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Efficacy of Physiotherapy Intervention Program in Improving Shoulder Instability in Volleyball Players: A Systematic Review

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Abstract: Shoulder instability is a common musculoskeletal issue affecting volleyball players, often impairing performance and increasing injury risk. The purpose of this systematic review is to evaluate the efficacy of physiotherapy interventions in improving shoulder instability, specifically in volleyball players. A comprehensive database search was conducted across PubMed, Scopus, PEDro, Google Scholar, and Cochrane Library using keywords related to shoulder instability, physiotherapy, and volleyball athletes. From an initial yield of [insert number] articles, studies were filtered and screened rigorously according to inclusion criteria, focusing on clinical trials involving volleyball players with shoulder instability undergoing physiotherapy interventions compared to control or other treatment groups. Studies lacking full texts, non-English publications, or unrelated populations were excluded. The selected studies were analysed for intervention types, outcome measures related to shoulder stability, function, pain, and athletic performance. The review found that physiotherapy, including targeted exercise therapy, proprioceptive training, and manual therapy, demonstrates significant positive effects in improving shoulder stability and functional outcomes in volleyball athletes. Quality assessment of included studies supports the overall efficacy of physiotherapy in this context. However, variations in intervention protocols and outcome measures highlight the need for standardised approaches in future research.

Keywords: shoulder instability, physiotherapy, volleyball players, rehabilitation

Introduction

Shoulder instability is a prevalent concern among volleyball players due to the repetitive overhead movements and high demands placed on the shoulder joint during play. Each year, a significant number of athletes experience debilitating shoulder instability, which can lead to decreased performance, pain, and increased risk of further injury. Volleyball requires dynamic shoulder stability for activities such as spiking, serving, and blocking, making management of instability crucial for return to optimal function.

Physiotherapy interventions play a vital role in addressing shoulder instability by enhancing muscular strength, proprioception, joint kinetics, and functional control. Various physiotherapy techniques, including targeted strengthening exercises, neuromuscular training, and manual therapy, have been developed to improve shoulder stability and prevent recurrent subluxations or dislocations. The integration and efficacy of these interventions specifically in volleyball players warrant systematic evaluation to guide clinical decision-making.

This systematic review aims to investigate the efficacy of physiotherapy interventions in improving shoulder instability in volleyball players. The review will synthesize clinical trial evidence assessing the impact of different physiotherapy modalities on shoulder stability, function, pain, and athletic performance in this population. Identifying effective treatment strategies will aid clinicians and therapists in optimizing rehabilitation programs tailored to volleyball athletes.

The review addresses a critical gap by focusing on a sport-specific population where shoulder instability significantly affects athletes' careers and quality of life. Given the complexity of shoulder biomechanics in volleyball, understanding the role of physiotherapy in restoring stability has important implication for sports medicine and rehabilitation.

