Low back pain (chronic)

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QUESTIONS

INTERVENTIONS

See glossary, p 1675

Key Messages

Oral drug treatments

- **Analgesics** One RCT found that tramadol (an opioid) decreased pain and increased function at 7 weeks compared with placebo. One RCT found that a combination of tramadol and paracetamol (acetaminophen) decreased pain and increased function at 3 months compared with placebo. One RCT found no significant difference between paracetamol and diflusinal in the proportion of people who rated the treatment as good or excellent. One RCT found no significant difference in pain relief between a parenteral non-steroidal anti-inflammatory drug and a parenteral opioid analgesic.

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- **Antidepressants** One systematic review found that antidepressants decreased pain compared with placebo, but found no consistent difference in function. One RCT found that maproteline increased pain relief compared with paroxetine. Four additional RCTs found no significant difference in depression between antidepressants and placebo, and two additional RCTs found that antidepressants improved depression in people with chronic low back pain.
- **Non-steroidal anti-inflammatory drugs** One small RCT found that naproxen reduced pain compared with placebo. One systematic review and one subsequent RCT found no significant differences in symptoms between different non-steroidal anti-inflammatory drugs. One RCT identified by the review found no significant difference between diflunisal and paracetamol in the proportion of people who rated the treatment as good or excellent. One RCT found no significant difference in pain relief between a parenteral non-steroidal anti-inflammatory drug and a parenteral opioid analgesic. Two RCTs found that COX 2 inhibitors decreased pain and improved function at 4–12 weeks compared with placebo, but effects were small.
- **Muscle relaxants** Two RCTs identified by a systematic review found that tetrazepam reduced pain and increased overall improvement after 10–14 days compared with placebo. Two RCTs identified by a systematic review found that non-benzodiazepines (flupirtine and tolperisone) increased overall improvement at 7–21 days, but found no significant difference for pain. Adverse effects of muscle relaxants include dizziness and drowsiness.

Injection therapy

- **Epidural steroid injections** We found no systematic reviews or RCTs in people with chronic back pain who did not have sciatica.
- **Local injections** One systematic review found no significant difference between local injections (local anaesthetic and corticosteroids) and placebo in short term pain relief.
- **Facet joint injections** One RCT identified by a systematic review found no significant difference in pain relief and disability between corticosteroid and saline injections after 1 and after 3 months. Adverse effects include infection, haemorrhage, chemical meningitis. and neurological damage.

Non-drug treatments

- **Multidisciplinary treatment programmes** One systematic review has found that intensive multidisciplinary biopsychosocial rehabilitation with functional restoration reduced pain and improved function compared with inpatient or outpatient non-multidisciplinary treatments or usual care. The review found no significant difference between less intensive multidisciplinary treatments and non-multidisciplinary treatment or usual care in pain or function.
- **Back schools** One systematic review and one subsequent RCT found limited evidence that back schools reduced pain and disability compared with inactive treatments (waiting list control, placebo gel, or written advice) or no treatment within 6 months, although results suggested that benefits may not persist in the longer term. Three RCTs identified by the review compared back schools with other treatments and found mixed results.
- **Behavioural therapy** One systematic review found that behavioural therapy reduced pain and improved functional status and behavioural outcomes compared with no treatment, placebo, or waiting list control. The review and one subsequent RCT provided no evidence of a difference in functional status, pain, or behavioural outcomes between different types of behavioural therapy. The review found insufficient evidence to compare behavioural therapy with other treatments.

- **Exercise** RCTs found insufficient evidence on the effects of different types of exercise, or exercise compared with other treatments.
- **Physical conditioning (cognitive behavioural approach plus physical training)** Two RCTs identified by a systematic review found that physical conditioning programmes (consisting of a cognitive behavioural approach plus physical training) reduced sick days overall but not the risk of being off work at 12 months compared with general practitioner care.
- **Spinal manipulative therapy** One systematic review found that spinal manipulative therapy reduced pain in the short and long term and improved short term function compared with sham manipulation, but found no significant difference in long term function (> 6 weeks). The systematic review found no significant difference in pain or function between spinal manipulative therapy and general practitioner care, physical therapy, exercises, or back school. Two subsequent RCTs compared spinal manipulation with exercise and found that spinal manipulation reduced pain at 6–12 months, but found different results for function. One of the RCTs found that spinal manipulation increased return to work at 12 months compared with exercise therapy.
- **Acupuncture** Two systematic reviews and two subsequent RCTs found insufficient evidence about the effects of acupuncture compared with placebo or no treatment. One systematic review and one subsequent RCT found limited evidence that acupuncture reduced pain intensity and increased overall improvement compared with transcutaneous electrical nerve stimulation.
- **Electromyographic biofeedback** One systematic review found no significant difference in pain relief or functional status between electromyographic biofeedback and placebo or waiting list control, but found insufficient evidence on the effects of electromyographic biofeedback compared with other treatments.
- **Lumbar supports** We found insufficient evidence on the effects of lumbar supports.
- **Massage** One systematic review found insufficient evidence about effects of massage compared with inactive treatments or other treatments.
- **Transcutaneous electrical nerve stimulation** One systematic review found no significant difference in pain relief between transcutaneous electrical nerve stimulation and sham stimulation.
- **Traction** One systematic review and two additional RCTs found no significant difference between traction and placebo or between traction plus massage and interferential treatment in pain relief or functional status.

