

Table S1: Search strategy for the Cochrane Back Group trials registry*

Search Strategy in Cochrane Library:

*:ti,ab,kw in Trials, with Back Group in Review Groups 6476

Endnote search strategy:

Any field contains: acute AND Any field contains chiropractic (43)

Any field contains: acute AND Any field contains physiotherapy* (87)

Any field contains: acute AND Any field contains opioid (30)

Any field contains: opioid NOT Any field contains: surgery NOT Any field contains:
chronic (28)

Any field contains: emergency (57) NOT Any field contains: whiplash (18)

*On May 1, 2015 we used the Cochrane Library to search the Cochrane Back Review Group (CBRG) Trials Register, which we exported to Endnote. We also screened the included studies lists of recent CBRG Reviews of chiropractic and physiotherapy interventions for acute low back pain (Franke et al., 2015, Rubinstein et al., 2012).

Table S2: Randomized controlled trials of acute low back pain assessing the effect of opioids, chiropractic care, or physical therapy, and their generalizability to injured workers receiving disability benefits

Study	Participants and Interventions	Representation of injured workers receiving lost-time disability benefits for acute low back pain
Glover 1974	84 patients with unilateral low back pain (LBP), randomized to manipulation or control (sham diathermy)	No mention regarding receipt of lost-time disability benefits
Bergquist-Ullman 1977	217 patients consulting a workplace health centre with acute or subacute LBP randomized to back school, physiotherapy or placebo	At least 88% of patients were enrolled with acute LBP, and of the 217, 184 were "sick-listed" for a median of 21 days during the study, but there was no mention regarding receipt of lost-time disability benefits
Rasmussen 1979	26 patients with LBP duration <3weeks, randomized to manipulation or diathermy	No mention regarding receipt of lost-time disability benefits
Hoehler 1981	95 patients with palpatory cues indicating hyperalgesia or a restricted or painful range of vertebral motion, randomized to rotational manipulation of the trunk or massage	No mention regarding receipt of lost-time disability benefits
Farrell 1982	48 subjects with acute LBP duration <3 weeks, randomized to passive mobilization and manipulation or combination of diathermy, exercises and ergonomic advice	No mention regarding receipt of lost-time disability benefits
Gilbert 1985	270 patients presenting with LBP, randomized to bed rest or physiotherapy	The authors reported that "people who were receiving workman's compensation were also slower to recover." p.794, but they did not report any associated data (e.g. how many patients were receiving disability benefits, or the quantitative results for this subgroup).
Waterworth 1985	112 patients with acute mechanical LBP, randomized to ergonomic advice/ Diflunisal or ergonomic advice/ conservative physiotherapy (ultrasound and exercise) or ergonomic advice/manipulation	The authors enrolled a mixed group of patients, that may include up to 54% receiving lost-time claim benefits, but that the proportion is unequal between study group (ranging from 47% to 63%) and the results are provided for the total population which precludes confident generalizability to only those who were receiving lost-time claim benefits.
Hadler 1987	54 subjects with acute LBP, randomized to mobilization or manipulation	Patients who were receiving disability benefits were explicitly excluded from this trial: "neither workers' compensation nor disability insurance should be at issued [sic] and the acute low-back pain must not be considered work-related."pg 703
MacDonald 1990	95 subjects with LBP duration <4 weeks, randomized to osteopathic manipulation or control (advice to rest and resume activities gradually)	"Less than 30% [of the study group] suffered loss of income because of disability" pg. 366

