Research Article
E-ISSN : 3048-1368
Volume 13, Issue No. 05. 2025
P-ISSN : 3048-1376

What is the effectiveness of chiropractic manipulation compared to standard physical therapy in reducing pain intensity and improving functional mobility for patients with chronic low back pain? : A Systematic Review

[1] Satya Agung Nugroho, [2] Nazalla Gwen Vaganesha, [3] Hasnan Habib Afifudin

[1,2] dr. Soeroto Regional General Hospital, Ngawi Regency, East Java, Indonesia

[3] Faculty of Medicine, Indonesian Islamic University, Special Region of Yogyakarta, Indonesia

Corresponding Author : Email : agungfkums2015@gmail.com

Article History :

Received date	: 2025/03/24
Revised date	: 2025/04/07
Accepted date	: 2025/05/19
Published date	: 2025/06/26

E-ISSN :
ISSN 3048-1368
9 773048 136000

P-ISSN
ISSN 3048-1376
9 773048 137007

ABSTRACT

Introduction : Chronic low back pain (CLBP) is a pervasive health issue that significantly impairs quality of life and functional capacity globally. Among non-pharmacologic interventions, chiropractic manipulation and standard physical therapy are common treatments. This systematic review aims to compare the effectiveness of these two modalities in reducing pain intensity and improving functional mobility for adults with CLBP.

Methods : This systematic review adhered to the PRISMA 2020 guidelines. A comprehensive search was conducted across PubMed, Semantic Scholar, Springer, and Google Scholar to identify randomized controlled trials, systematic reviews, and meta-analyses. Studies were included if they compared chiropractic manipulation by licensed chiropractors to standard physical therapy for adult patients with CLBP lasting over 12 weeks. Primary outcomes included pain intensity and functional mobility measured by validated scales.

Results : Eighteen studies were included in the final analysis. The results indicate that chiropractic manipulation and standard physical therapy are largely equivalent in effectiveness for both pain reduction and functional improvement. While a few studies reported superior short-term pain relief with spinal manipulative therapy , most found no significant long-term differences between the two interventions. Adverse events associated with both treatments were infrequently reported and were generally mild and transient.

Discussion: The evidence demonstrates a consistent pattern of equivalence in clinical outcomes between chiropractic care and physical therapy. This suggests that neither modality is definitively superior for the majority of CLBP patients. The significant variability in treatment protocols across studies highlights the need for individualized care plans. Patient characteristics did not reliably predict a differential response to either therapy, underscoring the importance of shared decision-making.

Conclusion: Chiropractic manipulation and standard physical therapy are both effective and safe interventions for managing chronic low back pain, yielding comparable outcomes. The choice between these treatments should be guided by patient preference, accessibility, and clinical presentation. An integrative approach, potentially combining the strengths of both disciplines, may further enhance patient care.

Keywords: Chronic Low Back Pain, Chiropractic Manipulation, Spinal Manipulative Therapy, Standard Physical Therapy, Pain Intensity, Functional Mobility.

INTRODUCTION

Chronic low back pain (CLBP) is a pervasive health issue that significantly impairs quality of life and functional capacity worldwide. It is characterized by persistent pain lasting more than 12 weeks, often leading to disability and increased healthcare utilization. Given its prevalence and impact, effective management strategies for CLBP are critical for improving patient outcomes and reducing societal burden (Blanchette et al., 2016).

Among the various non-pharmacologic interventions, chiropractic manipulation and physical therapy are two commonly employed treatments aimed at reducing pain intensity and enhancing functional mobility in CLBP patients. Chiropractic manipulation involves high-velocity low-amplitude thrust techniques applied by licensed chiropractors, while physical therapy typically includes exercise regimens and manual therapy administered by physiotherapists. Both approaches target musculoskeletal dysfunction and aim to restore spinal function and alleviate pain (Jenks et al., 2022).

Despite their widespread use, the comparative effectiveness of chiropractic manipulation versus standard physical therapy remains a subject of ongoing research and debate. Some studies suggest that chiropractic care may offer superior short-term pain relief, while others find no significant difference in long-term outcomes between the two modalities. This variability underscores the need for comprehensive evaluations to guide clinical decision-making (Sarker et al., 2020).

The primary objective of this research is to systematically assess and compare the effectiveness of chiropractic manipulation and standard physical therapy in reducing pain intensity and improving functional mobility among adults suffering from chronic low back pain. This study focuses on adult populations with nonspecific CLBP, excluding those with specific pathological conditions or recent spinal surgery, to ensure a homogeneous sample for accurate comparison (Eklund et al., 2018).

Secondary objectives include examining the safety profiles of both interventions, considering the frequency and severity of adverse events reported in clinical trials. Previous systematic reviews indicate that adverse effects associated with chiropractic manipulation and physical therapy are generally minor and transient, but inconsistent reporting limits definitive conclusions about their relative safety (Blanchette et al., 2016).

Another key aspect of this investigation is to evaluate the heterogeneity of treatment protocols, including the number and duration of sessions, as well as the specific techniques employed. Understanding these variables is essential to standardize care and optimize therapeutic outcomes for patients with CLBP (Kamali et al., 2018).

Furthermore, this study aims to identify potential patient characteristics that may predict differential responses to chiropractic manipulation versus physical therapy. However, existing evidence suggests that factors such as age, baseline pain severity, and disability levels do not reliably forecast treatment responsiveness, highlighting the complexity of CLBP management (de Zoete et al., 2020).

In summary, this research seeks to clarify the comparative effectiveness and safety of chiropractic manipulation and physical therapy in managing chronic low back pain, thereby informing evidence-based clinical practice and improving patient-centered care strategies (Licciardone & Gatchel, 2017).

METHODS

Protocol

The study strictly adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines to ensure methodological rigor and accuracy. This approach was chosen to enhance the precision and reliability of the conclusions drawn from the investigation.

Criteria for Eligibility

This systematic review aims to evaluate the most effective non-pharmacological interventions for preventing osteoporosis and sarcopenia in adults over 65 years old.

