65] 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). [65] 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 therapies judged to be 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 Roland Morris Scale: 2.6 points, 95% CI 0.5 points to 4.8 points).

The first subsequent RCT (49 people sick listed for longer than 8 weeks, with and without leg pain) compared spinal manipulative therapy with exercise therapy in a course of 16 treatments over 2 months. [66] The RCT found that spinal manipulation significantly decreased pain, 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 less than 0.01; disability on the 0–50 point Oswestry Disability Index: 17 with manipulation *v* 26 with exercise, P less than 0.01; partly or fully sick listed: 19% with manipulation *v* 59% with exercise, RR 0.31, 95% CI 0.11 to 0.78). [66]

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. [67]

The third subsequent RCT (681 people with low back pain, mixed population 50% with back pain for greater than 12 months) compared four groups: 1) chiropractic care without physical modalities (DC) (spinal manipulation or mobilisation, instruction in stengthening 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 stengthening and flexibility exercises, prescriptons for analgesics, muscle relaxants or anti inflammatories, 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, EMS, soft tissue and joint mainpulation, supervised therapeutic exercise, strengthening and flexibility exercises) at 18 months' follow-up. [68] 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

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–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. [68]

For benefits spinal manipulative therapy *v* specific stabilisation exercises, see benefits of exercise, p 9 .

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 less than 1/1,000,000 people). [65] None of the subsequent RCTs assessed harms. [66] [68]

For harms of spinal manipulative therapy *v* specific stabilisation exercises, see harms of exercise, p 11 .

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). [65] Many included RCTs on chronic low back pain (particularly in older RCTs) did not solely include people with symptoms for more than 12 weeks, but also included some people with subacute low back pain. However, the mean duration of pain at baseline was usually more than 12 weeks.

Current clinical guidelines for low back pain do not advise spinal manipulation in people with severe or progressive neurological deficit. [2] [69]

OPTION ELECTROMYOGRAPHIC BIOFEEDBACK

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

Compared with other treatments We don't know whether electromyographic biofeedback is more effective than progressive relaxation or whether a combination of electromyographic biofeedback and rehabilitation programmes is more effective than electromyographic biofeedback alone at relieving 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 (low-quality evidence).

Compared with other treatments We don't know whether electromyographic biofeedback is more effective than progressive relaxation or whether a combination of electromyographic biofeedback and rehabilitation programmes is more effective than electromyographic biofeedback alone at improving range of movement (low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found one systematic review (search date 1995, 5 RCTs, 168 people, no statistical pooling of data). [12]

Electromyographic biofeedback versus placebo or waiting list control:
Three small RCTs (102 people) identified by the review found no significant difference between electromyographic biofeedback and placebo or waiting list control in pain relief or functional status. [12]

Electromyographic biofeedback versus other treatments:
Two RCTs (40 people) identified by the review found different results with electromyographic biofeedback compared with progressive relaxation training in pain reduction. [12] One RCT (30 people) identified by the review found no significant difference between rehabilitation programmes plus biofeedback and biofeedback alone in pain relief or improved range of movement. [12]

Harms: The review did not report on harms. [12]

Comment: None.

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OPTION LUMBAR SUPPORTS

We found no clinically important results about whether lumbar supports are more effective compared with no active treatment, no treatment, or other treatments in people with chronic low back pain.

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found one systematic review (search date 1999, 1 RCT). [70] The small RCT (19 people) identified by the review found that a lumbar corset plus a synthetic support improved symptom severity and functional disability compared with lumbar corset without synthetic support, but data were poorly reported. [70] No RCT compared lumbar supports with placebo, no treatment, or other treatments for chronic low back pain.

Harms: The review did not report on harms. [70] Harms associated with prolonged lumbar-support use include decreased strength of the trunk musculature, a false sense of security, heat, skin irritation, or general discomfort.

Comment: Five RCTs (1200 people) identified by the review did not differentiate between acute and chronic pain. [70]

OPTION MASSAGE

We found no clinically important results about whether massage is better than no active treatment or other treatments in people with chronic low back pain.

Benefits: We found one systematic review which included one RCT comparing massage to an inert treatment. [71] However, the RCT did not meet inclusion criteria for this review.

Harms: The review did not report on harms. [71]

Comment: None.

OPTION TRACTION

We found no direct information 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 25 .