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 — see glossary, p 1676),[1] and is defined as chronic when it persists for 12 weeks or more (see definition of low back pain and sciatica [acute], p 1641).[2] Non-specific low back pain is low back pain not attributed to a recognisable pathology (such as infection, tumour, osteoporosis, rheumatoid arthritis, fracture, or inflammation).[1] This review excludes low back pain with symptoms or signs at presentation that suggest a specific underlying condition. People with sciatica (lumbosacral radicular syndrome) or pain due to herniated discs are also excluded.

INCIDENCE/ PREVALENCE Over 70% of people in developed countries will experience low back pain at some time in their lives.[3] Each year, 15–45% of adults suffer

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low back pain, and 1/20 people present to hospital with a new episode. About 2–7% of patients with acute low back pain will go on to become chronic. Low back pain is most common between the ages of 35–55 years.[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 chapter only covers non-specific chronic low back pain. Risk factors for the development of non-specific low back pain include heavy physical work, frequent bending, twisting, lifting, and prolonged static postures. Psychosocial risk factors include anxiety, depression, and mental stress at work.[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 seems to be favourable, and most pain will resolve within 2 weeks. 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 due to low back pain is similarly favourable. One study reported that 67% of patients with sick leave due to low back pain returned to work within a week, and 90% within 2 months. 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 develop coping strategies for pain, with minimal adverse effects from treatment.[2,10]

OUTCOMES

Pain intensity (visual analogue or numerical rating scale); overall improvement (self reported or observed); back pain specific functional status (such as Roland Morris questionnaire, Oswestry questionnaire); impact on employment (days of sick leave, number of people returned to work); medication use; intervention specific outcomes (such as coping and pain behaviour for behavioural treatment, strength, and flexibility for exercise, depression [in people with depression and low back pain] for antidepressants, and muscle spasm for muscle relaxants and electromyographic biofeedback — see glossary, p 1675).

QUESTION What are the effects of oral drug treatments?

OPTION ANALGESICS (PARACETAMOL, OPIOIDS)

One RCT found that tramadol (an opioid) decreased pain and increased function at 7 weeks compared with placebo. One RCT found that a combination of tramadol and paracetamol (acetaminophen) decreased pain and increased function at 3 months compared with placebo. One RCT found no significant difference between paracetamol and diflusinal in the proportion of people who rated the treatment as good or excellent. One RCT found no significant difference in pain relief between a parenteral non-steroidal anti-inflammatory drug and a parenteral opioid analgesic.

Benefits:

Analgesics versus placebo: We found no systematic reviews but we found two RCTs.[13,14] The first RCT (254 people) found that tramadol (an opioid) significantly decreased pain and significantly improved functional status at 7 weeks compared with placebo (pain on a 10 cm visual analogue scale: 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).[13] The second RCT (318 people) found that a combination of tramadol plus paracetamol (acetaminophen) significantly decreased pain and significantly improved function compared with placebo at 3 months (pain score at baseline and 3 months on 100 mm visual analogue scale, 311 people: 71.1–44.4 mm with combination *v* 68.8–52.3 mm with placebo; P = 0.015 for difference in final values; change in function on Roland Morris Disability Questionnaire, 297 people: –4.1 with combination *v* –2.6 with placebo; P = 0.023).[14] **Analgesics versus non-steroidal anti-inflammatory drugs:** See non-steroidal anti-inflammatory drugs, p 1700.

Harms:

RCTs found adverse effects (constipation and drowsiness) with analgesics in about 50% of people.[2,15] The RCT comparing tramadol plus paracetamol (acetaminophen) versus placebo found that combination treatment increased discontinuation because of adverse effects and significantly increased nausea, somnolence and constipation compared with placebo (discontinuation: 18.6% *v* 5.7%, P not reported; nausea: 13% *v* 3.2%, P = 0.001; somnolence: 12.4% *v* 1.3%, P < 0.001; constipation: 11.2% *v* 5.1%, P = 0.003).[14] One systematic review (search date 1995) in people with pain of different types compared combinations of paracetamol plus weak opioids versus paracetamol alone.[15] It 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:

None.

OPTION ANTIDEPRESSANTS

One systematic review found that antidepressants decreased pain compared with placebo, but found no consistent difference in function. One RCT found that maproteline increased pain relief compared with

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paroxetine. Four additional RCTs found no significant difference in depression between antidepressants and placebo, and two additional RCTs found that antidepressants improved depression in people with chronic low back pain.

Benefits: **Versus placebo:** We found one systematic review (search date 2000; 9 RCTs, 504 people)[16] and six additional RCTs (2 RCTs in people with low back pain and depression; 2 RCTs in people with low back pain without depression; 2 RCTs did not report whether people were depressed).[17–22] The review found that antidepressants significantly increased pain relief compared with placebo but found no significant difference in functioning (pain: SMD 0.41, 95% CI 0.22 to 0.61; function: SMD +0.24, 95% CI −0.21 to +0.69).[16] The six additional RCTs compared an antidepressant (imipramine, amitriptyline, trazodone, nortriptyline, doxepin, maprotiline, paroxetine, or clomipramine) versus placebo and reported on depression. Four RCTs found no significant difference in depression, although two RCTs[18,20] found that antidepressants significantly reduced depression compared with placebo. **Versus each other:** We found one systematic review (search date 2000; 1 RCT[21], 67 people).[16] The included RCT found that maprotiline significantly increased pain relief compared with paroxetine (mean decrease on 0–20 scale: 5.41 with maprotiline *v* 2.34 with paroxetine).[21]

Harms: Adverse effects of antidepressants include dry mouth, drowsiness, constipation, urinary retention, orthostatic hypotension, and mania.[2] One RCT found that the prevalence of dry mouth, insomnia, sedation, and orthostatic symptoms was 60–80% with tricyclic antidepressants.[17] However, rates were only slightly lower in the placebo group and none of the differences were significant.

