ISSN: 2347-6567

International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

IJAMSCR |Vol.14 | Issue 2| Apr - Jun - 2026

www.ijamscr.com

DOI : https://doi.org/10.61096/ijamscr.v14.iss2.2026.753-761

A Study on the Effectiveness of Scapula Stabilizing Exercises to Improve Strength And Throw-In Distance Among College Level Recreational Circket Players

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Published on: 01.05.2026
Published by: Futuristic Publications

Abstract:

Background: Throwing in cricket depends on coordinated kinetic chain activity, with the scapula providing stability for shoulder function. Weak scapular stabilizers can reduce strength and throw-in distance. These muscles are often neglected in training. Improving their function may enhance performance. This study evaluated the effect of scapula stabilizing exercises in cricket players.

Design: Pre-test and post-test experimental study.

Methods: Fifteen male players (17–26 years) were assessed for strength (1RM) and throw-in distance. A supervised scapular stabilization program was performed 3 times/week for 6 weeks. Exercises included serratus anterior punch, rows, shrugs, and prone arm raises. Each session lasted 40 minutes. Pre- and post-values were compared using paired 't' test.

Outcome Measures: Muscle strength (1RM) and throw-in distance (meters).

Results:

Significant improvement was observed post-intervention. Strength increased from 194 to 203 (t = 17.86). Throw-in distance improved from 64.53 m to 65.93 m (t = 18.34). Results were statistically significant at 0.005 level.

Conclusion: Scapula stabilizing exercises improve strength and throw-in distance. They enhance shoulder stability and functional performance. These exercises aid efficient force transmission during throwing. Regular inclusion can improve performance outcomes. Recommended for cricket players and overhead athletes.

Keywords: Cricket, scapular stabilization, throw-in distance, muscle strength, shoulder stability

INTRODUCTION

Overview of Throwing in Cricket

Throwing is a fundamental skill in cricket, requiring power, accuracy, and coordination to transfer the ball effectively during play. Efficient throwing depends on the integration of the kinetic chain, involving the lower limbs, trunk, and upper extremity. Key contributing factors include core stability, range of motion, limb length, and muscular strength. Optimal performance is achieved when these components function in a coordinated manner.

Anatomy and Stability of the Shoulder Complex

The shoulder joint is a synovial ball-and-socket joint formed by the articulation of the humeral head with the glenoid cavity of the scapula. Due to the shallow nature of the glenoid, the joint is inherently unstable and relies primarily on dynamic muscular control for stability. The shoulder complex includes the glenohumeral,

acromioclavicular, sternoclavicular, and scapulothoracic joints. Muscles surrounding these structures maintain stability while allowing a wide range of motion required for overhead activities.

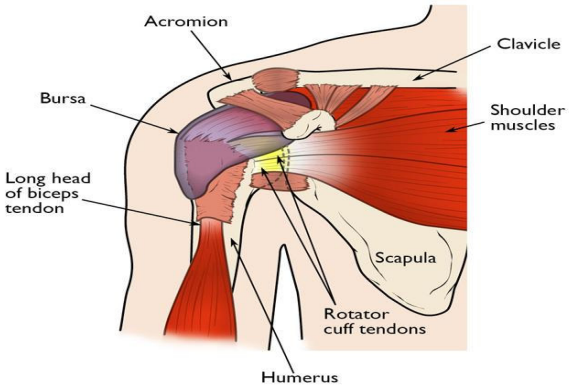


Fig 1: Anatomy of shoulder

Role of Scapula in Throwing Mechanics

The scapula plays a critical role in providing a stable base for glenohumeral movement and in orienting the glenoid fossa for optimal arm function. Scapular muscles, including the trapezius and serratus anterior, ensure coordinated motion and stability during upper limb activities. The scapula also acts as a link in the kinetic chain, facilitating efficient transfer of force generated from the lower body to the upper extremity.

Biomechanics of Throwing

Overarm throwing involves sequential phases: wind-up, cocking, acceleration, release, and follow-through. Each phase requires precise coordination of joints and muscles. During these phases, muscles such as the deltoid, pectoralis major, trapezius, and serratus anterior work together to generate and control movement. Improper mechanics or muscle imbalance can reduce performance and increase the risk of injury.

