



**Best Trauma Paper at the 2017 POSNA Annual Meeting**  
**“Acceptable Reduction” for Supracondylar Humerus Fractures**  
**in Children**

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**Purpose:** Following reduction and percutaneous fixation of humeral supracondylar fractures what is the magnitude of allowable intra-operative residual displacement compatible with a good clinical outcome?

**Methods:** 221 children, mean (SD) age 6.2 yrs (2.3), who underwent closed reduction and percutaneous wire fixation of supracondylar humerus fractures were prospectively enrolled at a tertiary pediatric hospital over a 18 month period. Intra-operative AP and lateral radiographs were analyzed to determine residual displacement after fixation. At 3 months, patient/parent reported outcomes were measured using the Quick DASH (0 best to 100 worst), the PROOF (0 best to 16 worst), in addition to elbow range of motion and standardized photographs of both upper limbs to record and compare carrying angles.

**Results:** Range of residual displacement was from 4.5 mm (15%) lateral to 7.0 mm (30%) medial; 6 mm (37%) posterior to 6 mm (33%) anterior. Baumann’s angle ranged from 59° to 83° (Ave 70°). The anterior humeral line crossed at or behind the anterior 1/3 of the capitulum in 219/221 patients. At 3 months, 211 out of 221 patients (95%) had a good functional outcome. The mean (SD) Quick DASH score was 2.06 (6.9). The mean (SD) PROOF score was 0.93 (1.57). There was little correlation between the amount of fracture displacement in any plane and the QuickDASH score; or PROOF-UE; carrying angle or range of motion.

**Conclusion:** In this prospective cohort of children with supracondylar humerus fractures treated by closed reduction and percutaneous wiring fixation, up to a displacement of 30% medial to 15% lateral in the AP plane and 33% anterior to 37% posterior in the sagittal plane, a Baumann’s angle between 59 and 83 degrees and an anterior humeral line that does not cross anterior to the capitellum is completely compatible with an excellent outcome based on physical appearance (carrying angle), range of motion, function and patient reported outcomes. Within the parameters described, the surgeon does not need to revise or improve upon the reduction of a SCH fracture treated with closed reduction and pinning to obtain an excellent clinical outcome. If replicated in a larger cohort, this might result in fewer open reductions, and less time to achieve a satisfactory closed reduction.