

# INPLASY PROTOCOL

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**Support:** Not have

**Review Stage at time of this submission:** Formal screening of search results against eligibility criteria.

**Conflicts of interest:**  
Not have.

## Early functional rehabilitation versus traditional immobilization for repair of acute Achilles tendon ruptures: a meta-analysis based on randomized controlled trials

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**Review question / Objective:** To compare the prognosis of Achilles tendon rupture with early functional rehabilitation and immobilization based on the latest evidence from RCTs by evaluating the re-rupture rate, patient self-report, muscle endurance, and time to return to work and sports.

**Condition being studied:** Acute Achilles tendon rupture (ATR) is a common traumatic injury that most frequently occurring in males in their third and fourth decades who play sport intermittently. Tendons have a low metabolic rate resulting in slow post-injury healing compared with muscle injuries. Therefore, ATR patient's functional capacity typically declines and impacts their quality of life. The treatment of acute ATR includes operative and nonoperative interventions followed by different rehabilitation programs. To date, there is no consensus regarding the optimal rehabilitation protocol of acute ATR. Data from animal studies and clinical studies indicate that early functional rehabilitation can stimulate the tendon cells (fibroblasts) to synthesize collagen and other extracellular components and may be beneficial to tendon healing. However, several studies have drawn controversial conclusions that functional rehabilitation does not show a better rehabilitation effect than traditional cast immobilization that such as the recovery of body function results and the ability to return to previous sports.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 24 August 2020 and was last updated on 24 August 2020 (registration number INPLASY202080100).

### INTRODUCTION

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with early functional rehabilitation and immobilization based on the latest evidence from RCTs by evaluating the re-rupture rate, patient self-report, muscle

endurance, and time to return to work and sports.

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## METHODS

**Search strategy:** (((("Achilles Tendon"[Mesh]) OR ((((((Achilles Tendon[Title/Abstract]) OR (Tendon, Achilles[Title/Abstract])) OR (Calcaneal Tendon[Title/Abstract])) OR (Calcaneal Tendons[Title/Abstract])) OR (Tendon, Calcaneal[Title/Abstract])) OR (Tendons, Calcaneal[Title/Abstract])) OR (Tendo Calcaneus[Title/Abstract]))) AND (("Rupture"[Mesh]) OR ((Rupture[Title/Abstract]) OR (Ruptures[Title/Abstract]))) AND ((((((mobili\*[Title/Abstract]) OR (immobili\*[Title/Abstract])) OR (cast\*[Title/Abstract])) OR (rehab\*[Title/Abstract])) OR (function\*[Title/Abstract])) OR (Motion\*[Title/Abstract])) OR (("Weight-Bearing"[Mesh]) OR ((((((Weight-Bearing[Title/Abstract]) OR (Weight Bearing[Title/Abstract])) OR (Weightbearing[Title/Abstract])) OR

(Loadbearing[Title/Abstract])) OR (Load-Bearing[Title/Abstract])) OR (Load Bearing[Title/Abstract])) OR (Axial Loading[Title/Abstract])) OR (Axial Loadings[Title/Abstract]))) AND (((((((((((randomized controlled trial[Publication Type]) OR (controlled clinical trial[Publication Type])) OR (randomized[Title/Abstract])) OR (placebo[Title/Abstract])) OR (randomly[Title/Abstract])) OR (trial[Title])) OR (groups[Title/Abstract])) OR (Double Blind Method[Title/Abstract])) OR (Single Blind Method[Title/Abstract])) NOT ("Animals"[Mesh]) NOT ("Humans"[Mesh])).

**Participant or population:** Adults with acute Achilles tendon rupture will be included. Exclusion criteria was previous rupture of one or both Achilles tendon(s).

**Intervention:** Controlled early motion, controlled early weight-bearing or a combination of the two.

**Comparator:** Traditional immobilization.

**Study designs to be included:** RCTs.

**Eligibility criteria:** Eligibility criteria: (1) RCTs; (2) acute ATR; (3) followed by functional rehabilitation versus immobilization within 3 weeks after operative or nonoperative treatment; (4) reporting of re-rupture rate, Achilles tendon Total Rupture Score (ATRS), muscle endurance or time taken to return to work and sports.

**Information sources:** PubMed, Embase, Web of Science, and Cochrane Library.

**Main outcome(s):** Primary outcomes included: (1) re-rupture rate; (2) ATRS: is a patient-reported outcome score developed to assess symptoms and physical activity after treatment for acute ATR. We subdivided ATRS according to follow-up, into short term (within 12 weeks), medium term (about half a year) and long term (more than half a year).

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**Additional outcome(s):** Secondary outcomes included: (1) calf muscle endurance at 1 year follow-up: calculate the limb symmetry index (LSI) of the total work (HRW) and the height (HRH) of heel-rise. The LSI can determine whether the difference was classified as normal or abnormal between the injured and uninjured side and expressed as a percentage (injured / uninjured × 100 = LSI); (2) time to return to work and sports.

**Quality assessment / Risk of bias analysis:** Risk of bias was assessed using the Cochrane risk of bias tools and the tool include random sequence generation, allocation concealment, blinding, incomplete outcome data, selective reporting and other possible biases.

**Strategy of data synthesis:** Pooled statistical analysis was conducted using STATA 14.0 to compare the differences between early functional rehabilitation group (FG) and immobilization group (IG). For dichotomous variables, the risk ratio (RR) and 95% confidence intervals (CI) were estimated using the Mantel-Haenszel (M-H) method. For continuous variables, the weighted mean difference (WMD) and 95% CI were estimated using the inverse variance (IV) method. Cochran's Q test and I<sup>2</sup> statistic were applied to determine the between-study heterogeneity. The random-effects model was used in cases of significant heterogeneity (I<sup>2</sup> ≥ 50% and p < 0.1); otherwise, a fixed-effects model was used. The level of statistical significance taken was p = 0.05 in each individual trial and in the present analysis. In addition, publication bias was performed if the included studies were more than ten.

**Subgroup analysis:** Operative and nonoperative interventions.

**Sensibility analysis:** By excluding 1 relevant study.

**Language:** English.

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

**Keywords:** Achilles tendon; Rupture; Rehabilitation; meta-analysis.

**Contributions of each author:**

Author 1 - Ye Liu.

Author 2 - Xuan Liu.

Author 3 - Tianjiao Dai.

Author 4 - Baolin Li.

Author 5 - Chen Li.

Author 6 - Zhouyuan Zheng.