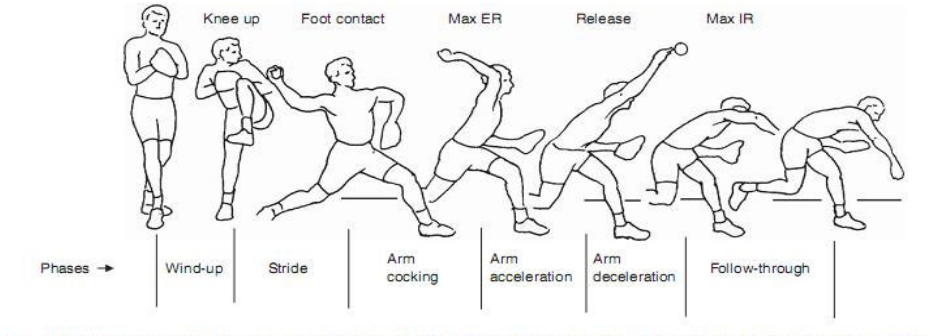


Fig 2: Biomechanics of throwing

Importance of Throw-in Distance

Throw-in distance is a key performance parameter in cricket, reflecting the ability to generate force and transfer it effectively through the kinetic chain. Greater throw-in distance improves fielding efficiency and game performance. Dysfunction in any component of the kinetic chain, particularly the scapular stabilizers, can negatively affect throwing performance.

Role of Scapular Stabilization Exercises

Scapular stabilizer muscles are essential for maintaining proper alignment and dynamic control of the scapula. Weakness or imbalance in these muscles can lead to altered biomechanics and reduced functional performance. Scapular stabilization exercises, involving strengthening and coordinated activation, have been shown to improve muscle strength and reduce dysfunction. However, their specific impact on throwing performance in cricket players remains underexplored.

Need for the Study

Most training programs emphasize strengthening of the lower limbs, trunk, and shoulder muscles, often neglecting scapular stabilization. Considering the important role of scapula in force transmission and shoulder stability, it is essential to evaluate its contribution to throwing performance. Limited evidence exists regarding the relationship between scapular stabilization and throw-in distance in cricket players.

Objective of the Study

To determine the effectiveness of scapula stabilizing exercises in improving muscle strength and throw-in distance among college-level recreational cricket players.

Hypothesis

There is no significant difference in muscle strength and throw-in distance following scapular stabilization exercises among college-level recreational cricket players.

Operational Definitions

Repetition Maximum (1RM): Maximum weight lifted through full range of motion before fatigue.

Throw-in Distance: Maximum distance a ball is thrown, influenced by force, technique, and biomechanics.

Scapular Stabilization Exercises: Exercises aimed at improving strength and coordination of scapular muscles using controlled resistance.

METHODOLOGY

The study was approved ethically, and informed consent was obtained from all participants prior to participation. This was an experimental study conducted to determine the effectiveness of scapular stabilization exercises on muscle strength and throw-in distance among college-level recreational cricket players. A total of 15 male subjects aged between 17 and 26 years were selected based on inclusion and exclusion criteria. The intervention was carried out for six weeks, during which participants underwent supervised scapular stabilization exercises three times per week. Each session lasted approximately 40 minutes and included structured warm-up, strengthening, and cool-down components. Pre- and post-intervention assessments were performed under uniform conditions using standardized tools. Muscle strength was measured using the One Repetition Maximum (1RM) test, and throw-in distance was assessed using Freeman's standard measuring tape. The collected data were analyzed using paired 't' test to determine the significance of improvement. The study ensured standardization of procedures, consistency in intervention, and supervision by a physiotherapist throughout the study period.

Study Setting

The study was conducted in the Outpatient Department of RVS College of Physiotherapy, Sulur, Coimbatore.

Selection of Subjects

Fifteen male college-level recreational cricket players were selected based on inclusion and exclusion criteria.

Variables

Dependent Variables

Muscle strength

Throw-in distance

Independent Variable

Scapular stabilization exercises

Measurement Tools

Variable	Tool
Muscle strength	One Repetition Maximum (1RM)
Throw in distance	Freeman's standard measuring tape

Study Design

Pre-test and post-test experimental study design.

