

(Clinical Pain 2011;10:1-37)

Key Words: Low back pain, Clinical practice guideline

- 3) ()
- 4)
- 5) , , ,
(fibromyalgia)
- 6) (worker's compensation)

3.

“ ” 10

1.

1.

1) : 10

2.

2) : 2010 2

2011 5

18
(Task Force

) (Team)”

- 1)
- 2) (Low back pain)

(NICE, 2009)()

()

(PubMed (<http://www.ncbi.nlm.nih.gov/pubmed/>),
Cochrane Library (<http://www.thecochranelibrary.com/view/0/index.html>) - Cochrane Database of Systemic Reviews,
Cochrane Central Register of Controlled trial), Embase (<http://www.embase.com/>)

3)

(1)

(KoreaMed (<http://www.koreamed.org/SearchBasic.php>))

2010 6 30

American society of interventional pain physicians (ASIPP)

(2)

(de novo development)
(Adaptation)

(3)

()

AGREE (Appraisal of Guideline Research and Evaluation)

(4)

A joint clinical practice guideline from the American College of Physician and the American Pain Society (ACP/APS, 2007)()

Adult back pain guideline, Institute for Clinical System Improvement (ICSI, 2008 revision)()

Low back disorders, American occupational medicine practice guideline, American College of Occupational and Environmental Medicine (ACOEM, 2007 revision)()

Low back pain: early management of persistent non-specific low back pain, full guideline, The National Institute for health and Clinical Excellence

2.

(level of evidence)
of recommendation)

(grade

US Agency for Health

Care Policy and Research

A joint clinical practice guideline from the American College of Physician and the American Pain Society

Table 1

randomized controlled trial
 efficacy

Table 2

Table 1. Level of Evidence and Grade of Recommendation (US Agency for Health Care Policy and Research)

Level	Type of evidence
Ia	Evidence obtained from meta-analysis of randomized controlled trials.
Ib	Evidence obtained from at least one randomized controlled trial.
IIa	Evidence obtained from at least one well-designed controlled study without randomization.
IIb	Evidence obtained from at least one other type of well-designed quasi-experimental study.
III	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies.
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities.

Grade	Recommendation
A (evidence Levels Ia, Ib)	Required - at least one randomized controlled trial as part of the body of literature of overall good quality and consistency addressing specific recommendation.
B (evidence Levels IIa, IIb, III)	Required - availability of well conducted clinical studies but no randomized clinical trials on the topic of recommendation.
C (evidence level IV)	Required - evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates absence of directly applicable clinical studies of good quality.
GPP (Good practice points)	Recommended best practice based on the clinical experience of the guideline development group.

Table 2. Level of Evidence and Grade of Recommendation (A Joint Clinical Practice Guideline from the American College of Physician and the American Pain Society)

Grade of Recommendation/Description	Benefit vs Risk and Burdens	Methodological Quality of Supporting Evidence
Strong recommendation, high-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs without important limitations or overwhelming evidence from observational studies
Strong recommendation, moderate quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from observational studies
Strong recommendation, low-quality or very low-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	Observational studies or case series
Weak recommendation, high-quality evidence	Benefits closely balanced with risks and burden	RCTs without important limitations or overwhelming evidence from observational studies
Weak recommendation, moderate-quality evidence	Benefits closely balanced with risks and burden	RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from observational studies
Weak recommendation, low-quality or very low-quality evidence	Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced	Observational studies or case series

10
 - , , , ,
 - : (), , , ,
 - : (), , , ,
 - - : (), , ,
 :
 :

1.

2009 2007
 1 3
 70 90%
 15% 45%,
 30% 1)
 3
 26.4%
 45
 2 5
 25)
 5.91% 11.1%
 6.7)

10
 11)
 12)
 1 4
 2007
 1 3 ()
 2007 20 79
 15.4%
 (18.4%) (12.2%)
 1 3 ()
 5.7% , "
 8.5% 2007
 5,554,256 ,
 1 3 ()
 2,060,829 , "
 3,084,188 (30
 , 25.1%, 26.5%), (30
 9.7%) (19 , 5.9%,
 15.9%)
 8)
 1997 ()
 900 ,
 37,700,000 14,400,000
 60% 9)
 7,000 13)

(Fig. 1)

1. (History taking and Physical examination)

(psychosocial risk factor)

1) : Clinicians should conduct a focused history and physical examination to help place patients with low back pain into 1 of 3 broad categories: non-specific low back pain, back pain potentially associated with radiculopathy or spinal stenosis, or back pain potentially associated with another specific spinal cause. The history should include assessment of psychosocial risk factors, which predict risk for chronic disabling back pain (ACP/APS: strong recommendation, moderate-quality evidence).

2) :

(radiculopathy)

(0.01%)

(4%), (0.7%),

([sciatica])

(pseudoclaudication) hood ratio) 2.2, 1.2

(positive likeli-

90%

(straight-leg-raise test, SLR)

(91%, [95% CI, 82 94%])

(26%, [95%

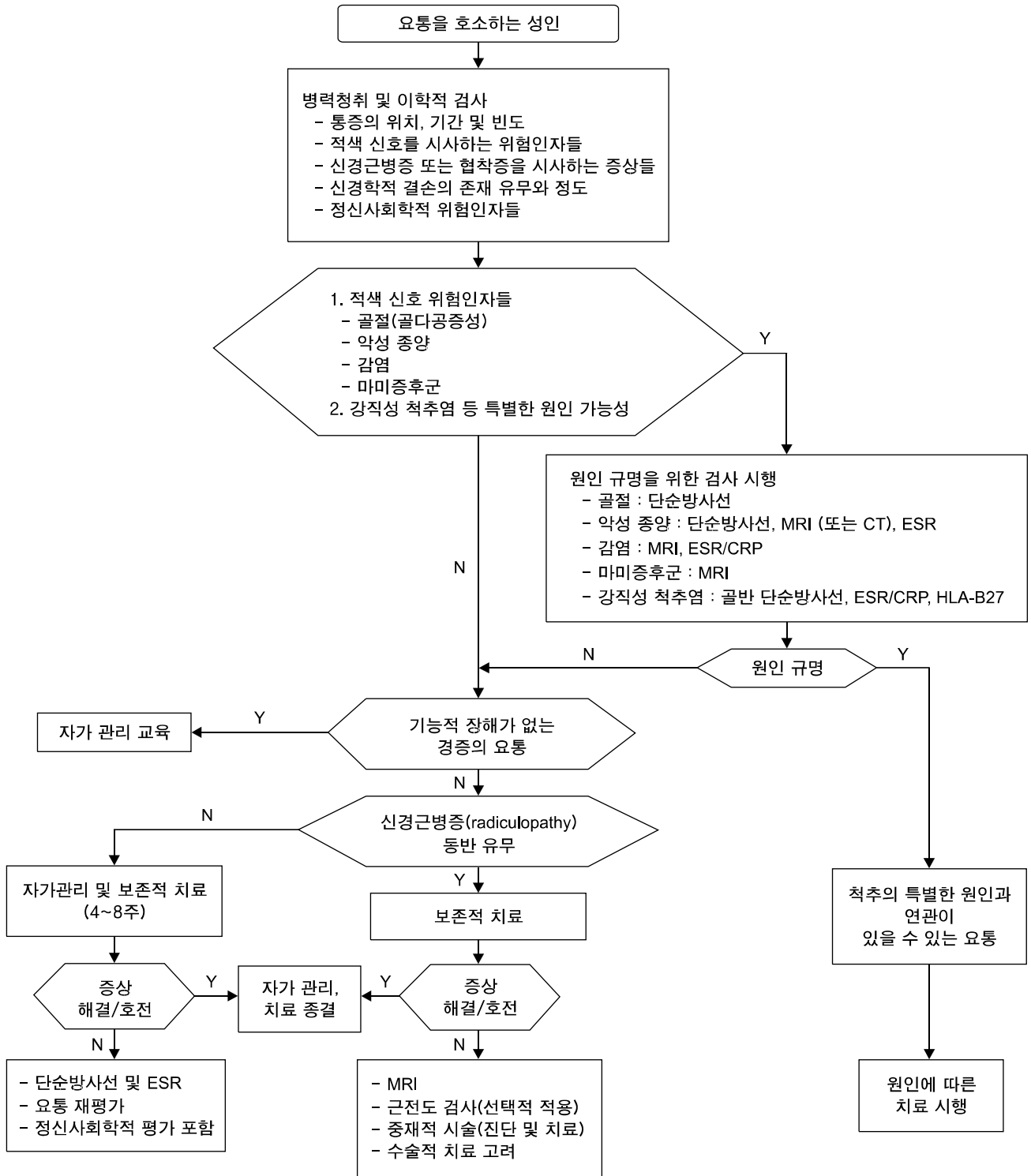


Fig. 1. Flowchart of diagnosis.

CI, 16-38%]) (crossed SLR) (88%, [95% CI, 86-90%]) (29%, [95% CI, 24-34%])^{15,22)}

3) (strong recommendation, high-quality evidence).

2. (Red flag)

(red flag)

1) : APS/ACP, ACOEM, ICSI

- Fracture, osteoporotic
- Older age
- History of osteoporosis
- Steroid use
- Cancer
- Severe localized pain over specific spinal processes
- History of cancer
- Age > 50 years
- Unexplained weight loss
- Pain that worsens when patient is supine
- Pain at night or at rest
- Failure to improve after 4 to 6 weeks conservative therapy
- Tenderness over spinous process and percussion tenderness
- Infection
- Risk factors for spinal infection: recent bacterial infection (e.g., urinary tract infection); IV drug abuse;

- diabetes; or immune suppression (due to corticosteroids, transplant, or HIV)
- Constitutional symptoms, such as recent fever, chills, or unexplained weight loss
- Tenderness over spinous process
- Cauda equina syndrome
- Perianal/perineal sensory loss
- Recent onset of bladder dysfunction, such as urinary retention, increased frequency, or overflow incontinence
- Bowel dysfunction or incontinence
- Severe or progressive neurologic deficit in lower extremities, usually involving multiple myotomes and dermatomes

2) :

16)

15)

20

(15 mg/)

1 g

, 30 mg

5 g

14.42 (95% , 8.29

25.08)

65

,^{24,25)} 50

()

16%, 5%²⁶⁾

90% ()

(positive likelihood ratio)

14.7, 2.7,

1 3.0, 5.0

2.7²⁸⁾

bility) 0.7% 9% , 3

(, 1

50)

1.2%²⁸⁾

2% 7% ,

²⁹⁾

(111 13)
(40%)
28)
.30
(urinary retention) 90%
15)

1) : The history should include assessment of psychosocial risk factors, which predict for chronic disabling back pain (ACP/APS: strong recommendation, moderate-quality evidence).