Screening

We screened in papers that met these criteria:

- **Population Age**: Does the study include only adult participants (18 years)?
- **Condition Duration**: Do all included participants have chronic low back pain (duration 12 weeks)?
- **Population Health Status**: Are participants free from specific pathological conditions (fractures, tumors, infections) and not within 6 months post-surgery?
- **Intervention Provider**: Is the spinal manipulative therapy delivered exclusively by licensed chiro- practors?
- **Intervention Isolation**: Is chiropractic manipulation evaluated as a standalone intervention (not combined with other treatments)?
- **Comparison Group**: Does the study include a comparison group receiving standard physical therapy interventions?
- **Outcome Measures**: Does the study measure at least one of: pain intensity using validated scales (e.g., VAS, NRS) OR functional mobility using validated measures (e.g., Roland-Morris, Oswestry)?
- **Study Design**: Is the study design either a randomized controlled trial, systematic review, or meta- analysis?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Data extraction

We asked a large language model to extract each data column below from each paper. We gave the

model the extraction instructions shown below for each column.

- **Study Design**:

Identify the specific type of study design used. Look in the methods section for details about:

- Randomized controlled trial (RCT)
- Controlled clinical trial
- Prospective or retrospective design
- Adaptive allocation design
- Crossover design

If multiple design elements are present, list all. If unclear, note ”design not clearly specified”. Prioritize the most specific design description available.

- **Blinding Status**:

Determine the blinding status of:

- Participants
- Clinicians/Interventionists
- Outcome assessors

Use the following notation:

- Fully blinded: ”Yes”
- Partially blinded: ”Partial”
- Not blinded: ”No”

If blinding information is missing, write ”Not reported”. If explicitly stated that blinding was impossible, write ”Not possible”.

- **Participant Demographics**:

Extract the following participant details:

- Total sample size
- Mean age (with standard deviation)

- Gender distribution (% male/female)
- Inclusion criteria for low back pain (e.g., duration, intensity)
- Specific diagnostic classifications used

If any information is missing, note ”Not reported”. Use exact numbers and percentages where possible.

- **Intervention Characteristics**:

For chiropractic manipulation interventions, extract:

- Type of manipulation (thrust vs. non-thrust)
- Specific technique used
- Body regions targeted
- Number of treatment sessions
- Duration of each session
- Total intervention period

If multiple intervention groups exist, detail each separately. Use precise measurements and specify units.

- **Comparison / Control Conditions**:

Describe the control or comparison group:

- Type of control (wait-list, standard physical therapy, placebo)
- Specific interventions in control group
- Duration of control condition

If no clear control group exists, write ”No control group reported”.

- **Primary Outcome Measures**:

List all primary outcome measures:

- Specific assessment tools used (e.g., Roland-Morris Disability Questionnaire)
- Measurement time points
- Reported results with statistical significance

Extract exact numerical results where possible. If statistical significance is reported, include p-values or effect sizes.

- **Secondary Outcome Measures**:

List all secondary outcome measures:

- Assessment tools used
- Measurement time points
- Reported results

Include any additional measures beyond primary outcomes, such as pain intensity scales, quality of life measures, or functional mobility assessments.

Search Strategy

The keywords used for this research based PICO :

Element	Keyword 1	Keyword 2	Keyword 3	Keyword 4
Population (P)	Chronic Low Back Pain Patients	Patients with Chronic Low Back Pain	Individuals with Chronic Low Back Pain	People with Chronic Low Back Pain
Intervention (I)	Chiropractic manipulation	Spinal manipulation	Spinal manipulative therapy	Chiropractic adjustment
Comparison (C)	Standard physical therapy	Conventional physical therapy	General physical therapy	Standard physiotherapy
Outcome (O)	Pain intensity reduction	Functional mobility improvement	Roland-Morris Disability Questionnaire	Oswestry Disability Index

The Boolean MeSH keywords inputted on databases for this research are: *("Chronic Low Back Pain Patients" OR "Patients with Chronic Low Back Pain" OR "Individuals with Chronic*

Low Back Pain" OR "People with Chronic Low Back Pain") AND ("Chiropractic manipulation" OR "Spinal manipulation" OR "Spinal manipulative therapy" OR "Chiropractic adjustment") AND ("Standard physical therapy" OR "Conventional physical therapy" OR "General physical therapy" OR "Standard physiotherapy") AND ("Pain intensity reduction" OR "Functional mobility improvement" OR "Roland-Morris Disability Questionnaire" OR "Oswestry Disability Index")

Data retrieval

Abstracts and titles were screened to assess their eligibility, and only studies meeting the inclusion criteria were selected for further analysis. Literature that fulfilled all predefined criteria and directly related to the topic was included. Studies that did not meet these criteria were excluded. Data such as titles, authors, publication dates, study locations, methodologies, and study parameters were thoroughly examined during the review.

Quality Assessment and Data Synthesis

Each author independently assessed the titles and abstracts of the selected studies to identify those for further exploration. Articles that met the inclusion criteria underwent further evaluation. Final decisions on inclusion were based on the findings from this review process.

