

Δ Simple Decompression versus Anterior Transposition of the Ulnar Nerve for Distal Humerus Fractures Treated with Plate Fixation:

A Multi Centre Randomized Controlled Trial

Emil H. Schemitsch, MD¹; Niloofar Dehghan, MD, MS, FRCSC²; Milena Vicente, RN²; Aaron Nauth, MD, FRCSC¹; Jeremy Hall, MD, FRCS (ORTHO), MEd¹; Michael D. McKee, MD¹; COTS (Canadian Orthopaedic Trauma Society)

¹St. Michael's Hospital, Toronto, Ontario, CANADA

²University of Toronto, Toronto, Ontario, CANADA

Background/Purpose: Isolation, decompression, and protection of the ulnar nerve is required for the fixation of distal humerus fractures performed through a posterior approach. While this fact is widely agreed upon, the management of the ulnar nerve at the conclusion of the surgical procedure is a matter of controversy, focused upon either leaving the nerve in situ versus anterior transposition. There have been advocates of both strategies in the literature, but high-level evidence comparing the two strategies is lacking. Given the high incidence of ulnar nerve dysfunction following the surgical management of distal humerus fractures, and the substantial impact of ulnar nerve symptoms on patient outcomes, this important issue warrants further research. This study sought to address this controversy by comparing simple decompression to anterior transposition of the ulnar nerve following plate fixation of fractures of the distal humerus. The hypothesis was that there would be no difference in ulnar nerve function at 1 year postsurgery between the two groups.

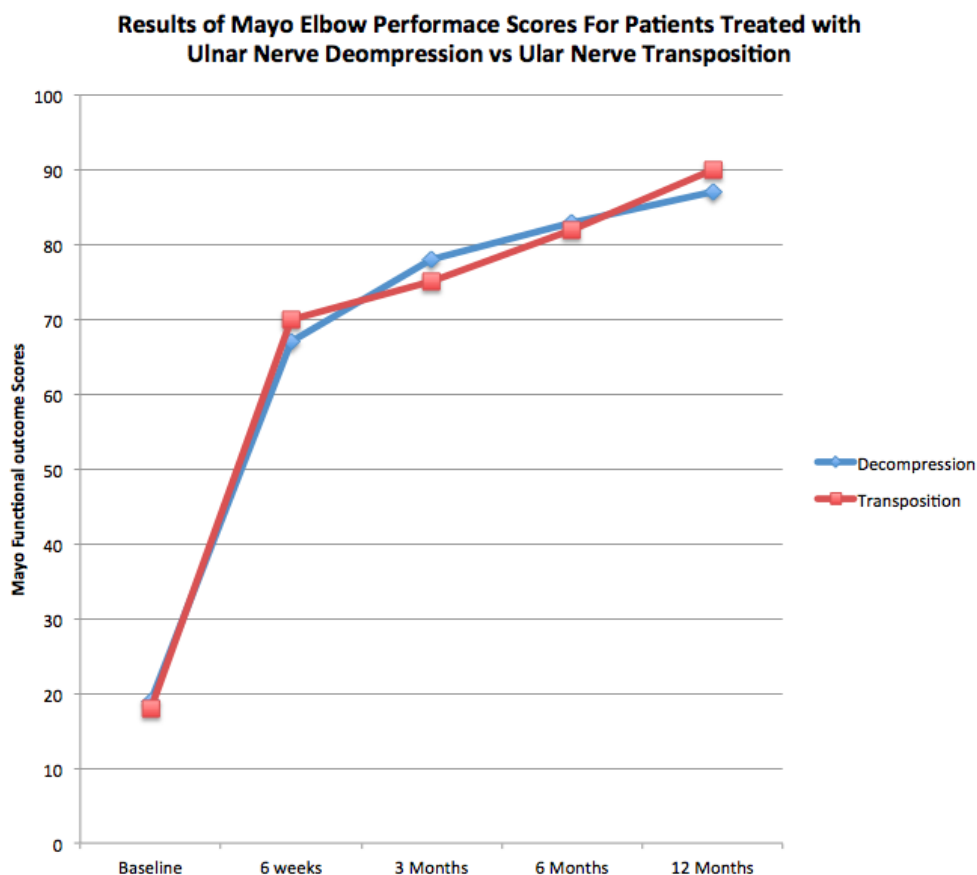
Methods: This multicenter randomized controlled trial was performed across eight trauma centers in North America. All patients underwent dual plate fixation for an acute, displaced fracture of the distal humerus, and were randomized to receive either (1) simple decompression or (2) anterior subcutaneous transposition of the ulnar nerve at the conclusion of the procedure. Inclusion criteria included: patients 16 to 80 years of age, displaced distal humerus fractures (OTA 13A or 13C) \leq 28 days postinjury, closed fractures or grade I/II open fractures, and provision of informed consent. Comprehensive neurological, functional, sensory, motor, and electrophysiological outcome assessments were conducted. The primary outcome was the Ulnar Nerve Entrapment Score classification system of Gabel and Amadio. Secondary outcomes included a functional outcome score (MEPS [Mayo Elbow Performance Score]), grip and pinch strength, hand function test of Jebsen, and nerve conduction testing. Patients were followed at 6 weeks, 3 months, 6 months, 1 year, and 2 years postoperatively. Complications were also assessed at each visit.

Results: 61 patients were recruited: 30 were randomized to decompression, 28 were randomized to anterior transposition, and 3 patients withdrew from the study. The mean age was 52 years, and 60% were female. There was no difference between the two groups with regard to age, sex, body mass index (BMI), smoking, diabetes, injury characteristics, time to operating room (OR), length of OR, or surgical approach. When comparing simple decompression and anterior transposition of the ulnar nerve, there was no difference in outcome between the two groups at any time point with regard to Ulnar Nerve Entrapment Score, MEPS scores, VAS (visual analog scale), or two-point discrimination. Overall, Ulnar Nerve Entrapment Scores improved in both groups from 6.0 at baseline to 7.8 at 1 year postoperatively ($P = 0.005$).

Δ OTA Grant

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.

Patients also had significant improvement in MEPS scores at each visit: 19 at baseline, 68 at 6 weeks, 77 at 3 months, 83 at 6 months, and 88 at 1 year postoperatively (Fig. 1, $P < 0.05$). Overall, two-point discrimination in the ulnar nerve distribution improved from 7.2 mm at 6 weeks to 5.0 mm at 1 year postoperatively ($P = 0.003$). There was minimal change in the VAS at any time point. Complications included 4 superficial wound infections, 2 deep infections, 4 nonunions, and 11 revision surgeries, and were equally distributed between the two groups.



Conclusion: This randomized trial demonstrated that the majority of patients with plate fixation of a distal humerus fracture develop symptoms of ulnar nerve irritation postinjury; however, the majority of patients demonstrated improvement by 1 year postsurgery. Functional outcomes also improved significantly in the first year after surgical treatment. There was no difference with regards to ulnar nerve symptoms, functional outcomes, or complications for patients treated with either simple decompression or anterior transposition of the ulnar nerve. This study was unable to demonstrate any significant difference in outcome between these two treatments of the ulnar nerve when performed following dual plate fixation of a distal humerus fracture. Either strategy for managing the ulnar nerve is acceptable and can be used at the discretion of the treating surgeon.