

## Hinged external fixation combined with open debridement for post-traumatic elbow stiffness: a systematic review and meta-analysis

INPLASY202390066

doi: 10.37766/inplasy2023.9.0066

Received: 20 September 2023

Published: 20 September 2023

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**ADMINISTRATIVE INFORMATION****Support** - Natural Science Foundation of Bengbu Medical College (No. BYKY2019229ZD).**Review Stage at time of this submission** - Preliminary searches.**Conflicts of interest** - None declared.**INPLASY registration number:** INPLASY202390066**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 September 2023 and was last updated on 20 September 2023.**INTRODUCTION**

**Review question / Objective** Open debridement remains the gold standard for the clinical treatment of post-traumatic elbow stiffness. However, postoperative complications such as re-contraction and heterotopic ossification of the elbow joint are highly prevalent, and a hinged external fixation appears to offer the potential for greater improvement of joint function and reduction of complications. The purpose of this article is to provide the latest evidence on the effectiveness and safety of hinged external fixation combined with open debridement for the treatment of post-traumatic elbow stiffness.

**Condition being studied** Post-traumatic elbow stiffness is a common complication of elbow sports injuries, which is more likely to develop stiffness than any other joint after trauma, with a

prevalence of 3% -20%. The pathogenesis includes soft tissue contracture, heterotopic ossification, abnormal healing of extra- and intra-articular fractures, osteochondral nonunion, and articular cartilage loss.

**METHODS**

**Participant or population** (1) Post-traumatic elbow dysfunction. (2) No surgical history of the affected limb.

**Intervention** Hinged external fixation combined with open debridement for post-traumatic elbow stiffness.

**Comparator** Open debridement without hinged external fixation for post-traumatic elbow stiffness.

**Study designs to be included** Randomized controlled trial(RCT).

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**Eligibility criteria** (1) Studies with duplicate patient populations reported in previous publications. (2) Incomplete or incorrect data.

**Information sources** China National Knowledge Infrastructure (CNKI), MEDLINE, PubMed, Web of Science, EMBASE, and Cochrane Library.

**Main outcome(s)** Elbow flexion and extension mobility, Mayo elbow function scores, Mayo excellent rate, complication rate.

**Quality assessment / Risk of bias analysis** The risk of bias in included studies was assessed independently by two reviewers according to the guidelines of the Cochran Collaboration Manual, version 5.3.

**Strategy of data synthesis** The joint effect of continuous variables was expressed as weighted mean difference (WMD); the combined effect of dichotomous variables was expressed as relative risk (RR). The joint effect size was expressed by 95% confidence interval (CI), and hypothesis testing was performed by Z-test. Heterogeneity tests between studies were included by chi-square test and I<sup>2</sup> statistical analysis. If I<sup>2</sup> > 50% and P > 0.05, a fixed-effects model was used. Otherwise, a random-effects model was used.

**Subgroup analysis** No.

**Sensitivity analysis** Sensitivity analysis results indicates that removal of any individual study each time did not alter the original prognostic significance, indicating that the results had good stability.

**Language restriction** No.

**Country(ies) involved** China.

**Keywords** Meta-analysis, hinged external fixation, open debridement, post-traumatic, elbow stiffness.

#### **Contributions of each author**

Author 1 - Wenzhi Bi - designed the study; prepared the manuscript.

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