

# INPLASY

## Effects of Speed, Agility, and Quickness (SAQ) Training on Athletic Performance: A Systematic Review and Meta-Analysis

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### ADMINISTRATIVE INFORMATION

**Support - No.**

**Review Stage at time of this submission - Preliminary searches.**

**Conflicts of interest - None declared.**

**INPLASY registration number:** INPLASY202480062

**Amendments -** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 13 August 2024 and was last updated on 13 August 2024.

### INTRODUCTION

**Review question / Objective** P: Athletes or individuals engaged in sports activities. I: Speed, Agility, and Quickness (SAQ) training programs. C: Comparison with athletes undergoing conventional training, such as skill training, physical conditioning, or small-sided games. O: Improvements in athletic performance metrics such as speed, agility, reaction time, etc. S: Randomized controlled trials.

**Rationale** Background: While Speed, Agility, and Quickness (SAQ) training is widely used to enhance athletic performance, the effects are debated and existing studies show inconsistencies and limitations.

Importance: This study aims to clarify the effects of SAQ training on athletic performance through a systematic review and meta-analysis, providing evidence-based guidance for coaches and athletes to optimize training methods.

Research Gap: Current studies often suffer from small sample sizes and methodological weaknesses, leading to inconsistent conclusions.

This research will address these gaps and provide more reliable evidence.

Objective: To assess the overall effects of SAQ training on athletic performance, and to aid in the development of more effective training programs.

Expected Impact: The study will offer clear evidence on the effectiveness of SAQ training, advancing the field of sports science and improving training outcomes for athletes.

**Condition being studied** This study focuses on the effects of Speed, Agility, and Quickness (SAQ) training on athletic performance. SAQ training, as a method of physical conditioning, aims to enhance athletes' speed, agility, and reaction abilities through systematic exercises. This training approach is widely used in competitive sports, particularly in sports requiring rapid responses and high-intensity movements, such as soccer, basketball, and track and field.

### METHODS

**Search strategy** The search strategy for this study involves a comprehensive approach using multiple

databases and search methods to ensure thorough literature coverage. The strategy is as follows:

Databases:

Web of Science Core Collection

SPORTDiscus

PubMed

Scopus

Search Terms and Boolean Operators:

The following terms and Boolean operators were used:

("SAQ training" OR "Speed, Agility, Quickness training" OR "SAQ exercises" OR "Speed, Agility, Quickness exercises") AND ("performance" OR "physical performance" OR "sport performance" OR "athletic performance" OR "skill\*" OR "speed" OR "agilit\*" OR "flexibility" OR "explosiveness" OR "reaction time" OR "strength" OR "endurance" OR "power").

Supplementary Searches:

Google Scholar: Manual searches for relevant articles, including citation tracking and free-text searches to uncover additional research materials.

Reference List Screening: Reviewing reference lists of all identified articles to find publications not detected by computer searches.

Data Collection Support:

Experienced librarians supported the data collection process to ensure the accuracy and comprehensiveness of the search strategy and data.

**Participant or population** The participants involved in this review will include athletes engaged in various sports. These participants can be categorized as follows:

Athletes: Individuals actively participating in competitive sports, such as soccer, basketball, track and field, etc.

Gender: Both male and female athletes will be considered.

**Intervention** The intervention in this review is Speed, Agility, and Quickness (SAQ) training. SAQ training involves exercises designed to improve an athlete's speed, agility, and reaction time. It includes activities such as:

Speed Drills: Exercises to enhance sprinting and acceleration.

Agility Drills: Tasks to improve quick changes in direction.

Quickness Drills: Activities to boost reaction time and explosive movements.

These exercises are used to assess improvements in athletic performance.

**Comparator** The comparator for this review is the conventional or standard training methods used in

sports. This includes traditional training approaches that focus on:

Skill Training: Drills and exercises specific to the sport's skills.

Physical Conditioning: General fitness and strength training.

Small-Sided Games: Practice games that simulate competitive conditions but with fewer players.

Comparing SAQ training to these conventional methods helps evaluate the relative effectiveness of SAQ training on athletic performance.

**Study designs to be included** Randomized Controlled Trials (RCTs), Controlled Clinical Trials (CCTs).

**Eligibility criteria** Inclusion Criteria: Outcome Measures:

Studies that report on athletic performance improvements such as speed, agility, or reaction time.