Comment: None.

OPTION MUSCLE RELAXANTS

Two RCTs identified by a systematic review found that tetrazepam reduced pain and increased overall improvement after 10–14 days compared with placebo. Two RCTs identified by a systematic review found that non-benzodiazepines (flupirtine and tolperisone) increased overall improvement after 7–21 days but found no significant difference for pain. Adverse effects of muscle relaxants include dizziness and drowsiness.

Benefits: We found one systematic review (search date 2001, 5 RCTs).[23] **Benzodiazepines versus placebo:** The review (2 RCTs, 222 people) found that 50 mg tetrazepam three times daily significantly reduced pain and significantly increased overall improvement after 8–14 days compared with placebo (pain: RR 0.71, 95% CI 0.54 to 0.93; no overall improvement: RR 0.63, 95% CI 0.42 to 0.97).[23] **Non-benzodiazepines versus placebo:** The review identified three RCTs, which compared non-benzodiazepines (flupirtine, tolperisone, cyclobenzaprine) versus placebo, and found different results.[23] The first RCT identified by the review (107 people) found that flupirtine reduced pain at 7 days compared with placebo, but the difference was not statistically significant (AR for reduction in pain intensity by 2 categories on 5 point scale: 54.3% with flupirtine

v 33.4% with placebo).[24] However, it found that flupirtine significantly improved overall assessment by physician compared with placebo at 7 days (physician rating "very good", "good" or "satisfactory": 84.8% with flupirtine *v* 54.3% with placebo). The second RCT identified by the review (112 people) found that tolperisone 100 mg three times daily significantly increased the proportion of people reporting improvement at 21 days compared with placebo, but found no significant difference between treatments in pain.[25] The third RCT identified by the review (76 people) did not assess pain, global improvement, or function.[26]

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).[23]

Comment: None.

OPTION NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

One small RCT found that naproxen reduced pain compared with placebo. One systematic review and one subsequent RCT found no significant differences in symptoms between different non-steroidal anti-inflammatory drugs. One RCT identified by the review found no significant difference between diflunisal and paracetamol in the proportion of people who rated the treatment as good or excellent. One RCT found no significant difference in pain relief between a parenteral non-steroidal anti-inflammatory drug and a parenteral opioid analgesic. Two RCTs found that COX 2 inhibitors decreased pain and improved function at 4–12 weeks compared with placebo, but effects were small.

Benefits: **NSAIDs versus placebo:** We found one systematic review (search date 1998).[27] One small RCT (37 people) identified by the review found that naproxen but not diflunisal significantly increased pain relief compared with placebo (data presented graphically).[27] **NSAIDs versus each other:** We found one systematic review (search date 1998; 4 RCTs, 453 people)[27] and one subsequent RCT.[28] All four RCTs identified by the review found no significant difference between different non-steroidal anti-inflammatory drugs for symptoms.[27] The subsequent RCT (196 people) found no significant difference between nimesulide and diclofenac in pain or functional status.[28] **NSAIDs versus analgesics:** We found one systematic review (search date 1998; 2 RCTs, 184 people).[27] The first RCT (29 people) identified by the review found no significant difference between diflunisal and paracetamol in the proportion of people rating their treatment as good or excellent at 4 weeks (10/16 [62%] *v* 4/12 [33%]).[27] However, the study may have lacked power to exclude a clinically important difference. The second RCT (155 people) identified by the review found no significant difference in pain relief between a parenteral non-steroidal anti-inflammatory drug and a parenteral opioid.[27] **COX 2 inhibitors versus placebo:** We found no systematic review, but found two RCTs.[29,30] Both RCTs found that COX 2 inhibitors decreased pain and improved function compared with placebo, but effects were

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small. The first RCT (319 people) found that 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 visual analogue scale: 12.9 mm for 60 mg etoricoxib and 10.3 mm for 90 mg etoricoxib, both $P \leq 0.001$; improvement in function compared with placebo on Roland Morris Disability Score [on a scale from 0–24 points]: 2.42 with 60 mg etoricoxib, $P \leq 0.001$ and 2.06 with 90 mg etoricoxib, $P \leq 0.01$).[29] The second RCT (690 people) found that rofecoxib 25 mg and 50 mg significantly decreased pain and improved function compared with placebo at 4 weeks (improvement in pain compared with placebo on 100 mm visual analogue scale: 13.5 mm with 25 mg rofecoxib and 13.8 mm with 50 mg rofecoxib; $P < 0.001$; improvement compared with placebo in function on Roland Morris Disability Score [0–24 points]: 2.2 with 25 mg rofecoxib and 2.3 with 50 mg refecoxib; $P < 0.001$).[30]

