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## INTRODUCTION

Arthrodesis is a common treatment for painful, deformed hallux interphalangeal joints. The ideal fusion construct for this treatment is unknown; however, intramedullary screw fixation has been proven to be a viable construct. The goal of this retrospective chart review was to determine whether there is a difference between using a single 4.0-mm intramedullary screw or two 3.0-mm intramedullary screws in: (1) fusion rate, (2) average time to fusion, and (3) the rate of other clinical outcomes (e.g. infection, nonunion, delayed union, rate of hardware removal).

## METHODS

Between 2008 - 2014, 39 patients underwent interphalangeal joint fusion. Patients were included if they were 18 years or older and had hallux interphalangeal joint pathology requiring arthrodesis. They were excluded if concomitant procedures were performed, other forms of fixation were used, or had osteomyelitis.

## RESULTS

Of the 39 patients, 17.9% (n=7) received one 4.0-mm screw and 82.1% (n=32) received two 3.0-mm screws. Overall, 76.9% (n=30) of patients, who required hallux interphalangeal joint arthrodesis, achieved complete fusion, and 10.3% (n=4) achieved partial fusion. No statistically significant differences (p<0.05) were observed for: (1) fusion rate (complete fusion: [single screw, 71.4%] and [two-screw, 78.1%]); (2) average time to fusion (single screw [median: 36.7 weeks, range: 11.0 – 83.9] and two-screw [median: 13.1 weeks, range: 4.7 – 90.9]); and (3) the rate of other clinical outcomes.

Demographic & Clinical Characteristics	Overall (n=39)	Single Screw Fixation (n=7)	Two Screw Fixation (n=32)	p-value
Sex, n (%)				0.475
Female	26 (66.7)	6 (85.7)	20 (62.5)	
Male	13 (33.3)	1 (14.3)	12 (37.5)	
Age, mean (SD)	58.6 (14.2)	64.7 (10.9)	57.3 (14.7)	0.216
BMI, mean (SD)	28.3 (6.5)	25.5 (5.6)	28.9 (6.6)	0.218
Laterality, n (%)				0.547
Left	21 (53.9)	5 (71.4)	16 (50.0)	
Right	18 (46.2)	2 (28.6)	16 (50.0)	
Diabetic, n (%)	9 (23.1)	0 (0.0)	9 (28.1)	0.265
Osteoporosis, n (%)	9 (23.1)	3 (42.9)	6 (18.8)	0.373
Smoking status, n (%)				0.274
Never	31 (79.5)	4 (57.1)	27 (84.4)	
Former	3 (7.7)	1 (14.3)	2 (6.3)	
Current	5 (12.8)	2 (28.6)	3 (9.4)	

Outcomes	Overall (n=39)	Single Screw Fixation (n=7)	Two Screw Fixation (n=32)	p-value
Fusion, n (%)				>0.999
Achieved complete fusion	30 (76.9)	5 (71.4)	25 (78.1)	
Achieved partial fusion	4 (10.3)	1 (14.3)	3 (9.4)	
Revision/hardware removal before fusion	4 (10.3)	1 (14.3)	3 (9.4)	
Loss to follow up	1 (2.6)	0 (0.0)	1 (3.1)	
Time to complete fusion, in weeks, median (range)	15.6 (4.7 – 90.9)	36.7 (11.0 – 83.9)	13.1 (4.7 – 90.9)	0.164
Hardware removal, n (%)	7 (18.0)	1 (14.3)	6 (18.8)	>0.999
Revisional hallux IPJ arthrodesis, n (%)	4 (10.3)	1 (14.3)	3 (9.4)	>0.999
Infection, n (%)	6 (15.4)	2 (28.6)	4 (12.5)	0.580

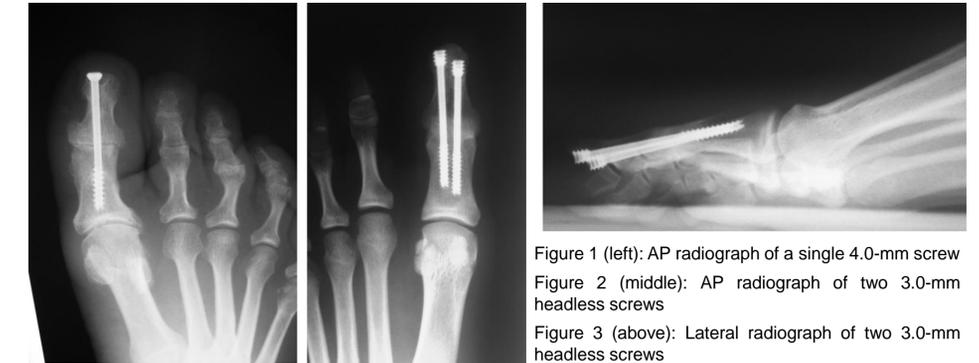


Figure 1 (left): AP radiograph of a single 4.0-mm screw  
 Figure 2 (middle): AP radiograph of two 3.0-mm headless screws  
 Figure 3 (above): Lateral radiograph of two 3.0-mm headless screws

## DISCUSSION

This is the first study to date comparing single and two intramedullary screws for interphalangeal joint arthrodesis. Future studies could increase power through larger sample size and could explore barriers to complete fusion rates.

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