Duration

Total study duration: 4 months

Intervention duration: 6 weeks

Inclusion Criteria

Male college-level recreational cricket players

Age between 17 and 26 years

Participants involved in regular cricket activities

Individuals with no current shoulder injury but requiring performance improvement

Subjects willing to participate and provide informed consent

Exclusion Criteria

History of recent shoulder, cervical, or upper limb injury

Any neurological or musculoskeletal disorder affecting upper limb function

Previous shoulder surgery or fracture

Participants undergoing any other physiotherapy or strength training program during the study period

Individuals with pain or conditions limiting exercise participation

Procedure

Fifteen subjects were selected and underwent scapular stabilization exercises for six weeks. Before starting the intervention, participants were informed about the study and trained in testing procedures. Pre-test measurements of strength and throw-in distance were recorded. The exercise program was administered under supervision three times per week. After completion of the intervention, post-test measurements were recorded using the same methods.

Test Administration

Muscle Strength (1RM)

The One Repetition Maximum test was used to measure the maximum strength of scapular stabilizing muscles under controlled conditions.

Throw-In Distance

Throw-in distance was measured using Freeman's standard measuring tape, ensuring consistent technique and environmental conditions.

Materials Used

Dumbbells

Cable machine

Measuring tape

Treatment Procedure

Participants trained three times per week for six weeks under physiotherapist supervision. Each session lasted approximately 40 minutes.

Exercise Protocol

Warm-up

Serratus anterior punch

Seated cable rows

Dumbbell shrugs

Prone lying arm raise over head

Cool down

Warm-Up

Performed to increase heart rate and blood flow, producing mild sweating without fatigue.

Serratus Anterior Punch

Performed with elbow extended and scapular protraction movement while avoiding trunk rotation.
3 sets: 12, 10, 8 repetitions

Seated Cable Rows

Performed with proper posture, emphasizing scapular retraction and controlled movement.

3 sets: 12, 10, 8 repetitions

Dumbbell Shrugs

Shoulder elevation followed by controlled lowering.

3 sets: 12, 10, 8 repetitions

Prone Lying Arm Raise Over Head

Performed in prone position maintaining neutral alignment and controlled scapular movement.

3 sets: 12, 10, 8 repetitions

Cool Down

Included:

Light jogging/walking

Stretching exercises

Relaxation postures

Collection of Data

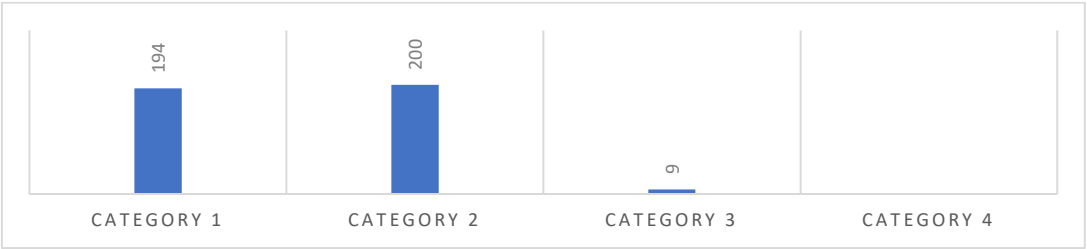
Data were collected before and after six weeks of intervention. Strength and throw-in distance were recorded using standardized methods.

Statistical Analysis

Data were analyzed using paired 't' test to determine the significance of differences between pre-test and post-test values.

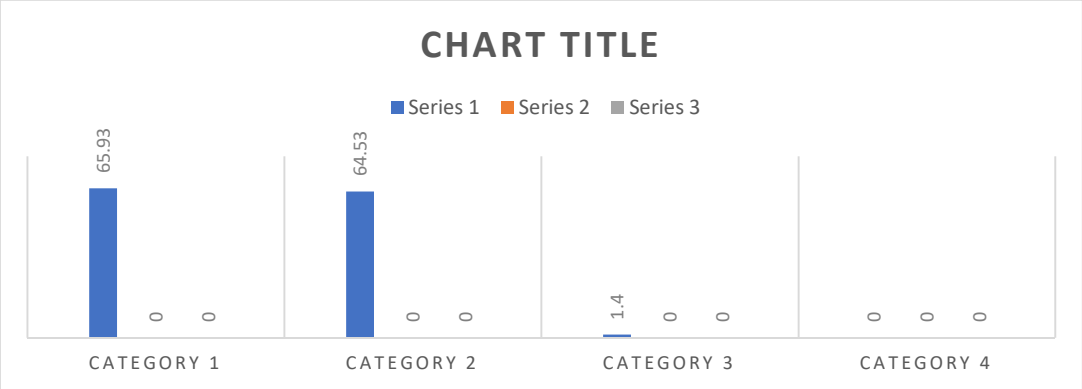
RESULTS

s.no	STRENGTH	MEAN	MEAN DIFFERENCE	SD	T VALUE
1.	Pre-test	194	9	0.13	17.86
2.	Post- test	203	9	0.13	17.86



Since the calculated 't' value exceeded the table value (3.250 at 0.005 level), there was a statistically significant improvement in muscle strength.