2) :

3) :
(strong recommendation, moderate-quality evidence).
()

31-33)

34)

35,36)

50

32,33)

4 6

- (1)
- (2)
- (3)
- (4)
- (5)
- (6)
- (7)
- (8)
- (9)

HIV)

37-40)

/

Waddell's sign, (pain drawing),
DSM-IV
CAGE-AID
modified Work APGAR

[overflow])

3)
(1)

3. (Psychological evaluation)

(strong recommendation, moderate-quality evidence).

(2)

(strong recommendation, moderate-quality evidence).

(3) (strong recommendation, moderate-quality evidence).

4.

1) :

(1)

Routine x-rays are not recommended for acute, non-specific LBP. X-rays are recommended for acute LBP with “red flags”, subacute LBP that is not improving over 4 to 6 weeks, or chronic LBP to rule out other possible conditions (ACP/APS, ACOEM, NICE: strong recommendation, moderate-quality evidence).

Flexion and extension views are recommended for evaluating symptomatic spondylolisthesis in which there is consideration for surgery or other invasive treatment or occasionally in the setting of trauma (ICSI: weak recommendation, low-quality evidence).

Oblique view x-rays are not recommended (ICSI: strong recommendation, low-quality evidence).

(2) ;

Roland ³ SF-36 ⁴¹⁾ 6 , 1 ⁴²⁾ (Oblique views)

2

(3)

(strong recommendation, moderate-quality evidence).

(strong recommendation, low-quality evidence).

4 8 (strong recommendation, low-quality evidence).

2) (CT), (MRI):
 CT MRI

(1)

Prompt work-up with CT or MRI is recommended for patients with low back pain when severe or progressive neurologic deficit are present or when serious underlying conditions are suspected on the basis of history and physical examination (ACP/APS: strong recommendation, moderate-quality evidence).

Clinicians should evaluate patients with persistent low back pain and signs or symptoms of radiculopathy or spinal stenosis with MRI (preferred) or CT only if they are potential candidates for surgery or epidural steroid injection (for suspected radiculopathy) (ACP/APS: strong recommendation, moderate-quality evidence).

MRI is recommended for patients with acute low back pain during first 6 weeks if they have demonstrated progressive neurologic deficit, cauda equina syndrome, significant trauma with no improvement in atypical symptoms, a history of neoplasia (cancer), or atypical presentation (e.g. clinical pictures suggests multiple nerve root involvement) (ACOEM: strong recommendation, low-quality evidence).

MRI is not recommended for acute radicular pain syndromes in the first 6 weeks unless they are severe and not trending towards improvement and both the patient and surgeon are willing to consider prompt surgical treatment, assuming the MRI confirms ongoing nerve root compression. Repeated MRI imaging without significant clinical deterioration in symptoms and/or signs is not recommended (ACOEM: low-quality evidence).

MRI is recommended for patients with subacute or chronic back or radicular pain syndromes lasting at least 4 to 6 weeks in whom symptoms are not trending towards improvement if both the patient and surgeon are considering prompt surgical treatment, assuming the MRI confirms ongoing nerve root compression. In case where an epidural glucocorticosteroid injection is being considered for temporary relief of acute and subacute radiculopathy, MRI at 3

to 4 weeks (before the epidural steroid injection) may be reasonable (ACOEM: strong recommendation, moderate-quality evidence).

MRI is recommended as an option for the evaluation of select chronic low back pain patient in order to rule out concurrent pathology unrelated to injury. This option should not be considered before 3 months and only after other treatment modalities (including NSIADs, aerobic exercise, other exercise, and consideration for manipulation and acupuncture) have failed (ACOEM: strong recommendation, low-quality evidence).

CT is recommended for patients with acute or sub-acute radicular pain syndromes that have failed to improve within 4 to 6 weeks and there is consideration for an epidural glucocorticoid injection or surgical discectomy (ACOEM: strong recommendation, low-quality evidence).

(2) ; MRI
 45) 380 190
 , 190 MRI
 3 , 12 SF-36

MRI 46)
 CT MRI

CT/MRI
 47)
 MRI

48)

MRI 16)

MRI CT 49,50)

MRI 51)

50

1 MRI

52)

MRI CT

(3)

4 6

CT MRI
 (strong recommendation, moderate-quality evidence).

CT
 MRI
 (strong recommendation, moderate-quality evidence).

CT MRI MRI
 MRI (strong recommendation, moderate-quality evidence).

(3)

(1)

Bone scanning is not recommended for routine use in patients with low back pain. But it can be a good diagnostic test for evaluating specific situations such as suspected metastases, infected bone (osteomyelitis), inflammatory arthropathies, and fractures or ankylosing spondylitis (ACOEM: strong recommendation, low-quality evidence).

Myelography, including CT or MR myelography, is recommended only in uncommon specific situations (e.g., implanted metal that preclude MRI, equivocal findings of disc herniation on MRI suspected of being false positives, spinal stenosis, and/or a post-surgical situation that requires myelography) (ACOEM, ICSI: weak recommendation, moderate-quality evidence).

(2) ; (spondyloarthropathy)

95%
 25% 53)
 74%, 81%,
 64%, 88%, 79% 54)

, MRI

MRI MRI

	NSAID (ACOEM LOE IV GOR C).	
	:	
(1)	NSAID	NSAID
:		
		68,69)
		:
a. Take regular paracetamol as the first medication option (NICE LOE IV GOR C).	(IIa, B).	
b. For mild or moderate pain, a trial of acetaminophen might be a reasonable first option because it may offer more favorable safety profile than NSAID (ACP/APS LOE II GOR B).	(2) NSAID () : NSAID acetaminophen	
c. Acetaminophen or aspirin as 1st line therapy appear to be the safest to use for patients with known or multiple risk factors for cardiovascular disease (ACOEM LOE IV GOR C).		a. When paracetamol alone provides insufficient pain relief, offer NSAID/CoX-2 and/or weak opioid as a short-term treatment (NICE LOE Ib GOR A).
d. Acetaminophen is recommended for treatment of LBP, particularly for those with contraindication for		b. For more severe pain, a small increase in car-

Table 3. Evidence of Pharmacologic Treatment for Low Back Pain

	IIa	B
	Ib	A
	Ib	A
	IV	C
	Ib	A
Norepinephrine reuptake inhibitor (TCA)	Ib	A
Selective serotonin reuptake inhibitor	IIa	B
	IIb	B
	Ib	A
	IIb	B
	IIb or III	C
	Ib	A
	IV	C
/	Ib	A

diovascular or gastrointestinal risk with NSAIDs in exchange for greater pain relief could be an acceptable trade-off for some patients, but others may consider even a small increase in these risks unacceptable (ACP/APS, ACOEM LOE IV GOR GPP).

c. NSAIDs are recommended for treatment of acute, sub-acute, chronic or post-operative LBP (ACOEM LOE Ib GOR A).

d. NSAIDs are recommended for the treatment of back and radicular pain syndromes including sciatica (ACOEM LOE IV GOR GPP).

e. Concomitant prescriptions of cytoprotective medications are recommended for patients at substantially increased risk for gastrointestinal bleeding (ACOEM LOE Ia GOR A).

: NSAID 1

70

(odd ratio, 0.99, [CI, 0.6 to 1.7]).⁷³
 49.4±24.7

NSAID (

NSAID 74
 NSAID 3 5

Ibuprofen, diclofenac NSAID 75

hibitor 76 proton pump in- 77

a NSAID (Ib,

A).
 b. NSAID (

Ia, A).
 c. NSAID (Ia, A).

(3)

a. Muscle relaxants are sometimes helpful for a few days but can cause drowsiness (ICSI LOE Ib GOR A).

b. Muscle relaxants for acute low back pain are effective for short-term pain relief (ACP/APS LOE Ib GOR A).

c. Recommended as a second line treatment in moderate to severe low back pain that has not been adequately controlled by NSAIDs (ACOEM LOE IV GOR C).

d. Recommended as a second or third line agents for acute radicular pain syndromes or acute post surgical situation (ACOEM LOE IV GOR C).

e. Not recommended for chronic use in subacute or chronic LBP (ACOEM LOE IV GOR GPP).

(2
 4) Tizanidine

NSAID
 AAP, NASID
 78-80 Cyclobezaprine 3

81,82

a (Ia,

A).
 b. (

(4) (Opioid & Tramadol)
 : Opioid

a. Consider offering strong opioids for short-term use to people in severe pain (NICE LOE IV GOR C).

b. Give due consideration to the risk of opioid dependence and side effects for both strong and weak opioids (NICE LOE Ib GOR A).

c. Opioid analgesics are rarely indicated in the treatment of acute low back pain. There is insufficient evidence to support opioid use in early treatment. If used, it should be

only for short term intervention, less than 2 weeks (ICSI LOE IV GOR C).

d. For severe, disabling pain, a trial of opioids in appropriately selected patients may be a reasonable option to achieve adequate pain relief and improve function, despite the potential risks for abuse, addiction, and other adverse events (ACP/APS LOE III GOR B).

e. Routine use of opioids for treatment of any acute, subacute, or chronic LBP condition is not recommended (ACOEM LOE Ib GOR A).

f. For chronic severe back or leg pain, a trial of opioid therapy may be indicated and may be required by specific intractable pain acts (ACOEM LOE Ib GOR A).

g. Limited use of opioids for treatment of acute LBP, post-operative pain management is recommended (ACOEM LOE IV GOR C).

: 3

oxymorphone extended release

(, ,)

⁸³ oxymorphone oxycodone
18

, opioid 30%
, - 0.6 (CI, - 0.69 to - 0.50)

. Tramadol 4 , 6

tramadol

12

⁸⁴⁻⁸⁸

:

opioid (

Ib, A).

(5)

:

.

a. Despite conflicting evidence for antidepressants to reduce pain, there was little risk and low cost associated with treatment, so recommended (NICE LOE IV GOR GPP).

b. Do not offer selective serotonin reuptake inhibitors for treating pain (NICE LOE IIa GOR B).

c. Selective serotonin reuptake inhibitors (paroxetine, bupropion, trazodone) are not recommended for treatment of chronic LBP (ACOEM LOE IIa GOR B).

d. Consider offering TCA if other medications provide insufficient pain relief (NICE LOE IV GOR C).

e. Norepinephrine reuptake inhibitor antidepressants (TCA) e.g. amitriptyline, imipramine, nortriptyline, maprotiline, doxepin are recommended for chronic LBP (ACOEM LOE Ia GOR A).

f. Norepinephrine reuptake inhibitors (TCA) are recommended as there is limited evidence that they result in modest reductions in pain ratings in the treatment of radicular pain compared with placebo (ACOEM LOE III GOR B).

g. Anti-depressants are not recommended for managing acute or subacute LBP as there is no quality evidence supporting their efficacy (ACOEM LOE IV GOR GPP).