Cramer 1993	36 subjects with mechanical LBP less than two weeks duration randomized to side-lying manipulation, electrical stimulation and cold packs or control (detuned ultrasound, cold packs and 15-30 sec. gentle massage)	Patients who were receiving disability benefits were explicitly excluded from this trial. Inclusion criteria stipulate "no litigation or workers' compensation" (as per the review by Rubinstein 2012, pg. 52)
Skargren 1997	323 patients with back and neck pain of mixed duration, randomized to chiropractic or physiotherapy.	51% of patients (166 of 323) were on "sick-leave" when enrolled (Table 3, pg. 2170), but there was no mention regarding receipt of lost-time disability benefits.
Innes 1998	123 patients with acute LBP, randomized to ketorolac or acetaminophen/codeine	Patients who were receiving disability benefits were limited during enrollment: "Because Workers Compensation status might influence response to therapy, we limited each site to 10 work-related back injuries, hoping to limit such cases to no more than half the total study enrollment." pg. 550
Cherkin 1998	321 adults with acute LBP randomized to the McKenzie method of physical therapy, chiropractic manipulation, or provision of an educational booklet	patients who were receiving disability benefits were explicitly excluded from this trial: "Subjects who... were involved in claims for compensation or litigation because of the back injury... were also excluded"; pg. 1022
Seferlis 1998	180 patients sick-listed for < 2 weeks for LBP randomized to General Practitioner Program (rest, sick-leave, analgesics etc.) or Manual Therapy Program (autotractor, manipulation, mobilization etc.) or Intensive Training Program (information, muscle training and general condition training 3x/week for 8 weeks)	All enrolled patients were "sick listed for acute low-back pain for up to 2 weeks", but there is no mention regarding receipt of lost-time disability benefits.
Morton 1999	29 patients with acute mechanical LBP, randomized to manipulation/ exercise or exercise alone	Patients who were receiving disability benefits were explicitly excluded from this trial: "Exclusion criteria were ... third-party, public liability or workers' compensation claimants"; pg. 185
Veenema 2000	155 patients with musculoskeletal LBP, randomized to meperidine or ketorolac	No mention regarding receipt of lost-time disability benefits
Metscher 2001	192 Patients with acute LBP randomized to dexketoprofen-trometamol or tramadolhydrochloride	Abstract in English, paper in German. No mention in the abstract about receipt of lost-time disability benefits
Palangio 2002	147 patients with acute LBP, first episode or exacerbation of chronic condition with onset <48 hours before enrolment, randomized to combination hydrocodone 7.5 mg and ibuprofen 200 mg (HC/IB) or combination oxycodone 5 mg and acetaminophen 325 mg (OX/AC)	No mention regarding receipt of lost-time disability benefits
Hofstee 2002	250 patients with sciatica of less than 1 months duration randomized to bed rest, physiotherapy or continuation of activities of daily living	No mention regarding receipt of lost-time disability benefits
Johnstone 2002	12 patients with acute LBP with signs of psychological distress (DRAM score Modified Zung score >17) randomized to cognitive behavioral therapy and conventional physiotherapy or conventional physiotherapy alone	Patients with "ongoing medico legal issues" were excluded (pg.183). No mention regarding receipt of lost-time disability benefits

Childs 2004	131 patients with LBP of median duration of 27 days, randomized to manipulation and exercise or exercise alone	39.8% of patients had missed work due to LBP, Table 2 pg. 925, but there was no mention regarding receipt of lost-time disability benefits
Hoiriis 2004	192 patients with LBP of 3 to 6 weeks duration randomized to chiropractic adjustments with placebo medicine, muscle relaxants with sham adjustments, or placebo medicine with sham adjustments	No mention regarding receipt of lost-time disability benefits
Salvador 2005	28 subjects randomly allocated to a muscle energy technique or transcutaneous electrical nerve stimulation (TENS)	Abstract in English, paper in Portuguese. No mention in the abstract about receipt of lost-time disability benefits
Brennan 2006	123 patients referred to physiotherapy for LBP less than 90 days duration, randomized to manipulation or specific exercise or stabilization	No mention regarding receipt of lost-time disability benefits
Santilli 2006	102 patients with acute moderate to severe radiating LBP of duration <10 days with MRI evidence of disc protrusion, randomized to manipulation or simulated manipulation	No mention regarding receipt of lost-time disability benefits
Hancock 2007	240 subjects with acute LBP duration < 6 weeks, randomized to four groups: control (placebo drug and placebo manipulation) or NSAIDs (diclofenac and placebo manipulation) or manipulation (placebo drug and active manipulation) or manipulation and NSAIDs (diclofenac and active manipulation)	No mention regarding receipt of lost-time disability benefits
Lee 2008	Study of 78 musculoskeletal pain patients, 67% with LBP, randomized to tramadol/paracetamol (n=28 with LBP) or ketorolac/paracetamol (n=24 with LBP)	No mention regarding receipt of lost-time disability benefits
Lau 2008	110 patients with acute LBP, randomized to immediate intervention (advice to stay active, Back Care booklet, reassurance, advice, interferential current therapy) or control (walking training and prescription of walking aids as indicated) followed by outpatient physiotherapy (for both groups)	12% of patients (13 of 110) had work-related injuries (see Table 1), but no mention regarding receipt of lost-time disability benefits
Selkow 2009	20 subjects with acute LBP, randomly allocated to muscle energy technique or sham manual treatment	No mention regarding receipt of lost-time disability benefits
Cleland 2009	112 subjects with LBP, that met 4 out of 5 criteria for a clinical prediction rule for LBP likely to respond to manipulation, randomized to supine thrust manipulation, side-lying thrust manipulation or non-thrust manipulation	Only 6% of patients were unable to work due to LBP. Table 2, pg.2724.
Hallegraef 2009	64 patients with acute nonspecific LBP duration <16 days, randomized to manipulative therapy plus physical therapy or physical therapy alone	No mention regarding receipt of lost-time disability benefits

