SHORT COMMUNICATION

Adjusted Internal Joint Stabilizer Implants as a Supplementary Management of Chronic Elbow Injury: A Preliminary Case Series

Iman Widya Aminata, MD; Salman Azis Nizami, MD

Research performed at Fatmawati General Hospital, Jakarta, Indonesia

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Abstract

Chronic elbow injuries often cause instability and stiffness. The Internal Joint Stabilizer of Elbow (IJS-E), introduced in 2014, stabilizes the elbow and enables early mobilization. In resource-limited settings where the IJS-E is unavailable, an adapted radius T-plate technique has been developed. This study evaluated patients (n=11) with chronic elbow injuries, showing significant improvements in Mayo Elbow Performance Scores (MEPS) and range of motion (ROM). Despite challenges like implant rigidity and precise screw placement, the T-plate effectively maintained stability and allowed early ROM exercises. Limitations include the short follow-up period and the need for further studies; however, this approach holds promise for low-resource settings.

Level of evidence: IV

Keywords: Chronic trauma, Elbow, IJS, Internal joint stabilizer, Neglected case

Introduction

Chronic elbow conditions, such as trauma and dislocations, are frequently encountered in tertiary settings. In third-world countries, there is a delayed presentation with delayed management for months and years. Those cases lead to elbow instability and stiffness due to the primary complication of chronic elbow injury. Management of chronic elbow injuries required a specific approach, which ensured stability and early mobilization to prevent disability that could lead to elbow stiffness.[1]

Main body

To gain stability, mitigate prolonged immobilization, and improve range of motion, Jorge Orbay presented an exceptional method, the Internal Joint Stabilizer of the Elbow (IJS-E), in 2014, which stabilizes the elbow and permits the patient's elbow to move earlier.[2] IJS-E produced excellent results, multicenter study in 2017.[3]

It can be determined that the original IJS-E yields highly favorable outcomes regarding both daily activities and the elbow's range of motion [Table 1].[3-10] Orbay used an inner elbow stabilizing implant with a Steinmann pin in axial alignment of the ulnohumeral connected to a base plate, which attached to the proximal ulna.[2] IJS-E contributed to stability, enabling early patient movement. IJS-E opposed both instability and stiffness. However, the IJS-E implant was not available in our country. We adjusted and adapted a new technique inspired by the IJS-E original implant and converted it into a radius T-plate suitable for use in third-world countries.

This research was approved by the Health Research Ethics Committee, the National Institute of Health Research and Development. This study was conducted in Fatmawati General Hospital, a national referral hospital. The authors worked following the Declaration of Helsinki. The research subjects had been informed of and agreed to participate in this research. Statistical analyses were conducted using SPSS Statistics version 25.0 (IBM, Armonk, NY). Paired T-Test was employed to analyze MEPS (Mayo Elbow Performance Score) and ROM (Range of Motion) after surgery.

Corresponding Author: Salman Azis Nizami, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia

Email: salman.azis@ui.ac.id

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Table 1. IJS-E outcome from previous studies. MEPS (Mayo Elbow Performance Score).

Author	Year	Patients	MEPS Score (0-100)	Range Of Motion	
				Flexion-Extension	*Pronation-Supination*
Orbay[3]	2017	26	(-)	119	152
PardoGarcia[4]	2021	5	94	134	180
Sheth[5]	2022	30	74	101	134
Fene[6]	2022	17	(-)	92	139
Salazar[7]	2022	22	(-)	99	97
Wynn[8]	2023	12	78	115	160
Cresenzo[9]	2024	11	90	123	151
Heifner[10]	2025	44	81	(-)	(-)

From June to October 2024, 11 patients with neglected elbow injuries and dislocations were included. ROM and MEPS were evaluated. Surgery indications were posterolateral dislocations (63.6%), terrible triad (18.1%), and dislocation with radial head fracture (18.1%). All cases included in the study were chronic, with durations ranging from 6 to 36 months.

The surgery methods are shown in [Figure 1]. A posterior incision and approach to the elbow were used. The olecranon and capitellum were identified to determine if they were fractured, to fix the fracture, or to perform an osteotomy to correct the malunion first. Reduce the dislocation concentrically and apply the adjusted implant by bending the 4-hole radius T-plate, non-locking (3.5 mm, manufactured by Hengji), approximately 90 degrees. The last hole on the vertical site T-plate was placed over the center of capitellum with cancellous screw in transverse pattern (lateral to medial aspect). The center of the capitellum was labelled as the Center of Rotation (COR). Two cortical screws were used in the olecranon and coronoid.