: Cochrane Database 10

6

,

SSRI

⁸⁹

⁹⁰ Atkinson

6

8

nortriptyline

8%

22%

⁹¹

(TCA)

etin, trazodone

norepinephrine reuptake

parox-

^{92,93}

a.

nor-

epinephrine reuptake inhibitor

(Ia, A).

b. serotonin reuptake inhibitor

(IIa,

B).

(6)

:

carbamazepine

a. Topiramate is recommended for limited use in selected chronic LBP patients as a fourth or fifth line agent (ACOEM LOE IV GOR GPP).

b. Carbamazepine is recommended as a potential adjunct as a fourth or fifth line treatment for chronic radicular or

neuropathic pain after attempting other treatments (ACOEM LOE IV GOR GPP).

c. Topiramate is not recommended for neuropathic pain, including peripheral neuropathy (ACOEM LOE IV GOR GPP).

d. Gabapentin is not recommended for chronic non neuropathic pain or LBP (ACOEM LOE IV GOR C).

e. There is no recommendation for or against the use of gabapentin for chronic radicular pain syndromes as the evidence is conflicting (ACOEM LOE IV GOR GPP).

f. Gabapentin is recommended for the treatment of severe neurogenic claudication with limited walking distance (ACOEM LOE III GOR C).

: Gabapentin Yildirim

1 2
⁹⁴ Turan
gabapentin 1,200 mg

morphine

rishnan

iramate

()

^{97,98}

(IIb, B).

2. (Lumbar epidural steroid injection)

1) :

2)

(1) Epidural glucocorticosteroid injections is recommended as option for acute or subacute radicular pain syndromes lasting at least 3 weeks after treating with NSAIDs and without evidence of trending towards spontaneous res-

olution (ACOEM LOE Ib GOR A).

(2) Epidural glucocorticosteroid injections is recommended as 2nd-line treatment of acute spinal stenosis flare-ups (ACOEM LOE Ib GOR A).

(3) Epidural glucocorticosteroid injections for acute, sub-acute, or chronic low back pain in the absence or radicular signs and symptoms is not recommended (ACOEM LOE IV GOR C).

3) : Karppinen 160

6 ⁹⁹ Rew
55

5

¹⁰⁰

1,179

18

10

¹⁰¹

^{100,102,103}

^{102,103}

4)

(1)

(

: Ib, : A,
: IIb, : B)

(2)

(IIb

III, C).

3. (Facet medial nerve branch blocks and facet neurotomy)

1) : (zygapophyseal joint)

2)

(1) The guideline development group agreed that there was a lack of evidence to recommend the use of these treatments (Facet-joint corticosteroid injections) and agreed by consensus injections were of no benefit for this population (NICE LOE Ia GOR GPP).

(2) Two studies showed some evidence of benefit for radiofrequency facet joint denervation to reduce pain, whilst

one other study found no evidence of benefit. The guideline development group concluded further research was required (NICE LOE Ib GOR GPP).

(3) Therapeutic facet joint injections are not recommended for acute, subacute, or chronic LBP or for any radicular pain syndrome (ACOEM LOE Ib GOR GPP).

(4) Facet joint injections with hyaluronic acid are not recommended for facet degenerative joint disease as additional studies are needed prior to recommending this fairly invasive intervention (ACOEM LOE Ib GOR GPP).

(5) Radiofrequency neurotomy, neurotomy, and facet rhizotomy are not recommended for any spinal condition (ACOEM LOE Ib GOR GPP).

3) : (radiofrequency denervation)

104-109

4) :

4. 1) :

2) (1) Sacroiliac joint corticosteroid injections are recommended as a treatment option for patients with a specific known cause of sacroiliitis, i.e., proven rheumatologic inflammatory arthritis involving the sacroiliac joints (ACOEM LOE Ib GOR A).

(2) SIJ injections are not recommended for acute LBP including LBP thought to be SIJ related. The natural history of LBP is to resolve with conservative management. SIJ injections are not recommended for subacute or chronic non-specific LBP, including pain attributed to the SIJs, but without evidence of inflammatory sacroiliitis (rheumatologic disease). Sacroiliac injections are not recommended for treatment of any radicular pain syndrome (ACOEM LOE IV GOR C).

3) : (moderate quality) (Randomized controlled Trial)

. Luukkainen 24

13 methylprednisolone acetate 11 . 1

methylprednisolone acetate .¹¹⁰ Luukkainen 20

(seronegative spondyloarthritis) 10

methylprednisolone acetate 10

. 2

methylprednisolone acetate .¹¹¹ Maugars 1

10

13 1 85.7%, 3 62%,

6 58% NSAID .¹¹²

4 113114 3

4 (randomized controlled trials) 14

6

(controlled with placebo or controlled comparative local anesthetic blocks) U.S. Preventive Service Task Force (USPSTF)

II-2 US Agency for Health Care Policy and Research

IIb B

50%

.¹¹³ Manchikanti 5

(chemo-nucleolysis)
117

17 mg triamcinolone acetonide 40 mg 2% lidocaine hydrochloride 0.5 cc
114 3 82.4%
118

4)
 (1)

(2) (Ib, A).

(3) (IV, C).

5.

1) :
 (intradiscal steroids)

2)
 (1) Intradiscal steroid injections are not recommended in patients with acute LBP as there is no quality evidence of their efficacy (ACOEM: LOE IV, GOR C).
 (2) Intradiscal steroid injections are not recommended for management of subacute or chronic low back pain (ACOEM: LOE Ib, GOR A).

3) : (moderate quality)
 (Randomized controlled Trial)

(no treatment)

6 120
 (methylprednisolone) 1

Oswestry
115

25
 Depo-medrol (15) Bupivacaine (11)
 (pain diagram grid score),
 , Oswestry 10 14
 Depo-medrol
116

4
 ()

(chemo-nucleolysis)
117

17 mg triamcinolone acetonide 40 mg 2% lidocaine hydrochloride 0.5 cc
114 3 82.4%
118

4) :

/

(Ib, A).

(Table 4)

1. (Physical modality)

1)
(1)
 : (hot pack), (heat wrap),
 (heat blanket)

a. The heat wrap therapy or a heated blanket is moderately superior to placebo or a nonheated blanket for short-term pain relief and back-specific functional status (ACP/APS LOE Ib GOR B, ICSI LOE Ia GOR A).
 b. Heat therapy, including heat wrap, is recommended for treating acute, subacute, and chronic LBP. Self-application of heat is recommended (ACOEM LOE IIb GOR B).

: 371

(heat wrap)

6
 acetaminophen 0.66 , ibuprofen 0.93
119

1
120
120-123

:
 (Ia, A).

Table 4. Evidence of Non-pharmacologic Treatment for Low Back Pain

	Ia	A
	IV	C
	IV	C
	IV	C
	IV	C
	Ia	A
	IIb	B
	IV	C
	IV	C
	Ia	A
	III	B
CPR	IV	C
		GPP
	IIb	B
	IV	C
	IIa	B
	Ia	A
2	Ia	A
		GPP
	Ia	A
	IIa	B
	Ia	A
	IV	C
	III	B
	IV	C
		GPP
	IIa	B
	IIa	B
()	Ib	A
	IV	C
()	IIb	B

CPR: Clinical prediction rule.

(2)

: There is no recommendation for the use of infrared therapy to treat acute LBP until additional

quality studies are published. Infrared therapy is not recommended for subacute and chronic LBP (ACOEM).

: Gale 39

50% 15%

124

a

b.

(IIa, B).

2)
(1)

: There is no recommendation for or against the use of ultrasound to treat LBP with the qualifications as noted under the rationale for recommendation (ACP/ASP, ACOEM).

: Ansari 10

(functional

rating score)

125) Dumus

59

126)

Nwuga

127)

Roman

128)

129)

(2) : (shortwave) (microwave) (diathermy)

: Diathermy is not recommended for treatment of any LBP-related conditions (ACOEM LOE IV GOR-C).

: 400 Sweetman

¹³⁰ 12 Gibson ¹³¹ 2 Rasmussen ¹³²

Shakoor

3 6 : ¹³³ (shortwave), (microwave)

IV, C).

3)
(1) ;

(2)

Self applications of low-tech cryotherapies are recommended for management of acute LBP. Cryotherapies may be tried for other forms of LBP, though they may be less beneficial (ACOEM LOE IV GOR C).

Routine use of cryotherapies in health care provider offices or home use of a high-tech device for the treatment of LBP is not recommended. However, single use of low-tech cryotherapy (ice in a plastic bag) for severe exacerbations is reasonable to try (ACOEM LOE IV GOR C).

(3) ;

¹³⁴

French

¹³⁵⁻¹³⁷

(4)

IV, C).

4)

(1)

a. TENS is not recommended for acute or subacute LBP or acute radicular pain syndromes (ACOEM LOE IV GOR C).

b. TENS is recommended for select use in chronic LBP or chronic radicular pain syndrome as an adjunct for more efficacious treatments (ACOEM LOE IV GOR C).

: Khadilkar

¹³⁸

Deyo

¹³⁹

¹⁴⁰

¹⁴¹

^{142,143}

a. (TENS) (Ia, A).

b. (IIb, B).

(2)

2

a. Interferential therapy is not recommended for treat-

ment of subacute or chronic LBP, chronic radicular pain syndromes, or other back-related conditions (ACOEM LOE IV GOR C).

b. Interferential therapy may be an option for limited use for acute LBP with or without radicular pain (ACP/APS LOE IV GOR C, ACOEM LOE IV GOR C).

c. No studies of large enough sample size comparing interferential therapy with usual care or sham were found (NICE).

: 240

¹⁴⁴ Wemers

¹⁴⁵

a

(IV,

C).

b.

5)

(1) ;

(2)

For low back pain of varying duration (with or without sciatica) found traction no more effective than placebo, sham, or no treatment for any reported outcome (ACP/APS LOE Ia GOR A, ACOEM LOE IIa GOR B).

For sciatica of mixed duration, autotrraction was more effective than placebo, sham, or no treatment (ACP/APS LOE-III GOR B).

(3) ;

Cochrane

¹⁴⁶⁻¹⁴⁸ 151

¹⁴⁹⁻¹⁵¹⁾

(autotrraction)

¹⁵² 64

2

6

¹⁵³⁾

(4)

(Ia,

A).

(III,

B).

6)

(1) ; Manipulation mobilization

mobilization

manipulation

manipulation,

vertebrobasilar

(cauda equine syndrome),

(2)

Regular or routine manipulation or mobilization - not recommended, insufficient evidence (ACOEM LOE IV GOR GPP).

Manipulation for neurological deficits - not recommended, insufficient evidence (ACOEM LOE IV GOR GPP).

Manipulation for other areas of the back - not recommended, insufficient evidence (ACOEM LOE IV GOR GPP).

Manipulation is recommended for treatment of acute and subacute low back pain. It is particularly indicated in patients testing positive with the clinical prediction rule (ACOEM LOE Ib GOR A).