Harms: Non-steroidal anti-inflammatory drugs may cause gastrointestinal complications (see non-steroidal anti-inflammatory drugs, p 1700). Some RCTs in people with acute and chronic back pain have found that ibuprofen and diclofenac have the lowest gastrointestinal complication rate mainly because of the low doses used in practice (pooled OR for adverse effects *v* placebo 1.30, 95% CI 0.91 to 1.80).[2,31,32] The first subsequent RCT found that nimesulide has a similar rate of gastrointestinal adverse effects to diclofenac.[28] The third subsequent RCT found no significant difference between etoricoxib (60 mg and 90 mg) and placebo in overall adverse effects or headache, nausea, or diarrhoea at 12 weeks (overall: 46.8% with placebo *v* 58.3% with 60 mg etoricoxib *v* 52.3% with 90 mg etoricoxib; headache: 5.5% with placebo *v* 11.7% with 60 mg etoricoxib *v* 5.6% with 90 mg etoricoxib; nausea: 2.8% with placebo *v* 5.8% with 60 mg etoricoxib *v* 7.5% with 90 mg etoricoxib; diarrhoea: 1.8% with placebo *v* 3.9% with 60 mg etoricoxib *v* 8.4% with 90 mg etoricoxib).[29] The fourth subsequent RCT found no significant difference between rofecoxib (25 mg and 50 mg) and placebo in overall adverse effects at 4 weeks (40.8% with placebo *v* 48.1% with 25 mg rofecoxib *v* 46.4% with 50 mg rofecoxib).[30] It found that the most common adverse effects were headache and diarrhoea (headache: 10.1% with placebo *v* 8.2% with 25 mg rofecoxib *v* and 6.6% with 50 mg rofecoxib; diarrhoea: 3.5% with placebo *v* 7.3% with 25 mg rofecoxib *v* 4.8% with 50 mg rofecoxib).[30]

Comment: None.

QUESTION What are the effects of injection therapy?

OPTION EPIDURAL STEROID INJECTIONS

We found no systematic reviews or RCTs in people with chronic back pain who did not have sciatica.

Benefits: **Versus placebo:** We found one systematic review (search date 1996, 4 RCTs, 302 people) comparing epidural steroid injections versus placebo.[33] However, all identified RCTs included people with sciatica (see glossary, p 1676), which is not discussed in this topic. We found no subsequent RCTs.

Harms: We found no RCTs.

Comment: None.

OPTION FACET JOINT INJECTIONS

One RCT identified by a systematic review found no significant difference in pain relief and disability between corticosteroid and saline injections after 1 and 3 months. Adverse effects include infection, haemorrhage, chemical meningitis. and neurological damage.

Benefits: We found one systematic review (search date 1996, 1 RCT, 101 people with chronic back pain and without sciatica [see glossary, p 1676]; see comment below).[33] The RCT 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).

Harms: The review found that adverse effects included pain at injection site, infection, haemorrhage, neurological damage, and chemical meningitis.[33]

Comment: Two other RCTs identified by the review[33] did not distinguish between acute and chronic pain, involved people with sciatica, and so these RCTs have not been included.

OPTION LOCAL INJECTIONS

One systematic review found no significant difference between local injections (local anaesthetic and corticosteroids) and placebo in short term pain relief.

Benefits: We found one systematic review (search date 1996, 4 RCTs, 200 people).[33] It found no significant difference between local injection therapy (local anaesthetic and corticosteroids) and placebo in short term pain relief (3 RCTs; 137 people; RR 0.80, 95% CI 0.40 to 1.59).

Harms: The review found that potential harms included nerve or other tissue damage, infection, and haemorrhage.[2]

Comment: One study included in the review compared local injection plus forceful manipulation with light manipulation plus placebo injection, and was not included.

QUESTION What are the effects of non-drug treatments?

OPTION BACK SCHOOLS

One systematic review and one subsequent RCT found limited evidence that back schools reduced pain and disability compared with inactive treatments (waiting list control, placebo gel, or written advice) or no treatment within 6 months, although results suggested that benefits may not persist in the longer term. Three RCTs identified by the review compared back schools with other treatments and found mixed results.

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Benefits: We found one systematic review[34] (search date 1997, 8 RCTs in people with chronic back pain) and one subsequent RCT.[35] RCTs identified by the review used back schools (see glossary, p 1675) interventions of variable intensity.[34] The review did not pool data from the studies (see table 1, p 1680). **Versus no treatment or inactive control treatments:** Results from six RCTs identified by the review 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 1680).[36–38,41–43] The subsequent RCT (104 male construction workers with chronic low back pain) found that back schools significantly increased overall improvement compared with no treatment after 8 weeks and 6 months (8 weeks: AR for reduced or no back pain: 71% with back school *v* 14% with no treatment pain; 6 months 43% with back school *v* 14% with no treatment; P value not reported).[35] **Versus other treatments:** Three RCTs identified by the review compared back school versus other active treatments (spinal manipulation, non-steroidal anti-inflammatory drugs, physiotherapy, callisthenics, and exercise) and found different results (see table 1, p 1680).[38–40] The first RCT found that back school reduced pain compared with exercise at 16 weeks.[40] The second RCT found that callisthenics significantly reduced the duration of low back pain compared with back school.[39] The third RCT found that back school improved pain at 2 and 6 months compared with controls, which included spinal manipulation, non-steroidal anti-inflammatory drugs, and physiotherapy in a subgroup of people with chronic pain.[38]

Harms: The review and subsequent RCT did not report on harms.[34,35]

Comment: We found another more recent systematic review (search date 2000, 18 RCTs), which combined randomised and non-randomised studies, compared back schools, no treatment, and other active treatments in the same meta-analysis, and did not take the methods of the studies into account.[44] 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.[44]

OPTION BEHAVIOURAL THERAPY

One systematic review found that behavioural therapy reduced pain and improved functional status and behavioural outcomes compared with no treatment, placebo, or waiting list control. The review and one subsequent RCT provided no evidence of a difference in functional status, pain, or behavioural outcomes between different types of behavioural therapy. The review found insufficient evidence to compare behavioural therapy with other treatments.