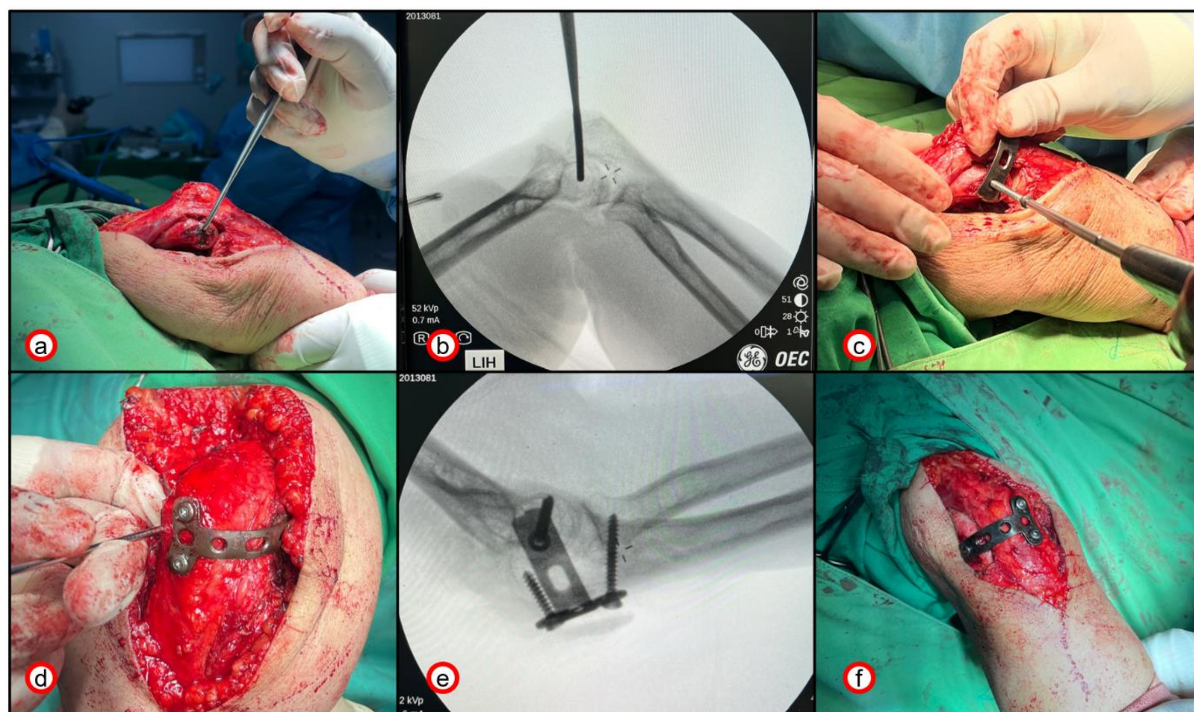

Figure 1. Adjusted IJS-E Implant Surgery Methods. (a)Identifying Center of Rotation (COR), (b)Identifying COR by C-arm, (c)Screw at the COR, (d)Screw at olecranon-coronoid (e)Final construction by C-arm, (f)Final construction from posterolateral view

The patient was instructed to utilize a sling for two weeks following the surgery. Subsequently, the patient was provided with guidance on performing self-directed rehabilitation exercises at home, which included flexion-extension and pronation-supination movements. Periodic follow-up was conducted monthly until the fourth postoperative month to strategize the removal of the adjusted IJS-E implant [Figure 2].

