Retrospective Comparative Analysis of Hallux Interphalangeal Joint Fusion Fixation Constructs: Single 4.0 Intramedullary Screw Versus Double 3.0 Headless Intramedullary Screws
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Introduction/Purpose: Arthrodesis is a common treatment for painful, deformed hallux interphalangeal joints (IPJ). To date, the ideal fusion construct for this treatment is unclear; however, intramedullary screw fixation has been proven a viable construct. The goal of this retrospective comparative analysis was to compare use of a single 4.0-mm intramedullary screw versus two 3.0-mm headless intramedullary screws in fusion rate, average time to fusion, and the rate of other clinical outcomes (e.g. infection, nonunion, delayed union, rate of hardware removal).

Methods: Thirty-nine patients underwent hallux IPJ fusion at our institution from 2008 – 2014 that met all inclusion criteria (18 years or older and had hallux IPJ pathology requiring arthrodesis) and no exclusion criteria (concomitant procedures that would affect postoperative weightbearing course, other forms of fixation, and osteomyelitis). Of the 39 patients, 17.9% (n=7) received one intramedullary 4.0-mm screw and 82.1% (n=32) received two 3.0-mm headless intramedullary screws. Complete clinical chart and radiologic exams were reviewed for each patient to determine clinical and radiographic fusions.

Results: Overall, 76.9% (n=30) of patients achieved complete radiographic hallux IPJ fusion, 10.3% (n=4) partial fusion and 12.8% nonunion. No statistically significant differences (p<0.05) were observed for complete fusion rate (single: 71.4%; two screws: 78.1%); median time to fusion (single: 36.7 (range: 11.0 – 83.9) weeks; two screws: 13.1 (range: 4.7 – 90.9) weeks); and the rate of other clinical outcomes (hardware removal: 1 (14.3%) from single screw, 6 (18.8%) from two screws; revision hallux IPJ arthrodesis: 1 (14.3%) from single screw, 3 (9.4%) from two screws; and infection: 2 (28.6%) from single screw, 4 (12.5%) from two screws).

Conclusion: This is the first study to date comparing outcomes between a single and double intramedullary screws for hallux IPJ arthrodesis. Our finding suggests both fixation constructs are comparable in clinical outcome. Surprisingly, hallux IPJ fusion radiographic rates are lower than similar joint fusions; however, revision rates are low suggesting that clinical fusion rates are still acceptable. Future studies could increase power through larger sample size and could explore barriers to better fusion rates.