Sutlive 2009	60 subjects with LBP meeting 3 out of 5 criteria for a clinical prediction rule for LBP likely to respond to manipulation, randomized to lumbopelvic manipulation or neutral gap manipulation	Patients "with litigation pending for their LBP" were excluded. No mention regarding receipt of lost-time disability benefits
Juni 2009	104 patients with acute LBP duration < 4 weeks, randomized to standard care with manipulation or standard care alone	No mention regarding receipt of lost-time disability benefits
Machado 2010	148 adults with acute LBP duration <6 weeks, randomized to the McKenzie method and first-line care (advice, reassurance and time-contingent acetaminophen) or first-line care alone	Only 3% of participants (4 of 146) were receiving disability benefits for their injury (see Table 1)
Lewis 2011	89 patients with acute LBP duration < 3 months, randomized to strain-counterstrain manual therapy/exercise or exercise alone	No mention regarding receipt of lost-time disability benefits
Biondi 2013	1664 patients with acute LBP, randomized to tapentadol or oxycodone	No mention regarding receipt of lost-time disability benefits
Goertz 2013	91 patients with acute LBP, duration < 4 weeks, randomized to standard medical care and chiropractic manipulation or standard care alone	No mention regarding receipt of lost-time disability benefits
Behrbalk 2014	65 adults with acute LBP, randomized to morphine or morphine/promethazine	No mention regarding receipt of lost-time disability benefits
Eken 2014	137 patients with moderate or severe acute LBP, randomized to paracetamol, morphine or dextketoprofen	No mention regarding receipt of lost-time disability benefits
Tanen 2014	44 patients with acute radicular LBP, randomized to lidocaine or ketorolac	No mention regarding receipt of lost-time disability benefits

References for Tables S1 and S2

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Table S3: Sensitivity analysis of factors associated with time to claim closure, entering chiropractic care and physiotherapy as time-dependant co-variates (n=1,442)

	Univariate		Multivariable	
	Hazard Ratio (99% CI)	p-value	Adjusted Hazard Ratio (99% CI)	p-value
Baseline predictors				
Age categories in years		<0.001		<0.001
15 to <25	1.00		1.00	
25 to <35	0.88 (0.65, 1.19)		0.79 (0.58, 1.08)	
35 to <45	0.78 (0.59, 1.04)		0.70 (0.52, 0.95)	
45 to <55	0.76 (0.56, 1.02)		0.67 (0.49, 0.91)	
55 to 65	0.56 (0.40, 0.80)		0.52 (0.36, 0.74)	
Gender		0.114		0.451
Females	1.09 (0.95, 1.26)		0.96 (0.82, 1.12)	
Males	1.00		1.00	
First language		0.137		0.327
English	1.00		1.00	
Other	0.83 (0.59, 1.15)		0.88 (0.63, 1.23)	
Pre-disability income in dollars per week				
At 30 days:				
≤480	1.00	-	1.00	-
481-694	1.15 (0.91, 1.45)	0.125	1.08 (0.85, 1.37)	0.396
695-920	1.21 (0.96, 1.54)	0.034	1.05 (0.81, 1.36)	0.614
>920	1.20 (0.94, 1.52)	0.050	1.04 (0.80, 1.35)	0.689
At 60 days:				
≤480	1.00	-	1.00	-
481-694	1.09 (0.89, 1.34)	0.273	1.03 (0.83, 1.27)	0.710
695-920	1.13 (0.92, 1.39)	0.137	0.97 (0.77, 1.22)	0.746
>920	1.08 (0.88, 1.33)	0.326	0.94 (0.74, 1.19)	0.477
At 180 days:				
≤480	1.00	-	1.00	-
481-694	0.89 (0.68, 1.17)	0.267	0.85 (0.65, 1.12)	0.130
695-920	0.84 (0.63, 1.12)	0.115	0.71 (0.52, 0.96)	0.003
>920	0.72 (0.54, 0.97)	0.004	0.61 (0.45, 0.84)	<0.001
At 365 days:				
≤480	1.00	-	1.00	-
481-694	0.65 (0.36, 1.18)	0.064	0.63 (0.35, 1.16)	0.051
695-920	0.53 (0.28, 1.02)	0.012	0.44 (0.23, 0.84)	0.001
>920	0.39 (0.20, 0.75)	<0.001	0.32 (0.16, 0.63)	<0.001
Opioid prescription		<0.001		<0.001
Yes	0.62 (0.48, 0.80)		0.69 (0.53, 0.89)	
No	1.00		1.00	
Prior claims		0.306		0.661
Yes	1.07 (0.91, 1.26)		1.03 (0.87, 1.22)	
No	1.00		1.00	
Union membership		<0.001		0.014
Yes	1.29 (1.11, 1.50)		1.14 (0.96, 1.36)	
No	1.00		1.00	
Missing	1.34 (1.07, 1.68)		1.27 (1.01, 1.60)	
Employer RTW program		<0.001		<0.001
Yes	1.73 (1.43, 2.09)		1.77 (1.45, 2.18)	