S.NO	THROW IN DISTANCE	MEAN	MEAN DIFFERENCE	SD	PAIRED T VALUE1
1.	PRE-TEST	64.53	1.4	0.84	18.34
2.	POST TEST	65.93	1.4	0.84	18.34



Since the calculated 't' value exceeded the table value (3.250 at 0.005 level), there was a statistically significant improvement in throw-in distance

15 college-level recreational cricket players were included in the study and were assessed for muscle strength and throw-in distance before and after the intervention.

Analysis of Dependent Variable: Muscle Strength

In muscle strength, the calculated paired 't' value is 17.86 and the 't' table value is 3.250 at 0.005 level. Since the calculated 't' value is more than the 't' table value, it shows that there is a significant difference in muscle strength following scapular stabilization exercises among college-level recreational cricket players.

When comparing the mean values, the post-test mean (203) is higher than the pre-test mean (194), indicating improvement in muscle strength after the intervention.

Analysis of Dependent Variable: Throw-In Distance

In throw-in distance, the calculated paired 't' value is 18.34 and the 't' table value is 3.250 at 0.005 level. Since the calculated 't' value is more than the 't' table value, it shows that there is a significant difference in throw-in distance following scapular stabilization exercises among college-level recreational cricket players.

When comparing the mean values, the post-test mean (65.93) is higher than the pre-test mean (64.53), indicating improvement in throw-in distance after the intervention.

Overall Comparison of Dependent Variables

Both dependent variables showed statistically significant improvement following the intervention. The calculated 't' values for both muscle strength and throw-in distance were higher than the table value at 0.005 level, confirming the effectiveness of scapular stabilization exercises.

When comparing the mean differences, muscle strength showed a greater improvement compared to throw-in distance, indicating a more pronounced effect of the intervention on muscular strength.

DISCUSSION

The present study investigated the relationship between the strength of scapular stabilizing muscles and throw-in distance among college-level recreational cricket players. The findings demonstrated a significant improvement in both muscle strength and throw-in distance following a 6-week scapular stabilization exercise program performed three times per week.

The improvement in post-training strength may be attributed to the incorporation of functional and compound exercises such as serratus anterior punch, seated cable rows, dumbbell shrugs, and prone arm elevation. These exercises facilitate indirect activation and recruitment of scapular stabilizers, thereby enhancing overall shoulder complex performance.

Previous studies reported significant improvements in scapular muscle strength and corresponding increases in throwing performance following targeted rehabilitation exercises. The present study also demonstrated a statistically significant increase in throw-in distance within the group, indicating that enhanced scapular strength contributes directly to improved throwing ability.

Variations in throwing techniques influence performance outcomes. Running throw-ins produce higher vertical ground reaction forces and greater distances compared to standing throw-ins, suggesting biomechanical advantages associated with dynamic movement.

Strengthening of scapular stabilizing muscles should be included as part of athletic training programs, as it improves performance and reduces injury risk.

CONCLUSION

A structured scapular stabilization exercise program performed over 6 weeks leads to significant improvements in muscle strength and throw-in distance among college-level recreational cricket players.

Scapular stabilizing muscles play a crucial role in throwing performance. Strengthening these muscles enhances functional capacity and contributes to improved athletic performance.

These exercises should be incorporated into regular cricket training programs to optimize performance and support shoulder health.

LIMITATIONS

Small sample size limits generalization of results.

Study included only male recreational players.

Lack of control group reduces comparative analysis.

Short duration limits long-term evaluation.

External factors such as technique and fatigue were not controlled.

SUGGESTIONS FOR FUTURE RESEARCH

Conduct studies with larger and diverse populations.

Include female and professional athletes.

Compare different strengthening protocols.

Evaluate long-term effects.

Include biomechanical analysis.

Use control groups for better validity.

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