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12

¹⁵⁴⁻¹⁶⁷⁾

manipulation

5 6

3 6

manipulation
 12
 diction rule
 Clinical prediction rule (4 5)

Criteria	
	16
FABQ work subscale score	19
	35

(4)
 prediction rule
 C).
 (IV, GPP).
 7)
 (1) ;

(2)
 Massage is recommended for select use in subacute and chronic low back pain as an adjunct to more efficacious treatments consisting primarily of a graded aerobic and strengthening exercise program (ACOEM IIa GORB).

Massage is recommended as a treatment for acute low back pain and chronic radicular syndromes in which low back pain is a substantial symptom component (ACOEM LOE IIb GOR C).

Mechanical devices for administering massage are not recommended (ACOEM LOE Ib GOR A).

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169
 170) 2
 171)

2
 145)
 169,170)

172)
 clinical
 (IV,

(4)
 IIb, B).
 (IV, C).
 8)
 (1) ;

(2)
 Low level laser therapy is not recommended for treatment of LBP (ACOEM LOE IV GOR C).
 (3) ;

Klein Gur 173-176)

(4) ;
(Ila, B).
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1)
(1) ;
(2)
Advise people with acute low back pain that staying physically active and continue ordinary activity within the limits permitted by the pain (ICSI, ACOEM LOE Ia GOR A).
Bed rest is not recommended. If the patient must rest, bed rest should be limited to no more than two days (ICSI LOE Ia GOR A).
Patients with acute low back problems may be more comfortable if they temporarily limit or avoid specific activities known to increase mechanical stress on the spine, especially prolonged unsupported sitting, heavy lifting, and bending or twisting the back, especially while lifting (ICSI LOE IIa GOR B).
(3) ;

(4)
(Ila, A).
2
(Ila, A).
(GPP).
(2)
(1) ;
(2)
Consultation with a non-surgical spine specialist, who can evaluate individual characteristics and symptoms and establish a specific exercise program, is recommended (ICSI LOE Ia GOR A).
Supervised exercise therapy and home exercise regimens are not effective for acute low back pain, and the optimal time to start exercise therapy after the onset of symptoms is unclear (ACP/APS LOE Ia GOR A).
Clinicians should consider the addition of non-pharmacologic therapy with proven benefits for chronic or subacute low back pain, intensive interdisciplinary rehabilitation, exercise therapy (ACP/APS LOE Ia GOR A).
Exercise programs may include the following elements: aerobic activity, movement instruction, muscle strengthening, postural control, stretching (ACOEM LOE Ia GOR A).
Consider a graded active exercise program (ICSI LOE Ia GOR A).
Consider specific exercises to strengthen the core trunk stabilizing muscles (ICSI LOE Ia GOR A).
(3) ;

(Ib, A).
(6)
158,185)
3
(
IIa, B).
3
(Ia, A).
(6)
(GPP).
181)
(Ia, A).
1
190)
(Ia
A).
3.
1) / **(Trigger/Tender Point Injections)**
188,193)
(1) ;
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(2)
Trigger and/or tender point injections are not recommended for treatment of acute LBP as there are other more efficacious treatment strategies available (ACOEM LOE IV GOR C).
Trigger or tender point injections may be reasonable as second or tertiary options for subacute or chronic LBP that is not resolving. These injections are recommended to consist solely of a topical anesthetic (e.g., bupivacaine). Repeated injections should be linked to subjective and objective improvements. The use of therapeutic injections without participation in an active therapy program or in the context of maintaining employment is not recommended (ACOEM LOE III GOR B).
194-199)
200,201)
(4) (3) ; /

syndrome)
caine (8% vs 58%)
202

(progressive relaxation, PR),
(operant treatment)

203 4

(4)

C).
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2)

(1) ;

(2)

; Prolotherapy injections are not recommended for acute, subacute, or chronic LBP or for any radicular pain syndrome (ACOEM LOE IV GOR C).

(3) ;

(4)

GPP).

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(1) ;

FABT),

(Fear Avoidance Belief Training, (cognitive-behavioral therapy, CBT),

(2)

For patients who do not improve with self-care options, clinicians should consider the addition of non-pharmacologic therapy with proven benefits for chronic or subacute low back pain, cognitive-behavioral therapy, or progressive relaxation (ACP/APS LOE IIa GOR B for CBT, LOE III GOR B for PR).

Cognitive behavioral therapy is recommended as a component of a formal interdisciplinary program for the treatment of chronic LBP (ACOEM LOE IIa GOR B for chronic and subacute LBP, LOE IV GOR C for acute LBP).

FABT is recommended for acute, subacute, and chronic LBP, particularly if there are any suggestions of fear avoidance belief issues (ACOEM LOE IIa GOR B).

(3) ; Henschke 208 7

Turner 209

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(low-quality)

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For patients who do not improve with self-care options, clinicians should consider the addition of non-pharmacologic therapy with proven benefits for chronic or subacute low back pain, intensive interdisciplinary rehabilitation (ACP/APS LOE IIA GOR B).

A multidisciplinary rehabilitation program with a focus on cognitive behavioral, occupational, and activity-based approaches combined with aerobic exercise and other conditioning exercise is recommended for patients with chronic LBP who are not working due to LBP (ACOEM LOE III GOR B).

A multidisciplinary rehabilitation program with a primary focus on interventions addressing LBP is not recommended as there are other options proven efficacious that are recommended (ACOEM LOE III GOR B).

Consider referral for a combined physical and psychological treatment programme, comprising around 100 hours over a maximum of 8 weeks, for people who:

- a. Have received at least one less intensive treatment and
- b. Have high disability and/or significant psychological distress (NICE LOE Ib GOR B)

(3) ; Guzmán ^{214,215}

Bendix ¹⁹⁸

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Due to the limited evidence available the GDG's clinical opinion was that the use of lumbar supports could not be recommended (NICE LOE 1a GOR A).

Lumbar supports are not recommended for treatment of LBP, although they may be useful for specific treatment of spondylolisthesis, documented instability, or post-operative treatment (ACOEM LOE IIa GOR B).

(3) ;

²¹⁷

1 , van Duijvenbode ²¹⁸

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, van Duijvenbode ²¹⁸

(4) ;

select patients with chronic LBP as a component of an interdisciplinary approach (ACOEM LOE IIb GOR B).

(3) ; Bush ²²⁰ 72

(Ib A).

4)

(1) ;

3

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. Donaldson ²²¹ 36

(2) ; Kinesio-taping and taping are not recommended for the treatment of acute, subacute, or chronic LBP or radicular pain syndromes or other back-related conditions (ACOEM LOE IV GOR C).

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90

(3) ;

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(postisometric relaxation),

, Kibler Fold mobilization

30

Maigne's relaxation

. Asfour ²²²

(4)

90%

, 80%

(Ib B).

(4)

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(IV,

1)

1.

C).

5) (Biofeedback)

(1) ;

2)

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(2) ; Biofeedback is not recommended for patients with acute or subacute LBP as there are other treatments for which there is quality evidence of efficacy that are more appropriate. Biofeedback is recommended for

4-2)

4)

2.

. VAS NRS, 2011 5 5 2010 2

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TENS

1. Andersson GBJ. The epidemiology of spinal disorders. In: Frymoyer JW, editor. *The adult spine: principles and practice*. 2nd ed. Philadelphia: Lippincott-Raven; 1997. p.93-141.
2. Richard AD, Sohail KM, Martin BI. Back pain prevalence and visit rates. Estimates from U.S. national surveys, 2002. *Spine* 2006;31:2724-7.
3. Praemer A, Fumes S, Rice DP. *Musculoskeletal conditions in the United States*. Rosemont: AAUS; 1992. 1-99.
4. Taylor VM, Deyo RA, Cherkin DC, Kreuter W. Low-back pain hospitalization: recent United States trends and re-

- gional variations. *Spine* 1994;19:1207-13.
5. Hart LG, Deyo RA, Cherkin DC. Physician office visits for low back pain. *Spine* 1995;20:11-9.
 6. Salaffi F, De Angelis R, Grassi W. Prevalence of musculoskeletal conditions in an Italian population sample: results of a regional community-based study. I. The MAPPING study. *Clin Exp Rheumatol* 2005;23:819-28.
 7. Waxman R, Tennant A, Helliwell P. A prospective follow-up study of low back pain in the community. *Spine* 2000;25:2085-90.
 8. Frank A. Low back pain. *BMJ* 1993;306:901-8.
 9. Xuemei LR, Shawn XS, Gordon GL, Lloyd H. Estimates and patterns of direct health care expenditures among individuals with back pain in the United States. *Spine* 2004;29:79-86.
 10. Simon D, Jaime C, Scott H. A systematic review of low back pain cost of illness studies in the United States and internationally. *The Spine Journal* 2008;8:8-20.
 11. Damian H, Lyn M, Peter B, Anthony W, Fiona B, Theo V, et al. Measuring the global burden of low back pain. *Best Practice & Research Clinical Rheumatology* 2010;24:155-65.
 12. Jhun HJ, Park JY. Estimated number of Korean adults with back pain and population-based associated factors of back pain: data from the fourth Korea national health and nutrition examination survey. *J Korean Neurosurg Soc* 2009;46:443-50.
 13. Kim HS, Choi JW, Chang SH, Lee KS, Oh Y. Treatment duration and cost of work-related low back pain in Korea. *J Korean Med Sci* 2005;20:127-31.
 14. Chou R, Qaseem A, Snow V, Casey D, Cross JT Jr, Shekelle P, et al. Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Ann Intern Med* 2007;147:478-91.
 15. Deyo RA, Rainville J, Kent DL. What can the history and physical examination tell us about low back pain? *JAMA* 1992;268:760-5.
 16. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. *Ann Intern Med* 2002;137:586-97.
 17. Rudwaleit M, Metter A, Listing J, Sieper J, Braun J. Inflammatory back pain in ankylosing spondylitis: a reassessment of the clinical history for application as classification and diagnostic criteria. *Arthritis Rheum* 2006;54:569-78.
 18. Rudwaleit M, Khan MA, Sieper J. The challenge of diagnosis and classification in early ankylosing spondylitis: do we need new criteria? *Arthritis Rheum* 2005;52:1000-8.
 19. van den Hoogen HM, Koes BW, van Eijk JT, Bouter LM. On the accuracy of history, physical examination, and erythrocyte sedimentation rate in diagnosing low back pain in general practice. A criteria-based review of the literature. *Spine* 1995;20:318-27.
 20. Vroomen PC, de Krom MC, Knottnerus JA. Diagnostic value of history and physical examination in patients suspected of sciatica due to disc herniation: a systematic review. *J Neurol* 1999;246:899-906.
 21. de Graaf I, Prak A, Biema-Zeinstra S, Thomas S, Peul W, Koes B. Diagnosis of lumbar spinal stenosis: a systematic review of the accuracy of diagnostic tests. *Spine* 2006;31:1168-76.
 22. Deville' WL, van der Windt DA, Dzaferagic' A, Bezemer PD, Bouter LM. The test of Lase'gue: systematic review of the accuracy in diagnosing herniated discs. *Spine* 2000;25:1140-7.
 23. De Vries F, Bracke M, Leufkens HG, Lammers JW, Cooper C, Van Staa TP. Fracture risk with intermittent high-dose oral glucocorticoid therapy. *Arthritis Rheum* 2007;56:208-14.
 24. Cohn SH, Abesamis C, Yasumura S, Aloia JF, Zarzi I, Ellis KJ. Comparative skeletal mass and radial bone mineral content in black and white women. *Metabolism* 1977;26:171-8.
 25. Tobias JH, Hutchinson AP, Hunt LP, McCloskey EV, Stone MD, Martin JC, et al. Use of clinical risk factors to identify postmenopausal women with vertebral fractures. *Osteoporos Int* 2007;18:35-43.
 26. Melton LJ 3rd, Kallmes DF. Epidemiology of vertebral fractures: implications for vertebral augmentation. *Acad Radiol* 2006;13:538-45.
 27. Gilbert RW, Kim JH, Posner JB. Epidural spinal cord compression from metastatic tumor: diagnosis and treatment. *Ann Neurol* 1978;3:40-51.
 28. Deyo RA, Diehl AK. Cancer as a cause of back pain: frequency, clinical presentation, and diagnostic strategies. *J Gen Intern Med* 1988;3:230-8.
 29. Waldvogel FA, Medoff G, Swartz MN. Osteomyelitis: a review of clinical features, therapeutic considerations and unusual aspects. 3. Osteomyelitis associated with vascular insufficiency. *N Engl J Med* 1970;282:316-22.
 30. Carragee EJ. Pyogenic vertebral osteomyelitis. *J Bone Joint Surg Am* 1997;79:874-80.
 31. Pengel LH, Herbert RD, Maher CG, Refshauge KM. Acute low back pain: systematic review of its prognosis. *BMJ* 2003;327:323.
 32. Fayad F, Lefevre-Colau MM, Poiradeau S, Fernanrian J, Rannou F, Wlodyka Demaille S, et al. Chronicity, recurrence, and return to work in low back pain: common prognostic factors. *Ann Readapt Med Phys* 2004;47:179-

