

Complications After Titanium Elastic Nailing of the Forearm*Matthew Abbott, MD¹; Frances Farley, MD¹; Ying Li, MD¹; Michelle S. Caird**¹University of Michigan, Ann Arbor, Michigan, USA*

Purpose: Titanium elastic nailing is the most common method of operative treatment of pediatric forearm fractures. It is believed to be safe and reliable with high rates of good to excellent results. However, published complication rates vary widely and are as high as 50%. The purpose of this study was to evaluate complications after titanium elastic nailing of forearm fractures at our institution.

Methods: We retrospectively reviewed 243 consecutive pediatric patients from 2007-2014 who underwent titanium elastic nailing of a forearm fracture. Medical records were reviewed to determine age, gender, reason for surgery, closed versus open fracture, need for open reduction, bones instrumented, removal of implant, date of removal, complications, and length of follow-up. Complications consisted of any deviation from the postoperative course that could possibly be attributed to the nail itself or the procedure. These were divided into minor complications (transient tendon or nerve injury and implant prominence/pain requiring early implant removal prior to 3 months postoperatively) and major complications (delayed/nonunion, refracture, and extensor pollicis longus [EPL] rupture). Univariate logistic regression was used to compare variables between those with minor and major complications and those without.

Results: 243 patients were identified with a total of 345 nails (158 ulnar, 187 radial) for 7 distinct fracture types: 151 both bone forearm fractures, 7 ulnar shaft fractures, 25 radial shaft fractures, 24 radial neck fractures, 24 Monteggia fractures, 10 radial neck with olecranon fractures, and 3 Galeazzi fractures. 65 of the 243 patients (26.7%) sustained a total of 71 complications. Minor complications consisted of 30 patients (12.3%) with painful/prominent implants requiring early implant removal, 16 patients (6.6%) with transient superficial radial nerve paresthesia, 7 (2.9%) with EPL irritation, and 3 (1.2%) with transient ulnar neuropraxia. 15 of the 243 patients (6.2%) sustained a major complication consisting of 9 (3.7%) refractures, 3 (1.2%) delayed/nonunions, 2 (0.8%) malunions, and 1 (0.4%) EPL rupture. Two refractures and 1 delayed union occurred after removal of implants prior to 3 months postoperatively. With regard to total complications, instrumentation of both bones ($P = 0.004$) had a significantly increased rate of complications. Open reduction carried an increased risk of major complication ($P = 0.044$), while dorsal insertion of radial nail trended toward a significantly increased rate of major complication ($P = 0.056$). 13 of 75 patients (17.3%) who underwent open reduction sustained a major complication in our study group.

Conclusion: Titanium elastic nailing continues to be the most common method of treating pediatric forearm fractures. However, it is not without risk. Our study suggests that this method of fixation carries a high rate of complications, although most are transient and resolved with implant removal. Fractures requiring open reduction carried an increased rate of major complication, although our total rate compares similarly to previous published complication rates of pediatric forearm fractures treated with plate fixation.