

Simultaneous Versus Sequential Subtalar Arthrodesis/Calcaneal Osteotomy: A Retrospective Study

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INTRODUCTION:

Subtalar arthrodesis is a standard surgical treatment for end-stage subtalar arthrosis. While mild hindfoot malalignment can be corrected via arthrodesis, some patients with significant varus or valgus deformity may benefit from concomitant calcaneal osteotomy. However, some patients initially treated with only subtalar fusion may later require a calcaneal osteotomy due to progressive deformity or new arthritic changes. The decision to perform these procedures simultaneously or sequentially are dictated by patient-specific factors and disease progression. Existing studies have yet to directly compare outcomes such as union rates, complications, and functional recovery between simultaneous and sequential approaches. This study fills that gap by evaluating the impact of surgical timing on clinical outcomes between patients treated with simultaneous and sequential procedures.

METHODS: We retrospectively reviewed 27 patients from a multicenter database who underwent subtalar arthrodesis and calcaneal osteotomy with 18 undergoing simultaneous and 9 undergoing sequential procedures. Demographic data, comorbidities, complications, revision rates, VAS pain scores, and recovery outcomes were analyzed. Comparisons were conducted using Mann - Whitney U Tests and Fisher's Exact Tests due to limited sample size and data characteristics. P values < 0.05 were considered to be statistically significant.

RESULTS:

Of the 27 patients, 18 (66.67%) underwent both procedures simultaneously during a single operative session and 9 (33.33%) underwent procedures performed at different times. Complication rates, including surgical site infections, wound dehiscence, deep vein thromboses, and sural nerve injury were generally low with no statistical differences noted. Mean follow-up was 90.54 weeks in the simultaneous group, ranging between 12 to 234 weeks and 205.59 weeks in the non-simultaneous group, ranging between 50 weeks and 399 weeks. In the non-simultaneous group, follow-up was counted starting from the first surgery.

Though not statistically significant, patients who received simultaneous procedures had a lower rate of revision surgery (16.67% vs 33.33%, $p = 0.61$) for complications and lower rates of non-union (5.88% vs 11.11%). In the simultaneous group, revision surgery consisted of three hardware removals, with one patient who had hardware removal also requiring irrigation and debridement and one patient requiring calcaneal valgus osteotomy and refixation of the calcaneus. In the non-simultaneous group, revisions included hardware removal, total ankle arthroplasty, and calcaneal osteotomy after fusion.

These trends may be clinically relevant, but statistical significance was limited by the small cohort size and infrequency of non-unions. A full set of outcomes can be found in Table 1.

DISCUSSION AND CONCLUSION: In conclusion, our study demonstrates that both simultaneous and staged approaches to subtalar arthrodesis with calcaneal osteotomy yield safe, comparable outcomes. Notably, the simultaneous group showed a trend toward fewer nonunions and revisions, though not statistically significant, suggesting potential clinical benefits that warrant further investigation. These preliminary findings contribute to the limited literature on this topic and underscore the need for larger, prospective studies to determine the optimal surgical approach and timing for managing complex hindfoot pathology.

Table 1. Comparison of Factors in Simultaneous & Sequential Subtalar Arthrodesis and Calcaneal Osteotomy Groups

	Simultaneous	Sequential	P value
Age avg (years)	51.32	63.78	0.07 [†]
BMI (mean)	28.26	33.22	-*
Comorbidities	76.47%	88.89%	0.63 [‡]
Post-op pain VAS (mean)	2.50	3.50	0.77 [†]
Revision surgery	16.67%	33.33%	0.61 [‡]
Non-union at 1 yr	5.56%	11.11%	-*
Surgical site infection	0.00%	0.00%	-*
Dehiscence within 1 yr	5.56%	0.00%	-*
DVT within 1 yr	0.00%	0.00%	-*
Sural nerve injury within 1 yr	5.56%	0.00%	-*
Time to weightbearing avg (days)	50.00	56.25	0.74 [†]

(*) denotes one or both groups had sample size inadequate for statistical analysis

(†) denotes Mann-Whitney U test

(‡) denotes Fisher's Exact Test