No	1.00		1.00	
Missing	1.17 (0.87, 1.58)		1.18 (0.86, 1.60)	
Doubt Work-relatedness		0.174		0.119
Yes	0.94 (0.76, 1.16)		0.87 (0.70, 1.08)	
No	1.00		1.00	
Missing	1.13 (0.92, 1.39)		1.08 (0.87, 1.33)	
Time-dependent predictors*				
Chiropractic care received after the accident prior to claim closure	1.11 (0.95, 1.30)	0.096	1.08 (0.91, 1.29)	0.268
Physiotherapy after the accident prior to claim closure	0.96 (0.83, 1.10)	0.420	0.99 (0.85, 1.16)	0.913

HR>1 indicates faster claim closure; RTW = return to work

* The time-dependent predictors are “turned on” once the claimant has received their first service after their accident.

Table S4: Search strategy for observational studies exploring the association of early opioid, physiotherapy, or chiropractic care with Workers' Compensation claim duration, for cases of acute low back pain

MEDLINE (OvidSP)

- 1 exp Whiplash Injuries/
- 2 exp Soft Tissue Injuries/
- 3 repetitive strain injur\$.mp.
- 4 carpal tunnel syndrome.mp.
- 5 exp Cumulative Trauma Disorders/
- 6 exp Back pain/ or exp pain/ or chronic pain.tw.
- 7 exp Anxiety/
- 8 exp Depression/
- 9 exp Neck Pain/
- 10 exp Depressive Disorder/
- 11 exp Back Injuries/
- 12 injured worker\$.mp.
- 13 musculoskeletal injur\$.mp.
- 14 or/1-13
- 15 exp "Wounds and Injuries"/
- 16 Musculoskeletal System/ or Musculoskeletal Diseases/
- 17 15 and 16
- 18 14 or 17
- 19 exp insurance claim reporting/ or exp "insurance claim review"/ or exp insurance, disability/ or insurance, liability/
- 20 Insurance, Accident/
- 21 ((worker\$ or workman\$ or workmen&) adj compensation).mp. or exp Workers' compensation/
- 22 claim.mp.
- 23 claimant.mp.
- 24 or/19-23
- 25 prognosis.mp. or exp Prognosis/
- 26 Time/ or exp Time Factors/
- 27 exp "Recovery of Function"/
- 28 "Severity of Illness Index"/
- 29 exp Trauma Severity Indices/
- 30 (recovery or prognostic).mp.
- 31 or/25-30
- 32 18 and 24 and 31
- 33 exp Disability Evaluation/
- 34 24 and 31 and 33
- 35 exp Occupational Diseases/ or exp Accidents, Occupational/ or (occupational injur: or occupational accident:).mp.
- 36 24 and 31 and 35
- 37 exp Accidents, Traffic/
- 38 24 and 31 and 37
- 39 "Compensation and Redress"/
- 40 18 and 31 and 39

- 41 exp Work Capacity Evaluation/ or exp workload/ or workload.mp.
- 42 (18 or 35) and 24 and 41
- 43 32 or 34 or 36 or 38 or 40 or 42
- 44 18 or 33
- 45 31 or 41
- 46 35 and 44 and 45
- 47 46 or 43

EMBASE (OvidSP)