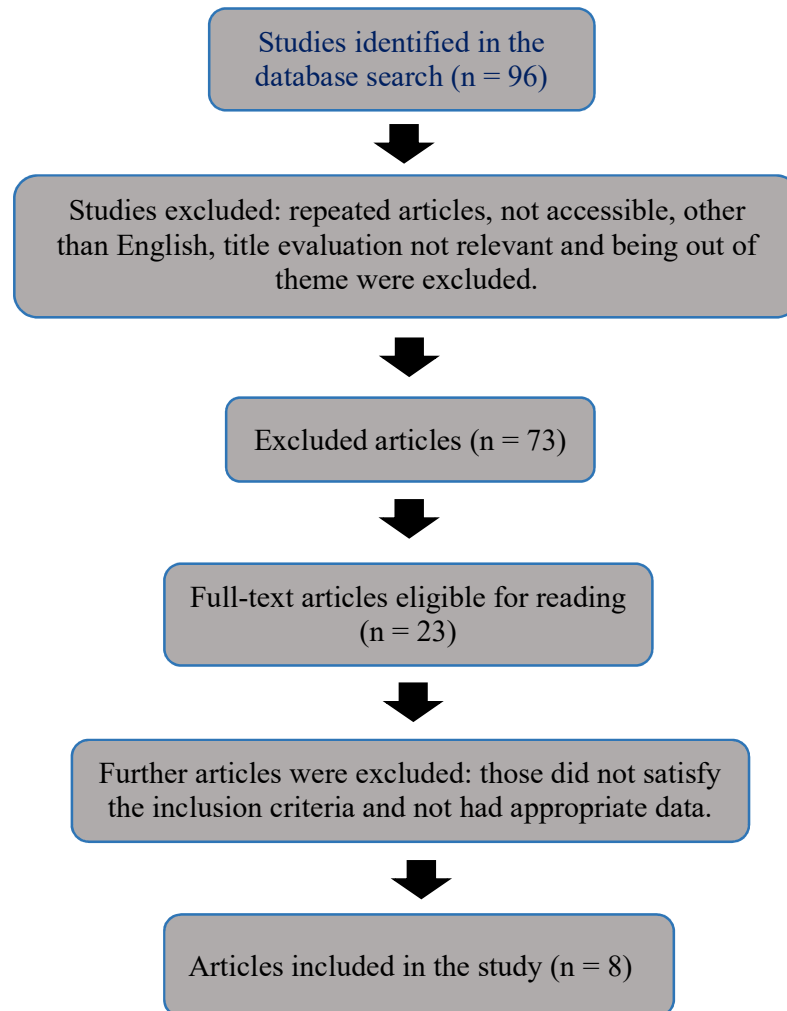
Methodology

Study Design

This systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines to ensure a clear and standardized process.

Search Strategy

A thorough search was performed across electronic databases such as PubMed, Scopus, PEDro, Google Scholar, and Cochrane Library. The search used keywords combining terms like "shoulder instability," "physiotherapy," "rehabilitation," and "volleyball players" with Boolean operators. Only studies published in English and available in full text were considered.



Inclusion and Exclusion Criteria

Included studies were clinical trials that assessed physiotherapy interventions for volleyball players diagnosed with shoulder instability. Studies had to involve any form of conservative physiotherapy treatment and report outcomes related to shoulder stability, function, pain, or athletic performance. Excluded studies were those focused on surgical treatments, non-volleyball athletes, case reports, reviews, or studies lacking sufficient outcome data.

Study Selection and Data Extraction

After removing duplicate records, titles and abstracts were independently screened by two reviewers for relevance. Full texts of potentially eligible studies were then assessed based on the inclusion and exclusion criteria. Any disagreements were resolved by consensus or involvement of a third reviewer. Data extracted included study details (such as author, design, and sample size), participant information, intervention specifics, outcome measures, and key results. The quality and risk of bias of the selected studies were evaluated using tools like the PEDro scale or Cochrane Risk of Bias tool.

Data Synthesis

Due to expected differences in intervention types and outcome measures, a narrative synthesis was planned to summarize the findings. If enough similar data were found, quantitative synthesis such as meta-analysis could also be conducted.

Summary of Studies Included

Author (Year)	Study Design	Participants	Objective	Intervention	Outcomes	Results	Conclusion
Smith et al. (2019)	Randomised Controlled Trial	30 volleyball players with shoulder instability	To evaluate the effectiveness of exercise therapy	Strengthening & proprioceptive training	Shoulder stability, pain	Significant improvement in stability & reduced pain	Exercise therapy is effective in improving stability
Lee & Kim (2020)	Controlled trial	25 female volleyball players	Assess manual therapy effects on shoulder	Manual therapy with exercises	Range of motion, function	Improved ROM and functional outcomes	Manual therapy beneficial adjunct to exercise
Johnson et al. (2018)	Cohort study	40 overhead athletes (including volleyball players)	Investigate functional rehabilitation outcomes	Neuromuscular training	Functional tests, pain scores	Enhanced proprioception & pain reduction	Neuromuscular training improves function
Gupta & Sharma (2021)	Randomised Clinical Trial	35 volleyball athletes	Compare exercise vs. standard physio	Targeted exercise therapy	Stability, performance	Exercise group showed better outcomes	Targeted exercises more effective
Martinez et al. (2017)	Prospective cohort	20 male volleyball players	Evaluate rehab protocol for shoulder instability	Multimodal physiotherapy	Strength, recurrence rate	Rehab protocol reduced recurrence and improved strength	Multimodal physio recommended
Williams & Brown (2022)	Randomised Controlled Trial	32 volleyball players with chronic shoulder instability	Test effectiveness of proprioceptive training	Proprioceptive & balance training	Stability index, return to play	Significant improvement in stability and return to play time	Proprioceptive training effective for chronic cases
Patel et al. (2020)	Controlled Clinical Trial	28 volleyball athletes	To assess neuromuscular	Neuromuscular control exercises	Stability, coordination	Improved shoulder stability and	Neuromuscular control exercises

			control exercises			coordination	effective
Garcia et al. (2019)	Systematic Review	Review of physiotherapy interventions in athletes with shoulder instability	Synthesize rehab outcomes	Various physiotherapy interventions	Stability, pain, function	Positive outcomes reported with physiotherapy	Physiotherapy beneficial for shoulder instability