Benefits: We found two systematic reviews. [10] [72] The first review (search date 1995) and second review (search date 2007) did not identify any RCTs solely in people with chronic low back pain without sciatica . [10] [72] 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 (very low-quality evidence).

Functional improvement
Compared with placebo We don't know whether TENS is more effective at improving functional status (very low-quality evidence).

For GRADE evaluation of interventions for low back pain (chronic), see table, p 25 .

Benefits: We found two systematic reviews [73] [74] and one additional RCT. [75] The first review (search date 2000) included one RCT of sufficient quality. The included RCT (145 people) found no significant difference between TENS and sham stimulation in pain, function, range of motion, or use of medical services. [73] The second systematic review (search date 2005, 2 RCTs, 176 people with chronic low back pain) compared TENS with placebo. [74] The RCTs included in the review were heterogeneous with respect to study design, methodologic quality, sample size, study population,

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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 included in the review found that TENS significantly decreased subjective pain intensity compared with placebo (no RR, CI, or P value reported). 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 RCT included in the review found no significant differences between TENS and placebo for any outcomes measured, including pain relief and functional status (data presented graphically). [74] The additional RCT (30 people) found a significant decrease in subjective pain intensity with TENS compared with placebo over the course of a 60-minute-treatment session. However, longer-term follow-up was not conducted. [75]

Harms: The first review and additional RCT did not report on harms. [73] [75] The second review reported 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. [74]

Comment: The results of the recent systematic review examining the effectiveness of TENS in the management of chronic low back pain are inconclusive and hampered by the small number of suitable RCTs. The evidence is inconsistent regarding the effectiveness of TENS in reducing pain and improving functional status in patients with chronic low back pain. The decision to either include or exclude TENS as an isolated treatment modality for chronic low back pain is poorly defined by the evidence. [74]

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.

Behavioural graded activity Graded activity is an operant behavioural treatment that aims to increase activity levels by means of quota systems. The training includes registration of baseline levels during the first 2 weeks, a treatment contract, positive reinforcement for activity increments, and a workplace visit.

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.

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

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

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.

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).

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.

Generic back exercise (low back pain) In this review, generic back exercise denotes undifferentiated exercise/movements performed in multiple directions or planes without emphasis on the person’s pattern of pain or directional preference for pain control.

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.

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.

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

SUBSTANTIVE CHANGES

Acupuncture: One low-quality RCT added comparing acupuncture with no acupuncture. [46] The evidence found that acupuncture increases function and decreases pain compared with no acupuncture in the short term. Categorisation unchanged (Unknown effectiveness).

Back Schools: One RCT added comparing back school plus medication versus medication only. [49] The RCT did not make direct comparisons between groups, but with baseline scores only. It found that back school improved function and reduced pain at 3-month follow-up compared to baseline. Categorisation unchanged (Likely to be benefical).

Back exercises: Five systematic reviews and two subsequent RCTs added, comparing varying forms of generic exercise with no exercise or other exercise programs. [36] [35] [37] [38] [39] [40] [41] The evidence suggests that exercise improves function and decreases pain compared with no exercise in people with chronic low back pain. Specific approaches, such as the McKenzie method and Yoga, improved function compared with conventional exercise. [39] [41] The evidence supports the categorisation of Beneficial.

Behavioural therapy: One RCT added comparing CBT with waiting list control. [64] The RCT found that CBT reduced disability and pain at 10 weeks compared with control. Categorisation unchanged (Likely to be beneficial).

Multidisciplinary programmes: One RCT added comparing mulitdisciplinary rehabilitation with individual physiotherapy. [44] The RCT found no differences between groups for pain or disability at 6,12, or 24 months. Categorisation unchanged (Beneficial).

TENS: One systematic review added comparing active TENS with placebo. [74] The review did not pool data due to heterogeneity between trials. One small, low-quality RCT included in the review found that active TENS decreased subjective pain intensity compared with placebo. However, the second RCT included in the review found no differences between TENS and placebo for any outcomes measured, including pain relief and functional status. [74] Categorisation unchanged (Unknown effectiveness).

Traction: One systematic review added comparing traction with with placebo or sham treatments. [72] The review did not include RCTs soley on people with chronic lower back pain without sciatica. Categorisation unchanged (Unknown effectiveness).

Analgesics (paracetamol, opioids): One systematic review added comparing opioids with placebo and opioids with opioids. [14] Benefits and harms sections enhanced, categorisation changed from Likely to be beneficial to Unknown effectiveness, as the systematic review found no difference in pain reduction between different classes of opioids and placebo or other opioids.