- 1 whiplash injur\$.mp. or exp whiplash injury/
- 2 exp soft tissue injury/
- 3 soft tissue injur\$.mp.
- 4 repetitive strain injur\$.mp.
- 5 carpal tunnel syndrome.mp. or exp carpal tunnel syndrome/
- 6 exp cumulative trauma disorder/
- 7 back pain.mp. or exp backache/
- 8 backpain.mp.
- 9 chronic pain.mp. or exp chronic pain/
- 10 exp pain/
- 11 anxiety/
- 12 exp depression/
- 13 neck pain.mp. or exp neck pain/
- 14 back injur\$.mp.
- 15 low back injury/
- 16 injured worker\$.mp.
- 17 musculoskeletal injury/
- 18 occupational injuries.mp. or exp occupational accident/
- 19 occupational accidents.mp.
- 20 occupational diseases.mp. or exp occupational disease/
- 21 or/1-20
- 22 insurance/ or exp compensation/ or exp workman compensation/ or exp health insurance/ or exp "health plan employer data and information set"/
- 23 accident insurance.mp.
- 24 exp workman compensation/
- 25 ((worker\$ or workman\$ or workmen&) adj compensation).mp.
- 26 (claim or claimant).mp.
- 27 or/22-26
- 28 prognosis.mp. or prognosis/
- 29 exp time/
- 30 recovery of function.mp. or convalescence/
- 31 disease severity/
- 32 exp injury scale/
- 33 (recovery or prognostic).mp.
- 34 workload.mp. or exp workload/
- 35 exp work capacity/
- 36 exp work resumption/ or return to work.mp.
- 37 or/28-36

38 21 and 27 and 37
39 or/1-17
40 or/18-20
41 37 and 39 and 40
42 38 or 41

PsycInfo (OvidSP)

1 exp Whiplash/
2 whiplash injur:.mp.
3 soft tissue injur\$.mp.
4 cumulative trauma disorder\$.mp.
5 repetitive strain injur\$.mp.
6 carpal tunnel syndrome.mp.
7 back pain.mp. or exp Back Pain/
8 (backpain or backache).mp.
9 chronic pain.mp. or exp Chronic Pain/
10 exp Musculoskeletal Disorders/ or exp Fibromyalgia/ or fibromyalgia.mp.
11 exp Anxiety/
12 exp "Depression (Emotion)"/ or exp Major Depression/
13 neck pain.mp.
14 back injur:.mp.
15 musculoskeletal injur\$.mp.
16 exp Industrial Accidents/
17 exp Occupational Safety/
18 (occupational injur: or occupational accident:).mp.
19 exp Work Related Illnesses/
20 or/1-19
21 exp Workers' Compensation Insurance/
22 exp Employee Health Insurance/
23 exp Insurance/
24 disability insurance.mp.
25 (claim or claimant).mp.
26 ((worker: or workman: or workmen:) adj compensation).mp.
27 accident insurance.mp.
28 or/21-27
29 prognosis.mp. or exp Prognosis/
30 exp Time/
31 time factors.mp.
32 exp "Recovery (Disorders)"/
33 recovery of function.mp.
34 exp "Severity (Disorders)"/ or severity of illness.mp.
35 (recovery or prognostic).mp.
36 exp Work Load/ or workload.mp. or exp Job Performance/
37 exp Vocational Evaluation/ or exp Disability Evaluation/ or work capacity evaluation.mp. or
exp Reemployment/
38 work resumption.mp.
39 or/29-38
40 20 and 28 and 39

41 16 or 17 or 18 or 19
42 or/1-15
43 39 and 41 and 42
44 28 and 41
45 40 or 43 or 44

CINAHL (Ebsco)

