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## Background

- Percutaneous pinning is a commonly used technique for stabilization of fifth metacarpal fractures, lunotriquetral (LT) joint instability, ulnar styloid fractures, or distal radioulnar joint (DRUJ) instability
- The dorsal branch of the ulnar nerve (DBUN) may be at risk for injury.

## Objective

- The purpose of this study was to directly assess the proximity pinning sites of ulnar sided structures of the hand and wrist to the DBUN using a cadaver model.
- We hypothesized that pinning of the ulnar styloid and LT joints posed the greatest risk of injury to this nerve.

## Methods

- Eleven fresh Frozen Cadaveric specimens were pinned with 0.045 mm Kirschner wires
- The DRUJ, ulnar styloid, LT joint, base of the 5<sup>th</sup> metacarpal, and the 5<sup>th</sup> metacarpal neck were pinned under fluoroscopic guidance.
- Specimens were carefully dissected and the skin and subcutaneous fat excised
- The distance from each pin site to the DBUN was measured using digital calipers.
- Secondary data points included:
  - Direct penetration of the DBUN
  - Pin sites adjacent to the DBUN
  - Overall risk of nerve injury (DBUN penetration + pin sites adjacent to DBUN)
- Comparisons between fixation locations were performed using Kruskal-Wallis/Mann-Whitney U tests and Fisher's Exact Test to analyze continuous and categorical data, respectively. LOS was  $p < 0.05$  for all data points.

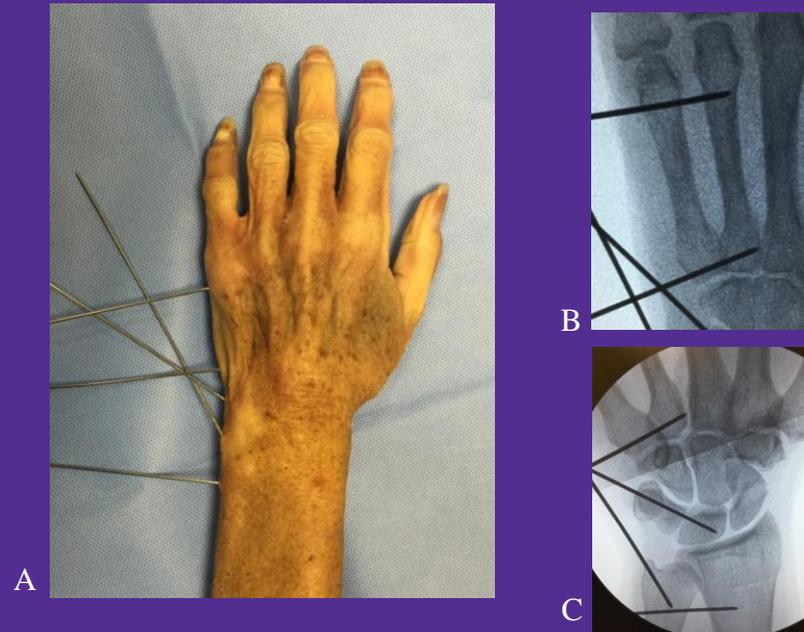


Figure 1. A) Gross specimen after pinning. B/C) Radiographs of DRUJ, Ulnar Styloid, 5<sup>th</sup> metacarpal base, and 5<sup>th</sup> metacarpal neck pins



Figure 2. Photograph of ulnar styloid pin penetration of the DBUN.

## Results

- Eleven specimens underwent pinning of the DRUJ, ulnar styloid, LT joint, 5<sup>th</sup> metacarpal base, and 5<sup>th</sup> metacarpal neck (Table 1)
- Both ulnar styloid and LT joint pins were within 2 mm of the DBUN on average.
- Ulnar styloid and LT joint pins were significantly closer to DBUN than 5<sup>th</sup> metacarpal neck ( $P < 0.001$ ,  $P < 0.001$ ) and DRUJ pins ( $P < 0.001$ ,  $P = 0.004$ )

## Results

- 2 (18%) Ulnar styloid and 1 (9%) LT pin directly penetrated a branch of the DBUN
- 4 (36%) Ulnar styloid pins were found directly adjacent to the nerve.
- 6/11 (54%) of ulnar styloid pins either were directly adjacent or directly penetrated the nerve. This was significant when compared to the 5<sup>th</sup> metacarpal neck and DRUJ pins ( $P < 0.001$ )

Pin Location	Mean distance to DSBUN ± SD	Direct DBUN Injury N (%)	Pin adjacent to DBUN N (%)	Overall Risk of DBUN Injury N (%)
5 <sup>th</sup> Metacarpal Neck	4.97 ± 1.47 mm	0 (0)	0 (0)	0 (0)
5 <sup>th</sup> Metacarpal Base	2.33 ± 2.16 mm	0 (0)	3 (27)	3 (27)
Lunotriquetral Joint	1.82 ± 1.61 mm	1 (9)	2 (18)	3 (27)
Ulnar Styloid	0.84 ± 1.05 mm	2 (18)	4 (36)	6 (54)
DRUJ	3.06 ± 0.88 mm	0 (0)	0 (0)	0 (0)

Table 1. Data summary of DSBUN injury by pinning location. N = 11.

## Conclusions

- Close proximity ( $< 2$  mm) of ulnar styloid and LT joint pin sites to the DBUN were observed.
- Overall risk of nerve injury was significantly higher in pins to the ulnar styloid compared the 5<sup>th</sup> metacarpal base and neck.
- We recommend mini-dissection and protection of underlying structures to mitigate the risk of iatrogenic nerve injury.

## References:

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