



# The Effectiveness of a Shoulder Strengthening Program to Reduce the Prevalence of Shoulder Pain in Wheelchair Basketball Athletes: A Critically Appraised Topic

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## CLINICAL SCENARIO

- Athletes who play overhead sports have been described as having an increased risk for developing shoulder pathologies that result in pain and strength loss.<sup>2</sup>
- Most shoulder injuries in overhead athletes are correlated with adaptations for performance during physical activity such as strength imbalances and range of motion (ROM).<sup>3</sup> These imbalances can lead to an abnormal scapular rhythm, such as an anteriorly rotated shoulder that later leads to injury or pain.<sup>3</sup>
- SP is one of the most common symptoms of physical dysfunction caused by increased shoulder load and the repetitive stress of wheelchair handling.<sup>1</sup>
- Wheelchair basketball athletes not only have an increased load on their shoulders for daily living, but these athletes also have an increased load for competition when shooting a basketball overhead.<sup>1-4</sup>

## FOCUSED CLINICAL QUESTION

Does implementing a shoulder strengthening program reduce the prevalence of shoulder pain in wheelchair basketball athletes?

## SEARCH STRATEGY

**Sources of Evidence Searched**  
Literature search was conducted in October 2020. Data sources searched included Google Scholar, PubMed, EBSCO and CINAHL

**Search terms:** (Wheelchair Basketball Athletes) AND (Shoulder Strengthening Program) AND (Pain). Studies were limited to academic and peer reviewed articles that were published in English or translated to English between 2015 and 2020.

**Study Selection**  
Criteria for selection required that original studies: a) included wheelchair basketball players as participants, b) that assessed pain using a patient-reported outcome measure, c) were not meta-analysis or literature reviews, d) Were level 3 evidence or higher.

## SUMMARY OF SEARCH, “BEST EVIDENCE” APPRAISED, AND KEY FINDINGS

**Summary of Search and Best Evidence Appraised**

- The search of the literature produced 66 articles that pertained to the search parameters.
- After thorough review, two relevant studies met the inclusion criteria and were included.<sup>1-2</sup> and were critically appraised using the PEDRO scale.

**Key Findings**

- Each study implemented different intervention timelines, indicated there was a four-week difference between the two studies.
- Each study implemented strengthening and mobility exercises focusing on the musculature surrounding the shoulder, scapular retraction, depression, Shoulder internal rotation, external rotation, abduction, adduction.
- The results from Gomez et al.<sup>1</sup> demonstrated implementing a shoulder mobility and strengthening program provided significant results in decreasing the prevalence of shoulder pain.
- The results from Wilroy et al.<sup>2</sup> had no significantly different results compared to the control group. Results did show that there was no increase in shoulder pain in either group.
- Evidence proves that there were no increase in shoulder injury or shoulder pain

## RESULTS OF SEARCH

**Table 1. Summary of Study Designs of Articles Reviewed**

Author	Study Design	Level of Evidence*	PEDRO Score
Gomez et al. <sup>1</sup>	Non-Randomized Control Trial	2	7/11
Wilroy et al. <sup>2</sup>	Prospective Cohort	3	10/11

\*Level of evidence assessed using the Oxford Centre for Evidence-Based Medicine 2011 criteria.

## CLINICAL BOTTOM LINE

There is currently inconsistent high-quality evidence demonstrating that a shoulder strengthening intervention may decrease the prevalence of shoulder pain in wheelchair basketball athletes.

**Strength of Recommendation**  
Based on the inconsistent findings from level 2 and 3 evidence, a grade of “B” strength of recommendation was made based on the Strength of Recommendation Taxonomy (SORT).

## IMPLICATIONS FOR PRACTICE, EDUCATION, AND FUTURE RESEARCH

- Overall, shoulder disorders are common in wheelchair athletes due to an increased load and repetitive stress that is needed when handling a wheelchair.<sup>4-6</sup> Implementing a multi-directional shoulder mobility and strengthening program and patient reported outcome surveys will provide objective and subjective measurements will help provide better results.
- The results imply that a longer program with continuous participation and supervision have longer lasting effects.
- Education of individuals who are wheelchair bound on what anatomical and biomechanical structures lead to shoulder pain and how it can be prevented, can in fact decrease the chances of shoulder pain in those athletes.
- Future research should implement both programs together in a larger sample size to determine the overall effectiveness, along with implementing technological advancements to help with reducing the prevalence of shoulder pain
- Future research should focus on the general population not just basketball athletes who are bound to a wheelchair, this will assist clinicians in developing a proper strengthening program for the all individuals who use wheelchairs.

## REFERENCES

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