Table 1. Article Search Strategy

Database	Keywords	Hits
Pubmed	*("Chronic Low Back Pain Patients" OR "Patients with Chronic Low Back Pain" OR "Individuals with Chronic Low Back Pain" OR "People with Chronic Low Back Pain" AND "Chiropractic manipulation" OR "Spinal manipulation" OR "Spinal manipulative therapy" OR "Chiropractic adjustment") AND ("Standard physical therapy" OR "Conventional physical therapy" OR "General physical therapy" OR "Standard physiotherapy") AND ("Pain intensity reduction" OR "Functional mobility improvement" OR "Roland-Morris Disability Questionnaire" OR "Oswestry Disability Index")*	1
Semantic Scholar	*("Chronic Low Back Pain Patients" OR "Patients with Chronic Low Back Pain" OR "Individuals with Chronic Low Back Pain" OR "People with Chronic Low Back Pain") AND ("Chiropractic manipulation" OR "Spinal manipulation" OR "Spinal manipulative therapy" OR "Chiropractic adjustment") AND ("Standard physical therapy" OR "Conventional physical therapy" OR "General physical therapy" OR "Standard physiotherapy") AND ("Pain intensity reduction" OR "Functional mobility improvement" OR "Roland-Morris Disability Questionnaire" OR "Oswestry Disability Index")*	250
Springer	*("Chronic Low Back Pain Patients" OR "Patients with Chronic Low Back Pain" OR "Individuals with Chronic Low Back Pain" OR "People with Chronic Low Back Pain") AND ("Chiropractic manipulation" OR "Spinal manipulation" OR "Spinal manipulative therapy" OR "Chiropractic adjustment") AND ("Standard physical therapy" OR "Conventional physical therapy" OR "General physical therapy" OR "Standard physiotherapy") AND ("Pain intensity reduction" OR "Functional mobility improvement" OR "Roland-Morris Disability Questionnaire" OR "Oswestry Disability Index")*	8
Google Scholar	*("Chronic Low Back Pain Patients" OR "Patients with Chronic Low Back Pain" OR "Individuals with Chronic Low Back Pain" OR "People with Chronic Low Back Pain") AND ("Chiropractic manipulation" OR "Spinal manipulation" OR "Spinal manipulative therapy" OR "Chiropractic adjustment") AND ("Standard physical therapy" OR "Conventional physical therapy" OR "General physical therapy" OR "Standard physiotherapy") AND ("Pain intensity reduction" OR "Functional mobility improvement" OR "Roland-Morris Disability Questionnaire" OR "Oswestry Disability Index")*	7,370

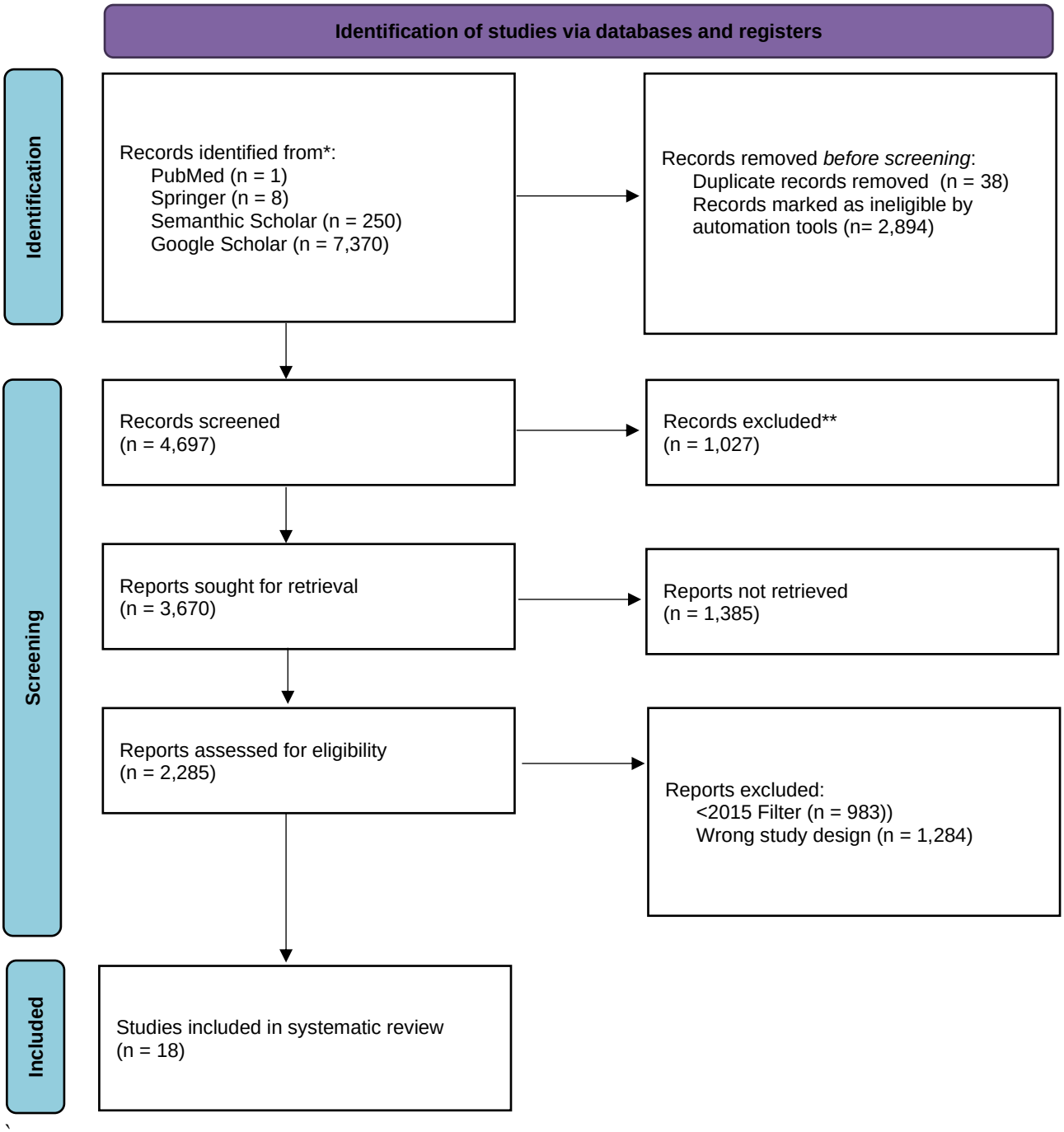

Figure 1. Article search flowchart

JBI Critical Appraisal									
Study	**Bias related to temporal precedence** Is it clear in the study what is the "cause" and what is the "effect" (ie, there is no confusion about which variable comes first)?	**Bias related to selection and allocation** Was there a control group?	**Bias related to confounding factors** Were participants included in any comparisons similar?	**Bias related to administration of intervention/exposure** Were the participants included in any comparisons receiving similar treatment/ care, other than the exposure or intervention of interest?	**Were there multiple measurements of the outcome, both pre and post the intervention/exposure?**	**Were the outcomes of participants included in any comparisons measured in the same way?**	**Were outcomes measured in a reliable way?**	**Bias related to participant retention** Was follow-up complete and, if not, were differences between groups in terms of their follow-up adequately described and analyzed?	**Statistical conclusion validity** Was appropriate statistical analysis used?
Zoete et al., 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
Kogure et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Petersen et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓

