

Dorsal Plate Versus Intramedullary Fixation In Single Metacarpal And Proximal Phalanx Fractures: A Comparative Institutional Study

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Background

- Metacarpal and proximal phalangeal fractures are common upper extremity injuries
- Common surgical options include:
 - **Dorsal plate:** provides stable fixation but may require greater soft tissue dissection
 - **Intramedullary (IM) fixation:** a less invasive alternative
- Comparative data on functional outcomes and operative efficiency remain limited
- **Aim:** to compare functional outcomes, operative time, and complication rates between plate fixation and IM fixation

Materials and Methods

- **Study design:** Retrospective single-institution cohort (2017–2025)
- **Patients:** Adult patients undergoing operative fixation (N=88) Plate fixation (n=49) IM fixation (n=39)
- **Outcomes:**
 - **Primary:** DASH score (telephone follow-up)
 - **Secondary:** Operative time, complication rates, return to work
- **Statistical analysis:**
 - Mann-Whitney U test
 - Fisher’s exact test
 - Multivariable linear regression
 - Cohen’s d

Results

Table 1. Complication Rates by Fixation Method

Complication	Plate (n=49)	IM (n=39)	p-value
Hardware failure	0 (0)	0 (0)	1.00
Infection	1 (2.0)	1 (2.6)	1.00
Tendon rupture	0 (0)	0 (0)	1.00
Tendon adhesion	0 (0)	1 (2.6)	0.43
Hardware removal/revision	1 (2.0)	2 (5.1)	0.40
Capsulotomy	0 (0)	0 (0)	1.00
Malunion	0 (0)	0 (0)	1.00
Nonunion	0 (0)	0 (0)	1.00
Nerve injury	1 (2.0)	2 (5.1)	0.57
Total Complications	3 (6.1)	4 (10.2)	0.32

Figure 2. DASH scores by fixation method. (A) Plate (n=30) vs IM fixation (n=29); lower scores indicate less disability. (B) Metacarpal subgroup with Plate (n=26) vs IM fixation (n=18) with large effect (Cohen’s d = 1.38)

