

INPLASY PROTOCOL

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Conflicts of interest:
None declared.

Lower Limb Biomechanics During the Topspin Forehand in Table Tennis: A Systemic Review

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Review question / Objective: The aim of this study is to review the valuable lower limb biomechanical contribution to table tennis topspin forehand.

Eligibility criteria: The following inclusion criteria were used to screen the studies (1) the article should be published in English; (2) the article should be published in a peer-review journal; (3) biomechanics research with a table tennis experiment design; (4) the article investigated the lower limb biomechanics information of topspin forehand of table tennis athletes. Articles were excluded if (1) the participant was under 18 years old; (2) had a musculoskeletal problem, injury, or rehabilitation; (3) the article focused on table tennis robots or machine learning; (4) the article only used theoretical model or simulations; (5) without specified stroke movement information and treatment methods.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 24 June 2022 and was last updated on 24 June 2022 (registration number INPLASY202260096).

INTRODUCTION

Review question / Objective: The aim of this study is to review the valuable lower limb biomechanical contribution to table tennis topspin forehand.

Condition being studied: None.

METHODS

Participant or population: Table tennis players over the age of 18 without musculoskeletal injuries.

Intervention: Not applicable.

Comparator: Not applicable.

Study designs to be included: Cross-sectional study.

Eligibility criteria: The following inclusion criteria were used to screen the studies (1) the article should be published in English; (2) the article should be published in a peer-review journal; (3) biomechanics research with a table tennis experiment design; (4) the article investigated the lower limb biomechanics information of topspin forehand of table tennis athletes. Articles were excluded if (1) the participant was under 18 years old; (2) had a musculoskeletal problem, injury, or rehabilitation; (3) the article focused on table tennis robots or machine learning; (4) the article only used theoretical model or simulations; (5) without specified stroke movement information and treatment methods.

Information sources: The electronic databases of ISI Web of Science, Scopus, and PubMed were used for searching electronic literature from 1975, 1960, and 1975 to 15 April 2022, respectively.

Main outcome(s): The hip movement characteristics and the hip muscle group activity following a proximal-to-distal sequence strategy significantly contributed to the maximum acceleration of the racket. Optimizing the motion strategy of the ankle and plantar as well as the ankle muscle group activity is beneficial for the transmission of energy in the kinetic chain. Muscle groups around the ankle and subtalar joints are heavily activated during landing to maintain foot stability during the landing phase. Lower limb muscle development plays an important role in movement control and stability as well as sports injury prevention in table tennis footwork during the performance of the topspin forehand.

Quality assessment / Risk of bias analysis: Two reviewers independently screen the methodological quality by including articles based on the Combie criteria for cross-sectional studies and included seven domains. Any disagreements arising in the

quality assessment would be resolved by an independent arbitrator.

Strategy of data synthesis: Narrative synthesis will be conducted in the review.

Subgroup analysis: None.

Sensitivity analysis: None.

Country(ies) involved: China.

Keywords: Kinematics; kinetics; table tennis; topspin forehand; muscle activity.

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