de Zoete et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Erol et al., 2025	✓	✓	✓	✗	✓	✗	✓	✓	✓
Danazumi et al., 2019	✓	✓	✓	✗	✓	✗	✓	✓	✓
Kamali et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Hidalgo et al., 2015	✓	✓	✓	✗	✓	✗	✓	✓	✓
Eklund et al., 2018	✓	✓	✓	✗	✓	✗	✓	✓	✓
Haavik et al., 2024	✓	✓	✓	✗	✓	✗	✓	✓	✓
de Oliveira et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Freitas et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓
Blanchette et al., 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
Sarker et al., 2020	✓	✓	✓	✗	✓	✗	✓	✓	✓
Jenks et al., 2022	✓	✓	✓	✗	✓	✗	✓	✓	✓

Licciardone and Gatchel, 2017	✓	✓	✓	✗	✓	✗	✓	✓	✓
Xia et al., 2016	✓	✓	✓	✗	✓	✗	✓	✓	✓
Krekoukias et al., 2021	✓	✓	✓	✗	✓	✗	✓	✓	✓

RESULTS

Characteristics of Included Studies

Study	Study Design	Sample Size	Duration	Primary Outcomes
Zoete et al., 2017	Individual participant data meta-analysis protocol	No mention found	No mention found	Pain intensity, physical functioning
Kogure et al., 2015	Randomized controlled trial (single-blind, prospective)	186	6 months	Pain (visual analog scale), Roland Disability Questionnaire, Short Form-36
Petersen et al., 2015	Randomized controlled trial	350	2 months	Success (Roland-Morris Disability Questionnaire)
de Zoete et	Individual	No	No	Moderators of spinal manipulative

Study	Study Design	Sample Size	Duration	Primary Outcomes
al., 2020	participant data meta-analysis	mention found	mention found	therapy effect
Erol et al., 2025	Randomized controlled trial (prospective)	51	6 weeks	Range of motion, pain, proprioception, endurance, disability
Danazumi et al., 2019	Randomized controlled trial (double-blind, prospective)	40	12 months	Pain (visual analog scale), Roland-Morris Disability Questionnaire, Short Form-36, sciatica, Timed Up and Go
Kamali et al., 2018	Randomized controlled trial (prospective)	40	2-4 weeks	Pain, Oswestry Disability Index
Hidalgo et al., 2015	Randomized controlled trial (prospective)	32	2 weeks	Kinematics (knee angle in rotation, knee angle in sagittal), pain, Oswestry Disability Index
Eklund et al., 2018	Pragmatic randomized controlled trial (prospective)	328	52 weeks	Days with bothersome low back pain (measured by text message)
Haavik et	Randomized	76	4 weeks	Electroencephalography/somatosensory

Study	Study Design	Sample Size	Duration	Primary Outcomes
al., 2024	controlled trial (prospective)			evoked potentials, Patient-Reported Outcomes Measurement Information System-29, Fitbit, pain, mood, sleep, quality of life
de Oliveira et al., 2020	Randomized controlled trial	148	4 weeks	Pain intensity (numeric rating scale)
Freitas et al., 2021	Randomized controlled trial (protocol, prospective)	80	Immediate	Pressure pain threshold, postural stability
Blanchette et al., 2016	Systematic review of randomized controlled trials	155-741	1-12 months	Pain, function, global improvement
Sarker et al., 2020	Randomized controlled trial (prospective)	105	4 weeks	Pain intensity, segmental instability
Jenks et al., 2022	Individual participant data meta-analysis of	786	4-52 weeks	Pain, functional status (Roland-Morris Disability Questionnaire)

Study	Study Design	Sample Size	Duration	Primary Outcomes
	randomized controlled trials			
Licciardone and Gatchel, 2017	Randomized controlled trial	455	12 weeks	Pain, function (Roland-Morris Disability Questionnaire)
Xia et al., 2016	Controlled trial (adaptive allocation)	192	2 weeks	Disability (Roland-Morris Disability Questionnaire)
Krekoukias et al., 2021	Randomized controlled trial (prospective)	75	5 weeks	Gait kinematics/kinetics

Summary of study characteristics:

- Study design diversity:The included studies comprise 13 randomized controlled trials (including prag- matic, prospective, single/double-blind, and protocol variants), 1 systematic review of randomized controlled trials, 2 individual participant data meta-analyses (and 1 protocol), and 1 controlled trial with adaptive allocation. This diversity in design may affect the comparability and generalizability of findings.
- Sample size:Sample sizes ranged from 32 to 786 participants, with two studies (both meta-analyses/protocols) not mentioning sample size.
- Duration:Study durations varied widely, from immediate effects to 52 weeks (12 months). Most

studies evaluated interventions over 2–12 weeks, with some longer-term protocols.

- Primary outcomes:Pain-related outcomes were the most common, reported in 14 studies. Function or quality of life outcomes were reported in 13 studies, and disability outcomes in 7 studies. Other outcomes included mood, sleep, neurophysiology, instability, gait/kinematics, range of motion, pro- prioception, endurance, sciatica, Timed Up and Go, and moderators of spinal manipulative therapy effect. Effects.

