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Elastic Intramedullary Nailing in Adult Radius and Ulna Fractures: A Modern Minimal Invasive Approach to Internal Fixation

Md. Iftekharul Alam[1*], Muhammad Hasnat[2], Md. Emdadul Hoque Bhuyan[3], Md. Sarwar Jahan[4], Md. Imranur Rahman[5], Mostakim Billah[6], Sefet-E-Rabbi Eva[7]

[1]Assistant Professor, Department of Orthopedic Surgery (Hand and Microsurgery), National Institute of Traumatology & Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh
[2]Assistant Registrar, Department of Orthopedic, National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh
[3]Assistant Professor (Hand and Microsurgery), National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh
[4]Assistant Professor, Department of Spine Surgery, National Institute of Traumatology & Orthopedic Rehabilitation (NITOR), Dhaka, Bangladesh
[5]Junior Consultant (Orthopedic), National Institute of Traumatology and Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh
[6]Junior Consultant, Department of Analgesia and Critical Care Medicine, Bogra 250 bed Mohammad Ali District Hospital, Bogura, Bangladesh
[7]Lecturer, Department of Microbiology, Sir Salimullah Medical College, Dhaka, Bangladesh

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***Corresponding author:** Md. Iftekharul Alam
Assistant Professor, Department of Orthopaedic Surgery (Hand and Microsurgery), National Institute of Traumatology & Orthopaedic Rehabilitation (NITOR), Dhaka, Bangladesh

Abstract **Original Research Article**

Background**:* Forearm fractures in adults have traditionally been treated with open reduction and internal fixation (ORIF) using plates and screws. This study evaluates elastic intramedullary nailing (EIN) as a minimally invasive alternative for the treatment of adult radius and ulna fractures ***Methods: Forty adult patients (24 males, 16 females; mean age 36.7 years) with diaphyseal fractures of the radius and/or ulna were treated with elastic intramedullary nailing between January 2022 and December 2023. Patients were followed for a mean of 14.3 months. Outcomes were assessed using time to union, Disabilities of the Arm, Shoulder and Hand (DASH) score, Anderson criteria, range of motion, grip strength, and complications. ***Results**:* Union was achieved in 38 patients (95%) at a mean time of 11.8 weeks. Two patients (5%) developed delayed union, which eventually healed without intervention. At final follow-up, the mean DASH score was 8.4. According to Anderson criteria, excellent results were achieved in 32 patients (80%), satisfactory in 6 patients (15%), and unsatisfactory in 2 patients (5%). The mean range of motion showed near-complete restoration of function with elbow flexion-extension arc of 143.5°, wrist flexion-extension arc of 135.7°, and forearm rotation arc of 164.3°. Complications were observed in 8 patients (20%), including superficial infection (5%), hardware irritation (7.5%), and transient nerve paresthesia (5%). No cases of deep infection, implant failure, or nonunion were recorded. ***Conclusion**:* Elastic intramedullary nailing is a safe and effective minimally invasive treatment option for selected adult radius and ulna fractures, offering excellent union rates, favorable functional outcomes, and a low complication profile. This technique may be considered as an alternative to conventional plating in appropriate cases, particularly when minimizing soft tissue dissection is desirable.
Keywords: Forearm fractures, radius fractures, ulna fractures, intramedullary nailing, elastic nails, minimally invasive, internal fixation.

INTRODUCTION

Fractures of the radius and ulna are among the most common fractures of the upper extremity in adults, accounting for approximately 10-14% of all fractures [1,2]. The management of these fractures has evolved significantly over the past decades, with the primary goal of treatment being the restoration of anatomical alignment, stable fixation, and early mobilization to ensure optimal functional outcomes [3].

Traditionally, open reduction and internal fixation (ORIF) with plating has been considered the gold standard for adult diaphyseal forearm fractures

[4,5]. However, this approach is associated with extensive soft tissue dissection, periosteal stripping, and potential complications including infection, neurovascular injury, and hardware-related issues [6,7].

In recent years, there has been growing interest in minimally invasive techniques for the treatment of forearm fractures. Elastic intramedullary nailing (EIN), initially popularized in pediatric fractures, has emerged as a promising alternative for selected adult fractures [8, 9]. This technique offers several theoretical advantages, including smaller incisions, reduced soft tissue trauma, preservation of fracture hematoma and periosteal blood supply, and potentially lower infection rates [10, 11].

While the literature on EIN in pediatric forearm fractures is extensive, its application in adults remains relatively limited [12]. Several small studies have reported satisfactory outcomes with EIN in adult radius and ulna fractures, but concerns regarding rotational stability, maintenance of reduction, and union rates have limited its widespread adoption. [13-15].

The purpose of this study is to evaluate the clinical and radiological outcomes of elastic intramedullary nailing in the management of adult radius and ulna fractures. We present our experience with 40 consecutive cases, examining the surgical technique, complications, functional outcomes, and patient satisfaction. We hypothesize that EIN represents a viable minimally invasive alternative to conventional plating for selected adult forearm fractures with comparable functional outcomes and lower complication rates [16,17].

