

# INPLASY PROTOCOL

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**Conflicts of interest:**  
None declared.

## The Effects of Platelet-Rich Plasma on the Clinical Outcomes of Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-analysis

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**Review question / Objective:** The aim of this meta-analysis is to evaluate the effects of Platelet-Rich Plasma on the clinical outcomes of anterior cruciate ligament reconstruction.

**Condition being studied:** Anterior cruciate ligament (ACL) ruptures are a common knee injury, and ACL reconstruction is the gold standard for the restoration of stability and function of knee. Platelet-rich plasma (PRP) is an autologous blood product used commonly to augment musculoskeletal healing, which is obtained by centrifugation of whole blood collected from the patient. There have been a number of reports documenting the use of PRP alongside ACL reconstruction in the management of ACL injury.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 28 January 2021 and was last updated on 28 January 2021 (registration number INPLASY202110110).

### INTRODUCTION

**Review question / Objective:** The aim of this meta-analysis is to evaluate the effects of Platelet-Rich Plasma on the clinical outcomes of anterior cruciate ligament reconstruction.

**Rationale:** Although ACL reconstruction (ACLR) is the gold standard for the restoration of stability and function, it is still that many patients with ACLR could not return to preoperative sports or have high reinjury rates. PRP have been proved having ability of promoting the regeneration in tissue and alleviation of

symptoms, it may could accelerate the healing of ACL. Among injectable options for symptom relief and functional improvement in patients with ACLR, PRP has increased in popularity in recent years. Several randomized controlled trials have further determined the potential of ACL reconstruction combined with PRP in treating ACL injury.

**Condition being studied:** Anterior cruciate ligament (ACL) ruptures are a common knee injury, and ACL reconstruction is the gold standard for the restoration of stability and function of knee. Platelet-rich plasma (PRP) is an autologous blood product used commonly to augment musculoskeletal healing, which is obtained by centrifugation of whole blood collected from the patient. There have been a number of reports documenting the use of PRP alongside ACL reconstruction in the management of ACL injury.

## METHODS

**Search strategy:** Keywords and synonyms were entered in various combinations in the title, abstract or keywords: (“Anterior Cruciate Ligament Reconstruction” OR “Anterior Cruciate Ligament” OR “Anterior Cruciate Ligament Injuries” OR “ACL”) AND (“Platelet-Rich Plasma” OR “PRP”).

**Participant or population:** Patients who were clinically and radiographically diagnosed with ACL injuries and had ACL reconstruction.

**Intervention:** Platelet-Rich Plasma injections.

**Comparator:** Saline injections.

**Study designs to be included:** Only randomized controlled trials will be considered.

**Eligibility criteria:** Studies comparing ACLR with PRP on injury side compared to a control group when they reported measures for at least one of the main outcomes of the ACLR: pain (VAS), Lysholm, international knee documentation

committee (IKDC), Tegner, PIVOT test; KT1000, tunnel widening (assessed by CT), graft maturity (assessed by MRI); and (2) articles written in English or Chinese; and (3) full text available. The exclusion criteria were: (1) papers not published in English or Chinese; (2) other article types than original (e.g., reviews, letters to editors, trial registrations, proposals for protocols, editorials, book chapters). and (3) laboratory studies.

**Information sources:** We will search articles in main electronic databases including PubMed, EMBASE, Cochrane Library Web of science, China National Knowledge Infrastructure (CNKI), WanFang, VIP, CBM. Relevant publications prior to 26 January 2021 were searched.

**Main outcome(s):** We will consider pain (measured with visual analog scale [VAS]) and joint function (measured with Lysholm, international knee documentation committee (IKDC), Tegner), knee stability (measured with PIVOT test; KT1000), graft maturity (assessed by MRI) and tunnel widening (assessed by CT).

**Quality assessment / Risk of bias analysis:** Two reviewers will independently assesses the quality of the selected studies according to the Cochrane Collaboration's tool for randomized controlled trials. Items will be evaluated in three categories: low risk of bias, unclear bias and high risk of bias. The following characteristics will be evaluated: Random sequence generation (selection bias), Allocation concealment (selection bias), Binding of participants and personnel (performance bias), Blinding of outcome assessment (detection bias), Incomplete outcome data (attrition bias) Selective reporting (reporting bias), Other biases. Results from these questions will be graphed and assessed using Review Manager 5.4.

**Strategy of data synthesis:** Mean, standard deviation (SD) and sample number (n) were used for analysis. Considering the variables were presented by the same unit of measurements among all studies, raw mean difference (RMD) and 95%

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confidence interval were calculated for all outcomes. We will perform traditional direct meta-analysis based on the random effects model depending on the Review Manager (RevMan) version 5.4. When there was no statistical significance for heterogeneity, fixed-effect models were selected for analyses, and when there was statistical significance for heterogeneity, randomized-effect models were selected for analyses. We will draw funnel plot to inspect the possibility of presence of publication bias when the accumulated number of eligible studies for individual outcome was greater than 10.

**Subgroup analysis:** Subgroup analysis will be performed to compare different time points of assessments of VAS, IKDC, Lysholm.

**Sensitivity analysis:** When the heterogeneity is high (such as  $I^2 > 50\%$ ), the randomized-effect model can be used. There are 14 documents (1-14) for an outcome indicator, or whether the heterogeneity has changed after removing 1-14 separately (record the changes in the combined effect values WMD and RR). If the heterogeneity changes after finding an article, then this may be the source of heterogeneity.

**Language:** English and Chinese.

**Country(ies) involved:** China.

**Keywords:** Anterior cruciate ligament, Anterior cruciate ligament reconstruction, Platelet Rich Plasma, Meta-analysis.

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