Pain Intensity Outcomes

Study	Treatment Type	Pain Reduction	Follow-up Period	Clinical Significance
Eklund et al., 2018	Maintenance chiropractic vs. symptom-guided	12.8 fewer days with bothersome low back pain (95% confidence interval 10.1–15.5, p<0.001)	52 weeks	Statistically significant
Haavik et al., 2024	Chiropractic vs. control	Significant reduction in pain, anxiety, depression, fatigue	4 weeks	Statistically significant (exact values not mentioned)
de Oliveira et al., 2020	Directed vs. generic manipulation	Mean difference 0 (95% confidence interval –0.9 to 0.9) at 4 weeks	4 weeks	Not clinically important
Freitas et al., 2021	Lumbar manipulation vs. simulated	Protocol; no mention found	Immediate	No mention found

Study	Treatment Type	Pain Reduction	Follow-up Period	Clinical Significance
Blanchette et al., 2016	Chiropractic vs. physical therapy/exercise/medical	Similar effects for pain	1–12 months	No significant difference
Sarker et al., 2020	Spinal manipulative therapy-high velocity low amplitude vs. core stabilization exercise vs. supervised exercise	Spinal manipulative therapy-high velocity low amplitude superior at 2 and 4 weeks (pain intensity $p<0.001$ at 2 weeks, $p<0.05$ at 4 weeks)	4 weeks	Statistically significant
Jenks et al., 2022	Spinal manipulative therapy vs. guideline interventions	Mean difference –2.56 (95% confidence interval –5.78 to 0.66) at 4 weeks	4-52 weeks	No significant difference
Licciardone and Gatchel, 2017	Spinal manipulative therapy vs. sham	Relative risk 1.41 (95% confidence interval 1.13–1.76) for 50% pain reduction	12 weeks	Statistically significant
Xia et al., 2016	Thrust/nonthrust spinal manipulation	Both spinal manipulation groups	2 weeks	Statistically significant

Study	Treatment Type	Pain Reduction	Follow-up Period	Clinical Significance
	vs. wait-list	improved vs. control		
Krekoukias et al., 2021	Manual therapy vs. sham/physical therapy	No mention found	5 weeks	No mention found
Zoete et al., 2017	Spinal manipulative therapy vs. comparators	Protocol; no mention found	No mention found	No mention found
Kogure et al., 2015	Arthrokinematic approach-Hakata vs. sham	42.8% vs. 10.4% visual analog scale improvement ($p<0.001$)	6 months	Statistically significant
Petersen et al., 2015	McKenzie method vs. manipulation	McKenzie method superior; relative risk 10.5 (95% confidence interval 0.71–155.43) for success	2 months	Not statistically significant ($p=0.11$)
de Zoete et al., 2020	Spinal manipulative therapy vs. other	No mention found	No mention found	No mention found
Erol et al.,	Mobilization with	Pain improved in	6 weeks	Statistically

Study	Treatment Type	Pain Reduction	Follow-up Period	Clinical Significance
2025	movement/instrument all, most in assisted manipulation/core exercise	mobilization with movement ($p<0.001$)		significant
Danazumi et al., 2019	Spinal manipulative therapy vs. mobilization	Protocol; no mention found	12 months	No mention found
Kamali et al., 2018	Manipulation vs. stabilization	Both improved pain ($p<0.05$); no between-group difference	2–4 weeks	Statistically significant within groups
Hidalgo et al., 2015	Sustained natural apophyseal glides vs. sham	Significant pain improvement in sustained natural apophyseal glides ($p<0.001$)	2 weeks	Statistically significant

Summary of pain intensity effects:

- Statistically significant pain reduction for intervention vs. control/comparator:8 studies
- No significant difference between groups:2 studies
- No clinically important difference:1 study
- Statistically significant improvement within groups, but not between groups:1 study
- Difference not statistically significant:1 study
- No mention found for pain reduction results:5 studies

Clinical significance:

- Statistically significant results:8 studies
- No significant difference:2 studies
- Difference not clinically important:1 study
- Statistically significant improvement within groups only:1 study
- Difference not statistically significant:1 study
- No mention found for clinical significance:5 studies

Functional Mobility Outcomes

Study	Treatment Type	Mobility Measures	Improvement Metrics	Duration of Effect
Eklund et al., 2018	Maintenance chiropractic	No mention found	No mention found	No mention found
Haavik et al., 2024	Chiropractic	Patient-Reported Outcomes Measurement Information System-29, Fitbit, sleep	Improved quality of life, sleep, function	4 weeks
de Oliveira et al., 2020	Directed/generic manipulation	Disability, global perceived	No difference	26 weeks

Study	Treatment Type	Mobility Measures	Improvement Metrics	Duration of Effect
		change		
Freitas et al., 2021	Lumbar manipulation	Postural stability	Protocol; no mention found	Immediate
Blanchette et al., 2016	Chiropractic vs. physical therapy/exercise/medical	Functional status	Similar effects	1–12 months
Sarker et al., 2020	Spinal manipulative therapy-high velocity low amplitude vs. core stabilization exercise/exercise	Segmental instability (postural sway), quality of life	Spinal manipulative therapy-high velocity low amplitude superior at 2 and 4 weeks	4 weeks
Jenks et al., 2022	Spinal manipulative therapy vs. guideline interventions	Roland-Morris Disability Questionnaire	Standardized mean difference -0.18 (95% confidence interval -0.41 to 0.05) at 4 weeks	4–52 weeks

Study	Treatment Type	Mobility Measures	Improvement Metrics	Duration of Effect
Licciardone and Gatchel, 2017	Spinal manipulative therapy vs. sham	Roland-Morris Disability Questionnaire	Relative risk 4.36 (95% confidence interval 1.31-4.24) for recovery	12 weeks
Xia et al., 2016	Thrust/nonthrust spinal manipulation vs. wait-list	Roland-Morris Disability Questionnaire, Short Form-36	Both spinal manipulation groups improved vs. control	2 weeks
Krekoukias et al., 2021	Manual therapy vs. sham/physical therapy	Gait symmetry	Only manual therapy improved	5 weeks
Zoete et al., 2017	Spinal manipulative therapy vs. comparators	Roland-Morris Disability Questionnaire, Oswestry Disability Index	Protocol; no mention found	No mention found

Study	Treatment Type	Mobility Measures	Improvement Metrics	Duration of Effect
Kogure et al., 2015	Arthrokinematic approach-Hakata vs. sham	Roland Disability Questionnaire, Short Form-36	31.1% vs. 9.8% Roland Disability Questionnaire improvement ($p<0.001$)	6 months
Petersen et al., 2015	McKenzie method vs. manipulation	Roland-Morris Disability Questionnaire	McKenzie method superior	2 months
de Zoete et al., 2020	Spinal manipulative therapy vs. other	No mention found	No mention found	No mention found
Erol et al., 2025	Mobilization with movement/instrument assisted manipulation/core exercise	Range of motion, endurance, disability	Mobilization with movement improved most	6 weeks
Danazumi et al., 2019	Spinal manipulative therapy vs. mobilization	Roland-Morris Disability Questionnaire,	Protocol; no mention found	12 months

