

Pediatric Proximal Phalanx Base Fractures in Fingers: Identifying the Need for Surgical Management



Andy Lalka, MPH^{1,2}; Nicole Look, MD²; Hannah Korrell, BS²; Micah Sinclair, MD

Jennifer Nance DNP²; John Schutz, BS²; Frank A. Scott, MD^{1,2}; Sarah E. Sibbel, MD^{1,2}

Musculoskeletal Research Center, Orthopedics Institute, Children's Hospital Colorado, Aurora, CO¹
Department of Orthopedics, University of Colorado Anschutz Medical Campus, Aurora, CO²

Background

- Fractures of the base of the proximal phalanx are among the most common finger fractures in children (1).
- Immobilization with or without a closed reduction of the digit for 3-4 weeks can lead to good functional results.

Purpose

- The purpose of this retrospective study is to evaluate outcomes of proximal phalanx base fractures in skeletally immature patients at final follow up.

Methods

- A retrospective review of skeletally immature patients under 18 years of age treated for a proximal phalanx base fracture between years 2002-2019. The variables collected included: demographics, initial and final angulation and displacement on the lateral and anteroposterior views (2), treatment group, malunions, Salter Harris classification, and time union.
- Patients with less than 3-weeks follow up, inadequate medical record details, or missing radiographs were excluded.

Statistical Methods:

- Between group comparisons were analyzed using a chi-squared test. Radiographic differences were evaluated using the Kruskal-Wallis test.
- Within group differences were evaluated using a paired t-test.

Results

Table 1 Clinical and Demographic Characteristics by Treatment Group

Variable	Non-operative n=479	Reduction n=151	Operative n=14	P<0.05
Age	10.9 (3.5)	10.8 (3.4)	8.4 (5.8)	0.0833
Sex (% Male)	67.7%	60.2%	57.1%	0.193
Finger Injured: Small	50.4%	64.2%	57.1%	
Ring	14.3%	17.2%	28.5%	
Middle	9.0%	9.9%	7.1%	0.001
Index	7.1%	1.9%	7.1%	
Thumb	19.2%	6.6%	0.0%	
Malrotations	3	3	0	0.255
Angulation Initial AP (deg.)	2 (7)	16 (18)	15.1 (21)	0.0001
Angulation Final AP (deg.)	2 (5)	4 (7.1)	1.5 (3)	0.0001
Displacement Initial AP (mm)	0 (0.15)	0.72 (1.6)	1.6 (2.5)	0.0001
Salter Harris Type: SH II	85.2%	90.7%	85.7%	
SH Other	3.5%	2.0%	14.3%	0.001
Extraphyseal	11.3%	7.3%	0.0%	

Table 2 Intra-Subject Radiographic Mean Comparisons

Group	Initial Coronal Plane Deformity (deg.)	Final Coronal Plane Deformity (deg.)	Difference mm (95%CI)	P<0.05
Non-operative	4.6 (5.6)	3.3 (3.9)	1.1 (0.8, 3.8)	0.0001
Closed	17.3 (11.9)	5.6 (5.0)	11.7 (10.0, 13.4)	0.0001
Reduction	20.9 (17.2)	2.6 (3.5)	18.3 (7.7, 28.9)	0.0073
Surgery	Initial Sagittal Plane Deformity (deg.)	Final Sagittal Plane Deformity (deg.)	Difference mm (95%CI)	P<0.05
Non-operative	3.8 (5.0)	3.1 (4.5)	0.72 (0.33, 3.6)	0.0013
Closed	11.2 (10.6)	4.9 (5.9)	6.3 (4.6, 8.1)	0.0001
Reduction	18.1 (15.4)	4.1 (3.9)	14.0 (3.4, 24.6)	0.0309
Surgery				



Figure 1: Proximal phalanx base fracture of the fifth digit. The angulation is 41 degrees with 5.19 mm of displacement.

Conclusions

- A limited number of proximal phalanx base fractures require surgical management.
- The great majority can be treated with closed reduction in the emergency room or clinical setting without sedation, resulting in equivalent outcomes of minimal angular deformity.
- Current treatment methods have led to good results with correction of angular deformity in both the sagittal and coronal planes at final follow-up.
- Evaluation of radiographic parameters typically lead to appropriate treatment decisions with resolution of deformities and minimal malrotation.
- The malrotation rate was 0.93% and not associated with either treatment group.

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