- 89.
33. Pincus T, Burton AK, Vogel S, Field AP. A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. *Spine* 2002;27:E109-20.
34. Gatchel RJ, Polatin PB, Noe C, Gardea M, Pulliam C, Thompson J. Treatment- and cost-effectiveness of early intervention for acute low-back pain patients: a one-year prospective study. *J Occup Rehabil* 2003;13:1-9.
35. Hay EM, Mullis R, Lewis M, Vohora K, Main CJ, Watson P, et al. Comparison of physical treatments versus a brief pain-management programme for back pain in primary care: a randomised clinical trial in physiotherapy practice. *Lancet* 2005;365:2024-30.
36. Jellema P, van der Windt DA, van der Horst HE, Twisk JW, Stalman WA, Bouter LM. Should treatment of (sub)acute low back pain be aimed at psychosocial prognostic factors? Cluster randomised clinical trial in general practice. *BMJ* 2005;331:84.
37. Bigos SJ, Battié MC, Spengler DM, Fisher LD, Fordyce WE, Hansson TH, et al. A prospective study of work perceptions and psychosocial factors affecting the report of back injury. *Spine* 1991;16:1-6.
38. Chan CW, Goldman S, Ilstrup DM, Kunselman AR, O'Neill PI. The pain drawing and Waddell's non-organic physical signs in chronic low-back pain. *Spine* 1993;18:1717-22.
39. Deyo RA, Loeser JD, Bigos SJ. Herniated lumbar intervertebral disk. *Ann Intern Med* 1990;112:598-603.
40. Fritz JM, George SZ, Delitto A. The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status. *Pain* 2001;94:7-15.
41. Kendrick D, Fielding K, Bentley E, Kerslake R, Miller P, Pringle M. Radiography of the lumbar spine in primary care patients with low back pain: randomised controlled trial. *BMJ* 2001;322:400-5.
42. Kerry S, Hilton S, Patel S, Dundas D, Rink E, Lord J. Routine referral for radiography of patients presenting with low back pain: is patients' outcome influenced by GPs' referral for plain radiography? *Health Technol Assess* 2000;4:1-119.
43. Deyo RA, Diehl AK. Lumbar spine films in primary care: current use and effects of selective ordering criteria. *J Gen Intern Med* 1986;1:20-5.
44. Liang M, Komaroff AL. Roentgenograms in primary care patients with acute low back pain: a cost-effectiveness analysis. *Arch Intern Med* 1982;142:1108-12.
45. Kleinstuck F, Dvorak J, Mannion AF. Are "structural abnormalities" on magnetic resonance imaging a contra-indication to the successful conservative treatment of chronic nonspecific low back pain? *Spine* 2006;31:2250-7.
46. Jarvik JG, Hollingworth W, Martin B, Emerson SS, Gray DT, Overman S, et al. Rapid magnetic resonance imaging vs radiographs for patients with low back pain: a randomized controlled trial. *JAMA* 2003;289:2810-8.
47. Gilbert FJ, Grant AM, Gillan MG, Vale LD, Campbell MK, Scott NW, et al. Low back pain: influence of early MR imaging or CT on treatment and outcome--multicenter randomized trial. *Radiology* 2004;231:343-51.
48. Modic MT, Obuchowski NA, Ross JS, Brant-Zawadzki MN, Grooff PN, Mazanec DJ, et al. Acute low back pain and radiculopathy: MR imaging findings and their prognostic role and effect on outcome. *Radiology* 2005;237:597-604.
49. Todd NV. Cauda equina syndrome: the timing of surgery probably does influence outcome. *Br J Neurosurg* 2005;19:301-6.
50. Tsiodras S, Falagas ME. Clinical assessment and medical treatment of spine infections. *Clin Orthop Relat Res* 2006;444:38-50.
51. Joines JD, McNutt RA, Carey TS, Deyo RA, Rouhani R. Finding cancer in primary care outpatients with low back pain: a comparison of diagnostic strategies. *J Gen Intern Med* 2001;16:14-23.
52. Suarez-Almazor ME, Belseck E, Russell AS, Mackel JV. Use of lumbar radiographs for the early diagnosis of low back pain. Proposed guidelines would increase utilization. *JAMA* 1997;277:1782-6.
53. Hanly JG, Barnes DC, Mitchell MJ, MacMillan L, Docherty P. Single photon emission computed tomography in the diagnosis of inflammatory spondyloarthropathies. *J Rheumatol* 1993;20:2062-8.
54. Han LJ, Au-Yong TK, Tong WC, Chu KS, Szeto LT, Wong CP. Comparison of bone single-photon emission tomography and planar imaging in the detection of vertebral metastases in patients with back pain. *Eur J Nucl Med* 1998;25:635-8.
55. Song KS, Jang EC, Jung HJ, Kim KW, Yu H. Observer variability in the evaluation of multiple lumbar stenosis by routine MR-myelography and MRI. *J Spinal Disord Tech* 2008;21:569-74.
56. Loblaw DA, Perry J, Chambers A, Laperriere NJ. Systematic review of the diagnosis and management of malignant extradural spinal cord compression: the Cancer Care Ontario Practice Guidelines Initiative's Neuro-Oncology Disease Site Group. *J Clin Oncol* 2005;23:2028-37.
57. Weber F, Albert U. Electrodiagnostic examination of lumbosacral radiculopathies. *Electromyogr Clin Neurophysiol* 2000;40:231-6.

58. Wilbourn AJ, Aminoff MJ. AAEM Minimonography 32: the electrodiagnostic examination in patients with radiculopathies. *American Association of Electrodiagnostic Medicine. Muscle Nerve* 1998;21:1612-31.
59. Kwon BS, Lee SJ, Park CH. Relation between symptom duration and abnormal spontaneous activity in S1 radiculopathy. *J Korean Acad Rehab Med* 2001;25:609-14.
60. Boden SD, Davis DO, Dina TS, Patronas NJ, Wiesel SW. Abnormal magnetic-resonance scans of the lumbar spine in asymptomatic subjects. *J Bone Joint Surg* 1990;72:403-8.
61. Jensen MC, Brant-Zawadzki MN, Obuchowski N, Modic MT, Malkasian D, Ross JS. Magnetic resonance imaging of the lumbar spine in people without backache. *N Engl J Med* 1994;331:69-73.
62. Hans JB, Michael TW. Diagnostic value of different neurophysiological methods in the assessment of lumbar nerve root lesions. *Arch Phys Med Rehabil* 1997;78:518-20.
63. McLaurin RL. Diagnosis and course of cervical radiculopathy. In: Dunsker SB, editor. *Seminars in neurological surgery. Cervical spondylosis*. New York: Raven Press; 1987. p.103-17.
64. Dillingham TR, Pezzin LE, Lauder TD. Cervical paraspinal muscle abnormalities and symptom duration: a multivariate analysis. *Muscle Nerve* 1998;21:640-2.
65. Date ES, Mar EY, Bugola MR, Teraoka JK. The prevalence of lumbar paraspinal spontaneous activity in asymptomatic subjects. *Muscle Nerve* 1996;19:350-4.
66. Aiello I, Rosati G, Serra G, Marica M. The diagnostic value of H-index in S1 root compression. *J Neurol Neurosurg Psychiatr* 1981;44:171-2.
67. Alrowayeh HN, Sabbahi MA. The proportion of patients with non-specific low back pain and neural compromise. *Electromyogr Clin Neurophysiol* 2010;50:67-73.
68. Towhead TE, Maxwell L, Judd MG, Catton M, Hochberg MC, Wells G. Acetaminophen for osteoarthritis. *Cochrane Database Syst Rev* 2006;CD004257.
69. Roelofs PD, Deyo RA, Koes BW, Scholten RJ, van Tulder MW. NSAID for low back pain. *Cochrane Database Syst Rev* 2008;CD000369.
70. van Tulder MW, Scholten RJ, Koes BW, Deyo RA. Nonsteroid anti-inflammatory drugs for low back pain: a systematic review within the framework of the Cochrane Collaboration Back Review Group. *Spine* 2000;25:2501-13.
71. Berry H, Bloom B, Hamilton EB, Swinson DR. Naproxen sodium, diflunisal and placebo in the treatment of chronic back pain. *Ann Rheum Dis* 1982;41:129-32.
72. Hickey RF. Chronic low back pain: a comparison of diflunisal with paracetamol. *N Z Med J* 1982;95:312-4.
73. Vroomen PC, de Krom MC, Slofstra PD, Knottnerus JA. Conservative treatment of sciatica: a systemic review. *J Spinal Disord* 2000;13:463-9.
74. Lee C, Straus WL, Balshaw R, Barlas S, Vogel S, Schnitzer TJ. A Comparison of the efficacy and safety of nonsteroidal antiinflammatory agents versus acetaminophen in the treatment of osteoarthritis: a meta analysis. *Arthritis Rheum* 2004;51:746-54.
75. Griffin M. Epidemiology of nonsteroidal anti-inflammatory drug associated gastrointestinal injury. *Am J Med* 1998;104:S23-9.
76. Henry D, Lim LL, Garcia Rodriguez LA, Perez Gutthann S, Carson JL, Griffin M, et al. Variability in risk of gastrointestinal complications with individual non steroidal anti inflammatory drugs: results of collaborative meta-analysis. *BMJ* 1996;312:1563-6.
77. Graham DY, Agrawal NM, Campbell DR. Ulcer prevention in long term users of nonsteroidal anti inflammatory drugs: results of a double blind, randomized multicenter, active and placebo controlled study of misoprostol vs. ansoprazole. *Arch Intern Med* 2002;162:169-75.
78. van Tulder MW, Touray T, Furlan AD, Solway S, Bouter LM. Muscle relaxants for nonspecific low back pain. *Cochrane Database Syst Rev* 2003;CD004252.
79. Cochrane Back Review Group. Muscle relaxants for non-specific low back pain: a systemic review with the framework of the Cochrane Collaboration. *Spine* 2003;28:1978-92.
80. Berry H, Hutchinson DR. Tizadidine and ibuprofen in acute low back pain: results of a double blind multicenter study in general practice. *J Int Med Res* 1988;16:83-91.
81. Browning R, Jackson JL, O'Malley PG. Cyclobenzaprine and back pain: a meta analysis. *Arch Intern Med* 2001;161:1613-20.
82. Basmajian JV. Cyclobenzaprine hydrochloride effect on skeletal muscle spasm in lumbar region and neck: two double-blind controlled clinical and laboratory studies. *Arch Phys Med Rehabil* 1978;59:58-63.
83. Katz N, Rauck R, Ahdieh H, Ma T, Gerritsen van der Hoop R, Kerwin R, et al. A 12-week, randomized, placebo-controlled trial assessing the safety and efficacy of oxycodone extended release for opioid-naïve patients with chronic low back pain. *Curr Med Res Opin* 2007;23:117-28.
84. Hale ME, Dvergsten C, Gimbel J. Efficacy and safety of oxycodone extended release in chronic low back pain: results of a randomized, double-blind placebo- and active controlled phase III study. *J Pain* 2005;6:21-8.
85. Kalso E, Edwards JE, Moore RA, McQuay HJ. Opioids