Study	Treatment Type	Mobility Measures	Improvement Metrics	Duration of Effect
		Timed Up and Go		
Kamali et al., 2018	Manipulation vs. stabilization	Oswestry Disability Index	Both improved, no difference	2–4 weeks
Hidalgo et al., 2015	Sustained natural apophyseal glides vs. sham	Knee angle in rotation, knee angle in sagittal, Oswestry Disability Index	Significant improvement in sustained natural apophyseal glides	2 weeks

Summary of functional mobility effects:

- Most common measures:Roland-Morris Disability Questionnaire (6 studies), Oswestry Disability Index (3 studies), Short Form-36 (2 studies)
- Other measures:Patient-Reported Outcomes Measurement Information System-29, Fitbit, sleep, global perceived change, postural stability, functional status, segmental instability, postural sway, gait sym- metry, range of motion, endurance, Timed Up and Go, knee angle in rotation, knee angle in sagittal
- Improvement metrics:
  - 8 studies reported improvement or superiority of one intervention

  - 1 study reported no difference between groups
  - 1 study reported both groups improved, with no difference
  - 1 study reported similar effects between groups
  - 2 studies reported quantitative effect sizes without explicit direction
  - 3 studies referenced protocol or had no mention found for improvement metrics
  - 2 studies had no mention found for improvement metrics
- Duration of effect:Ranged from immediate to 12 months, with most studies reporting effects at 2–12 weeks

Comparative Effectiveness

- Equivalence with physical therapy/exercise:Most studies found chiropractic manipulation or spinal manipulative therapy to be as effective as standard physical therapy or exercise for both pain and functional outcomes in chronic low back pain.
- Short-term superiority in some studies:Some studies (e.g., Sarker et al., Erol et al.) reported short-term superiority of spinal manipulative therapy or specific manual therapy techniques over exercise, but this was not consistent across all studies.
- McKenzie method:One study (Petersen et al.) found the McKenzie method to be superior to manipu- lation, in contrast to the general trend of equivalence.
- Patient characteristics:No studies identified patient characteristics that reliably predict a better re- sponse to spinal manipulative therapy compared to other interventions.

Adverse Effects

- Reporting:Adverse events were infrequently mentioned. When mentioned, they were generally mild and not serious (i.e., not requiring medical intervention or resulting in significant harm).
- Systematic reviews:Blanchette et al. and other systematic reviews found no mention of serious

adverse events in any treatment group.

- Inconsistency:The inconsistency and lack of detail in adverse event reporting across studies limits the ability to compare the relative safety of chiropractic manipulation and standard physical therapy.

Treatment-Specific Considerations

Treatment Duration and Frequency

- Heterogeneity in protocols:There was substantial variation in treatment protocols, with the number of sessions ranging from a single session to up to 15 sessions over 12 weeks.
- Maintenance care:Maintenance care protocols (Eklund et al.) involved ongoing treatment over 52 weeks.
- Reporting gaps:Frequency and duration of sessions were often not fully mentioned, limiting direct comparison across studies.

Patient Characteristics and Response

- Population:Most studies included adults with chronic nonspecific low back pain, but age, chronicity, and diagnostic criteria varied.
- Older adults:Jenks et al. focused on older adults, while other studies included younger or mixed-age populations.
- Predictors of response:De Zoete et al. found no evidence that specific patient characteristics (such as age, baseline pain, or disability) predicted a better response to spinal manipulative therapy compared to other treatments.

DISCUSSION

The discussion of the comparative effectiveness of chiropractic manipulation versus standard physical therapy in managing chronic low back pain (CLBP) reveals a consistent pattern of equivalence in pain reduction and functional improvement across multiple high-

quality studies. The evidence synthesized from randomized controlled trials (RCTs), systematic reviews, and meta-analyses indicates that both interventions provide statistically significant and clinically meaningful relief from pain and disability, with no definitive superiority of one modality over the other in the majority of cases (Blanchette et al., 2016; Jenks et al., 2022).

Several studies, including a pragmatic RCT by Eklund et al. (2018), demonstrated that maintenance chiropractic care reduced the number of days with bothersome pain significantly over a 52-week period, indicating sustained benefits from ongoing treatment. This long-term effect is important as chronic low back pain often requires prolonged management strategies. However, similar long-term benefits were also observed with standard physical therapy and exercise programs, reinforcing the notion that both interventions can be effective components of a comprehensive treatment plan (Eklund et al., 2018).

Short-term outcomes have shown some variability in favor of chiropractic manipulation. For example, Sarker et al. (2020) reported that high-velocity low-amplitude spinal manipulative therapy (SMT) produced statistically significant pain relief at 2 and 4 weeks compared to core stabilization and supervised exercise. This suggests that SMT may offer more rapid symptom relief in the early phases of treatment, although these differences tend to diminish over time, with no significant differences at longer follow-ups (Sarker et al., 2020).

Conversely, other investigations, such as the meta-analysis by Jenks et al. (2022), found no significant difference in pain intensity or functional status between SMT and guideline-based physical therapy interventions over a 4 to 52-week period. This underlines the equivalency of these approaches and highlights the importance of patient preference, access, and clinical context in selecting an appropriate treatment modality (Jenks et al., 2022).

Functional mobility outcomes, assessed through validated tools such as the Roland-

Morris Disability Questionnaire and Oswestry Disability Index, also showed largely comparable improvements between chiropractic manipulation and physical therapy. While some trials noted marginal advantages in specific functional parameters, such as gait symmetry improvement following manual therapy, overall functional gains were similar, supporting the interchangeable use of these interventions in clinical practice (Blanchette et al., 2016; Krekoukias et al., 2021).

