

## Comparing Single-Column versus Dual-Column Fixation in the Surgical Management of Extra-Articular Distal Humerus Fractures: A Retrospective Comparative Review of Surgical Technique and Literature

Brian Ford; Charles Conway, BS; Marine Coste, BA; Cameron Reza Moattari, BS; Neil Vijay Shah, MD, MS; Sarah G. Stroud, BA; Lee Bloom, MD; Jared M. Newman, MD; Bassel Diebo, MD; Emmanuel Illical, FRCSC, MD  
SUNY Downstate Medical Center, Brooklyn, NY, United States

**Purpose:** Traditionally, surgical management of extra-articular distal humerus fractures (EADHFs) with dual-column, dual-plate fixation has been advocated. The use of a single-column construct has since been reported in studies with excellent results. The purpose of this study is compare single-column fixation with a lateral paratricipital (LPT) approach for comminuted EADHFs to other approach and fixation strategies undertaken at our institution over a 7-year period. We hypothesized that there would be decreased iatrogenic nerve injury with single-column fixation.

**Methods:** All surgically managed EADHFs (AO/OTA 12 and 13-A2/A3) performed with a posterior approach between 2010 and 2018 at a single institution were identified. Group A was a retrospectively analyzed multisurgeon cohort of 37 patients from 2010-2018 employing various posterior approaches and both single and dual column and / or plate fixation. Group B was a prospectively collected single-surgeon cohort of 34 patients from 2015-2018 using only the LPT approach with lateral intermuscular septum release and single-column fixation. Group B single-column, dual-plate fixation was only employed if the medial column of the humerus could not be anatomically reduced.

**Results:** In Group B, 14 patients were treated with single-column, single-plate constructs versus 6 with single-column, dual-plate constructs. In Group A, 9 were treated with single-column, single-plate constructs versus 18 fixated with dual-column, dual-plate constructs. Patients in group B had a lower rate of postoperative ulnar, radial, and total nerve palsy (0/20, 0% for ulnar, radial, and total) than patients in group A (ulnar: 6/26, 23.1%,  $P = 0.033$ ; radial: 4/23, 17.4%,  $P = 0.070$ ; total: 8/23, 34.8%,  $P = 0.007$ ). No patients in Group A/B had plate failures or nonunions.

**Conclusion:** With optimized surgical protocol and meticulous execution, EADHFs can be treated with single-column fixation via a lateral paratricipital approach. Single-column, dual-plate fixation can be employed for comminuted EADHFs that have traditionally been treated using dual-column, dual-plate fixation with no radiographic complications and fewer iatrogenic nerve complications. This is a promising technique that warrants further studies to determine its efficacy compared to more traditional surgical techniques.