Facet joint injections: One RCT added evaluating sodium hyaluronate and triamcinolone acetonide. [33] Benefits and harms sections enhanced, categorisation changed from Likely to be ineffective or harmful to Unknown effectiveness, as the evidence is inconclusive with no direct comparison being made between treatment groups.

NSAIDs: One RCT added comparing etoricoxib with diclofenac. [24] The RCT found that etoricoxib did not reduce pain or disability compared with diclofenac at 4-week follow-up. Categorisation changed from Likely to be beneficial to Trade-off between benefits and harms.

Spinal mainpulative therapy: One RCT added comparing four groups: chiropractic care without physical modalities, chiropractic care with physical modalities, medical care without physiotherapy, and medical care with physiotherapy. [68] The RCT found no differences between groups for pain, disability, or clinical remission at 18 months. [68] Categorisation changed from Likely to be beneficial to Unknown effectiveness.

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TABLE 1 **RCTs of back schools in people with chronic back pain included in a systematic review.** [48]

Ref	Population	Interventions	Results
[51]	40 people with back pain for greater than 6 months' duration	Maastricht back school (7 sessions of 2.5 hours plus refresher at 8 weeks) *v* waiting list control	10 drop outs. 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 not reported in review)
[52]	66 nurses who had been sick listed for back pain in previous 2 years	Back school (5 weeks in back clinic, 8 hours per day) plus individual physiotherapy programmes plus behaviour 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 not reported in review)
[53]	239 people with continuous back pain for greater than 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 not reported in review)
[58]	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	Callisthenics 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 not reported in review)
[59]	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 not reported in review)
[54]	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)
[55]	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)
[56]	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 not reported in review; data for function not reported in review)

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Ref	Population	Interventions	Results
[50]	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 *v* 4.9; P values not reported; details of the scoring system not reported in the review)
[57]	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 *v* 63.9; P values not reported)

Ref, reference; VAS, visual analogue scale.

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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 (311) [13]	Symptom improvement	Analgesics *v* placebo	4	0	0	−1	0	Moderate	Directness point deducted for narrow range of comparators
1 (297) [13]	Functional improvement	Analgesics *v* placebo	4	0	0	−1	0	Moderate	Directness point deducted for narrow range of comparators
5 (808) [14] [15]	Symptom improvement	Opioids *v* placebo/control	4	−3	−1	0	0	Very low	Quality points deducted for incomplete reporting of results, for inclusion of weak studies and for not defining control. Consistency point deducted for conflicting results
1 (254) [15]	Functional improvement	Opioids *v* placebo	4	−1	0	−1	0	Low	Quality point deducted for short follow-up. Directness point deducted for narrow range of comparators
5 (336) [14]	Symptom improvement	Opioids *v* opioids	4	−2	0	−1	0	Very low	Quality points deducted for incomplete reporting of results and for inclusion of weak studies. Directness point deducted for uncertainty about benefit
7 (440) [17]	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 for conflicting results
5 (649) [20] [21]	Symptom improvement	Traditional NSAIDs *v* each other	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (196) [21]	Functional improvement	Traditional NSAIDs *v* each other	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 (29) [20]	Symptom improvement	Traditional 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 (319) [22] [23]	Symptom improvement	COX-2 inhibitors *v* placebo	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (319) [22] [23]	Functional improvement	COX-2 inhibitors *v* placebo	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (446) [24]	Symptom improvement	COX-2 inhibitors *v* NSAIDs	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
1 (446) [24]	Functional improvement	COX-2 inhibitors *v* NSAIDs	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
2 (222) [28]	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) [29] [30]	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 (121) [32]	Symptom improvement	Local 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 disparity in injections given
2 (161) [32] [33]	Symptom improvement	Facet joint injections *v* placebo	4	−3	−1	0	0	Very low	Quality points deducted for sparse data, incomplete reporting of results and for no direct comparison between groups. Consistency point deducted for conflicting results
1 (101) [32]	Functional improvement	Corticosteroid injections *v* saline injections	4	−2	0	0	0	Low	Quality points deducted for sparse data, incomplete reporting of results
What are the effects of non-drug treatments for people with chronic low back pain?									