Benefits: We found one systematic review[45] (search date 1999; 20 RCTs) and one subsequent RCT.[46] **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: SMD 0.62, 95% CI 0.25 to 0.98; behavioural outcomes: SMD 0.40, 95% CI 0.10 to 0.70).[45] It found that behavioural therapy increased function but the difference was not statistically significant (SMD +0.35, 95% CI −0.04 to +0.74). **Different types of behavioural therapy versus each other:** The review identified nine RCTs (308 people), which found no statistically significant difference between different types of behavioural therapy (cognitive behavioural therapy, operant behavioural treatments, and respondent behavioural treatment — see glossary, p 1675) in functional status, pain, or behavioural outcomes (including anxiety, depression, pain behaviour, and coping.[45] The subsequent RCT (84 people recently on sick leave with low back pain) compared problem solving therapy versus group education.[46] All participants also received behavioural graded activity (see glossary, p 1675). The RCT found that problem solving therapy significantly reduced total sick leave compared with group education between 6 months and 1 year after treatment (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; $P < 0.05$).[46] 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. Results of the RCT may, therefore, be 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: 8.9% at baseline to 75% at 6 months and 85.4% at 12 months with problem solving *v* 20.5% at baseline to 70.3% at 6 months and 62.9% at 12 months with group education; P value not reported). **Versus other treatments:** Two RCTs (202 people) identified by the review found that behavioural therapy significantly increased the proportion of people who had 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 months or 12 months (no statistical pooling of data).[45] Six RCTs (343 people) identified by the review comparing behavioural therapy plus other treatments (physiotherapy and back education, multidisciplinary treatment [see glossary, p 1675] programmes, inpatient pain management programmes, and back exercises) 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 (no statistical pooling of data).[45]

Harms: The review did not report on harms.[45]

Comment: None.

OPTION ELECTROMYOGRAPHIC BIOFEEDBACK

One systematic review found no significant difference in pain relief or functional status between electromyographic biofeedback and placebo or waiting list control, but found insufficient evidence on the effects of electromyographic biofeedback compared with other treatments.

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Benefits: We found one systematic review (search date 1995, 5 RCTs, 168 people, no statistical pooling of data).[12] **Versus placebo or waiting list control:** Three RCTs (102 people) identified by the review found no significant difference between electromyographic biofeedback (see glossary, p 1675) and placebo or waiting list control in pain relief or functional status.[12] **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 or range of movement.[12]

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

Comment: None.

OPTION EXERCISE

RCTs found insufficient evidence on the effects of different types of exercise, or exercise compared with other treatments.

Benefits: **Versus inactive treatment:** We found one systematic review (search date 1999; 6 RCTs, 587 people)[47] and one additional small RCT.[48] The RCTs identified by the review compared exercise versus inactive treatments (hot packs plus rest, semi-hot packs plus sham traction, waiting list control, transcutaneous electrical nerve stimulation [TENS], sham TENS, detuned ultrasound, or short wave diathermy).[47] Three of these RCTs found that exercise significantly increased overall improvement, whereas the remaining three RCTs found no significant difference in overall improvement. The additional small RCT (59 people) found that active rehabilitation consisting of 24 exercise sessions during 12 weeks significantly improved pain intensity and functional disability compared with inactive treatments.[48] **Versus other treatments:** We found one systematic review[47] (search date 1999; 9 RCTs, 1020 people), three additional RCTs (four publications),[49–52] and one subsequent RCT.[53] Three high quality RCTs identified by the review found no significant difference between exercise and conventional physiotherapy in pain, functional status, overall improvement, or return to work. The first additional RCT found that exercise (as part of a combined physiotherapy programme) significantly improved pain, functional status, and return to work compared with usual care by the general practitioner.[52] The second additional RCT (132 people) found that exercise with or without psychological pain management did not significantly reduce sick leave, but was significantly less effective at improving pain and functioning compared with a multidisciplinary programme after 4 and 24 months (after 4 months: median days of sick leave 13 with exercise *v* 122 with exercise plus psychosocial pain management *v* 25 with multidisciplinary programme; after 24 months: 11 with exercise *v* 37 with exercise plus psychosocial pain management *v* 2.5 with multidisciplinary programme).[49,50] The third additional RCT (190 people) found no significant difference between exercise and massage (see glossary, p 1675) in pain and disability 4 weeks after the end of treatment