Materials and Methods

Study Design and Patient Population

This prospective observational study was conducted at our institution between January 2022 and December 2023. The study protocol was approved by the Institutional Ethics Committee (IEC-2021/076), and informed consent was obtained from all participants. Forty consecutive adult patients with diaphyseal fractures of the radius and/or ulna who met the inclusion criteria were enrolled in the study.

Inclusion and Exclusion Criteria

The inclusion criteria were: (1) patients aged 18-65 years; (2) closed or Gustilo-Anderson type I open diaphyseal fractures of the radius and/or ulna; (3) fractures amenable to closed or minimally invasive reduction; and (4) patients who provided written informed consent to participate in the study [18,19].

Exclusion criteria were: (1) pathological fractures; (2) fractures with significant comminution (AO/OTA type C2 and C3); (3) fractures with bone loss; (4) Gustilo-Anderson type II and III open fractures; (5) fractures with significant soft tissue injury requiring primary repair; (6) fractures older than 2 weeks; (7) fractures with intra-articular extension; (8) patients with multiple injuries requiring prioritized management of other injuries; and (9) patients unable to comply with the rehabilitation protocol [20,21].

Preoperative Evaluation

All patients underwent a thorough clinical examination, including neurovascular assessment. Standard anteroposterior and lateral radiographs of the forearm, including the wrist and elbow joints, were obtained. Fractures were classified according to the AO/OTA classification system [22]. Preoperative planning included measurement of the canal diameter at the isthmus using digital radiographs to determine the appropriate nail diameter (typically 40-50% of the medullary canal diameter) [23].

Surgical Technique

All procedures were performed under regional or general anesthesia. Patients were positioned supine on a radiolucent table with the affected limb on a radiolucent arm board. A pneumatic tourniquet was applied but inflated only when necessary. Prophylactic intravenous antibiotics (1g cefazolin) were administered 30 minutes before skin incision [24].

For radius fractures, a 1-2 cm incision was made over the dorsoradial aspect of the distal radius, approximately 1 cm proximal to the radial styloid, taking care to protect the superficial branch of the radial nerve and tendons of the first and second extensor compartments [25]. Entry was made using an awl, directed at 45° to the long axis of the radius. For ulna fractures, a 1-2 cm longitudinal incision was made over the olecranon, and entry was created at the tip of the olecranon process [26].

Pre-contoured titanium elastic nails (TENs) were used, with diameter ranging from 2.0 to 3.0 mm depending on the canal size. The nail was advanced to the fracture site under fluoroscopic guidance. Closed reduction was attempted in all cases using a combination of traction, direct pressure, and manipulation. If closed reduction was unsuccessful after three attempts, a mini-open approach was performed through a 2-3 cm incision centered over the fracture site. [27,28]

After achieving satisfactory reduction, the nail was advanced across the fracture site to the metaphyseal region of the opposite end of the bone. For radius fractures, the nail was cut 0.5-1.0 cm from the entry point and bent to minimize soft tissue irritation. For ulna fractures, the nail was cut flush with the cortex and buried under the triceps aponeurosis when possible to prevent olecranon bursitis.[29]

In cases of both-bone forearm fractures, the ulna was typically fixed first to provide a stable reference for radius reduction. The adequacy of reduction and implant position was confirmed with anteroposterior and lateral fluoroscopic views. Rotational alignment was assessed clinically by comparing the forearm rotation to the contralateral uninjured side [30,31].

Postoperative Management

Postoperatively, patients were immobilized in an above-elbow splint for 2 weeks for comfort and soft tissue healing. Active finger movements were encouraged immediately after surgery. At 2 weeks, the splint was removed, and gentle active-assisted range of motion exercises of the wrist and elbow were initiated under the supervision of a physical therapist. Strengthening exercises were added progressively based on radiographic evidence of fracture healing. Weight-bearing and strenuous activities were restricted until radiographic union was achieved [32,33].

Follow-up and Outcome Assessment

Patients were followed up at 2 weeks, 6 weeks, 3 months, 6 months, and 12 months postoperatively. At each visit, clinical assessment included pain (Visual Analog Scale), range of motion of the elbow and wrist, rotation of the forearm, and complications. Radiographic evaluation included anteroposterior and lateral views of the forearm to assess fracture healing, maintenance of reduction, and implant position [34].

Union was defined as bridging callus on at least three cortices on orthogonal radiographic views and absence of pain at the fracture site during clinical examination [35]. Delayed union was defined as absence of radiographic union at 6 months, and non-union as absence of progressive healing for 3 consecutive months after the initial 6-month period [36].

Functional outcomes were assessed using the Disabilities of the Arm, Shoulder and Hand (DASH) score and the Anderson criteria at 6 and 12 months postoperatively.[37,38] The Anderson criteria categorize results as excellent (union with <10° loss of elbow or wrist motion and <25% loss of forearm rotation), satisfactory (union with <20° loss of elbow or wrist motion and <50% loss of forearm rotation), unsatisfactory (union with >30° loss of elbow or wrist motion and >50% loss of forearm rotation), or failure (nonunion or unresolved complications requiring additional surgery) [39].