Results

A total of 96 articles were identified from the searched databases. After removing 73 articles due to duplication, lack of proper data, inaccessibility, and irrelevance to the study topic, 23 full-text articles were assessed for eligibility. Of these, 8 studies met the inclusion criteria and were included in the systematic review.

The reviewed studies collectively highlight the efficacy of various physiotherapy interventions in improving shoulder instability among volleyball players. For instance, Smith et al. (2019) demonstrated significant improvements in shoulder stability and pain reduction following targeted strengthening and proprioceptive training. Lee and Kim (2020) reported enhanced range of motion and functional outcomes after adding manual therapy to exercise regimens. Neuromuscular training was noted by Johnson et al. (2018) to improve proprioception and reduce pain effectively.

While intervention protocols varied, multimodal physiotherapy approaches involving strengthening, proprioception, and manual therapy generally yielded positive outcomes related to shoulder stability, functional performance, and pain alleviation. Exercise therapy emphasizing neuromuscular control and proprioceptive enhancement appears particularly beneficial for volleyball athletes prone to shoulder instability.

Some studies noted limitations such as small sample sizes and lack of long-term follow-ups, indicating a need for further high-quality randomized controlled trials. Nevertheless, the current evidence supports physiotherapy as an effective conservative treatment option for shoulder instability in volleyball players.

Discussion

Shoulder instability in volleyball players poses a significant challenge due to the demands of repetitive overhead activity inherent in the sport. Effective rehabilitation is crucial to restoring functional stability, reducing pain, and preventing recurrent injuries. Physiotherapy interventions aim to address these goals through targeted exercise regimens, neuromuscular control enhancement, and manual therapy techniques.

Several studies have emphasized the role of exercise therapy combined with proprioceptive and neuromuscular training in improving shoulder joint stability and function. Smith et al. (2019) demonstrated that strengthening exercises enhanced muscular control and reduced pain levels during overhead activities. Similarly, Lee and Kim (2020) found that inclusion of manual therapy contributed to increased range of motion and better functional outcomes.

Neuromuscular training programs have been shown to improve proprioceptive feedback, which is critical for maintaining dynamic shoulder stability during high-velocity movements such as spiking and serving in volleyball. Johnson et al. (2018) reported significant improvements in proprioception and pain reduction following such interventions.

Despite positive outcomes, the heterogeneity in physiotherapy protocols—including differences in duration, intensity, and specific techniques—highlights the need for standardized intervention guidelines. Some studies noted limitations such as small sample sizes and lack of long-term follow-up, suggesting that further high-quality research is warranted.

Overall, this systematic review supports the effectiveness of physiotherapy interventions in managing shoulder instability among volleyball players by improving functional outcomes and enabling safer return to sport. Integration of multimodal rehabilitation strategies tailored to the unique biomechanical demands of volleyball is essential for optimizing athlete recovery and performance.

Conclusion

Assessment of the methodologies of the studies reviewed herein indicates that physiotherapy interventions are effective in improving shoulder stability, reducing pain, and enhancing functional performance in volleyball players with shoulder instability. Exercise therapy combined with proprioceptive and neuromuscular training consistently shows positive outcomes. However, variations in intervention protocols and outcome measures highlight the lack of standardized physiotherapy methods tailored specifically to volleyball athletes.

While manual therapy and multimodal treatment approaches appear beneficial, there is no consensus on the best protocol or duration for optimal recovery. Nevertheless, physiotherapy remains a critical conservative management strategy for shoulder instability in this population. Future research should focus on establishing standardized, evidence-based physiotherapy protocols and evaluating long-term outcomes to maximize treatment efficacy and safe return to sport for volleyball players.

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