- in chronic non cancer pain: systemic review of efficacy and safety. *Pain* 2004;112:372-80.
86. Furlan AD, Sandoval JA, Mailis-Gagnon A, Tunks E. Opioids for chronic noncancer pain: a meta-analysis of effectiveness and side effects. *CMAJ* 2006;174:1589-94.
87. Schnitzer TJ, Gray WL, Paster RZ, Kamin M. Efficacy of tramadol in treatment of chronic low back pain. *J Rheumatol* 2000;27:772-8.
88. Vorsanger GJ, Xiang J, Gana TJ, Pascual ML, Fleming RR. Extended release tramadol in the treatment of chronic low back pain. *J Opioid Man* 2008;4:87-97.
89. Urquhart DM, Hoving JL, Assendelft WW, Roland M, van Tulder MW. Antidepressant for non specific low back pain. *Cochrane Database of Systematic Review*. Issue 1 2008. Chichester: John Wiley & Sons; 2008.
90. Salerno SM, Browning R, Jackson JL. The effect of antidepressant treatment on chronic back pain: a meta analysis. *Arch Intern Med* 2002;162:19-24.
91. Atkinson JH, Slater MA, Williams RA, Zisook S, Patterson TL, Grant I, et al. A placebo controlled randomized clinical trial of nortriptyline for chronic low back pain. *Pain* 1998;76:287-96.
92. Staiger TO, Gaster B, Sullivan MD, Deyo RA. Systematic review of antidepressant in the treatment of chronic low back pain. *Spine* 2003;28:2540-5.
93. Dickens C, Jayson M, Sutton C, Creed F. The relationship between pain and depression in a trial using paroxetine in sufferers of chronic low back pain. *Psychosomatics* 2000;41:490-9.
94. Yildirim K, Sisecioglu M, Karatay S, Erdal A, Ugur M. The effectiveness of gabapentin in patients with chronic radiculopathy. *The Pain Clinic* 2003;15:213-8.
95. Turan A, Karamanlioglu B, Memiş D, Hamamcioglu MK, Tükenmez B, Pamukçu Z, et al. Analgesic effects of gabapentin after spinal surgery. *Anesthesiology* 2004;100:935-8.
96. Radhakrishnan M, Bithal PK, Chaturvedi A. Effect of pre-emptive gabapentin on postoperative pain relief and morphine consumption following lumbar laminectomy and discectomy. A randomized, double-blinded, placebo-controlled study. *J Neurosurg Anesthesiol* 2005;17:125-8.
97. Muehlbacher M, Nickel MK, Kettler C, Tritt K, Lahmann C, Leiberich PK. Topiramate in treatment of patients with chronic low back pain: a randomized, double-blind, placebo-controlled study. *Clin J Pain* 2006;22:526-31.
98. Khoromi S, Patsalides A, Parada S, Salehi V, Meegan JM, Max MB. Topiramate in chronic lumbar radicular pain. *J Pain* 2005;6:829-36.
99. Karppinen J, Ohinmaa A, Malmivaara A, Kurunlahti M, Kyllönen E, Pienimäki T, et al. Cost effectiveness of periradicular infiltration for sciatica: subgroup analysis of a randomized controlled trial. *Spine* 2001;26:2587-95.
100. Riew KD, Park JB, Cho YS, Gilula L, Patel A, Lenke LG, et al. Nerve root blocks in the treatment of lumbar radicular pain. A minimum five-year follow-up. *J Bone Joint Surg Am* 2006;88:1722-5.
101. Staal JB, de Bie RA, de Vet HC, Hildebrandt J, Nelemans P. Injection therapy for subacute and chronic low back pain: an updated Cochrane review. *Spine* 2009;34:49-59.
102. Buenaventura RM, Datta S, Abdi S, Smith HS. Systematic review of therapeutic lumbar transforaminal epidural steroid injections. *Pain Physician* 2009;12:233-51.
103. Parr AT, Diwan S, Abdi S. Lumbar interlaminar epidural injections in managing chronic low back and lower extremity pain: A systematic review. *Pain Physician* 2009;12:163-88.
104. Boswell MV, Colson JD, Sehgal N, Dunbar EE, Epter R. A systematic review of therapeutic facet joint interventions in chronic spinal pain. *Pain Physician* 2007;10:229-53.
105. Carrette S, Marcoux S, Truchon R, Grondin C, Gagnon J, Allard Y, et al. A controlled trial of corticosteroid injections into facet joints for chronic low back pain. *N Engl J Med* 1991;325:1002-7.
106. Leclaire R, Fortin L, Lambert R, Bergeron YM, Rossignol M. Radiofrequency facet joint denervation in the treatment of low back pain: a placebo-controlled clinical trial to assess efficacy. *Spine* 2001;26:1411-6.
107. Nath S, Nath CA, Pettersson K. Percutaneous lumbar zygapophysial (Facet) joint neurotomy using radiofrequency current, in the management of chronic low back pain: a randomized double-blind trial. *Spine* 2008;33:1291-7.
108. van Wijk RM, Geurts JW, Wynne HJ, Hammink E, Buskens E, Lousberg R, et al. Radiofrequency denervation of lumbar facet joints in the treatment of chronic low back pain: a randomized, double-blind, sham lesion-controlled trial. *Clin J Pain* 2005;21:335-44.
109. Oh WS, Shim JC. A randomized controlled trial of radiofrequency denervation of the ramus communicans nerve for chronic discogenic low back pain. *Clin J Pain* 2004;20:55-60.
110. Luukkainen R, Wennerstrand PV, Kautiainen HH, Sanila MT, Asikainen EL. Efficacy of periarticular corticosteroid treatment of the sacroiliac joint in non-spondyloarthropathic patients with chronic low back pain in the region of the sacroiliac joint. *Clin Exp Rheumatol* 2002;20:52-4.
111. Luukkainen R, Nissila M, Asikainen EL, Sanila M, Lehtinen K, Alanaatu A, et al. Periradicular corticosteroid treatment of the sacroiliac joint in patients with seronegative spondyloarthropathy. *Clin Exp Rheumatol* 1999;