Patients were also evaluated for complications including infection, compartment syndrome, neurovascular injury, implant-related issues, malunion, delayed union, and nonunion [40].

Statistical Analysis

Statistical analysis was performed using SPSS version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to present demographic data and outcome measurements. Continuous variables were expressed as mean ± standard deviation or median with interquartile range, and categorical variables as frequencies and percentages. The paired t-test or Wilcoxon signed-rank test was used to compare preoperative and postoperative measurements. A p-value <0.05 was considered statistically significant.

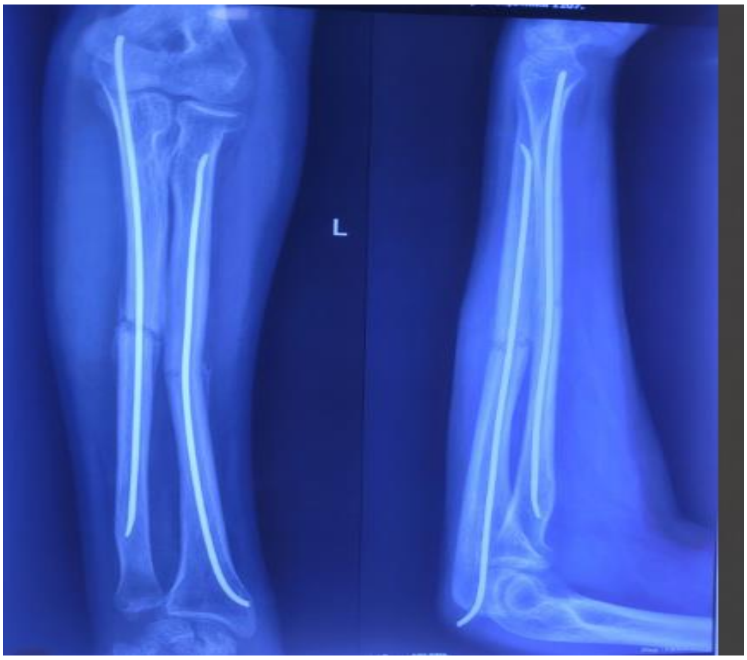

Figure-1: Intramedullary TENS radius UIna

Figure-2: Post opertive Elbow flexion(Follow Up) lat view

Figure-3: Post opertive Elbow Flexion Frontal view(Follow up)

Figure-4: Post opertive Elbow extension(Follow up)

Figure-4:3 Month Follow up Radius & ulna (united)

Figure-5: Pre op X-ray followup radius & uIna

RESULTS

Demographic and Fracture Characteristics

A total of 40 patients (24 males, 16 females) with a mean age of 36.7 ± 12.4 years (range: 19-64 years) were included in the study. The demographic and fracture characteristics are summarized in Table 1. The most common mechanism of injury was road traffic accident (n=22, 55%), followed by fall from height (n=10, 25%) and sports injuries (n=8, 20%). According to the AO/OTA classification, there were 14 type A (35%), 22 type B (55%), and 4 type C1 (10%) fractures. Both-bone fractures were present in 28 patients (70%), isolated radius fractures in 7 patients (17.5%), and isolated ulna fractures in 5 patients (12.5%). Four patients (10%) had Gustilo-Anderson type I open fractures.

Table 1: Demographic and Fracture Characteristics

Characteristic	Value
Age (years), mean ± SD (range)	36.7 ± 12.4 (19-64)
Gender, n (%)	
- Male	24 (60%)
- Female	16 (40%)
Mechanism of injury, n (%)	
- Road traffic accident	22 (55%)
- Fall from height	10 (25%)
- Sports injury	8 (20%)
Fracture pattern, n (%)	
- Both-bone fracture	28 (70%)
- Isolated radius fracture	7 (17.5%)
- Isolated ulna fracture	5 (12.5%)
AO/OTA classification, n (%)	
- Type A	14 (35%)
- Type B	22 (55%)
- Type C1	4 (10%)
Open fractures (Gustilo-Anderson type I), n (%)	4 (10%)
Side involved, n (%)	
- Right	22 (55%)
- Left	18 (45%)
Dominant limb involved, n (%)	23 (57.5%)
Time from injury to surgery (days), mean ± SD (range)	2.8 ± 1.4 (1-7)

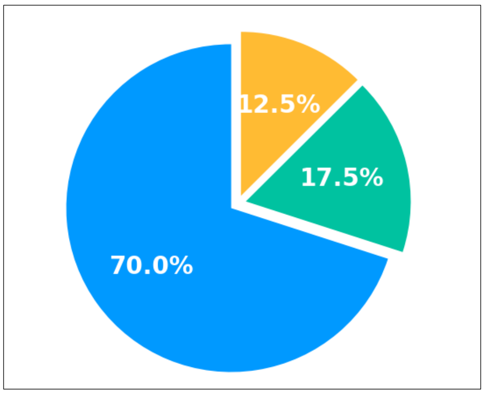

Figure 1: Pie chart here showing the distribution of fracture patterns (both-bone, isolated radius, isolated ulna)

