



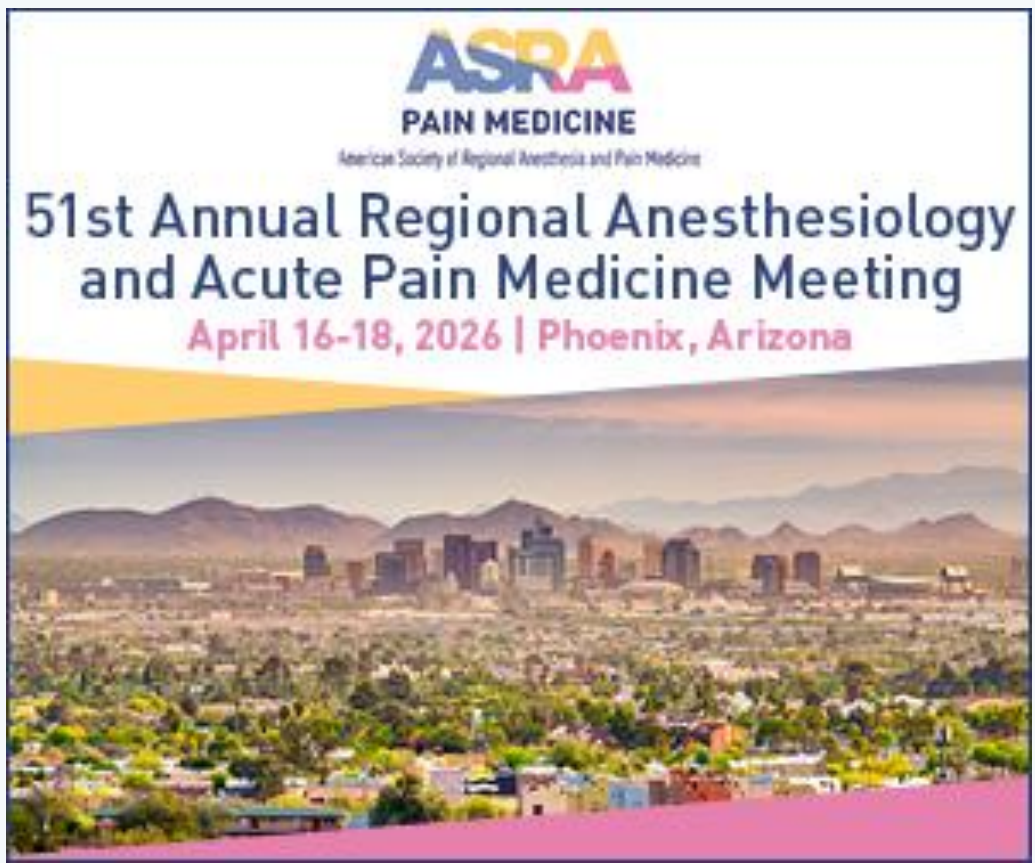
Surgery, Site, and Age: Differential Risk of Complex Regional Pain Syndrome After Radius and Ankle Fractures

Charles T Williams^{1,2}, Alexandra Sideris^{1,3}, Alex Illescas¹, Renee Ren^{1,4}, Tina Chen¹, William Chan¹, Jashvant Poeran^{1,4}, Kathryn DelPizzo^{1,3}, Michelle Carley^{1,3}, Stavros Memtsoudis^{1,3}, Anuj Malhotra^{1,3}, Semih Gungor^{1,3}, Daniel Richman^{1,3}

¹Pain Prevention Research Center, Department of Anesthesiology, Critical Care & Pain Management, Hospital for Special Surgery, New York, NY, USA; ²New Jersey Medical School, Newark, NJ, USA; ³Department of Anesthesiology, Weill Cornell Medicine, New York, NY, USA; ⁴Icahn School of Medicine at Mount Sinai, New York, NY, USA



Weill Cornell
Medicine



INTRODUCTION

- Complex Regional Pain Syndrome (CRPS) is characterized by severe, debilitating, long-lasting neuropathic pain, often triggered by surgery.
 - Frequently triggered by distal radius and ankle fractures.**^{1,2}
- Severity of fracture increases risk of CRPS**
- Surgical risk remains controversial.^{2,3}

METHODS

- Retrospective cohort using 2017-2022 MarketScan data (IRB#2017-0169).
- We included commercially insured pediatric and adult patients in the United States.
- Identified distal radius and lateral malleolus (ankle) fractures using ICD-10 codes.
- Surgical management was defined by CPT codes within 30 days of diagnosis.
- CRPS was identified using ICD-10 codes within one year of fracture.
- Patients were stratified by age, fracture location, and treatment type.
- Group comparisons were compared using chi-square tests ($p < 0.05$).

Main findings & tables/figures

Table 1. Demographic Characteristics of Adult and Pediatric Patients with Distal Radius and Ankle Fractures

	Radius Fractures		Ankle Fractures	
	Adult N=112,171	Pediatrics N=170,929	Adult N=77,136	Pediatrics N=16,858
Age, median [IQR]	52 [37-59]	10 [7-12]	48 [35-57]	13 [11-15]
Sex				
Male	35755 (31.9%)	103280 (60.4%)	25684 (33.3%)	8691 (51.5%)
Female	76416 (68.1%)	67649 (39.6%)	51452 (66.7%)	8167 (48.5%)

Table 2. Incidence of CRPS Following Distal Radius and Ankle Fractures by Treatment Modality

Radius Fractures				
		CRPS	No CRPS	P-Value
Adults	Surgical	503 (0.88)	56342 (99.12)	<.0001
	Non-Surgical	270 (0.49)	55056 (99.51)	
Pediatrics	Surgical	10 (0.01)	71484 (99.99)	0.73
	Non-Surgical	16 (0.02)	99419 (99.98)	
Ankle Fractures				
		CRPS	No CRPS	P-Value
Adults	Surgical	81 (0.31)	25964 (99.69)	0.93
	Non-Surgical	161 (0.32)	50930 (99.68)	
Pediatrics	Surgical	7 (0.14)	5149 (99.86)	0.67
	Non-Surgical	13 (0.11)	11689 (99.89)	

RESULTS

- The cohort included 112,171 adult radius and 77,136 adult ankle fractures.
- The cohort included 170,929 pediatric radius and 16,858 pediatric ankle fractures.
- In adults with radius fractures, **surgery was associated with increased CRPS incidence** (0.88% vs 0.49%, $p < 0.0001$).
 - This represented the **highest CRPS incidence** across all groups
- In adults with ankle fractures, **CRPS incidence did not differ by treatment** (0.32% vs 0.31%, $p = 0.93$).
- In pediatric patients, overall CRPS incidence was lower than in adults.
- No significant CRPS differences were observed by treatment in pediatric radius or ankle fractures.

DISCUSSION

- Surgical adult radius fractures showed higher CRPS incidence** (0.88% vs 0.49%).
- Treatment modality did not affect CRPS risk in ankle or pediatric fractures.
- Surgery in adult radius fractures may reflect greater injury severity.
- Injury complexity may drive CRPS risk more than surgical trauma.**
- Findings demonstrate age- and fracture-specific risk patterns.

References →

