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INPLASY

Manual therapy for adolescent idiopathic scoliosis: a systematic review and meta-analysis of randomised controlled trials

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ADMINISTRATIVE INFORMATION

Support - None. This review is self-funded as part of an undergraduate thesis; no external funding was received.

Review stage at the time of initial registration - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2026110043

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 November 2026 and was last updated on 11 November 2026.

INTRODUCTION

Review question / Objective To evaluate whether manual therapy, compared with conventional rehabilitation, bracing, no treatment, or another manual technique, improves Cobb angle, apical trunk rotation and quality of life in adolescents with idiopathic scoliosis.
PICO: In adolescents aged 10-18 years with idiopathic scoliosis and a Cobb angle of 10-45 degrees (P), does manual therapy (I), compared with conventional rehabilitation, bracing, no treatment or another manual technique (C), improve Cobb angle and trunk rotation in randomised controlled trials (O)?

Rationale Adolescent idiopathic scoliosis affects approximately 1-3% of adolescents and may progress during the growth spurt. Manual therapy, including Chinese tuina and bone-setting manipulation and Western spinal manipulative therapy, is widely used as a non-invasive option, but its effect on Cobb angle remains debated. Existing systematic reviews either evaluate a single technique or pool manual therapy with acupuncture and
bracing as one category, so different manual techniques have never been compared head to head.

Condition being studied Adolescent idiopathic scoliosis: a three-dimensional spinal deformity diagnosed in individuals aged 10-18 years with a Cobb angle of 10 degrees or more and no identifiable underlying cause.

METHODS

Search strategy Databases: PubMed, Embase, Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science Core Collection, Ovid MEDLINE, CNKI, Wanfang Data and VIP, searched from 1 August 2022 to 31 August 2026. PubMed strategy: ("Scoliosis"[MeSH] OR scoliosis[tiab] OR

"adolescent idiopathic scoliosis"[tiab] OR "idiopathic scoliosis"[tiab] OR AIS[tiab] OR "spinal curve*"[tiab]) AND ("Musculoskeletal Manipulations"[MeSH] OR "Manipulation, Spinal"[MeSH]
OR "Massage"[MeSH] OR manipulation[tiab] OR manipulative[tiab] OR "manual therap*"[tiab] OR chiropractic[tiab] OR osteopath*[tiab] OR massage[tiab] OR tuina[tiab] OR "spinal adjustment"[tiab] OR "myofascial release"[tiab] OR "joint mobili*"[tiab] OR "soft tissue release"[tiab]) AND ("randomized controlled trial"[pt] OR "controlled
clinical trial"[pt] OR randomized[tiab] OR randomised[tiab] OR placebo[tiab] OR randomly[tiab] OR
trial[tiab] OR groups[tiab]).

Participant or population Adolescents aged 10-18 years with a confirmed diagnosis of idiopathic scoliosis, Cobb angle 10-45 degrees, Risser sign 0-5, any treatment setting.

Intervention Manual therapy delivered as the principal intervention: Chinese tuina and bone-setting manipulation, spinal manipulative therapy (chiropractic or osteopathic), joint mobilisation, myofascial release and other manual soft-tissue techniques, administered alone or as an adjunct to conventional rehabilitation. No restriction on number of sessions, frequency or duration.

Comparator Conventional rehabilitation; Schroth or other exercise-based therapy; bracing; no treatment or waiting list; sham or placebo manual therapy; or a different manual technique.

Study designs to be included Randomised controlled trials, including cluster-randomised and randomised crossover trials. Quasi-randomised trials, non-randomised comparative studies,case series and case reports will be excluded.

Eligibility criteria Excluded: scoliosis secondary to congenital vertebral
anomalies, neuromuscular disease or connective tissue disorders; prior spinal surgery; adults; studies in which manual therapy is not the intervention of interest; conference abstracts, letters and duplicate publications.

Information sources Electronic databases listed above; reference lists of all included studies and of relevant published reviews will be hand-searched. Trial registers (ClinicalTrials.gov, ChiCTR) will be checked for ongoing trials. Conference abstracts and unpublished data will not be included; authors will be contacted only for missing outcome data.

Main outcome(s) (1) Cobb angle, in degrees, measured on standing full-
spine radiographs; (2) apical trunk rotation, in
degrees, measured with a scoliometer. Both assessed as
change from baseline to the end of intervention and at
the longest available follow-up.

Additional outcome(s) (1) Health-related quality of life measured with the
SRS-22 questionnaire; (2) pulmonary function (FVC,
FEV1, FEV1/FVC); (3) adverse events.

Data management Records will be exported to EndNote X9 for de-
duplication and uploaded to Rayyan for independent
screening by two reviewers; extracted data will be
entered into a piloted Excel spreadsheet and cross-
checked.

Quality assessment / Risk of bias analysis Two reviewers will independently assess each trial
with the Cochrane risk-of-bias tool (RoB 2), covering
randomisation process, deviations from intended
interventions, missing outcome data, measurement of the outcome, and selection of the reported result.
Each domain and the overall judgement will be rated low risk, some concerns, or high risk; disagreements will be resolved by a third reviewer and agreement quantified with Cohen's kappa.

Strategy of data synthesis Data will be pooled in RevMan 5.4 and Stata 17.0. Continuous outcomes will be expressed as mean differences, or standardised mean differences when scales differ, with 95% confidence intervals; dichotomous outcomes as risk ratios with 95% confidence intervals. Heterogeneity will be assessed with Cochran's Q test (alpha = 0.10) and the I-squared statistic; a fixed-effect model will be used when I-squared is 50% or less and P > 0.10, otherwise a random-effects model (DerSimonian-Laird). Where pooling is inappropriate, findings will be summarised
narratively.

Subgroup analysis (1) Duration of follow-up: less than 6 months, 6-12 months, 12 months or more;

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(2) type of manual technique: Chinese bone-setting or tuina versus Western spinal manipulation; (3) treatment frequency or total number of sessions; (4) baseline Cobb angle severity; (5) presence or absence of co-interventions.

Sensitivity analysis Leave-one-out analysis excluding one study at a time, and a repeat analysis restricted to studies at low overall risk of bias.

Language restriction No language restriction.

Country(ies) involved China.

Other relevant information This review is a secondary analysis of published data; it does not involve human participants or animals, so ethical approval is not required

Keywords adolescent idiopathic scoliosis; manual therapy;tuina; spinal manipulation; meta-analysis; randomisedcontrolled trial.

Dissemination plans Submission as an undergraduate thesis to Guangzhou Medical University; consideration for publication in a peer-reviewed rehabilitation or orthopaedic journal; presentation at a national rehabilitation conference.

Contributions of each author

Author 1 - Ruifeng Jin - Contributions: Conceived the review question, designed the search strategy, and will perform screening, data extraction, statistical analysis and manuscript drafting.
Email: jin1101331363@163.com
Author 2 - Junji Li - Contributions: Supervised the study design, will act as the third reviewer for disagreements, and will critically revise the manuscript.
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