



# Practice Patterns in Metacarpal Fracture Repair: A 14-Year Review of Data from the ABPS

Division of Plastic Surgery, Ann and Robert H. Lurie Children's Hospital



## 1 OBJECTIVES

- The American Board of Plastic Surgery has been collecting practice data on metacarpal fracture operative repair since 2006 as part of its Continuous Certification process.
- This data allows plastic surgeons to compare their surgical experience to national trends. Additionally, this data presents the opportunity to analyze those trends in relation to evidence-based medicine (EBM).

## 2 METHODS

- ABPS tracer data for metacarpal fracture operative repair were reviewed from May 2006 – March 2020.
- The data were divided into two groups, May 2006 – December 2014 and January 2015 – March 2020, to evaluate national trends.
- Comparisons between time points were performed using the chi-square test.
- Clinical “pearls” were selected after a comparative review of tracer data with published plastic surgery literature.<sup>1-3</sup>
- Evidence-based data present in the literature but not collected by the ABPS, and the converse, were examined for future research direction, focusing on improving patient outcomes.

## 3 RESULTS

- The ABPS CC database contained information on 1160 metacarpal fracture operative repair cases from May 2006 – March 2020.
- The average patient age was 29 years, and 78% identified as male.
- 87% of fractures were closed.
- Most fractures (48%) presented on the bone shaft, followed by the neck (24%).
- In terms of fracture pattern, 43% were transverse, 38% oblique, and 33% comminuted.
- Outpatient (as opposed to inpatient) operative repairs have been trending upwards, from 50% to 61% (p<0.001).
- Most patients experienced no postoperative adverse events (85%).
- Patients (85%) and their physicians (84%) were overall satisfied with procedural outcomes.

Table 1  
Anesthesia Plan; \*, p < 0.05; p-values indicate comparisons between 2006-2014 and 2015-2020 groups

	2006 — 2014		2015 — 2020		Overall		P-Value
	#	% / Avg	#	% / Avg	#	% / Avg	
<b>I. Anesthetic Type</b>							
Local anesthetic only injected in affected area without sedation	41	8%	42	6%	83	7%	0.301
Local anesthetic only injected in affected area with sedation	15	3%	29	4%	44	4%	0.178
Regional anesthesia (brachial plexus block)	69	14%	58	9%	127	11%	0.013*
Regional anesthesia (Bier block)	8	2%	7	1%	15	1%	0.462
General anesthesia	316	62%	473	73%	789	68%	<0.001*
Use of epinephrine in hand for hemostasis	11	2%	29	4%	40	3%	0.033*

## 4 DISCUSSION & CONCLUSIONS

- **Anesthesia:** No experimental evidence has been described in the literature to support a specific anesthetic modality in metacarpal fracture repair. Therefore, practice patterns are likely due to surgeon and anesthesiologist training, patient preference, and the extent of the injury. Tracer Reported data indicates an increase in general anesthesia from 62% to 73% (p<0.001), as well as a decrease in brachial plexus block specifically (regional anesthesia) from 14% to 9% (p=.01). However, the high proportion of general anesthesia is likely confounded by the larger proportion of complex (multiple fingers, comminuted, etc.) injuries in the dataset relative to the fractured population, which nearly always require surgical intervention.
- **Surgical Treatment Plan:** When excessive displacement is present, intermetacarpal pinning or intramedullary fixation is preferred to provide stability without disrupting extensor tendon function.<sup>3</sup> Plate fixation or interfragmentary (lag) screw fixation is preferred in significantly angulated shaft fractures.<sup>4-6</sup> Consensus exists among the literature that first metacarpal fractures be treated operatively in almost all cases to avoid trapeziometacarpal joint displacement. Bennett fractures with fragments of significant size should be treated openly with interfragmentary (lag) screw fixation.<sup>5</sup> In cases where the fragment size is insufficient to allow for screw fixation, closed (fluoroscopic) reduction with percutaneous pinning between the larger metacarpal base segment and trapezium can be utilized.<sup>7-8</sup> Open reduction and internal fixation was reported as the most commonly utilized operative modality (51%). This is in concurrence with EBM recommendations. Plate fixation and interfragmentary (lag) screws were far less commonly used

Table 2  
Surgical Treatment Plan; \*, p < 0.05; p-values indicate comparisons between 2006-2014 and 2015-2020 groups; †, operative technique is a subset of open reduction and internal fixation

	2006 — 2014		2015 — 2020		Overall		P-Value
	#	% / Avg	#	% / Avg	#	% / Avg	
Closed reduction, splinting	83	16%	63	10%	146	13%	0.001*
Closed reduction, percutaneous pinning	121	24%	182	28%	303	26%	0.100
Closed reduction percutaneous lag screw	1	0%	1	0%	2	0%	0.863
External fixator	2	0%	6	1%	8	1%	0.278
Open reduction and internal fixation†	259	51%	336	52%	595	51%	0.759
*Plate fixation	57	11%	58	9%	115	10%	0.202
*Lag screw(s)	35	7%	43	7%	78	7%	0.867
Other	59	12%	86	13%	145	13%	0.396

in open reduction at 10% and 7%, respectively. Closed reduction with percutaneous pinning was reported as the second most common technique.

## 5 LITERATURE CITED

1. PMID-21124162
2. PMID-24776556
3. PMID-28654615
4. PMID-18656755
5. PMID-22080220
6. PMID-21315521
7. PMID-22154304
8. PMID-10447177