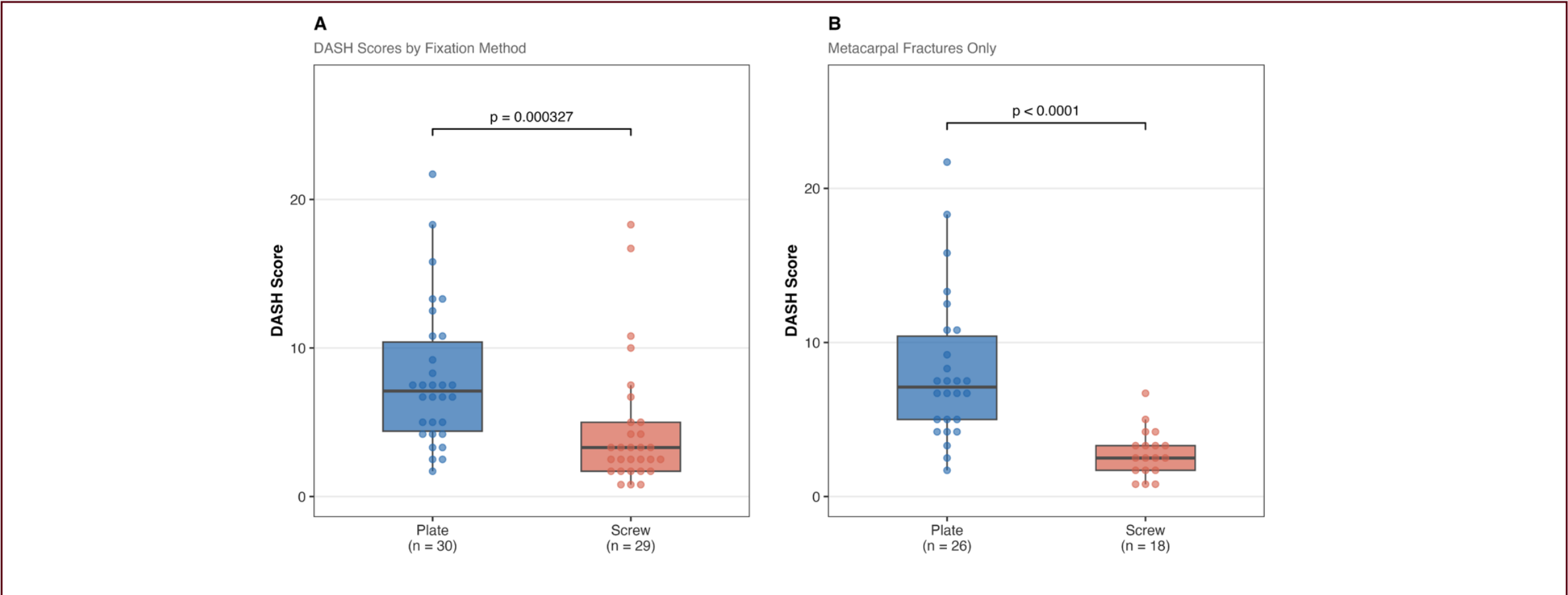
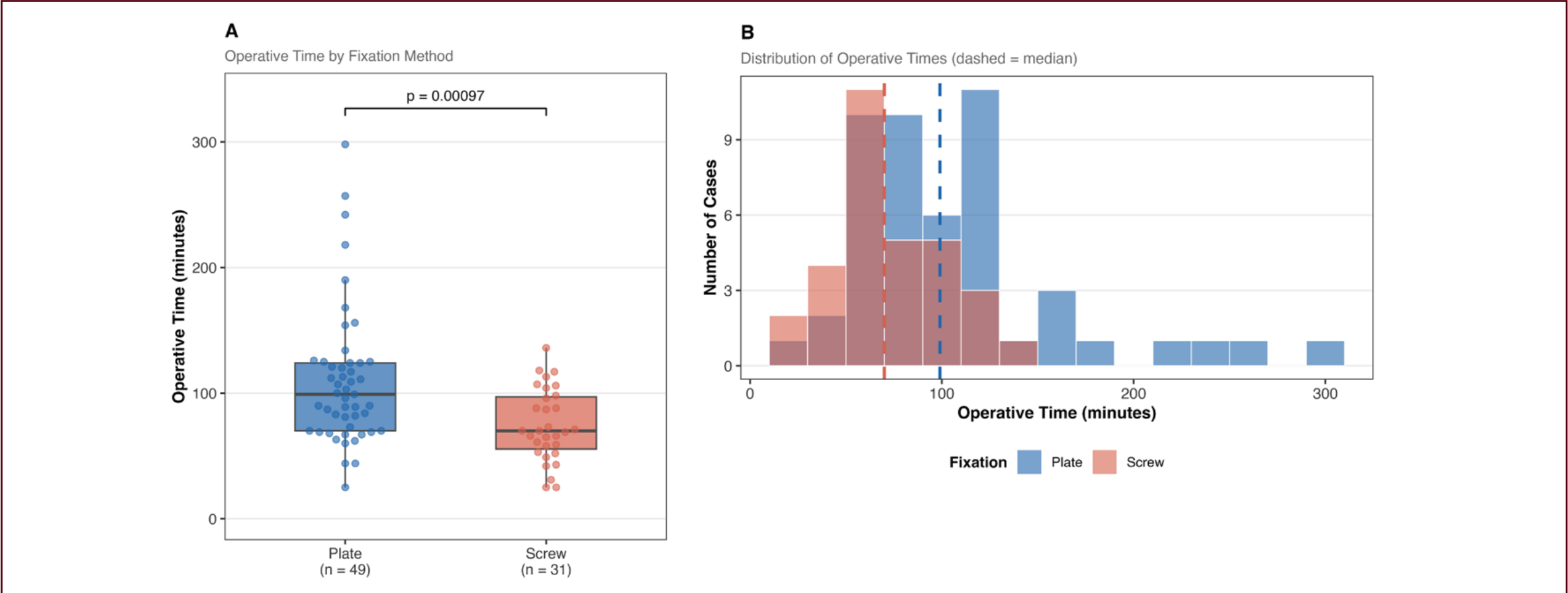


Figure 2. Operative time by fixation method. (A) Box plots with individual data points (plate n=49; IM fixation n=31); median/IQR shown. (B) Overlapping histograms with median lines (plate: 99 min; IM fixation: 70 min)



Results

- **Total Complications**
 - Plate: 6.1% vs IM fixation: 10.2% ($p = 0.32$)
- **DASH**
 - Plate: 7.97 ± 4.81 vs IM fixation: 4.51 ± 4.37 ($p < 0.001$)
- **Metacarpal Subgroup**
 - Plate: 8.18 ± 4.86 vs IM fixation: 2.82 ± 1.55 ($p < 0.0001$)
- **Operative Time**
 - Plate: 109.7 ± 54.7 min vs IM fixation: 74.4 ± 28.8 min ($p = 0.001$)
 - Adjusted difference: $\beta = -35.2$ min ($p = 0.002$)

Conclusions

- Slightly higher (non-significant) complication rates with IM fixation
- IM fixation is associated with **improved patient-reported functional outcomes and reduced operative time** compared to plate fixation
- These findings support IM fixation as an effective, minimally invasive option for appropriately selected metacarpal and phalangeal fractures
- Larger studies are needed to further evaluate complication rates and confirm these findings