Operative Details

The mean operative time was 47.5 ± 15.2 minutes (range: 30-85 minutes) for isolated bone fractures and 68.3 ± 18.7 minutes (range: 45-110 minutes) for both-bone fractures. Closed reduction was successful in 27 cases (67.5%), while 13 cases (32.5%) required a mini-open approach. The mean nail diameter used was 2.5 ± 0.3 mm (range: 2.0-3.0 mm) for the radius and 2.7 ± 0.3 mm (range: 2.0-3.0 mm) for the ulna. The mean fluoroscopy time was 2.6 ± 0.8 minutes. The operative details are presented in Table 2.

Table 2: Operative Details

Parameter	Value
Operative time (minutes), mean ± SD (range)	
- Isolated bone fracture	47.5 ± 15.2 (30-85)
- Both-bone fracture	68.3 ± 18.7 (45-110)
Reduction technique, n (%)	
- Closed	27 (67.5%)
- Mini-open	13 (32.5%)
Nail diameter (mm), mean ± SD (range)	
- Radius	2.5 ± 0.3 (2.0-3.0)
- Ulna	2.7 ± 0.3 (2.0-3.0)
Fluoroscopy time (minutes), mean ± SD	2.6 ± 0.8
Blood loss (ml), mean ± SD (range)	38.5 ± 24.7 (20-150)
Hospital stay (days), mean ± SD (range)	2.3 ± 1.1 (1-5)

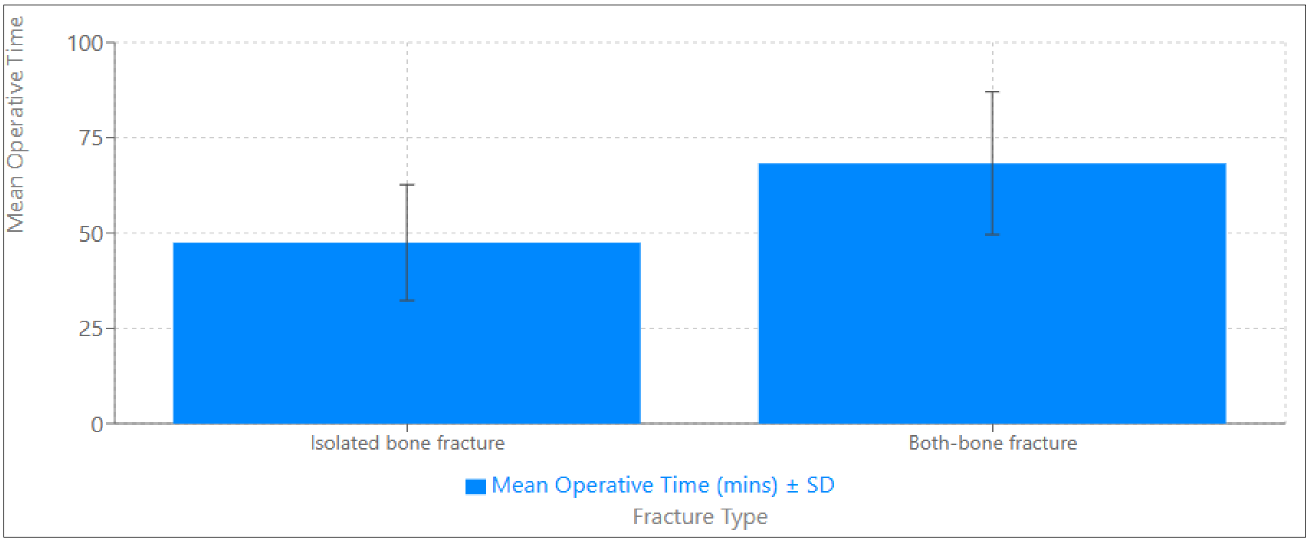

Figure 2: Bar graph comparing operative time between isolated bone fractures and both-bone fractures

Fracture Healing and Radiological Outcomes

The mean follow-up period was 14.3 ± 2.5 months (range: 12-18 months). Union was achieved in 38 patients (95%) at a mean time of 11.8 ± 2.6 weeks (range: 8-20 weeks) (Table 3). Two patients (5%) developed delayed union, which eventually healed at 28 and 32 weeks without additional intervention. No cases of nonunion were observed at the final follow-up.

Radiological outcomes showed maintenance of reduction in 37 patients (92.5%). Three patients (7.5%) had a mild angular deformity (<10°) that did not affect functional outcomes. No rotational malalignment of clinical significance was observed.

