INPLASY

The impact of repair and reconstruction techniques on the muscle strength of the knee joint following anterior cruciate ligament injury: A systematic review and network meta-analysis

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 8 August 2025 and was last updated on 8 August 2025.

INTRODUCTION

Review question / Objective Does the use of different plantar grafts in anterior cruciate ligament reconstruction or anterior cruciate ligament repair have different effects on the recovery of postural control?

Condition being studied Anterior cruciate ligament (ACL) injuries significantly compromise knee joint stability and postural control, profoundly impacting athletic performance and quality of life. Surgical interventions, predominantly ACL reconstruction using various grafts (e.g., autografts such as quadriceps tendon, patellar tendon, hamstring tendon, allografts, artificial ligaments) or ACL repair techniques, aim to restore knee functionality. Although existing studies and conventional meta-analyses have compared individual surgical procedures in terms of muscle strength and proprioception outcomes separately, there remains a lack of comprehensive comparisons across all currently available techniques concerning postural control. Postural control is critical for injury prevention, optimal functional recovery, and safe return-to-sport. Therefore, this systematic review and network meta-analysis aims to comprehensively compare the effects of different ACL repair and reconstruction techniques on postural control outcomes.

METHODS

Participant or population Inclusion: patients with a diagnosis of ACL rupture who underwent ACLR or ACL primary repair.
Exclusion: patients with previous surgery for partial or chronic ACL ruptures or concomitant multiple ligament injuries or previous surgery for the same or contralateral knee.

Intervention Anterior cruciate ligament reconstruction or anterior cruciate ligament repair.

Comparator This study was a network meta-analysis. The intervention factors were correlated with each other.

Study designs to be included Randomised studies and non-randomised studies.

Eligibility criteria There are no additional inclusion criteria outside the PICOS sections.

Information sources Both published and unpublished studies will be sought. The main databases to be searched are CINAHL - Cumulative Index to Nursing and Allied Health Literature, Embase - Embase via Ovid, Embase.com, PubMed, Scopus, Cochrane, Web of Science and SPORTDiscus. There are no language restrictions and search date restrictions. Other studies will be identified by: contacting authors or experts, looking through all the articles that cite the papers included in the review ("snowballing"), reference list checking, searching conference proceedings, searching dissertation and thesis databases and searching trial or study registers.

Main outcome(s) Isokinetic strength: Peak torque (Nm) at 60–180°/s; reported as SMD/MD (95% CI).
Isometric strength: Maximal voluntary contraction (MVC, N/kg); pre-post % change.
Peak torque: Normalized to body weight (Nm/kg); limb symmetry (%).
MVC: Force (N/kg) during isometric tasks; between-group differences (*p*<0.05).

Quality assessment / Risk of bias analysis Risk of bias will be assessed using: Cochrane RoB-1, Cochrane RoB-2, Newcastle-Ottawa and ROBINS-I Data will be assessed independently by at least two people (or person/machine combination) with a process to resolve differences.
Additional information will be sought from study investigators if required information is unclear or unavailable in the study publications/reports.

Strategy of data synthesis Information to be extracted will include:(1) study details: lead author's name, year of publication, study design, location, length of follow-up, and study period; (2) participant details: number of patients, number of participants lost to follow-up, age, gender, injured side, interval between injury and surgery, and meniscal and cartilage status; (3) intervention details: autograft type used, fixation methods for both the femoral and the tibial sides, and post-operative rehabilitation program; (4) outcome details: speed used and isokinetic muscle strength.

Subgroup analysis Subgroup analyses were performed when necessary.

Sensitivity analysis Sensitivity analyses were conducted to assess the robustness of the primary findings by examining the impact of potential biases or methodological variations.

Country(ies) involved China.

Keywords ACLR; Anterior cruciate ligament reconstruction; Anterior cruciate ligament repair; Muscle strength.

Contributions of each author
Author 1 - Xinyue Zhou - Conceived and designed the study, participated in all research phases, and oversaw the project.
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