

A Comparison of Anatomic Plating Versus Tubular Plating in the Treatment of Fibula Fractures

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Background/Purpose: Numerous implant designs exist for the treatment of fibula fractures. Cadaveric studies looking at biomechanical strength of different constructs have demonstrated no difference in strength among one-third tubular plates, locking plates, and anatomic plates. There is literature suggesting that in the setting of osteoporotic bone a locking construct may be beneficial compared to standard one-third tubular plating. However, a paucity of data exist in the literature looking at fixation of fibula fractures in healthy patients with nonosteoporotic bone. The primary goal of this study is to review treatment of fibula fractures in the setting of type 44B or 44C fractures about the ankle with either standard one-third tubular plating or anatomic plating to assess whether there is a difference in quality of fracture reduction.

Methods: After obtaining IRB approval, a retrospective chart and radiograph review of 201 patients identified by ICD-9 performed by four foot and ankle fellowship-trained orthopaedic surgeons at a single tertiary care practice was undertaken from 2007-2013. Office notes, operative reports, preoperative imaging, and postoperative imaging were reviewed to collect patient demographics (body mass index, age, sex, tobacco use, diabetes) and assess the quality of reduction of the fibula. Quality of reduction was assessed using radiographic parameters to measure fibular length, rotation, joint congruency, and step-off in order to determine whether an anatomic reduction was achieved.

Results: One-third tubular plating was used to treat 120 patients. 111 (92.5%) of these patients had an anatomic reduction of their fibula fracture. Anatomic plating was used to treat 81 patients. 74 (91.4%) of these patients had an anatomic reduction of their fibula fracture. A Fisher exact test determined no statistical significance existed between one-third tubular plates and anatomic plates in achieving anatomic reduction ($P = 0.795$). An exact binomial test estimated the probability of achieving anatomic reduction of fibula fractures with one-third tubular plates at 92.5% (confidence interval [CI]: 0.0349-0.1376) and anatomic plates at 91.4% (CI: 0.0355-0.1699). Comparing the success rates of achieving an anatomic reduction for each plate design yielded no statistical significance. A 2-sample test for equality determined no significant difference between the success of achieving anatomic reduction between one-third tubular plating and anatomic plating ($P = 0.9779$).

Conclusion: With the rising cost of health care, the onus of responsibility falls on the orthopaedic surgeon to temper enthusiasm for costlier implants and new innovations that may offer no significant benefit to patients while increasing the overall cost of treatment. Newer implant designs for distal fibular fractures may be beneficial in certain circumstances. However, in the treatment of type 44B and 44C ankle fractures, no benefit was found comparing the costlier anatomic plates with one-third tubular plates in achieving anatomic reductions.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.