Table 3: Radiological Outcomes

Parameter	Value
Union rate, n (%)	38 (95%)
Time to union (weeks), mean ± SD (range)	11.8 ± 2.6 (8-20)
- Isolated radius fracture	10.3 ± 1.8 (8-14)
- Isolated ulna fracture	11.2 ± 2.1 (9-16)
- Both-bone fracture	12.7 ± 2.8 (9-20)
Delayed union, n (%)	2 (5%)
Nonunion, n (%)	0 (0%)
Maintenance of reduction, n (%)	37 (92.5%)
Angular deformity, n (%)	
- <5°	1 (2.5%)
- 5-10°	2 (5%)
- >10°	0 (0%)
Shortening, n (%)	
- <5 mm	2 (5%)
- >5 mm	0 (0%)

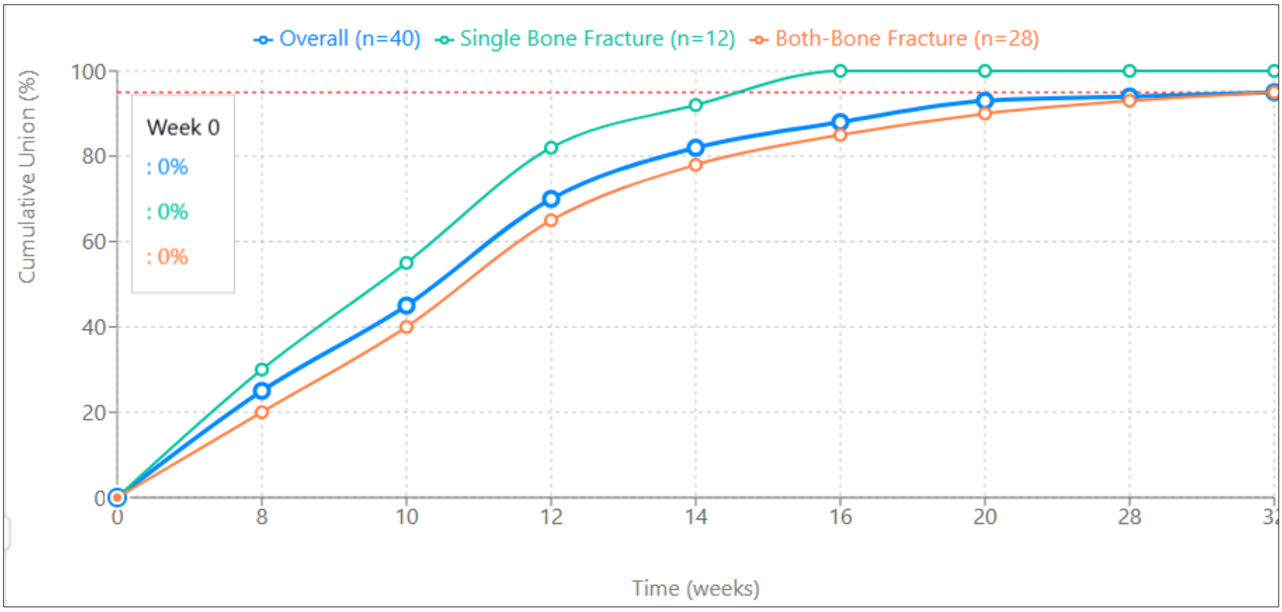

Figure 3: Line graph showing the cumulative percentage of fracture union over time in weeks

Functional Outcomes

The functional outcomes at 6 and 12 months are summarized in Table 4. At the final follow-up, the mean DASH score was 8.4 ± 5.7 (range: 0-24). According to the Anderson criteria, excellent results were achieved in 32 patients (80%), satisfactory in 6 patients (15%), and unsatisfactory in 2 patients (5%). No failures were recorded.

The mean range of motion at the final follow-up showed near-complete restoration of function. The mean elbow flexion-extension arc was 143.5° ± 8.7° (range: 120-150°), wrist flexion-extension arc was 135.7° ± 10.5° (range: 110-150°), and forearm rotation arc was 164.3° ± 12.8° (range: 130-180°). Grip strength, measured as a percentage of the uninjured side, was 92.4% ± 6.3% (range: 75-100%).

Table 4: Functional Outcomes

Parameter	6 months	12 months	p-value
DASH score, mean ± SD (range)	14.7 ± 7.2 (4-32)	8.4 ± 5.7 (0-24)	<0.001

Anderson criteria, n (%)			
- Excellent	26 (65%)	32 (80%)	0.007
- Satisfactory	11 (27.5%)	6 (15%)	0.011
- Unsatisfactory	3 (7.5%)	2 (5%)	0.648
- Failure	0 (0%)	0 (0%)	-
Range of motion, mean ± SD (range)			
- Elbow flexion-extension arc (°)	138.2 ± 10.3 (110-150)	143.5 ± 8.7 (120-150)	0.003
- Wrist flexion-extension arc (°)	130.4 ± 12.6 (100-150)	135.7 ± 10.5 (110-150)	0.008
- Forearm pronation (°)	76.8 ± 8.5 (60-90)	81.6 ± 6.4 (65-90)	0.002
- Forearm supination (°)	78.2 ± 9.7 (55-90)	82.7 ± 7.2 (65-90)	0.004
Grip strength (% of uninjured side), mean ± SD	84.5 ± 8.7 (65-98)	92.4 ± 6.3 (75-100)	<0.001
Return to work (weeks), mean ± SD (range)	-	9.2 ± 3.1 (6-16)	-

