**Article Full Title**

Treating low back pain in athletes: a systematic review with meta-analysis

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**Paper Abstract**

Objective: To summarise the evidence for non-pharmacological management of low back pain (LBP) in athletes, a common problem in sport that can negatively impact performance and contribute to early retirement. Data sources: Five databases (EMBASE, Medline, CINAHL, Web of Science, Scopus) were searched from inception to September 2020. The main outcomes of interest were pain, disability and return to sport (RTS). Results: Among 1629 references, 14 randomised controlled trials (RCTs) involving 541 athletes were included. The trials had biases across multiple domains including performance, attrition and reporting. Treatments included exercise, biomechanical modifications and manual therapy. There were no trials evaluating the efficacy of surgery or injections. Exercise was the most frequently investigated treatment; no RTS data were reported for any exercise intervention. There was a reduction in pain and disability reported after all treatments. Conclusions: While several treatments for LBP in athletes improved pain and function, it was unclear what the most effective treatments were, and for whom. Exercise approaches generally reduced pain and improved function in athletes with LBP, but the effect on RTS is unknown. No conclusions regarding the value of manual therapy (massage, spinal manipulation) or biomechanical modifications alone could be drawn because of insufficient evidence. High-quality RCTs are urgently needed to determine the effect of commonly used interventions in treating LBP in athletes.

**NIH Risk of Bias Tool**

Quality Assessment of Systematic Reviews and Meta-Analyses

1. **Is the review based on a focused question that is adequately formulated and described?**

Yes

1. **Were eligibility criteria for included and excluded studies predefined and specified?**

Yes

1. **Did the literature search strategy use a comprehensive, systematic approach?**

Yes

1. **Were titles, abstracts, and full-text articles dually and independently reviewed for inclusion and exclusion to minimize bias?**

Yes

1. **Was the quality of each included study rated independently by two or more reviewers using a standard method to appraise its internal validity?**

Yes

1. **Were the included studies listed along with important characteristics and results of each study?**

No

1. **Was publication bias assessed?**

Cannot Determine, Not Reported, Not Applicable

1. **Was heterogeneity assessed? (This question applies only to meta-analyses.)**

Yes

**Key Finding #1**

Spinal manipulation, when used as an adjunct treatment for athletes with both acute and chronic low back pain, was found to be an effective pain management intervention.

**Key Finding #2**

There is poor-quality evidence that supports the use of massage therapy in conjunction with herbal ointment or thermal magnetic therapy, and spinal manipulation for short-term benefits in treating low back pain in athletes.

**Key Finding #3**

The evidence supporting the use of manual therapy as a standalone treatment for low back pain in athletes is insufficient, including both spinal manipulation and massage.

**Key Finding #4**

**Please provide your summary of the paper**

Despite the prevalence of low back pain (LBP) in athletes across a variety of sports ranging from 18% to as high as 65%, there is insufficient evidence investigating the efficacy of non-pharmacologic treatment methods in this population. As a result, current treatment for athletes with LBP is modeled after treatment recommendations for the general population. While there are some shared risk factors for developing LBP between athletes and the general population, athletes have a host of risk factors that are unique to the demands of their sport. This population therefore, requires different rehabilitation considerations in order to achieve return to sport. Upon conducting a systematic review and meta-analysis, 14 randomized clinical trials were included in this study that assessed the impact of exercise, biomechanics modifications, and manual therapy on pain (visual analog scale, VAS) and disability (Oswestry Disability Index, ODI) in recreational to international level athletes. Five trials investigated the effects of manual therapy in this population, specifically spinal manipulation and massage. The review found that spinal manipulation, when used as an adjunct treatment for athletes with both acute and chronic low back pain, was found to be an effective pain management intervention. There is poor-quality evidence that supports the use of massage therapy in conjunction with herbal ointment or thermal magnetic therapy, and spinal manipulation for short-term benefits in treating low back pain in athletes. However, the evidence supporting the use of manual therapy as a standalone treatment is insufficient, including both spinal manipulation and massage.

**Please provide your clinical interpretation of this paper. Include how this study may impact clinical practice and how the results can be implemented.**

Manual therapy, when used in conjunction with other treatment interventions has been shown to improve VAS and ODI scores in athletes with acute and chronic LBP. However, this population is under-researched and requires more high-quality randomized controlled trials to determine if manual therapy, as well as other interventions, are effective treatment options to optimize return to sport.