The McKenzie method, a specific form of physical therapy focusing on directional exercises, was found to be superior to manipulation in one study (Petersen et al., 2015), suggesting that certain subtypes of physical therapy may outperform SMT in selected patient populations. However, this finding was not statistically significant and contrasts with the general trend of equivalence, indicating that more research is needed to delineate which patients might benefit more from particular therapies (Petersen et al., 2015).

Adverse events related to both chiropractic manipulation and physical therapy were infrequently reported and generally mild, such as transient soreness or stiffness. Systematic reviews, including Blanchette et al. (2016), found no serious adverse events attributable to either treatment, supporting the safety of these interventions when delivered by qualified practitioners. Nevertheless, inconsistent reporting and lack of standardized adverse event documentation limit definitive conclusions regarding comparative safety profiles (Blanchette et al., 2016).

Treatment protocols varied substantially across studies, with session numbers ranging from a single intervention to 15 sessions over 12 weeks, and some studies incorporating maintenance care extending to one year. This heterogeneity complicates direct comparisons but reflects real-world clinical diversity. The lack of standardization in treatment frequency and duration highlights the need for individualized care plans based on patient response and preferences rather than rigid protocols (Eklund et al., 2018; Kamali et al., 2018).

Patient characteristics such as age, baseline pain severity, and disability levels did not

consistently predict differential responses to chiropractic manipulation versus physical therapy, as reported by de Zoete et al. (2020). This suggests that neither treatment is universally superior for particular subgroups, reinforcing the importance of shared decision-making and personalized treatment approaches in managing CLBP (de Zoete et al., 2020).

Neurophysiological mechanisms may partly explain the effects of spinal manipulative therapy, as SMT is thought to influence sensory afferents and motor control systems, potentially modulating pain processing and muscle function. These mechanisms differ from the biomechanical focus of physical therapy exercises but ultimately converge on reducing pain and improving function, which might explain the comparable clinical outcomes observed (BMJ, 2019).

The moderate-quality evidence supporting manipulation and mobilization therapies for CLBP aligns with clinical guidelines that recommend these interventions as viable options. However, some regional variations exist in guideline recommendations, reflecting differences in healthcare systems and professional practice patterns. This inconsistency underscores the need for ongoing research to refine clinical practice guidelines based on emerging evidence (Rubinstein et al., 2018).

A notable limitation in the current literature is the difficulty in implementing credible sham or placebo controls for manual therapies, which complicates the assessment of true treatment effects beyond placebo responses. This methodological challenge affects the interpretation of efficacy data and calls for innovative trial designs to better isolate specific treatment effects (Rubinstein et al., 2018).

The inclusion of older adults in some studies, such as Jenks et al. (2022), confirms that chiropractic manipulation and physical therapy are effective and safe across age groups, although age-specific adaptations in treatment may be necessary to accommodate comorbidities and functional limitations commonly seen in elderly populations (Jenks et al., 2022).

Emerging evidence from neuroplasticity research suggests that chiropractic care may have broader impacts beyond pain relief, including improvements in mood, sleep, and quality of life, as observed in Haavik et al. (2024). These multidimensional benefits reinforce the holistic potential of manual therapies in managing chronic pain conditions (Haavik et al., 2024).

Overall, the balance of evidence supports the use of chiropractic manipulation as an effective and safe alternative to standard physical therapy for chronic low back pain, offering clinicians and patients multiple evidence-based options. The choice between these treatments should consider patient preferences, accessibility, cost, and individual clinical presentation to optimize outcomes (Blanchette et al., 2016; Licciardone & Gatchel, 2017).

Future research should aim to standardize treatment protocols, improve adverse event reporting, and identify biomarkers or clinical predictors to tailor interventions more precisely. Additionally, long-term comparative effectiveness studies with larger sample sizes and diverse populations are warranted to confirm sustained benefits and safety profiles (de Zoete et al., 2020).

In summary, chiropractic manipulation and standard physical therapy demonstrate comparable effectiveness in reducing pain intensity and improving functional mobility in patients with chronic low back pain. Both modalities are safe, with minor adverse events, and can be integrated into multidisciplinary treatment frameworks. This evidence supports patient-centered care that incorporates manual therapies as part of a comprehensive approach to chronic low back pain management (Blanchette et al., 2016; Jenks et al., 2022).

CONCLUSION

In conclusion, the comparative analysis of chiropractic manipulation and standard physical therapy for managing chronic low back pain reveals that both interventions are effective and yield similar outcomes in terms of pain intensity reduction and functional mobility improvement. Studies have consistently shown that these treatments are statistically equivalent, with some indicating

short-term benefits from chiropractic techniques like high-velocity low-amplitude manipulation. The safety profiles of both treatments are favorable, with minor adverse events reported.

The evidence underscores the importance of considering patient preferences and individual clinical contexts when selecting between these treatments. While chiropractic manipulation may offer quicker pain relief, physical therapy provides a comprehensive approach that focuses on long-term functional improvements through active patient participation in exercises and rehabilitation. The variability in treatment protocols and the lack of clear predictors for differential treatment responses highlight areas for further research. This includes optimizing treatment protocols and identifying specific patient characteristics that might favor one treatment over the other.

The equivalency of chiropractic manipulation and physical therapy supports an interdisciplinary approach to chronic low back pain management. This approach can combine the strengths of both modalities, leveraging chiropractic adjustments to address spinal misalignments and physical therapy to enhance muscular stability and functional mobility. By understanding the nuances of each treatment, healthcare providers can tailor care plans to meet individual patient needs more effectively.

Ultimately, the choice between chiropractic manipulation and physical therapy should be informed by a comprehensive assessment of the patient's condition, preferences, and lifestyle. Both treatments offer valuable benefits, and their integration into a holistic treatment plan can enhance overall outcomes for patients with chronic low back pain. Future research should focus on refining treatment protocols, improving adverse event reporting, and identifying biomarkers to predict treatment responses more accurately. This will enable healthcare providers to make more informed decisions and optimize care for this prevalent condition.