- 17:88-90.
112. Maugars Y, Mathis C, Berthelot JM, Charlier C, Prost A. Assessment of the efficacy of sacroiliac corticosteroid injections in spondyloarthropathies: a double blind study. *Br J Rheumatol* 1996;35:767-70.
 113. Rupert MP, Lee M, Manchikanti L, Datta S, Cohen SP. Evaluation of sacroiliac joint interventions: a systematic appraisal of the literature. *Pain Physician* 2009;12:399-418.
 114. Manchikanti L, Boswell MV, Singh V, Benyamin RM, Fellows B, Abdi S, et al. ASIPP-IPM. Comprehensive evidence-based guidelines for interventional techniques in the management of chronic spinal pain. *Pain Physician* 2009; 12:699-802.
 115. Khot A, Bowditch M, Powell J, Sharp D. The use of intradiscal steroid therapy for lumbar spinal discogenic pain: a randomized controlled trial. *Spine* 2004;29:833-6.
 116. Simmons JW, McMillin JN, Emery SF, Kimmich SJ. Intradiscal steroids. A prospective double-blind clinical trial. *Spine* 1992;17:S172-5.
 117. Chou R, Atlas SJ, Stanos SP, Rosenquist RW. Nonsurgical interventional therapies for low back pain: a review of the evidence for an American Pain Society clinical practice guideline. *Spine* 2009;34:1078-93.
 118. Ko HY, Park JH. Effects of intradiscal steroids injection in patients with lumbar discogenic pain. *J Korean Acad Rehabil Med* 2003;27:240-4.
 119. Nadler SF, Steiner DJ, Erasala GN, Hengehold DA, Hinkle RT, Beth Goodale M, et al. Continuous low-level heat wrap therapy provides more efficacy than Ibuprofen and acetaminophen for acute low back pain. *Spine* 2002; 27:1012-7.
 120. Mayer JM, Ralph L, Look M, Erasala GN, Vema JL, Matheson LN, et al. Treating acute low back pain with continuous low-level heat wrap therapy and/or exercise: a randomized controlled trial. *Spine J* 2005;5:395-403.
 121. Nadler SF, Steiner DJ, Petty SR, Erasala GN, Hengehold DA, Weingand KW. Overnight use of continuous low-level heatwrap therapy for relief of low back pain. *Arch Phys Med Rehabil* 2003;84:335-42.
 122. Nuhr M, Hoerauf K, Bertalanffy A, Bertalanffy P, Frickey N, Gore C, et al. Active warming during emergency transport relieves acute low back pain. *Spine* 2004;29:1499-503.
 123. Tao XG, Bernacki EJ. A randomized clinical trial of continuous low-level heat therapy for acute muscular low back pain in the workplace. *J Occup Environ Med* 2005; 47:1298-306.
 124. Gale GD, Rothbart PJ, Li Y. Infrared therapy for chronic low back pain: a randomized, controlled trial. *Pain Res Manag* 2006;11:193-6.
 125. Ansari NN, Ebadi S, Talebian S, Naghdi S, Mazaheri H, Olyaei G, et al. A randomized, single blind placebo controlled clinical trial on the effect of continuous ultrasound on low back pain. *Electromyogr Clin Neurophysiol* 2006; 46:329-36.
 126. Durmus D, Durmaz Y, Canturk F. Effects of therapeutic ultrasound and electrical stimulation program on pain, trunk muscle strength, disability, walking performance, quality of life, and depression in patients with low back pain: a randomized-controlled trial. *Rheumatol Int* 2010; 30:901-10.
 127. Nwuga VC. Ultrasound in treatment of back pain resulting from prolapsed intervertebral disc. *Arch Phys Med Rehabil* 1983;64:88-9.
 128. Roman MP. A clinical evaluation of ultrasound by use of a placebo technic. *Phys Ther Rev* 1960;40:649-52.
 129. van der Windt DA, van der Heijden GJ, van den Berg SG, Ter Riet G, de Winter AF, Bouter LM. Ultrasound therapy for musculoskeletal disorders: a systematic review. *Pain* 1999;81:257-71.
 130. Sweetman BJ, Heinrich I, Anderson JA. A randomized controlled trial of exercises, short wave diathermy, and traction for low back pain, with evidence of diagnosis-related response to treatment. *Journal of Orthopaedic Rheumatology* 1993;6:159-66.
 131. Gibson T, Grahame R, Harkness J, Woo P, Blagrove P, Hills R. Controlled comparison of short-wave diathermy treatment with osteopathic treatment in non-specific low back pain. *Lancet* 1985;1:1258-61.
 132. Rasmussen GG. Manipulation in treatment of low back pain: a randomized clinical trial. *Manuelle Medizin* 1979; 1:8-10.
 133. Shakoor MA, Rahman MS, Moyeenuzzaman M. Effects of deep heat therapy on the patients with chronic low back pain. *Mymensingh Med J* 2008;17:S32-8.
 134. Roberts D, Walls C, Carlile J. Relief of chronic low back pain heat versus cold. In: Aronoff GH, editor. *Evaluation and Treatment of Chronic Pain*. Baltimore: Urban & Schwarzenberg; 1992. p.263-6.
 135. French SD, Cameron M, Walker BF, Reggars JW, Esterman AJ. Superficial heat or cold for low back pain. *Cochrane Database Syst Rev* 2006;CD004750.
 136. Landen BR. Heat or cold for the relief of low back pain? *Phys Ther* 1967;47:1126-8.
 137. Melzack R, Jeans ME, Stratford JG, Monks RC. Ice massage and transcutaneous electrical stimulation: comparison of treatment for low-back pain. *Pain* 1980;9:209-17.
 138. Khadilkar A, Milne S, Brosseau L, Robinson V, Saginur M, Shea B, et al. Transcutaneous electrical nerve stim-

- ulation (TENS) for chronic low-back pain. *Cochrane Database Syst Rev* 2005;CD003008.
139. Deyo RA, Walsh NE, Martin DC, Schoenfeld LS, Ramamurthy S. A controlled trial of transcutaneous electrical nerve stimulation (TENS) and exercise for chronic low back pain. *N Engl J Med* 1990;322:1627-34.
 140. Cheing GL, Hui-Chan CW. Transcutaneous electrical nerve stimulation: nonparallel antinociceptive effects on chronic clinical pain and acute experimental pain. *Arch Phys Med Rehabil* 1999;80:305-12.
 141. Bloodworth DM, Nguyen BN, Garver W, Moss F, Pedroza C, Tran T, et al. Comparison of stochastic vs. conventional transcutaneous electrical stimulation for pain modulation in patients with electromyographically documented radiculopathy. *Am J Phys Med Rehabil* 2004;83:584-91.
 142. Thorsteinsson G, Stonnington HH, Stillwell GK, Elveback LR. Transcutaneous electrical stimulation: a double-blind trial of its efficacy for pain. *Arch Phys Med Rehabil* 1977;58:8-13.
 143. Moore SR, Shurman J. Combined neuromuscular electrical stimulation and transcutaneous electrical nerve stimulation for treatment of chronic back pain: a double-blind, repeated measures comparison. *Arch Phys Med Rehabil* 1997;78:55-60.
 144. Hurley DA, McDonough SM, Dempster M, Moore AP, Baxter GD. A randomized clinical trial of manipulative therapy and interferential therapy for acute low back pain. *Spine* 2004;29:2207-16.
 145. Wemers R, Pynsent PB, Bulstrode CJ. Randomized trial comparing interferential therapy with motorized lumbar traction and massage in the management of low back pain in a primary care setting. *Spine* 1999;24:1579-84.
 146. Clarke JA, van Tulder MW, Blomberg SE, de Vet HC, van der Heijden GJ, Bronfort G. Traction for low-back pain with or without sciatica. *Cochrane Database Syst Rev* 2005;CD003010.
 147. Clarke J, van Tulder M, Blomberg S, de Vet H, van der Heijden G, Bronfort G. Traction for low back pain with or without sciatica: an updated systematic review within the framework of the Cochrane collaboration. *Spine* 2006;31:1591-9.
 148. Harte AA, Baxter GD, Gracey JH. The efficacy of traction for back pain: a systematic review of randomized controlled trials. *Arch Phys Med Rehabil* 2003;84:1542-53.
 149. Beurskens AJ, de Vet HC, Köke AJ, Regtop W, van der Heijden GJ, Lindeman E, et al. Efficacy of traction for nonspecific low back pain. 12-week and 6-month results of a randomized clinical trial. *Spine* 1997;22:2756-62.
 150. Beurskens AJ, van der Heijden GJ, de Vet HC, Köke AJ, Lindeman E, Regtop W, et al. The efficacy of traction for lumbar back pain: design of a randomized clinical trial. *J Manipulative Physiol Ther* 1995;18:141-7.
 151. Beurskens AJ, de Vet HC, Köke AJ, Lindeman E, Regtop W, van der Heijden GJ, et al. Efficacy of traction for non-specific low back pain: a randomised clinical trial. *Lancet* 1995;346:1596-600.
 152. Larsson U, Chöler U, Lidström A, Lind G, Nachemson A, Nilsson B, et al. Auto-traction for treatment of lumbago-sciatica. A multicentre controlled investigation. *Acta Orthop Scand* 1980;51:791-8.
 153. Fritz JM, Lindsay W, Matheson JW, Brennan GP, Hunter SJ, Moffit SD, et al. Is there a subgroup of patients with low back pain likely to benefit from mechanical traction? Results of a randomized clinical trial and subgrouping analysis. *Spine* 2007;32:E793-800.
 154. Andersson GB, Lucente T, Davis AM, Kappler RE, Lipton JA, Leurgans S. A comparison of osteopathic spinal manipulation with standard care for patients with low back pain. *N Engl J Med* 1999;341:1426-31.
 155. Giles LG, Muller R. Chronic spinal pain. A randomized clinical trial comparing medication, acupuncture, and spinal manipulation. *Spine* 2003;28:1490-503.
 156. Strauss S. Myofascial pain syndromes: a short review. *Web J Acupuncture* 2002.
 157. Burns SH, Mierau DR. Chiropractic management of low back pain of mechanical origin. In: Giles LG, Singer KP, editors. *Clinical Anatomy and Management of Low Back Pain*. Oxford, England: Butterworth Heinemann; 1977. p.344-57.
 158. Brennan GP, Fritz JM, Hunter SJ, Thackeray A, Delitto A, Erhard RE. Identifying subgroups of patients with acute/subacute "nonspecific" low back pain: results of a randomized clinical trial. *Spine* 2006;15:623-31.
 159. Skargren EI, Carlsson PG, Oberg BE. One-year follow-up comparison of the cost and effectiveness of chiropractic and physiotherapy as primary management for back pain: subgroup analysis, recurrence, and additional health care utilization. *Spine* 1998;23:1875-83.
 160. Skargren EI, Oberg BE. Predictive factors for 1-year outcome of low-back and neck pain in patients treated in primary care: comparison between the treatment strategies chiropractic and physiotherapy. *Pain* 1998;77:201-7.
 161. Bronfort G, Goldsmith CH, Nelson CF, Boline PD, Anderson AV. Trunk exercise combined with spinal manipulative or NSAID therapy for chronic low back pain: a randomized, observer-blinded clinical trial. *J Manipulative Physiol Ther* 1996;19:570-82.
 162. Triano JJ, McGregor M, Hondras MA, Brennan PC. Manipulative therapy versus education program in chronic