Exclusion Criteria:

Non-Eligible Designs: Case reports, anecdotal evidence, editorials, and opinion pieces.

Participants: Non-athletes or individuals with medical conditions affecting their ability to participate in training.

Intervention: Studies focusing on non-SAQ training interventions or unrelated physical training methods.

Language: Studies not published in English.

**Information sources** The following sources will be used to gather information for this review:

Electronic Databases:

PubMed: For peer-reviewed articles in the field of medicine and sports science.

Scopus: For comprehensive coverage of scientific and technical literature.

Web of Science Core Collection: For multidisciplinary research and citation tracking.

SPORTDiscus: Specialized in sports and exercise literature.

Supplementary Literature:

Google Scholar: For supplementary materials, including theses, dissertations, and grey literature not found in traditional databases.

Reference Lists:

Review the reference lists of included studies and relevant systematic reviews to identify additional studies.

Contacting Authors:

Reach out to study authors for unpublished data or clarification on study details if needed.

These sources will provide a comprehensive collection of relevant studies and data for the review.

**Main outcome(s)** Primary Outcomes:  
 Speed: Sprint times (e.g., 5m, 10m, 20m, 30m).  
 Agility: Performance on agility tests (e.g., Arrowhead Agility Test, Illinois Agility Test).  
 Quickness: Reaction time.  
 Explosiveness: Vertical jump, broad jump, countermovement jump, and drop jump.  
 Aerobic Endurance:  
 Athletic Performance: Overall sport-specific performance improvements.  
 Time Frame:  
 Pre-Intervention: Baseline measurements.  
 Post-Intervention: Final measurements.

### Quality assessment / Risk of bias analysis

1. Quality Assessment Tool:  
 PEDro Scale: Used to assess the quality of randomized controlled trials (RCTs). The PEDro scale includes 11 items covering aspects such as randomization, allocation concealment, blinding, and follow-up completeness. Each item has specific criteria to evaluate the internal validity and methodological quality of the study.

2. Bias Risk Analysis Tool:  
 CMA Tool: Used for analyzing bias risk in systematic reviews and meta-analyses. The Comprehensive Meta-Analysis (CMA) tool assesses various types of bias, including selection bias, detection bias, reporting bias, and other potential biases.

3. Procedure:  
 Independent Review: Two reviewers will independently assess the quality and risk of bias for each study using the PEDro scale and the CMA tool.  
 Discrepancy Resolution: Any disagreements between reviewers will be resolved through discussion or consultation with a third reviewer.  
 Scoring and Classification: Studies will be classified based on the PEDro scale scores and CMA tool bias analysis results to guide the interpretation of findings.  
 This approach ensures a comprehensive and accurate assessment of the quality and risk of bias in the included studies.

### Strategy of data synthesis

Data Extraction: Gather outcome data (e.g., speed, agility, quickness, explosiveness, aerobic endurance, sport-specific skills) from included studies.  
 Meta-Analysis: Apply meta-analysis to calculate pooled effect sizes and assess heterogeneity.  
 Sensitivity Analysis: Conduct sensitivity analysis to check the stability of results by excluding low-quality studies.  
 Publication Bias: Evaluate using Egger's test and funnel plots to detect potential publication bias.

This approach ensures rigorous and systematic data analysis and synthesis.

**Subgroup analysis** Criteria: Define subgroups based on factors such as training type (e.g., SAQ vs. conventional), athlete experience level, and sport type.

Analysis: Perform meta-analysis within each subgroup to determine if effects vary by these factors.

Comparisons: Compare results across subgroups to identify patterns or differences in training effects.

**Sensitivity analysis** Objective: Assess the robustness of the meta-analysis results.

Process:

Exclude Low-Quality Studies: Remove studies with high risk of bias or methodological flaws and re-evaluate results.

Test Different Models: Compare results using fixed-effects and random-effects models.

Check Influence of Outliers: Evaluate the impact of individual studies on overall findings by excluding outliers or influential studies.

Outcome: Determine if results remain consistent under different conditions or assumptions.

**Language restriction** Include studies published in English only.

**Country(ies) involved** Country of Nationality: China. Country of Research: Malaysia (Universiti Putra Malaysia).

**Keywords** Speed; Agility; Quickness; Explosiveness; Aerobic Endurance; Sport-Specific Skills; Meta-Analysis; Systematic Review; Athletic Performance; Training Interventions.

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