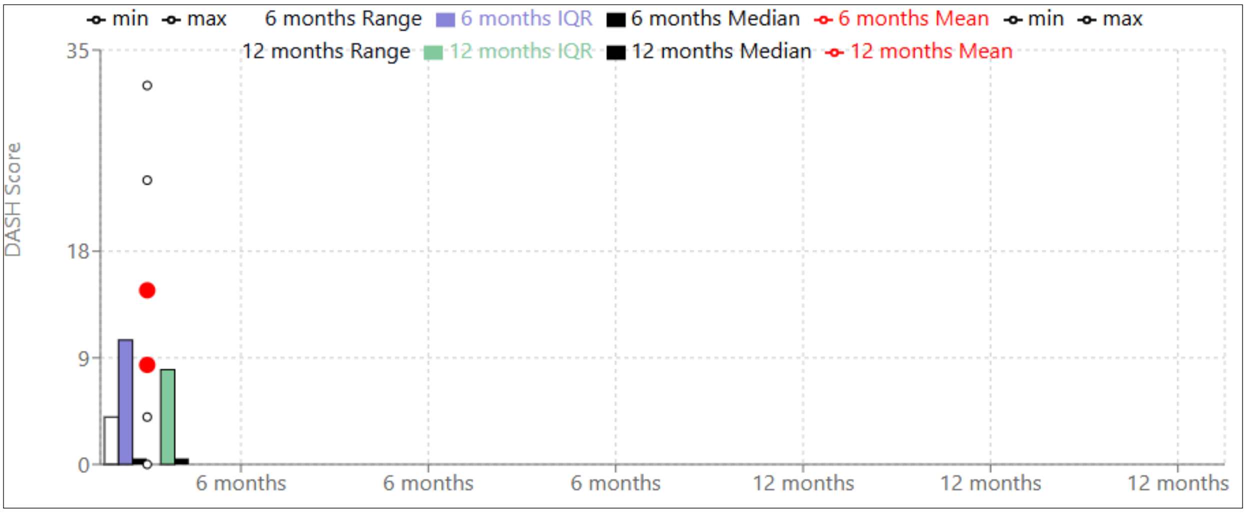

Figure 4: Box plot comparing DASH scores at 6 months versus 12 months

COMPLICATIONS

Complications were observed in 8 patients (20%) (Table 5). The most common complication was superficial infection at the entry point, which occurred in 2 patients (5%) and resolved with oral antibiotics and local wound care. Three patients (7.5%) reported symptomatic hardware irritation; two at the ulnar entry site and one at the radial entry site. One patient required early nail removal at 5 months due to persistent olecranon bursitis.

Transient superficial radial nerve paresthesia was observed in 2 patients (5%), which resolved spontaneously within 6 weeks. No cases of compartment syndrome, deep infection, implant failure, or synostosis were recorded.

Table 5: Complications

Complication	n (%)
Wound-related	
- Superficial infection	2 (5%)
- Deep infection	0 (0%)
Hardware-related	
- Symptomatic hardware irritation	3 (7.5%)
- Implant failure/breakage	0 (0%)
- Implant migration	1 (2.5%)
Neurological	
- Transient superficial radial nerve paresthesia	2 (5%)
- Permanent nerve injury	0 (0%)
Fracture-related	
- Delayed union	2 (5%)
- Nonunion	0 (0%)
- Malunion	0 (0%)
- Refracture after implant removal	0 (0%)
Others	

Complication	n (%)
- Compartment syndrome	0 (0%)
- Synostosis	0 (0%)
Total patients with complications	8 (20%)