(data for comparison not reported).[51] The small subsequent RCT (49 people) compared 16 sessions of manual therapy (spinal manipulation, specific mobilisation, and stretching) versus exercise therapy for 8 weeks.[53] It found that manual therapy significantly decreased pain and increased functioning and return to work compared with exercise therapy at 1 year (pain on 0–100 mm visual analogue scale: 21 mm with manual *v* 35 mm with exercise; P < 0.01; function on 0–45 point Oswestry Low Back Pain Disability Questionnaire score: 17 with manual *v* 26 with exercise; P < 0.01; partly or fully sick listed: 19.5% with manual *v* 59% with exercise; P < 0.01).[53] **Versus each other:** We found two RCTs (five publications).[54–58] The first RCT (148 people) found no significant difference between active physiotherapy, muscle reconditioning with training devices, and low impact aerobics in pain intensity after 6 months and 1 year, but found that muscle reconditioning and also aerobic exercises reduced disability after 6 and 12 months compared with active physiotherapy, but differences were very small (disability on Roland Morris Disability Scale: 6.7 *v* 6.3 *v* 6.8; 12 months: 5.7 *v* 5.4 *v* 7.7).[55–58] The second RCT found that a combined exercise and motivation programme significantly reduced pain and significantly improved disability after 4 and 12 months compared with exercises alone (pain on 110 mm VAS, 4 months: 32.7 mm with combination *v* 39.8 mm with exercise alone; P = 0.026; 12 months: 26.4 mm with combination *v* 41.9 mm with exercise alone; P = 0.006; disability on Greenough and Fraser scale [scale of results 0–75], 4 months: 57.2 with combination *v* 51.0 with exercise alone; P = 0.004; 12 months: 58.9 with combination *v* 50.9 with exercise alone; P = 0.004).[54] **Extension exercises (including McKenzie exercises):** See glossary, p 1675. We found one systematic review (search date 1999; 3 RCTs, 153 people), which compared extension versus flexion back exercises.[47] Two of the identified RCTs found no significant difference in pain intensity, and the third RCT found that extension exercises significantly reduced global improvement compared with flexion exercises. A subsequent RCT (60 patients) found no significant difference between extension exercises and whole body vibration exercises in pain intensity (VAS scale 0–10) and disability (Pain Disability Index 0–70, where 0 = no limitation and 70 = most severe limitation) during 12 weeks of treatment and after 6 months (pain intensity: data not shown; change in pain disability index: from 20.3 at baseline to 10.5 after treatment with extension *v* 20.7 at baseline to 11.6 after treatment with vibration).[59] **Strengthening exercises:** We found one systematic review (search date 1999; 9 RCTs, 899 people), which found no significant difference between strengthening exercises and other types of exercise in outcomes, and found conflicting evidence on strengthening exercises compared with inactive treatment.[47] **Postural exercises (Mensendieck/Cesar):** We found two RCTs (three publications).[60–62] The first RCT (77 people who had just finished treatment for their last episode of back pain) found that a Mensendieck exercise (see glossary, p 1675) group treatment for 13 weeks significantly reduced recurrences of back pain compared with usual care, but found no significant differences in sick leave, pain, or functioning after 1 and 3 years (recurrence: 58% *v* 77%).[61,62] The

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second RCT (222 people) found that Cesar therapy (see glossary, p 1675) significantly increased overall improvement after 3 and 6 months compared with usual care by the general practitioner, but found no statistically significant difference after 1 year (3 months: 80% *v* 47%; 6 months: 78% *v* 51%; 1 year: 61% *v* 66%).[60] **Group exercises:** We found one RCT (109 people).[51] It found no significant differences between individual and group exercises in pain and disability 4 weeks after the end of treatment (P = 0.55 for difference in pain and disability).

Harms: The reviews and RCTs did not report on harms.[47,48,50,51,53–58,60–62]

Comment: None.

OPTION LUMBAR SUPPORTS

We found insufficient evidence on the effects of lumbar supports.

Benefits: We found one systematic review (search date 1999, 1 RCT).[63] 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.[63] 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.[63] Harms associated with prolonged lumbar support use include decreased strength of the trunk musculature, a false sense of security, heat, skin irritation, and general discomfort.

Comment: Five RCTs (1200 people) identified by the review did not differentiate between acute and chronic pain.[63]

OPTION MULTIDISCIPLINARY TREATMENT PROGRAMMES

One systematic review found that intensive multidisciplinary biopsychosocial rehabilitation with functional restoration reduced pain and improved function compared with inpatient or outpatient non-multidisciplinary treatments or usual care. The review found no significant difference between less intensive multidisciplinary treatments and non-multidisciplinary treatment or usual care in pain or function.

Benefits: We found one systematic review (search date 1998, 10 RCTs, 1964 people, no statistical pooling), which compared multidisciplinary treatment (see glossary, p 1675) versus a control treatment.[64] The review 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.[64] The review found no statistically significant difference between less intensive outpatient multidisciplinary treatments and non-multidisciplinary outpatient treatment or usual care in pain or function.[64]

Harms: The review did not report on harms.[64]

Comment: We found one RCT (195 people), which compared three treatments: extensive multidisciplinary treatment, light multidisciplinary treatment, and usual care.[65] There was no overall analysis according to treatment allocation. However, subgroup analysis found that men returned to work more quickly with light multidisciplinary treatment (one sessions of 4 hours) than with usual care. It found no significant differences between extensive multidisciplinary treatment (6 hour sessions, 5 days per week, 4 weeks) and usual care in men and no significant differences between any two interventions in women.[65]

OPTION PHYSICAL CONDITIONING PROGRAMMES

Two RCTs identified by a systematic review found that physical conditioning programmes (consisting of a cognitive behavioural approach plus physical training) reduced sick days overall but not the risk of being off work at 12 months compared with general practitioner care.

Benefits: We found one systematic review of physical conditioning programmes compared with other treatments in adults with work disability related to back pain (search date 2000, 16 relevant RCTs).[66] The programmes were heterogeneous, all involving a cognitive behavioural approach plus a range of types of physical training (including aerobics, muscle strength and endurance training, and co-ordination training) given by a physiotherapist or a multidisciplinary team. The interventions varied in length from one session only to 1 hour per week for 18 months, most lasting between 3 and 6 weeks. **Versus general practitioner care:** The review found that physical conditioning programmes reduced the number of sick days compared with general practitioner advice or care after 12 months (2 RCTs, 160 people, average reduction in sick days: 45, 95% CI 3 to 88). There was no significant difference between physical conditioning programmes and general practitioner advice or care in the proportion of people off work at 12 months (physical conditioning *v* general practitioner care: OR 0.8, 95% CI 0.58 to 1.09).[66]

Harms: The review did not report on harms.[66]

Comment: None.

OPTION MASSAGE

One systematic review found insufficient evidence about effects of massage compared with inactive treatments or other treatments.

