INPLASY

Effects of Mat Pilates on Athletic Performance: A Systematic Review with Meta- Analysis

Corresponding author:
Vinodhkumar Ramalingam

vinodhkumar.scpt@saveetha.com

Author Affiliation:
Saveetha College of Physiotherapy, Saveetha Institute of Medical and Technical Sciences.

Ravichandran, L; Ramalingam, V; Thirumalai, J.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY2024120008

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 December 2024 and was last updated on 2 December 2024.

INTRODUCTION

Review question / Objective Review question: What are the effects of Mat Pilates on athletic performance in terms of strength, flexibility, balance, and overall performance among the sporting population?
Objective: The objective of the systemic review and meta-analysis is to determine the effectiveness of mat Pilates on athletic performance in terms of strength, flexibility, balance, and overall performance among the sporting population compared to conventional or other technical training interventions. This study aims to provide evidence on the outcomes of these interventions within sporting population performance.

Rationale With the growing use of effective training such as Mat Pilates exercises, there is a lack of synthesised evidence on their relative effectiveness. By analysing data from various published studies, this review will address the existing evidence gap, provide conclusions on the impact of Mat Pilates on strength, balance, flexibility, and overall performance of the athletes, and offer valuable insights to future research.

Condition being studied Core instability is a condition where the muscles responsible for stabilizing the spine and pelvis fail to function efficiently, leading to compromised movement patterns and a higher risk of injury. The core, which includes the deep stabilizers (such as the transverse abdominis, multifidus, pelvic floor, and diaphragm) and superficial muscles (like the rectus abdominis and obliques), acts as a foundation for all movement. When this system is weak or uncoordinated, it can result in poor posture, imbalances, and reduced force transfer between the upper and lower body.
In athletes, especially those in sports like volleyball, core instability can limit performance during essential activities such as jumping, spiking, and quick directional changes. This instability not only reduces efficiency but also puts added stress

on joints like the knees, hips, and shoulders, increasing the risk of injuries like ACL tears, lower back pain, or shoulder impingements. Common causes of core instability include a sedentary lifestyle, improper training techniques, muscle imbalances, or recovering from injuries.

To address core instability, rehabilitation or training programs often focus on building endurance, strength, and coordination of the core muscles. Exercises like planks, dead bugs, bridges, and Pilates-based movements are effective in enhancing core stability. Functional training that mimics sport-specific movements can also help transfer improvements in core stability to athletic performance. By strengthening the core, athletes can improve their balance, power, and overall resilience against injuries. Pilates exercises have also offered new effective methods for increasing strength and enhancing flexibility, as it is a series of exercises that help in the improvement of core muscle strength that further contribute to controlled movement of extremities, good posture, speed, power, and balance. Joseph Pilates had developed a unique system of hooking springs and straps in hospital beds to help disabled and immobilised patients regain strength and movement in order to counteract the deleterious effects of deconditioning after World War 1, which was later found to emerge as Pilates. Pilates training consists of a range of multidirectional movements starting with a variety of initial positions in which skeletal muscles are recruited in such a manner that benefits strength, flexibility, and endurance.

METHODS

Search strategy Search strategy Various databases will be used to search for literature related to Mat Pilates training interventions for the sporting population. These include Scopus, Web of Science, PubMed Central, Embase, DOAJ, Proquest, ClinicalTrials.gov, CINAHL, Medline, the WHO International Clinical Trials Registry Platform (ICTRP), and the Cochrane Library.

Participant or population The review will focus on athletes with core stability. All types of sports will be included. Players ages will range from 18 to 25 years.

Intervention Mat Pilates training.

Comparator Conventional therapy.

Study designs to be included Included only randomised controlled trials.

Eligibility criteria The review will focus on studies reporting muscle strength, balance, flexibility, and overall performance. The study will include all types of sports.

Information sources Various databases will be used to search for literature related to Mat Pilates training interventions for the sporting population. These include Scopus, Web of Science, PubMed Central, Embase, DOAJ, Proquest, ClinicalTrials.gov, CINAHL, Medline, the WHO International Clinical Trials Registry Platform (ICTRP), and the Cochrane Library.

Main outcome(s) Sit and Reach Test, Vertical Performance Test.

Additional outcome(s) Double Leg Test, Star Excursion Test.

Data management Reference Management: Mendeley. Paper screening: Rayaan. Data analysis: Jamovi.

Quality assessment / Risk of bias analysis Our systemic review involves randomised controlled trials (RCTs), for which the Cochrane risk of bias tool will be utilised.

Strategy of data synthesis Relevant data from the included study retrieved using standardised form. This will include information on authors, study design, total number of players, participation in sport, intervention, outcomes, and results. The mean and standard deviation of each group are retrieved to analyse the effect of the intervention. Meta-analysis includes effect size calculation and publication bias assessment.

Subgroup analysis Subgroup analysis will examine the difference in intervention based on the intervention type, duration, and frequency of the intervention.

Sensitivity analysis Sensitivity analysis will be conducted to assess the robustness of the findings by excluding studies with a high risk of bias or variations in methodological quality.

Language restriction The search for this systematic review will be restricted to studies published in English.

Country(ies) involved India.

Keywords Balance, Core Stability, Flexibility, Pilates Based Exercises, Muscle Strength, Sporting Population, Performance.

Contributions of each author

Author 1 - Lalitha Ravichandran - Conceptualize the study, designing the methodology, leading the data extraction process, and reviewing the manuscript for important intellectual content.
Email: lalitharavichandran2092@gmail.com

Author 2 - Vinodhkumar Ramalingam - Conduct the literature search, performing statistical analysis and meta-analysis, and assisting in drafting the manuscript.
Email: vinodhkumar.scpt@saveetha.com

Author 3 - Jeevarathinam Thirumalai - Assist in data extraction, contributing to statistical analysis, drafting the manuscript, and writing the discussion and conclusion sections.
Email: jeevarathinamhope@gmail.com