

Resident Autonomy and Tibial Intramedullary Nail Operative and Fluoroscopy Times, Reduction Quality, and Postoperative Complications

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Purpose: Much recent media attention has addressed trainee autonomy at academic teaching hospitals. This study evaluates the complication rate, quality of reduction, operating room (OR), and fluoroscopy time based on the degree of resident autonomy during a singular orthopaedic procedure, tibial intramedullary nailing (IMN).

Methods: 192 consecutive acute tibial IM nails at an academic Level-I trauma center between May 2014 and January 2017 were retrospectively reviewed. Resident autonomy was categorized as the attending present and scrubbed, present but not scrubbed, or available but not present. Demographic data, fracture characteristics, resident postgraduate year (PGY), and operative techniques were collected. Outcome measures were malreduction (sagittal or coronal malalignment $>5^\circ$), operative and fluoroscopy times, and short-term postoperative complications. Univariate analysis identified factors associated with different levels of attending involvement and with the above outcomes. Multivariate regression was used to assess the effect of resident autonomy on outcome measures adjusting for factors identified on univariate analysis.

Results: Attending physicians were scrubbed for 91 patients (47.4%), present for 87 (45.3%), and available for 14 (7.3%). Greater attending involvement was associated with nondiaphyseal fractures ($P = 0.004$), overnight procedures ($P = 0.007$), polytrauma cases ($P < 0.0005$), and earlier PGY level ($P < 0.0005$). On multivariate analysis, the degree of resident autonomy was not associated with having any complication ($P = 0.151$) unlike diabetes ($P = 0.032$), open fractures ($P = 0.004$), and open reduction ($P = 0.012$). Resident autonomy was not associated with angular malreduction ($P = 0.632$). OTA C-type fractures ($P = 0.014$) were associated with such malreductions. Resident autonomy was not associated with increased fluoroscopy time ($P = 0.179$) although suprapatellar nails were associated with an increase of 67 seconds of fluoroscopy time compared to infrapatellar nails ($P < 0.0005$). OR times were 23.5 minutes shorter when attendings were scrubbed versus present but not scrubbed ($P = 0.009$). OR times were increased for nondiaphyseal ($P = 0.015$) fractures and ones requiring an open reduction ($P = 0.003$).

Conclusion: While resident autonomy was associated with modest increases in OR time, graduated autonomy can allow for surgical training without compromising quality of reduction or increasing complication rates and fluoroscopy times.