Benefits: We found one systematic review (search date 2001; 9 RCTs, 891 people; no statistical pooling of data; see comment below).[67] The review included one RCT (107 people), which found that massage (see glossary, p 1675) combined with exercises and education significantly reduced pain and improved functioning compared with soft tissue manipulation, remedial exercise and posture education, and inactive treatment (sham laser) after treatment (pain, mean McGill pain questionnaire PPI 0.44 with massage *v* 1.04 with soft tissue manipulation *v* 1.64 with remedial exercise and positive eduction *v* 1.65 with inactive treatment; function, mean Roland

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Morris score 2.36 *v* 3.44 *v* 6.82 *v* 6.85). Results after 1 month were similar. However, this RCT included people with back pain of between 1 week and 8 months duration (mean duration 3 months). Seven RCTs included in the review compared massage with other treatments and found conflicting results.

Harms: The review did not report on harms.[67]

Comment: Problems with control group selection in the included RCTs limit the usefulness of their results.[67]

OPTION SPINAL MANIPULATIVE THERAPY

One systematic review found that spinal manipulative therapy reduced pain in the short and long term and improved short term function compared with sham manipulation, but found no significant difference in function after more than 6 weeks. The systematic review found no significant difference in pain or function between spinal manipulative therapy and general practitioner care, physical therapy, exercises, or back school. Two subsequent RCTs compared spinal manipulation with exercise and found that spinal manipulation reduced pain at 6–12 months, but found different results for function. One of the RCTs found that spinal manipulation increased return to work at 12 months compared with exercise therapy.

Benefits: We found one systematic review (search date 2001, 14 RCTs, 1596 people),[68] and two subsequent RCTs.[53,69] The review found that spinal manipulative therapy reduced pain in the short (< 6 weeks) and long term (> 6 weeks) compared with sham manipulation, and improved function in the short term (3 RCTs, 229 people; mean score improvement between groups in short term on 100 mm VAS: 10 mm; 95% CI 3 to 17 mm; in long term: 19 mm; 95% CI 3 to 35 mm; mean improvement between groups in function on Roland Morris Scale: 3.3; 95% CI 0.6 to 6.0).[68] 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), physical therapy, exercise (2 RCTs, 361 people), or back school (see glossary, p 1675) (3 RCTs, 238 people).[68] 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 [see glossary, p 1675]; improvement in pain on VAS: 4 mm; 95% CI 0 to 8; 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 > 8 weeks) compared spinal manipulative therapy with exercise therapy in a course of 16 treatments over 2 months.[53] It found that spinal manipulation significantly decreased pain and increased functioning and return to work at 12 months compared with exercise therapy (pain on a 0–100 mm VAS scale: 21 mm with manipulation *v* 35 mm with exercise, P < 0.01; disability on the 0–50 point Oswestry Disability Index: 17 with manipulation *v* 26 with exercise, P < 0.01; partly or fully sick listed: 19% with manipulation *v* 59% with exercise, RR 0.31, 95% CI 0.11 to 0.78).[53] The

second subsequent RCT (91 people, 66 assessed at 6 months) compared three treatments: osteopathic manipulation; sham manipulation; and no treatment control.[69] Manipulation was carried out in seven sessions over 5 months. It found that spinal manipulation therapy and sham manipulation significantly reduced pain at 6 months compared with no treatment, but found no significant difference in function (pain on 10 cm VAS: results presented graphically, P = 0.02 for both comparisons; no values for function using Roland Morris Disability scores).[69]

Harms: In the RCTs identified by the review that used a trained therapist to select people and perform spinal manipulation, the risk of serious complications was low (estimated risks: vertebrobasilar strokes 1/20 000 to 1/1 000 000 people; cauda equina syndrome < 1/1 000 000 people).[68] Neither of the subsequent RCTs assessed harms.[53,69]

Comment: Current guidelines do not advise spinal manipulation in people with severe or progressive neurological deficit.[2,70]

OPTION TRACTION

One systematic review and two additional RCTs found no significant difference between traction and placebo or between traction plus massage and interferential treatment in pain relief or functional status.

Benefits: We found one systematic review (search date 1995, 1 RCT)[10] and two additional RCTs.[71,72] Two RCTs (176 people) found no significant difference between traction and placebo in global improvement, pain relief, or functional status after 5–9 weeks.[10,72] The second additional RCT (152 people) found no significant difference between lumbar traction plus massage and interferential treatment (see glossary, p 1675) in pain relief or improvement of disability 3 weeks and 4 months after the end of treatment.[71]

Harms: The review and additional RCTs did not report on harms.[10,71,72] Potential adverse effects include debilitation, loss of muscle tone, bone demineralisation, and thrombophlebitis.[2]

Comment: None.

OPTION TRANSCUTANEOUS ELECTRICAL NERVE STIMULATION

One systematic review found no significant difference in pain relief between transcutaneous electrical nerve stimulation and sham stimulation.

Benefits: We found one systematic review (search date 2000, 5 RCTs, 421 people).[73] It found no significant difference between transcutaneous electrical nerve stimulation and sham stimulation in pain measured using a visual analogue scale (3 RCTs, 171 people; pooled standardised mean difference –0.21, 95% CI –0.51 to +0.1).[73]

Harms: The review did not report on harms.[73]

Comment: None.