49 S46 or S48
S48 S22 and S45 and S47
S47 S23 or S24 or S25 or S26
S46 S27 and S33 and S45
S45 S34 or S35 or S36 or S37 or S38 or S39 or S40 or S41 or S42 or S43 or S44
S44 (MH "Disability Evaluation+")
S43 "work resumption"
S42 "return to work" OR (MH "Job Re-Entry")
S41 (MH "Work Capacity Evaluation")
S40 (MH "Workload Measurement") OR (MH "Workload") OR "workload"
S39 (recovery or prognostic)
S38 (MH "Severity of Illness") OR (MH "Severity of Illness Indices+")
S37 (MH "Recovery")
S36 "recovery of function"
S35 (MH "Time+") OR (MH "Time Factors")
S34 (MH "Prognosis+") OR "prognosis"
S33 S28 or S29 or S30 or S31 or S32
S32 "accident insurance"
S31 (worker* N2 compensation) OR (workman* N2 compensation) OR (workmen* N2 compensation)
S30 (Claim or claimant)
S29 (MH "Insurance") OR (MH "Insurance, Disability+")
S28 (MH "Worker's Compensation")
S27 S22 or S23 or S24 or S25 or S26
S26 "occupational accident" OR (MH "Accidents, Occupational+")
S25 "occupational injur*"
S24 (MH "Occupational-Related Injuries")
S23 (MH "Occupational Diseases+")
S22 S18 or S21
S21 S19 and S20
S20 (MH "Wounds and Injuries+") OR (MH "Occupational-Related Injuries")
S19 (MH "Musculoskeletal Diseases+") or (MH "Musculoskeletal System+")
S18 S1 or S2 or S3 or S4 or S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17
S17 "musculoskeletal injur*"
S16 "back injur*"
S15 (MH "Back Injuries+")
S14 (MH "Neck Pain") OR "neck pain"
S13 (MH "Depression+")
S12 (MH "Anxiety+")
S11 (MH "Pain+")

- S10 (MH "Fibromyalgia") OR "fibromyalgia"
- S9 (MH "Chronic Pain") OR "chronic pain"
- S8 (backpain or backache)
- S7 (MH "Back Pain") OR "back pain"
- S6 (MH "Carpal Tunnel Syndrome") OR "carpal tunnel syndrome"
- S5 "repetitive strain injur*"
- S4 (MH "Cumulative Trauma Disorders+")
- S3 "soft tissue injur*"
- S2 (MH "Soft Tissue Injuries")
- S1 "whiplash injur*" OR (MH "Whiplash Injuries")

Figure S1: Flow diagram of the literature search process for randomized controlled trials assessing the effect of opioids, physiotherapy, or chiropractic care for acute low back pain.

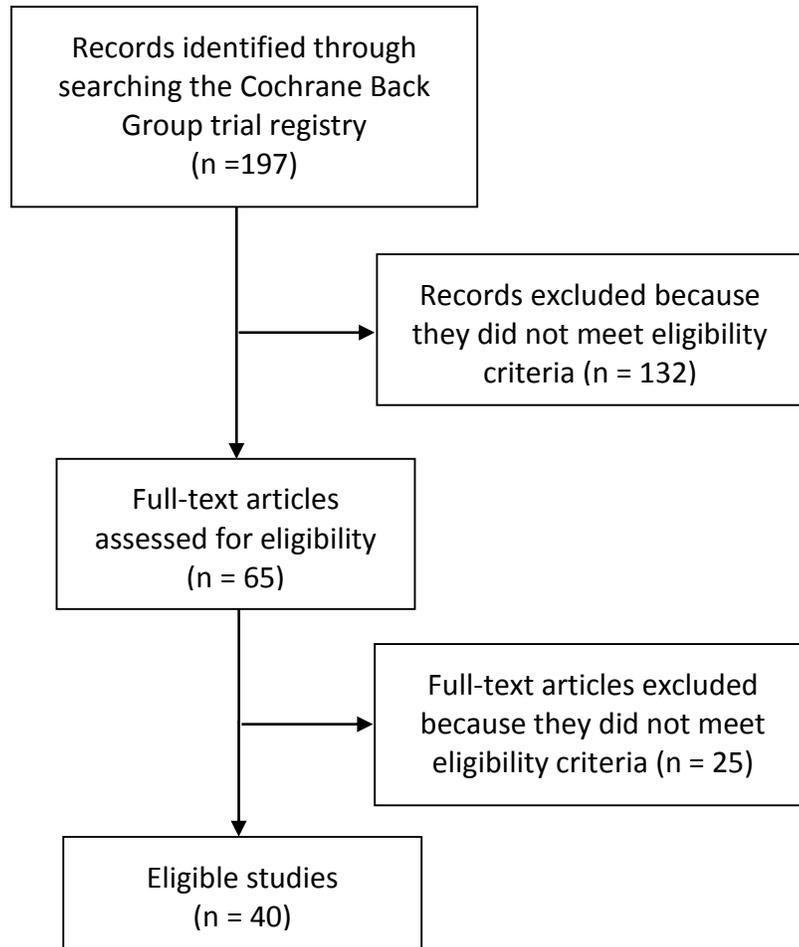


Figure S2: Flow diagram of the literature search process for observational studies assessing the effect of early opioids, physiotherapy, or chiropractic care for acute low back pain.