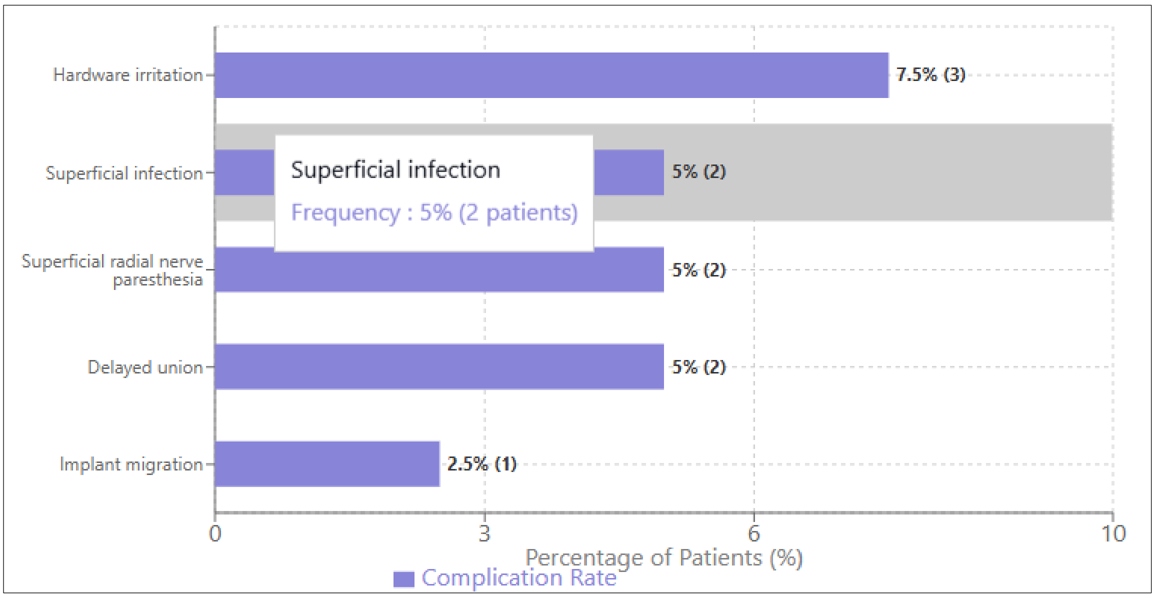

Figure 5: Horizontal bar chart showing the frequency of different complications

Implant Removal

Nail removal was performed in 18 patients (45%) at a mean time of 10.8 ± 2.3 months (range: 5-14 months) after the initial surgery. The indications for implant removal were patient request in 14 cases and hardware-related symptoms in 4 cases. No complications were observed following implant removal, and no refractures occurred during the follow-up period.

Discussion

This prospective study evaluated the clinical and radiological outcomes of elastic intramedullary nailing (EIN) in 40 adult patients with diaphyseal fractures of the radius and ulna. Our findings demonstrate that EIN is a safe and effective minimally invasive technique for selected forearm fractures, with excellent union rates, favorable functional outcomes, and a low complication profile.

The management of adult diaphyseal forearm fractures has traditionally centered on open reduction and internal fixation (ORIF) with plates and screws, as established by the AO group.[41,42] While plating provides excellent reduction and rigid fixation, it is associated with extensive soft tissue dissection, periosteal stripping, and potential complications.[43] In contrast, elastic intramedullary nailing offers several theoretical advantages, including smaller incisions, reduced soft tissue trauma, preservation of the fracture hematoma, and potentially lower infection rates.[44,45]

In our series, we achieved a union rate of 95% at a mean time of 11.8 weeks, comparable to the results reported by Sage *et al.,* [46], who documented a 93% union rate at 12.6 weeks in a series of 28 adult patients treated with titanium elastic nails. Similarly, Köse *et al.,* [47] reported a 97% union rate at a mean time of 14 weeks in their study of 42 forearm fractures treated with intramedullary nailing. These findings challenge the conventional belief that rigid fixation is essential for adult forearm fractures and suggest that relative stability provided by elastic nails can be sufficient to achieve union.

Our mean operative time (47.5 minutes for single-bone fractures and 68.3 minutes for both-bone fractures) was considerably shorter than the reported times for plate fixation in the literature. Schulte *et al.,* [48] reported a mean operative time of 94 minutes for plating of both-bone forearm fractures, while Hong *et al.,* [49] documented a mean time of 82 minutes. The reduced operative time with EIN may be attributed to the minimally invasive approach and the relative ease of the procedure once the learning curve is overcome, as noted by Lautenbach *et al.,* [50]

The minimal invasiveness of EIN is further exemplified by the low blood loss (mean 38.5 ml) and short hospital stay (mean 2.3 days) observed in our study. Saka *et al.,* [51] reported similar findings with a mean blood loss of 45 ml and hospital stay of 2.6 days in their series of 26 patients treated with elastic nailing. In contrast, plate fixation typically involves more substantial blood loss and longer hospital stays, as documented by Chapman *et al.,* [52], who reported a mean blood loss of 150 ml and hospital stay of 3.8 days.

Functional outcomes in our series were excellent, with a mean DASH score of 8.4 at the final follow-up and 80% of patients achieving excellent results according to Anderson criteria. These outcomes are comparable to those reported with plate fixation in several studies. Henle *et al.,* [53] reported a mean DASH score of 10.2 in their series of 62 patients treated with compression plating, while Anderson *et al.,* [54] documented excellent results in 85% of patients following plate fixation. Our findings suggest that when appropriate indications are observed, EIN can achieve functional outcomes similar to those of plate fixation.

The range of motion recovery in our patients was near-complete, with mean elbow flexion-extension arc of 143.5°, wrist flexion-extension arc of 135.7°, and forearm rotation arc of 164.3° at the final follow-up. These results are superior to those reported by Weckbach *et al.,* [55], who documented a mean forearm rotation arc of 154° following intramedullary nailing, and comparable to the findings of Leung *et al.,* [56], who reported a mean forearm rotation arc of 168° after plate fixation.

