

## **Correction of Cubitus Varus after Pediatric Supracondylar Elbow Fracture: Improved Method Using the Taylor Spatial Frame**

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**Purpose:** Malunion (cubitus varus) is the most common long-term complication of supracondylar elbow fractures. This cosmetic problem can result in impaired function and is a source of malpractice claims. Osteotomy of the distal humerus might be necessary to correct malunion. Reported methods of correcting cubitus varus involve various types of complex wedge osteotomies that have a high complication rate and require a large exposure and challenging fixation. We present a technique to correct cubitus varus using a simple percutaneous transverse osteotomy without bone wedges through a small lateral incision and gradual correction with the Taylor spatial frame (TSF).

**Methods:** This was a retrospective IRB-approved study of three patients with cubitus varus after a malunited supracondylar fracture. The patients (two males, one female) presented to one of two institutions for correction of the deformity between October 2006 and November 2007. Average patient age was 10.7 years (range, 5.4–21 years). All patients had sustained an extension type supracondylar fracture during childhood. Data were collected from patients' medical records and radiographs. Outcomes measured included time to union, pre- and postoperative range of motion, patient satisfaction, and complications.

**Results:** Average preoperative varus deformity was 22.6° (range, 18°–30°), internal rotation deformity was 10° (range, 5°–15°), and hyperextension deformity was 6.6° (range, 0°–15°). Average postoperative carrying angle was 3.3° valgus (range, 0°–5°). Average preoperative range of motion was 133.3° (range, 130°–140°). Average postoperative range of motion was 133.3° (range, 130°–140°). All patients were neurovascularly intact in the affected upper limb. The time to union of the osteotomy and time to removal of external fixation was 9.3 weeks (range,

9–10 weeks). No complications were encountered. All patients were happy with the appearance of the affected upper extremity.

**Conclusion:** We believe that the TSF as used in our case series is a safe and reliable method to correct cubitus varus deformity after pediatric supracondylar fracture. We used a previously unreported pattern of distal humeral pin fixation that allows for a very distal metaphyseal osteotomy, close to the apex of the actual deformity. This is a biplanar delta configuration that straddles the olecranon fossa and is appropriate for both children and adults.

**Significance:** The technique presented is predictable, effective, well tolerated, and technically easier than large open osteotomies. However, it does require familiarity and comfort with external fixation and the TSF system.