- low back pain. *Spine* 1995;20:948-55.
163. Glover JR, Morris JG, Khosla T. Back pain: a randomized clinical trial of rotational manipulation of the trunk. *Br J Ind Med* 1974;31:59-64.
 164. Jayson MI, Sims-Williams H, Young S, Baddeley H, Collins E. Mobilization and manipulation for low back pain. *Spine* 1981;6:409-16.
 165. MacDonald RS, Bell CM. An open controlled assessment of osteopathic manipulation in nonspecific low-back pain. *Spine* 1990;15:364-70.
 166. Cleland JA, Fritz JM, Kulig K, Davenport TE, Eberhart S, Magel J, et al. Comparison of the effectiveness of three manual physical therapy techniques in a subgroup of patients with low back pain who satisfy a clinical prediction rule: a randomized clinical trial. *Spine* 2009;34:2720-9.
 167. Jüni P, Battaglia M, Nüesch E, Hämmeler G, Eser P, van Beers R, et al. A randomized controlled trial of spinal manipulative therapy in acute low back pain. *Ann Rheum Dis* 2009;68:1420-7.
 168. Childs JD, Fritz JM, Flynn TW, Irgang JJ, Johnson KK, Majkowski GR, et al. A clinical prediction rule to identify patients likely to benefit from spinal manipulation: a validation study. *Ann Intern Med* 2004;141:920-8.
 169. Cherkin DC, Eisenberg D, Sherman KJ, Barlow W, Kaptchuk TJ, Street J, et al. Randomized trial comparing traditional Chinese medical acupuncture, therapeutic massage, and self-care education for chronic low back pain. *Arch Intern Med* 2001;161:1081-8.
 170. Preyde M. Effectiveness of massage therapy for subacute low-back pain: a randomized controlled trial. *CMAJ* 2000;162:1815-20.
 171. Melzack R, Vetere P, Finch L. Transcutaneous electrical nerve stimulation for low back pain. A comparison of TENS and massage for pain and range of motion. *Phys Ther* 1983;63:489-93.
 172. Cherkin DC, Sherman KJ, Deyo RA, Shekelle PG. A review of the evidence for the effectiveness, safety, and cost of acupuncture, massage therapy, and spinal manipulation for low back pain. *Ann Intern Med* 2003;138:898-906.
 173. Basford JR, Sheffield CG, Harmsen WS. Laser therapy: a randomized, controlled trial of the effects of low-intensity Nd:YAG laser irradiation on musculoskeletal back pain. *Arch Phys Med Rehabil* 1999;80:647-52.
 174. Longo L, Tamburini A, Monti A, Cattaneo L, Sesti A. Treatment with 904 nm and 10 600 nm laser of acute lumbago: double-blind control. *Laser Clinical Research* 1988;3:16-20.
 175. Soriano F, Rios R. Gallium arsenide laser treatment of chronic low back pain: a prospective, randomized and double-blind study. *Laser Therapy* 1998;10:175-80.
 176. Toya S, Motegi M, Inomata K, Ohshiro T, Maed T. Report on a computer-randomized double-blind clinical trial to determine the effectiveness of the GaAlAs (830 nm) diode laser for attenuation in selected pain groups. *Laser Therapy* 1994;6:143-8.
 177. Klein RG, Eek BC. Low-energy laser treatment and exercise for chronic low back pain: double-blind controlled trial. *Arch Phys Med Rehabil* 1990;71:34-7.
 178. Gur A, Karakoc M, Cevik R, Nas K, Sarac AJ, Karakoc M. Efficacy of low power laser therapy and exercise on pain and functions in chronic low back pain. *Lasers Surg Med* 2003;32:233-8.
 179. Hilde G, Hagen KB, Jamtvedt G, Winnem M. Advice to stay active as a single treatment for low back pain and sciatica. *Cochrane Database Syst Rev* 2002;2:CD003632.
 180. Deyo RA, Diehl AK, Rosenthal M. How many days of bed rest for acute low back pain? A randomized clinical trial. *N Engl J Med* 1986;315:1064-70.
 181. Malmivaara A, Häkkinen U, Aro T, Heinrichs ML, Koskeniemi L, Kuosma E, et al. The treatment of acute low back pain--bed rest, exercises, or ordinary activity? *N Engl J Med* 1995;332:351-5.
 182. Waddell G, Feder G, Lewis M. Systematic reviews of bed rest and advice to stay active for acute low back pain. *Br J Gen Pract* 1997;47:647-52.
 183. Hagen KB, Jamtvedt G, Hilde G, Winnem MF. The updated Cochrane review of bed rest for low back pain and sciatica. *Spine* 2005;30:542-6.
 184. New Zealand guidelines group. New Zealand acute low back pain guide. 2004.
 185. Hicks GE, Fritz JM, Delitto A, McGill SM. Preliminary development of a clinical prediction rule for determining which patients with low back pain will respond to a stabilization exercise program. *Arch Phys Med Rehabil* 2005;86:1753-62.
 186. Faas A, Chavannes AW, van Eijk JT, Gubbels JW. A randomized, placebo-controlled trial of exercise therapy in patients with acute low back pain. *Spine* 1993;18:1388-95.
 187. Faas A, van Eijk JT, Chavannes AW, Gubbels JW. A randomized trial of exercise therapy in patients with acute low back pain. Efficacy on sickness absence. *Spine* 1995;20:941-7.
 188. Hayden JA, van Tulder MW, Tomlinson G. Systematic review: strategies for using exercise therapy to improve outcomes in chronic low back pain. *Ann Intern Med* 2005;142:776-85.
 189. Chou R, Huffman LH; American Pain Society; American College of Physicians. Nonpharmacologic therapies for acute and chronic low back pain: a review of the evidence for an American Pain Society/American College of

- Physicians clinical practice guideline. *Ann Intern Med* 2007;147:492-504.
190. Hides JA, Jull GA, Richardson CA. Long-term effects of specific stabilizing exercises for first-episode low back pain. *Spine* 2001;26:E243-8.
191. Stankovic R, Johnell O. Conservative treatment of acute low-back pain. A prospective randomized trial: McKenzie method of treatment versus patient education in "mini back school". *Spine* 1990;15:120-3.
192. Stankovic R, Johnell O. Conservative treatment of acute low back pain. A 5-year follow-up study of two methods of treatment. *Spine* 1995;20:469-72.
193. Hayden J, van Tulder MW, Malmivaara A, Koes BW. Exercise therapy for treatment of non-specific low back pain. *Cochrane Database of Systematic Reviews* 2005, Issue 3.
194. Mannion AF, Muntener M, Taimela S, Dvorak J. A randomized clinical trial of three active therapies for chronic low back pain. *Spine* 1999;24:2435-48.
195. Chatzitheodorou D, Kabitsis C, Malliou P, Mougios V. A pilot study of the effects of high-intensity aerobic exercise versus passive interventions on pain, disability, psychological strain, and serum cortisol concentrations in people with chronic low back pain. *Phys Ther* 2007;87:304-12.
196. Lewis JS, Hewitt JS, Billington L, Cole S, Byng J, Karayiannis S. A randomized clinical trial comparing two physiotherapy interventions for chronic low back pain. *Spine* 2005;30:711-21.
197. Goldby LJ, Moore AP, Doust J, Trew ME. A randomized controlled trial investigating the efficiency of musculoskeletal physiotherapy on chronic low back disorder. *Spine* 2006;31:1083-93.
198. Bendix AF, Bendix T, Vaegter K, Lund C, Frølund L, Holm L. Multidisciplinary intensive treatment for chronic low back pain: a randomized, prospective study. *Cleve Clin J Med* 1996;63:62-9.
199. Kankaanpää M, Taimela S, Airaksinen O, Hänninen O. The efficacy of active rehabilitation in chronic low back pain. Effect on pain intensity, self-experienced disability, and lumbar fatigability. *Spine* 1999;24:1034-42.
200. Manniche C, Hesseløe G, Bentzen L, Christensen I, Lundberg E. Clinical trial of intensive muscle training for chronic low back pain. *Lancet* 1988;2:1473-6.
201. Manniche C, Lundberg E, Christensen I, Bentzen L, Hesseløe G. Intensive dynamic back exercises for chronic low back pain: a clinical trial. *Pain* 1991;47:53-63.
202. Collee G, Dijkmans BA, Vandenbroucke JP, Cats A. Iliac crest pain syndrome in low back pain: frequency and features. *J Rheumatol* 1991;18:1064-7.
203. Hameroff SR, Crago BR, Blitt CD, Womble J, Kanel J. Comparison of bupivacaine, etidocaine, and saline for trigger-point therapy. *Anesth Analg* 1981;60:752-5.
204. Garvey TA, Marks MR, Wiesel SW. A prospective, randomized, double-blind evaluation of trigger-point injection therapy for low-back pain. *Spine* 1989;14:962-4.
205. Dagenais S, Haldeman S, Wooley JR. Intraligamentous injection of sclerosing solutions (prolotherapy) for spinal pain: a critical review of the literature. *Spine J* 2005;5:310-28.
206. Yelland MJ, Del Mar C, Pirozzo S, Schoene ML. Prolotherapy injections for chronic low back pain: a systematic review. *Spine* 2004;29:2126-33.
207. Dagenais S, Yelland MJ, Del Mar C, Schoene ML. Prolotherapy injections for chronic low-back pain. *Cochrane Database Syst Rev* 2007:CD004059.
208. Henschke N, Ostelo RWJG, van Tulder MW, Vlaeyen JWS, Morley S, Assendelft WJJ, et al. Behavioural treatment for chronic low-back pain. *Cochrane Database Syst Rev* 2010:CD002014.
209. Turner JA, Clancy S. Comparison of operant behavioral and cognitivebehavioral group treatment for chronic low back pain. *J Consult Clin Psychol* 1988;56:261-6.
210. Smeets RJ, Vlaeyen JW, Hidding A, Kester AD, van der Heijden GJ, van Geel AC, et al. Active rehabilitation for chronic low back pain: cognitive-behavioral, physical, or both? First direct post-treatment results from a randomized controlled trial. *BMC Musculoskelet Disord* 2006;7:5.
211. Linton SJ, Andersson T. Can chronic disability be prevented? A randomized trial of a cognitive-behavior intervention and two forms of information for patients with spinal pain. *Spine* 2000;25:2825-31.
212. van Tulder MW, Koes BW, Bouter LM. Conservative treatment of acute and chronic nonspecific low back pain. A systematic review of randomized controlled trials of the most common interventions. *Spine* 1997;22:2128-56.
213. Fordyce WE, Brockway JA, Bergman JA, Spengler D. Acute back pain: a control-group comparison of behavioral vs traditional management methods. *J Behav Med* 1986;9:127-40.
214. Guzmán J, Esmail R, Karjalainen K, Malmivaara A, Irvin E, Bombardier C. Multidisciplinary rehabilitation for chronic low back pain: systematic review. *BMJ* 2001;322:1511-6.
215. Guzmán J, Esmail R, Karjalainen K, Malmivaara A, Irvin E, Bombardier C. Multidisciplinary bio-psycho-social rehabilitation for chronic low-back pain. *Cochrane Database Syst Rev* 2002;1:CD000963.
216. Kääpä EH, Frantsi K, Sama S, Malmivaara A. Multidisciplinary group rehabilitation versus individual physiotherapy for chronic nonspecific low back pain: a random-

- ized trial. *Spine* 2006;31:371-6
217. Coxhead CE, Inskip H, Meade TW, North WR, Troup JD. Multicenter trial of physiotherapy in the management of sciatic symptoms. *Lancet* 1981;1:1065-8
218. van Duijvenbode IC, Jellema P, van Poppel MN, van Tulder MW. Lumbar supports for prevention and treatment of low back pain. *Cochrane Database Syst Rev* 2008; 16:CD001823
219. Adamczyk A, Kiebzak W, Wilk-Frańczuk M, Sliwiński Z. Effectiveness of holistic physiotherapy for low back pain. *Ortop Traumatol Rehabil* 2009;11:562-76
220. Bush C, Ditto B, Feuerstein M. A controlled evaluation of paraspinal EMG biofeedback in the treatment of chronic low back pain. *Health Psychol* 1985;4:307-21.
221. Donaldson S, Romney D, Donaldson M, Skubick D. Randomized study of the application of single motor unit biofeedback training to chronic low back pain. *J Occup Rehabil* 1994;4:23-37.
222. Asfour SS, Khalil TM, Waly SM, Goldberg ML, Rosomoff RS, Rosomoff HL. Biofeedback in back muscle strengthening. *Spine* 1990;15:510-3.