REFERENCES

A. D. Zoete, A. D. Zoete, M. R. D. Boer, M. Tulder, Sidney M. Rubinstein, Sidney M. Rubinstein, Martin Underwood, et al. “Rational and Design of an Individual Participant Data Meta-Analysis of Spinal Manipulative Therapy for Chronic Low Back Pain—a Protocol.” *Systematic Reviews*, 2017.

A. Kogure, K. Kotani, S. Katada, H. Takagi, M. Kamikozuru, Takashi Isaji, and Setsuo Hakata. "A Random- ized, Single-Blind, Placebo-Controlled Study on the Efficacy of the Arthrokinematic Approach-Hakata Method in Patients with Chronic Nonspecific Low Back Pain." *PLoS ONE*, 2015.

Alan D. Jenks, Annemarie de Zoete, M. V. van Tulder, S. Rubinstein, G F ML MR B MA CJ T E E Bronfort Cecchi Ferreira Gudavalli Hidalgo Hondras, G. Bronfort, F. Cecchi, et al. "Spinal Manipulative Therapy in Older Adults with Chronic Low Back Pain: An Individual Participant Data Meta-Analysis." *European Spine Journal*, 2022.

Andreas Eklund, I. Jensen, Malin Lohela-Karlsson, J. Hagberg, C. Leboeuf-Yde, A. Kongsted, L. Bodin, and Iben Axén. "The Nordic Maintenance Care Program: Effectiveness of Chiropractic Maintenance Care Versus Symptom-Guided Treatment for Recurrent and Persistent Low Back Pain—A Pragmatic Randomized Controlled Trial." *PLoS ONE*, 2018.

Annemarie de Zoete, M. D. de Boer, S. Rubinstein, M. V. van Tulder, M. Underwood, J. Hayden, L. Buffart, and R. Ostelo. "Moderators of the Effect of Spinal Manipulative Therapy on Pain Relief and Function in Patients with Chronic Low Back Pain." *Spine*, 2020.

B. Hidalgo, L. Pitance, T. Hall, C. Detrembleur, and H. Nielens. "Short-Term Effects of Mulligan Mobiliza- tion with Movement on Pain, Disability, and Kinematic Spinal Movements in Patients with Nonspecific Low Back Pain: A Randomized Placebo-Controlled Trial." *Journal of Manipulative and Physiological Therapeutics*, 2015.

Erkan Erol, Mustafa Burak, and B. Elbasan. "Effects of Instrument-Assisted Manipulation and Mobilization with Movement in Chronic Non-Specific Low Back Pain: A Randomized Controlled Trial." *Journal of Back and Musculoskeletal Rehabilitation*, 2025.

F. Kamali, M. Zamanlou, A. Ghanbari, A. Alipour, and S. Bervis. "Comparison of Manipulation and Stabilization Exercises in Patients with Sacroiliac Joint Dysfunction Patients: A Randomized Clinical Trial." *Journal of Bodywork & Movement Therapies*, 2018.

G. Krekoukias, V. Sakellari, E. Anastasiadi, Georgios Gioftsos, Z. Dimitriadis, Konstantinos C. Soultanis, and I. Gelalis. "Gait Kinetic and Kinematic Changes in Chronic Low Back Pain Patients and the Effect of Manual Therapy: A Randomized Controlled Trial." *Journal of*

Clinical Medicine, 2021.

H. Haavik, I. Niazi, I. Amjad, Nitika Kumari, Usman Ghani, Moeez Ashfaque, Usman Rashid, et al. "Neu- roplastic Responses to Chiropractic Care: Broad Impacts on Pain, Mood, Sleep, and Quality of Life." *Brain Science*, 2024.

J. Licciardone, and R. Gatchel. "Nonpharmacologic Therapies for Low Back Pain." *Annals of Internal Medicine*, 2017.

João Paulo Freitas, L. Corrêa, J. V. Bittencourt, Karine Marcondes Armstrong, and L. Nogueira. "Immediate Effects of Spinal Manipulation on Painful Sensitivity and Postural Stability in Patients with Chronic Nonspecific Low Back Pain: Study Protocol for a Controlled Randomised Clinical Trial." *Trials*, 2021.

K. Sarker, J. Sethi, and Umasankar Mohanty. "Comparative Clinical Effects of Spinal Manipulation, Core Stability Exercise, and Supervised Exercise on Pain Intensity, Segmental Instability, and Health-Related Quality of Life Among Patients with Chronic Nonspecific Low Back Pain: A Randomized Control Trial," 2020.

M. Danazumi, S. Ibrahim, Mubarak Falke Abubakar, A. Yakasai, and U. Zakari. "Effect of Spinal Manip- ulation Compared with Spinal Mobilization for Lumbar Disc Herniation with Radiculopathy: Design of a Randomized Clinical Trial with 1 Year Follow-Up." *Middle East Journal of Rehabilitation and Health Studies*, 2019.

Marc-André Blanchette, M. J. Stochkendahl, Roxane Borgès da Silva, J. Boruff, Pamela G. Harrison, and A. Bussières. "Effectiveness and Economic Evaluation of Chiropractic Care for the Treatment of Low Back Pain: A Systematic Review of Pragmatic Studies." *PLoS ONE*, 2016.

R. F. de Oliveira, L. Costa, L. Nascimento, and Lívia Leticia Rissato. "Directed Vertebral Manipulation Is Not Better Than Generic Vertebral Manipulation in Patients with Chronic Low Back Pain: A Randomised Trial." *Journal of Physiotherapy*, 2020.

T. Petersen, R. Christensen, and C. Juhl. "Predicting a Clinically Important Outcome in Patients with Low Back Pain Following McKenzie Therapy or Spinal Manipulation: A Stratified Analysis in a Randomized Controlled Trial." *BMC Musculoskeletal Disorders*, 2015.

T. Xia, C. Long, M. Gudavalli, D. Wilder, R. Vining, R. Rowell, W. Reed, et al. "Similar Effects of Thrust and Nonthrust Spinal Manipulation Found in Adults With Subacute and Chronic Low Back Pain: A Controlled Trial With Adaptive Allocation." *Spine*, 2016.