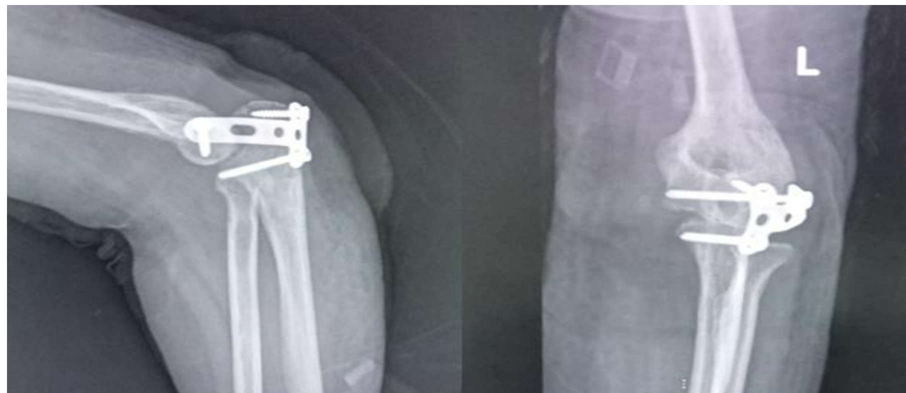

Figure 2. Radiology follow-up 1 month after surgery

The preoperative outcome and final follow-up at 4 months are shown in [Table 2]. The mean MEPS before surgery was 40.4±10.1, and after surgery was 79.5±12.3 (P value < 0.001, T Value -9.189). There was an improvement of mean flexion-extension from 20.8±12.3º to 88±25.5º (P value < 0.001, T Value -9.481). Moreover, mean pronation-supination improved from 50.5±16º to 126.9±28.8º (P value < 0.001, T Value -9.053).

Table 2. Adjusted IJS-E Outcome. MEPS (Mayo Elbow Performance Score). FE (Flexion-Extension) in degrees. PS (Pronation-Supination) in degrees.

Case	Gender	Age	Preoperative			Postoperative			Complication
			MEPS	*FE*	*PS*	*MEPS*	*FE*	*PS*	
1	Female	36	45	22	52	70	75	154	(-)
2	Female	48	30	8	80	65	65	113	(-)
3	Female	52	40	15	73	80	82	159	(-)
4	Female	27	20	0	26	85	80	141	(-)
5	Female	44	50	24	40	80	83	110	(-)
6	Female	47	55	49	58	85	110	135	(-)
7	Female	29	45	20	38	65	58	60	Implant Loosening
8	Female	35	40	18	39	100	134	105	(-)
9	Male	51	50	28	42	100	131	125	(-)
10	Female	30	35	25	58	75	78	152	(-)
11	Male	42	35	20	50	70	72	142	(-)

Chronic elbow trauma and dislocation continued to pose significant challenges for orthopedic surgeons, often leading to serious complications. These cases were commonly associated with severe instability, diminished elbow functionality, persistent pain, and restricted range of motion.

This study was a collection of chronic elbow trauma cases with a poor prognosis due to malunion and fibrosis. Our method yielded MEPS scores that were almost identical to those reported in the three prior studies (Sheth, 2022; Wynn, 2023; Heifner, 2025) involving the original IJS-E.[5,8,10] The ROM in pronation-supination also yielded highly favorable outcomes. However, the flexion-extension outcomes associated with the utilization of T-plate implants demonstrated significant differences when compared to findings from prior studies.[3-9]

The findings we obtained were correlated with the pitfalls and drawbacks associated with the utilization of T-Plate implants. Some pitfalls could be found in this method. First, determining the COR point area was vital. If the COR were not accurately positioned at the center of the capitellum, it would result in impaired flexion-extension motion of the elbow joint because the fulcrum was not aligned with the central axis of the elbow's flexion-extension arc. Second, the screw placement must be precisely at the apex of the olecranon. If the screw is not precisely positioned at the apex of the olecranon, the elbow joint will become non-concentric during flexion and extension movements. Disruptions in both of these aspects alter the outcome of elbow flexion-extension.

Unlike the connecting rod in the IJS-E original implant, the T-plate was essentially too rigid. This rigidity could interfere with the valgus-varus motion during elbow flexion-extension, and could obstruct the radial head movement, so that the pronation-supination motion is reduced. However, if the fixation is not sufficiently rigid, implant loosening may occur, as observed in one of the study participants. In this case, loosening was detected by the second month, leading to a compromised range of motion, which necessitated implant removal and resulted in additional complications, including elbow instability in the patient.

However, the T-plate is a beneficial alternative implant that can be used in cases of neglected elbows. The T-plate could maintain elbow stability, allowing the patient to perform ROM exercises immediately after surgery, thereby preventing stiffness and instability during ROM exercises.

Conclusion

This study has some limitations, including the absence of implant removal and a relatively short follow-up duration. As a preliminary investigation, this research aims to encourage other centers, particularly in developing countries that lack access to the IJS-E original implant, to adopt similar methodologies for comparative analysis. The authors are currently conducting Phase 2 of the study, which involves implant removal after four months and the implementation of medical rehabilitation training for at least 12 months.

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Iman Widya Aminata MD [1]
Salman Azis Nizami MD [2]

1 Department of Orthopaedic and Traumatology, Fatmawati General Hospital, Jakarta, Indonesia

2 Faculty of Medicine, University of Indonesia, Jakarta, Indonesia

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