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OPTION ACUPUNCTURE

Two systematic reviews and two subsequent RCTs found insufficient evidence about the effects of acupuncture compared with placebo or no treatment. One systematic review and one subsequent RCT found limited evidence that acupuncture reduced pain intensity and increased overall improvement compared with transcutaneous electrical nerve stimulation

Benefits: We found two systematic reviews (search dates 1996, 12 RCTs; see comment below)[74,75] and three subsequent RCTs.[76–78] The reviews identified seven RCTs (380 people) comparing acupuncture (see glossary, p 1675) versus no treatment, placebo acupuncture, waiting list control, or transcutaneous electrical nerve stimulation (TENS).[74,75] One review found no significant difference between acupuncture and placebo acupuncture or no treatment in clinical outcomes. This review concluded that the methodological quality of the trials was very poor and did not warrant any firm conclusions.[75] The second review found that acupuncture increased overall improvement compared with control interventions but found no significant difference between acupuncture and placebo acupuncture in pain and functioning (versus controls: OR 2.3, 95% CI 1.3 to 4.1; versus placebo: OR 1.4, 95% CI 0.8 to 2.3).[74] The first subsequent RCT (60 people) found that acupuncture significantly reduced pain intensity and the number of analgesic tablets consumed a week compared with TENS (median pain intensity on a 200 mm visual analogue scale: 140 at baseline and 60 at follow up with acupuncture *v* 101 at baseline and 63 at follow up with TENS; mean weekly analgesic tablet consumption 28 at baseline and 14 at follow up with acupuncture *v* 42 at baseline and 24 at follow up with TENS). However, at baseline, people in the acupuncture group had a higher pain score and used fewer tablets than people allocated to TENS. Results of the RCT may, therefore, be confounded by these factors, and not due to difference in relative effectiveness of the treatments.[76] The second RCT (50 people) compared three treatments: manual acupuncture, electroacupuncture, and mock TENS (placebo).[77] It found that manual and electroacupuncture significantly increased overall clinical improvement after 1 month compared with placebo (judged subjectively by investigator blinded to treatment allocation; 16/34 [47%] with acupuncture *v* 2/16 [13%] with placebo, $P < 0.05$; CI not reported). The third RCT (131 people) compared three treatments: acupuncture, sham acupuncture, and no treatment.[78] It found that acupuncture significantly reduced pain intensity and disability after 3 months, and disability after 9 months compared with no treatment. It found no significant difference between acupuncture and sham acupuncture for pain intensity and disability 9 months after the end of treatment (improvement in 10 cm visual analogue pain score 1.7 for acupuncture *v* 1.8 for sham acupuncture and 0.9 for no treatment; improvement in 70 point pain disability index 9.0 for acupuncture *v* 8.5 for sham acupuncture and 2.3 for no treatment).

Harms: One systematic review found that serious and rare adverse effects included infections (HIV, hepatitis, bacterial endocarditis) and visceral trauma (pneumothorax, cardiac tamponade).[75]

Comment: Three RCTs identified by the systematic reviews combined acute and chronic low back pain, and two RCTs did not specify the duration of symptoms.[74,75] One RCT identified by the reviews included people with back and neck pain.[74,75]

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.

Cesar therapy Cesar therapy is based on the hypothesis that there is an association between postural and movement deficiencies and back pain. The treatment aims to initiate a learning process aimed at correction of postural and movement deficiencies.

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.

Interferential therapy Interferential therapy is a low frequency current treatment that uses two medium frequency currents which "interfere" with each other to produce a beat frequency that the body recognises as a low frequency energy source. It is used as treatment for disorders in which inflammation is supposed to be a problem, such as back pain, osteoarthritis, rheumatoid arthritis, muscular pain/strain, and sports injuries.

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.

McKenzie exercises McKenzie exercises use self generated stresses and forces to centralise pain from the legs and buttocks to the lower back. This method emphasises self care.

Mensendieck therapy The Mensendieck approach combines postural exercises and education, emphasising "learning by doing". It is based on the assumption that human beings, through insight and guidance, can take responsibility for their own health and thus avoid the consequences of functional disability. Mensendieck therapy has been used for decades in the Netherlands and Scandinavia.

Multidisciplinary treatment Multidisciplinary treatment is intensive physical and psychosocial training by a team (e.g. a physician, physiotherapist, psychologist, social worker, and occupational therapist). Training is usually given in groups and does not involve passive physiotherapy.

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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.

Substantive changes

Analgesics One RCT added;[14] categorisation unchanged.

Muscle relaxants One systematic review added;[23] recategorised as Trade-off between benefits and harms.

Non-steroidal anti-inflammatory drugs Two RCTs added;[29,30] categorisation unchanged.

Local injections Evidence re-evaluated; option recategorised as Unknown effectiveness.[33]

Behaviour therapy One RCT added;[46] categorisation unchanged.

Exercise One RCT added;[53] recategorised as Likely to be beneficial.

Spinal manipulative therapy One systematic review and two RCTs added;[53,68,69] recategorised as Likely to be beneficial.

Antidepressants Evidence re-evaluated; recategorised as Likely to be beneficial.

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TABLE 1 **RCTs of back schools in people with chronic back pain included in a systematic review[33] (see text, p 1666).**

Ref	Participants	Interventions	Results
36	40 people with back pain > 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).
37	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) + individual physical therapy programmes + 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)
38	239 people with continuous back pain > 2 months duration or an acute-on-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* non-steroidal anti-inflammatory drug 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).

TABLE 1 continued

Ref	Participants	Interventions	Results
39	142 hospital employees	Back school (4 sessions, 90 minutes each over 2 weeks with further session at 2 months) *v* callisthenics (45 minutes 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).
40	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).
41	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).
42	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).

TABLE 1 continued

Ref	Participants	Interventions	Results
43	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).
35	104 male construction workers	Back school *v* no treatment	8 weeks: AR for reduced or no back pain: 71% with back school v 14% with no treatment pain; 6 months 43% with back school v 14% with no treatment; P value not reported

NSAIDS, non-steroidal anti-inflammatory drugs; Ref, reference; VAS, visual analogue scale.