One of the concerns regarding EIN in adult forearm fractures is the potential for rotational instability and subsequent malunion.[57] In our series, we observed angular deformity in only 3 patients (7.5%), all of which were mild (<10°) without functional implications. No cases of clinically significant rotational malalignment were recorded. These results are consistent with those of Moss *et al.,* [58], who reported a 6.7% rate of angular deformity in their series of 30 patients treated with intramedullary nailing. The low incidence of malunion in our study may be attributed to the careful patient selection, proper nail size, and adequate contouring of the nails.

The complication rate in our series was 20%, with most complications being minor and self-limiting. Superficial infection (5%), hardware irritation (7.5%), and transient nerve paresthesia (5%) were the most common complications. These rates are comparable to or lower than those reported with plate fixation in the literature. Stevens *et al.,* [59] documented a complication rate of 27% following plate fixation, including infection (7%), hardware irritation (10%), and nerve injury (6%). Similarly, Wright *et al.,* [60] reported a 31% complication rate with plate fixation, including a 9% infection rate.

The lower complication rate with EIN may be attributed to the minimal soft tissue dissection and the preservation of periosteal blood supply, which are critical factors in fracture healing and infection prevention.[61] Additionally, the smaller implant profile of elastic nails compared to plates reduces the risk of soft tissue irritation and the need for removal.[62]

Implant removal was performed in 45% of our patients, primarily due to patient request rather than complications. This rate is lower than the reported rates of implant removal following plate fixation, which range from 65% to 82% in various studies [63,64]. The lower rate of implant removal with EIN may contribute to reduced overall treatment costs and patient morbidity.

Several authors have raised concerns regarding the indications for EIN in adult forearm fractures. Gao *et al.,* [65] suggested that EIN should be limited to simple transverse or short oblique fractures without comminution. Similarly, Lee *et al.,* [66] advocated for the use of EIN only in selected cases where adequate reduction can be achieved and maintained. Our experience supports these recommendations, as we carefully selected patients with fractures amenable to closed or minimally invasive reduction and excluded those with significant comminution or bone loss.

The technical challenges of EIN include achieving and maintaining reduction, ensuring proper nail size and contouring, and avoiding entry point complications.[67] In our series, closed reduction was successful in 67.5% of cases, with the remaining requiring a mini-open approach. This rate is comparable to that reported by Shah *et al.,*[68], who achieved closed reduction in 72% of cases. The learning curve associated with EIN was noted by Tarr *et al.,*[69], who reported improved results and fewer complications with increasing surgeon experience.

One of the limitations of EIN is its potential unsuitability for comminuted fractures. Schemitsch *et al.,*[70] demonstrated in a biomechanical study that the rotational stability provided by elastic nails decreases significantly with increasing fracture comminution. This limitation was acknowledged in our study design through careful patient selection, excluding AO/OTA type C2 and C3 fractures.

Despite these promising results, there are certain limitations to our study. The lack of a control group treated with plate fixation prevents direct comparison of outcomes between the two techniques. Additionally, the relatively short follow-up period may not capture long-term complications or functional changes. Furthermore, our study was conducted at a single institution with surgeons experienced in minimally invasive techniques, which may limit the generalizability of our findings.

Future research should focus on randomized controlled trials comparing EIN with plate fixation, long-term follow-up studies to assess the durability of results, and biomechanical studies to optimize nail design and insertion techniques for adult forearm fractures.

Conclusion

In this prospective study of 40 adult patients with diaphyseal fractures of the radius and ulna treated with elastic intramedullary nailing, we have demonstrated that this minimally invasive technique represents a viable alternative to conventional plate fixation for selected forearm fractures. Our findings show excellent union rates (95%), favorable functional outcomes (80% excellent results according to Anderson criteria), and a low complication profile (20% overall complication rate, with most being minor and self-limiting).

The advantages of elastic intramedullary nailing observed in our series include shorter operative time, minimal blood loss, brief hospital stay, early mobilization, and excellent functional recovery. These benefits, coupled with the less invasive nature of the procedure, make it an attractive option for patients who meet the appropriate indications.

However, we emphasize that the success of this technique depends on careful patient selection, proper surgical technique, and adherence to established principles of fracture management. Elastic intramedullary nailing may not be suitable for all forearm fractures, particularly those with significant comminution, bone loss, or intra-articular extension.

While our results are promising, we acknowledge the limitations of our study design and the need for further research. Future multicenter randomized controlled trials comparing elastic intramedullary nailing with plate fixation, along with longer follow-up periods, would provide more definitive evidence regarding the optimal treatment strategy for adult forearm fractures.

In conclusion, elastic intramedullary nailing represents a modern, minimally invasive approach to internal fixation of adult radius and ulna fractures that can achieve comparable results to traditional plating techniques while potentially offering advantages in terms of surgical invasiveness, operative time, and complication rates. This technique should be considered as part of the orthopedic surgeon's armamentarium for the management of selected forearm fractures in adults.

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