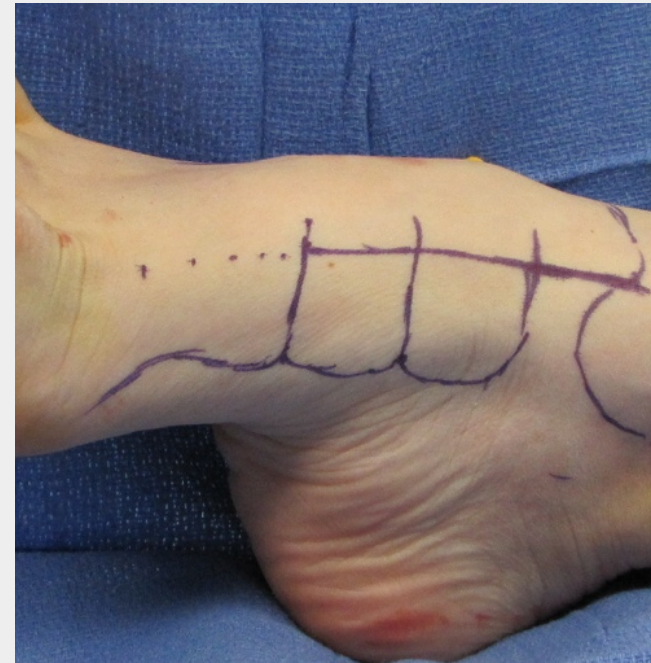


Midfoot Arthrodesis: Rate of Union & Nonunion in 214 Cases

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Introduction

Arthritis of the midfoot is a painful, disabling condition, commonly developing from an overt or subtle traumatic injury to the tarsometatarsal joint (TMTJ) and less commonly, the navicular cuneiform joint (NCJ)

Another common etiology is primary degenerative osteoarthritis

Arthrodesis of the midfoot joints is performed not only in the presence of arthritis, but also for the correction of painful deformities

The purpose of this study was to determine the TMTJ and/or NCJ arthrodesis rate in patients with a single level fusion, multiple level fusion, single joint fusion, and multiple joint fusion

Methodology

We retrospectively reviewed the charts of 74 patients (84 feet, 214 joints) who underwent an arthrodesis of the TMTJ(s) and/or NCJ(s) for pain secondary to arthritic changes in the midfoot due to trauma, degeneration or for deformity correction

Inclusion Criteria: Pain or deformity at the tarsometatarsal and/or navicular cuneiform joint based on clinical and radiographic findings; including revision cases

Exclusion Criteria: Charcot neuropathic osteoarthropathy

Of the 74 patients included, 24 (32%) were male, (68%) were female

Mean age, 45 (range, 11 to 80)

Mean BMI, 27.4 (overweight)



Materials & Methods

Radiographic and clinical assessment was performed by one surgeon, on average at 2 weeks, 6 weeks, 8 weeks, 6 months and 12 months post operatively

Data collected included age, gender, foot laterality, height, weight, follow-up time, number of joints involved, tobacco use, diabetic status, presence of neuropathy, complications, and radiographic evidence of union or lack thereof.

Mean follow up, 58 months (range, 10 to 80 months)



Materials & Methods

Delayed Union

Failure of bone bridging across the fusion site after 6 weeks, broken hardware, or both; radiographically, also see lucency or widening and sclerosis

Nonunion

The Food and Drug Administration define a nonunion as 9 months of elapsed time with no healing progress for 3 months

Union

Radiographically, complete consolidation across arthrodesis site with obliteration of joint space on more than one view; clinically, absence of warmth and swelling





Results

Union achieved in 74/84 feet (88%), 204/214 joints (95%)

Single joint union achieved in 21/22 feet (95%), 21/22 joints (95%)

Multiple joint union achieved in 53/62 feet (85%), 183/192 joints (95%)

Single level union achieved in 68/76 feet (89%)

Multiple level union achieved in 6/8 feet (75%)

Complications

Wound dehiscence - 12% (5%^{1,2})

Superficial infection - 4% (3%¹)

Hallux Malleus - 2%

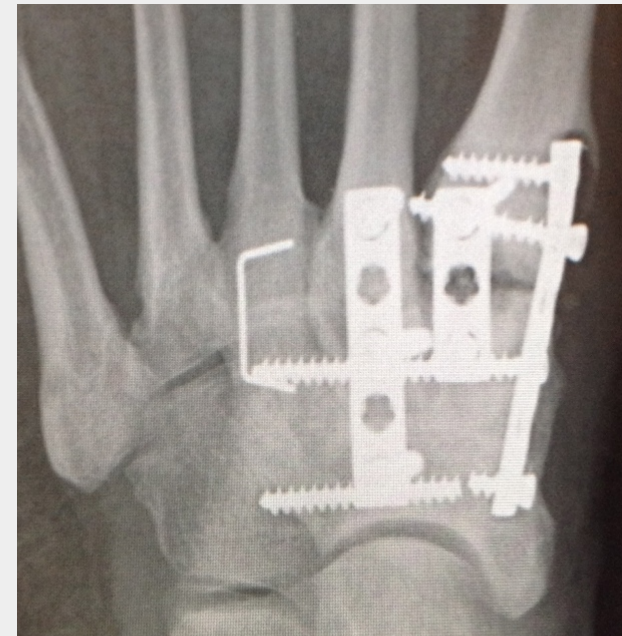
Implant complications (resulting in hardware removal) - 3%

Sesamoiditis - 2%

Metatarsalgia - 1 % (13%²)

Stress fracture - 0% (7.5%²)

Peripheral nerves - 0% (9%¹) and neuroma formation (8%²)





Statistical Analysis

Age and nonunion rate, Pearson's coefficient, $R = 0.17$

BMI and nonunion rate, Pearson's coefficient, $R = 0.12$

Tobacco and nonunion rate, Chi-square statistic, 6.4956, the P value is 0.010814; the result is significant at $p < 0.05$

Diabetes and nonunion, Chi-square statistic is 6.4956; the P value is 0.010814, his result is significant at $p < 0.05$

Revision cases and nonunion rate: Chi-square statistic, 20.1048; the p value is 7E-06, the result is significant at $p < 0.05$

Visual Analog Score (VAS) pre and post surgery was available for 33 feet; mean VAS pre was 7, post 1.5; the two-tailed P value is less than 0.0001



Discussion

The nonunion rate for tarsometatarsal joint arthrodesis has been reported between 0-12%¹⁻⁵. It is important, however, to note the 100% union rate was in a study consisting of 9 feet in 8 patients.

The most common complication in our study was the formation of a superficial wound dehiscence at 12%, higher than the reported 5% in the literature. Unlike the high numbers reported for metatarsalgia, nerve entrapment and neuroma formation after surgery, none were seen in this study population. Three patients returned to OR for hardware removal and 2 for revision of painful nonunion, the other 8 nonunions were asymptomatic.

When analyzing pain, pre and post surgery based on the VAS, the two-tailed P value is statistically significant at less than 0.0001. The mean of VAS pre minus VAS post equals 5.318, 95% confidence interval of this difference is from 4.404 to 6.232.

Though there is a positive correlation between nonunion rate and BMI, and between nonunion rate and age, it is technically small and therefore weak.

To the best of our knowledge, this is the first study with this sample size that looked at the union rates of the entire tarsometatarsal complex, including the navicular cuneiform joint.



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