

Factors Associated with Unplanned Surgery Following Tarsal Coalition Resection: A Multicenter Review

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INTRODUCTION:

Surgical excision of symptomatic tarsal coalitions is considered when nonoperative treatments fail to alleviate symptoms. Reasons and rates of revision surgery are rarely reported. This study aims to determine rates and causes for revision surgery for tarsal coalition.

METHODS:

This is a retrospective multicenter study involving patients aged ≤18 years at time of primary surgery for talocalcaneal coalition (TCC) or calcaneonavicular coalition (CNC) across 8 academic centers between 2001 and 2023 with ≥ 1-year follow-up (accepted range of 11 months or greater). Those with medical records were reviewed to collect patient demographics, imaging data, coalition characteristics, management details, and documentation of patient-reported outcomes such as pain. Statistical analysis included Chi-Squared tests and independent student's t-test, with statistical significance set at 0.05.

RESULTS:

A total of 212 patients met inclusion criteria with 281 feet undergoing surgery. There was a total of 98 (50.5%) females across the cohort with 62 (29.2%) bilateral coalitions procedures and a mean age of 11.3 years at time of presentation and 12.6 years at the time of surgery. Across the 281 feet undergoing surgery, there were only 10 (3.6%) cases of multiple coalitions with 165 (65.7%) undergoing nonoperative treatment before surgery.

There were 153 CNC and 97 (63.3%) had concurrent deformities. Isolated coalition resection was performed in 118 (83.7%) feet with an additional 23 (16.3%) patients requiring deformity correction. Fat was the interposition material in 77 (50.3%) cases. The cohort included 128 TCC, and of the 104 cases with documented coalition location, the middle facet was most common 95 (91.3%). Isolated coalition resection was completed for 85 (75.9%) TCC cases and with 27 (24.1%) requiring concurrent deformity correction. Fat was the interposition material in 84 (65.6%) patients. Follow-up was 33.0 months for CNC and 38.5 months for TCC patients, P=0.100.

Revision surgery was available in 20 (13.1%) CNC cases and 13 (10.2%) TCC cases, P=0.217. Coalition recurrence was the primary reason for revision in 9 (45%) CNC and 6 (46.2%) TCC feet. Repeat excision was performed in 7 (35%) for CNC and 5 (38.5%) TCC feet. Six TCC patients had concurrent deformity. Pain was reported by 63 (44.4%) CNC and 55 (47.8%) TCC patients at latest follow-up, P=0.580.

DISCUSSION AND CONCLUSION: This is one of the largest series of tarsal coalitions. Almost one in five patients required revision surgery with repeat resection being the most common reason followed by deformity correction. Families should be educated about the potential need for revision surgery after primary tarsal coalition resection. Additionally, a better understanding of risk factors for revision surgery is needed to establish optimal surgical indications.

	Value
Age at Presentation in Years, mean (SD)	11.3 (2.6)
Age at Surgery in Years, mean (SD)	12.6 (2.5)
Sex, n (%)	
Male	96 (49.5)
Female	98 (50.5)
Coalitions, n (%)	
Unilateral Cases	150 (70.8)
Bilateral Cases	62 (29.2)
Coalition Types, n (%)*	
Calcaneonavicular	153 (54.4)
Talocalcaneal	128 (45.6)
Multiple Coalitions, n (%)*	10 (3.6)
Prior Nonoperative Management, n (%)*	165 (65.7)

SD, Standard Deviation

Valid percents are displayed based on the available data per characteristic group.

*Across 281 feet undergoing surgery

	CN Coalition, n=153	TC Coalition, n=128	P-value
Coalitions, n (%)			<0.001
Osseous	15 (11.5)	34 (28.3)	
Fibrocartilaginous	99 (45.4)	30 (25)	
Fibrous	56 (43.1)	56 (46.7)	
Facet, n (%)			<0.001
Middle Facet	0 (0)	95 (91.3)	
Posterior Facet	0 (0)	9 (8.7)	
Concurrent Foot Deformity, n (%)	97 (63.3)	80 (62.5)	0.548
Average Age at Presentation in years, mean (SD)	10.9 (2.4)	11.8 (2.7)	0.038
Average Age at Surgery in years, mean (SD)	12.4 (2.4)	12.8 (2.6)	0.289
Primary Surgery, n (%)			0.229
Coalition Resection	118 (83.7)	85 (75.9)	
Concurrent Deformity Surgery	2 (1.4)	1 (0.9)	
Both Resection and Deformity Surgery	21 (14.9)	26 (23.2)	
Interposition Material, n (%)			
Fat	77 (50.3)	84 (65.6)	
Extensor Digitorum Brevis	34 (22.2)	0	
Wax	21 (13.7)	18 (14.1)	
Surgery Revision, n (%) *	20 (13.1)	13 (10.2)	0.217
Coalition Resection Only	6	2	
Deformity Correction Only	8	7	
Both Resection and Deformity Correction	1	3	
Revision Surgery Reason, n (%)†			
Coalition Recurrence	8	6	
Concurrent Foot Deformity	9	6	
Both Recurrence and Concurrent Deformity	1	0	
Other reasons	5	3	
Final Follow-up Length in Months, mean (SD)	33.0 (23.6)	38.2 (26.8)	0.100
Symptomatic Pain at Final Follow-up, n (%)	63 (44.4)	55 (47.8)	0.580

Bolded P values represent statistical significance

SD, Standard Deviation

*Remaining procedures include hardware removal and debridement secondary to infection

† Some patients with TC Coalition are missing revision surgery data following reason for surgery.

Valid percents are displayed based on the available data per characteristic group.