Use of the Internal Joint Stabilizer Reduces Need for Medial Approach in Terrible Triad Injuries of the Elbow: A Meta-Analysis

Caleb A. Casanova[1], Benjamin Fiedler[2], Todd Phillips[2], Eileen N Phan[2], Sameer Khawaja[2], Scott Mitchell[2]
[1]Baylor College of Medicine, 1 Baylor Plaza, Houston, TX, 77030, USA
[2]Baylor College of Medicine, Joseph Barnhart Department of Orthopedic Surgery, 7200 Cambridge, Ste. 10A, Houston, TX, 77030, USA

Caleb.Casanova@bcm.edu

Disclosures: The authors have no disclosures to report.

INTRODUCTION

Surgeons historically repair terrible triad injuries of the elbow with a lateral approach, adding a secondary medial approach when adequate stability is unable to be achieved with lateral repair alone. The introduction of the internal joint stabilizer (IJS) (Skeletal Dynamics, Inc. Miami, Florida, USA) allowed for improved joint stability from the standard lateral approach, theoretically decreasing the need for secondary medial approaches. The purpose of this study was to determine the effect of the introduction of internal joint stabilization on the rate of medial approaches and external fixation in the treatment of terrible triad injuries.

METHODS

This study utilized a cohort comparative design comparing data from a high-volume academic institution in the post-IJS era to historical data from pre-IJS years. A review was conducted of all terrible triad cases treated from a single institution from October 2018 to July 2025. Chart review was conducted to extract patient demographics, surgical approach utilized, and use of the internal joint stabilizer (IJS) system and/or external fixation. Imaging was reviewed to determine O'Driscoll and Regan-Morrey classification. A meta-analysis was conducted to determine historical rates of medial approach for terrible triad injuries prior to IJS use. Risk ratio calculations were used to compare pre-IJS medial approach rate to post-IJS medial approach rate. Chi-square was used to determine differences in categorical variables. Were the assumptive conditions of the chi-square not met, Fisher's exact test was used to determine statistical differences.

RESULTS

In the post-IJS cohort, 39 of 54 patients received the IJS (72.2%), with 2 of 54 (3.7%) patients requiring a medial approach. Literature review shows historical rates of medial approach pre-IJS ranging from 18.2—53.3% (mean 38.3%). The risk ratio for medial approach in the post-IJS cohort relative to historical findings is 0.10 ($p < 0.001$).

DISCUSSION

The present study found that the incorporation of the IJS into the treatment algorithm of terrible triad injuries of the elbow significantly decreases the need for medial-sided approaches. While some fracture and injury patterns will continue to necessitate a medial approach, the IJS adds a valuable tool to the arsenal in the treatment of unstable elbow fracture-dislocations and should be regularly considered in the treatment algorithm.

CLINICAL RELEVANCE

Implementation of the IJS in the treatment algorithm of terrible triad of the elbow is shown to significantly decrease need for secondary medial approach to achieve adequate joint stability. Avoiding secondary medial approach minimizes the risk of complications.

IMAGES AND TABLES

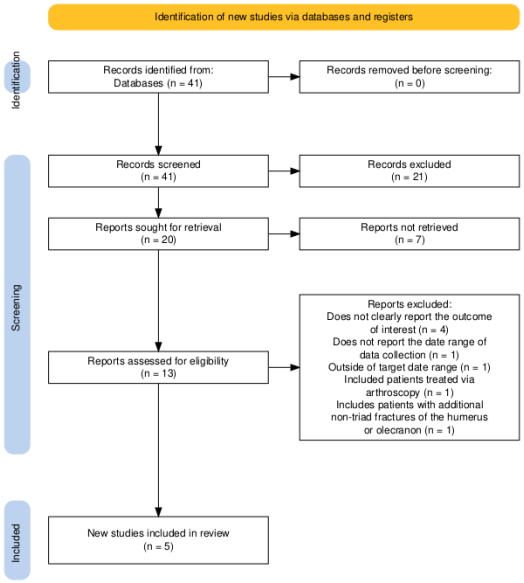

Figure 1 - PRISMA Flowchart of Meta-Analysis Study Inclusion Selection

Individual-level variables		N	Percent	Mean	SD
Age		54		42.2	13.3
Gender					
Male		38	70.4%		
Female		16	29.6%		
Classifications					
O'Driscoll				2.09	0.96
	1	22	40.7%		
	2	5	9.3%		
	3	27	50.0%		
Regan-Morrey				2.02	0.86
	1	19	35.2%		
	2	15	27.8%		
	3	20	37.0%		
Fixation					
IJS					
	Yes	39	72.2%		
	No	15	27.8%		
External Fixator					
	Yes	1	1.9%		
	No	53	98.1%		
Approach					
Lateral only		39	72.2%		
Lateral + Posterior		13	24.1%		
Lateral + Medial		1	1.9%		
Lateral + Medial + Posterior		1	1.9%		

Table 1 - Post-IJS retrospective cohort demographics (IJS = internal joint stabilizer)