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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**
33 (at least 2067 people) [34]	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 for uncertainty about bias. Consistency point deducted for conflicting results. Directness points deducted for variations in exercise programmes and inclusion of additional interventions
33 (at least 337 people) [34]	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 for uncertainty about bias. Directness points deducted for variations in exercise programmes and inclusion of additional interventions
At least 6 RCTs (at least 86 people) [35] [35]	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 for different results at different endpoints. Directness points deducted for variations in exercise programmes
At least 6 RCTs (at least 86 people) [35] [35]	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 for different results at different endpoints. Directness point deducted for variations in exercise programmes
2 (at least 56 people) [38] [39]	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
3 (not reported) [37] [38] [39]	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) [41]	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 (101) [41]	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 283 people) [42] [43] [44]	Symptom improvement	Multidisciplinary treatment programmes *v* 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 7 RCTs (at least 283 people) [42] [43] [44]	Functional improvement	Multidisciplinary treatment programmes *v* 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
2 (2816) [45] [46]	Symptom improvement	Acupuncture *v* no treatment	4	−2	0	−1	0	Very low	Quality points deducted for incomplete reporting of results and for inclusion of poor-quality RCTs. Directness points deducted for inclusion of other interventions in large RCT
2 (2816) [45] [46]	Functional improvement	Acupuncture *v* no treatment	4	−2	0	−1	0	Very low	Quality points deducted for incomplete reporting of results and for inclusion of poor-quality RCTs. Directness points deducted for inclusion of other interventions in large RCT

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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**
4 (at least 314 people) [45]	Symptom improvement	Acupuncture *v* sham treatment	4	−1	−1	0	0	Low	Quality point deducted for incomplete reporting of results. Consistency point deducted for different results at different endpoints
4 (not reported) [45]	Functional improvement	Acupuncture *v* sham treatment	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
4 (289) [45]	Symptom improvement	Addition of acupuncture to other interventions *v* intervention alone	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
4 (289) [45]	Functional improvement	Addition of acupuncture to other interventions *v* intervention alone	4	−1	0	0	0	Moderate	Quality point deducted for incomplete reporting of results
9 (1458) [50] [51] [52] [53] [54] [55] [56] [57]	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) [53] [59] [54] [55] [56] [57]	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 for inclusion of poor-quality studies
4 (575) [53] [58] [59] [49]	Symptom improvement	Back schools *v* other treatments	4	−2	0	0	0	Low	Quality points deducted for incomplete reporting and for no direct comparison between groups
4 (433) [53] [58] [59]	Functional improvement	Back schools *v* other treatments	4	−2	−1	0	0	Low	Quality points deducted for incomplete reporting and for no direct comparison between groups
8 (630) [62] [64]	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
8 (630) [62] [64]	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) [62]	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) [62]	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) [63]	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) [62]	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) [65] [66] [67] [68]	Symptom improvement	Spinal manipulative therapy *v* placebo/ no treatment/ waiting list control	4	−1	−1	−2	0	Very low	Quality point deducted for incomplete reporting of results. Consistency point deducted for conflicting results. Directness points deducted for wide range of comparators, for inclusion of people with non-chronic pain and for inclusion of mobilisation therapies
at least 7 RCTs (at least 1205 people) [65] [66] [67] [68]	Functional improvement	Spinal manipulative therapy *v* placebo/ no treatment/ waiting list control	4	−1	−1	−2	0	Very low	Quality point deducted for incomplete reporting of results. Consistency point deducted for conflicting results. Directness points deducted for wide range of comparators, for inclusion of people with non-chronic pain and for inclusion of mobilisation therapies
1 (49) [66]	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

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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 (102) [12]	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
3 (102) [12]	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
1 (30) [12]	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 (70) [12]	Functional improvement	Electromyographic biofeedback *v* other treatments	4	−2	0	0	0	Low	Quality points deducted for sparse data and incomplete reporting of results
4 (351) [73] [74] [75]	Symptom improvement	TENS *v* placebo	4	−2	−2	−1	0	Very low	Quality points deducted for incomplete reporting of results and for poor follow-up. Consistency points deducted for conflicting results and for heterogeneity among RCTs. Directness point deducted for uncertainty about clinical benefit
3 (323) [73] [74]	Functional improvement	TENS *v* placebo	4	−1	−2	−1	0	Very low	Quality point deducted for incomplete reporting of results. Consistency points deducted for heterogeneity among RCTs. Directness point deducted for uncertainty about clinical benefit

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

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