

Evaluating Factors Associated with Surgical Management in Pediatric Patients with Symptomatic Accessory Navicular: A Single-Center Retrospective Study

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INTRODUCTION: Accessory navicular (AN) is a common developmental variant of the foot; however, only a small fraction of individuals with an AN ever develop clinical symptoms. Initial management for symptomatic AN is typically nonoperative, surgery is reserved for patients who fail to improve with conservative management. Prior studies comparing nonoperative and operative outcomes for symptomatic AN remain limited and heterogeneous. The purpose of this study was to identify clinical factors associated with the need for surgical intervention in pediatric patients with symptomatic AN.

METHODS: A retrospective cohort study was performed on pediatric patients diagnosed with symptomatic AN between January 2012 and October 2023. Inclusion criteria encompassed patients under 18 years with radiographic evidence of AN who received at least one course of nonoperative treatment from a nonoperative provider. Collected data included demographics, clinical presentation, AN morphology, treatment modalities, and outcomes. Statistical analyses involved chi-square or Fisher's exact tests, t-tests, and binary logistic regression models adjusted for age and sex. This study was granted exemption by the Institutional Review Board (IRB) of our institution in accordance with 45 CFR 46.104(d)(4).

RESULTS SECTION: Among 143 patients (Male = 39, Female = 104), 34 (24%) underwent surgical management. Factors associated with increased likelihood of surgical management included presence of an antalgic gait (OR 2.93; 95% CI, 1.22-7.13; P = 0.0165), prior nonoperative treatment elsewhere (OR 3.23; 95% CI, 1.06-9.89; P = 0.0370), symptom duration prior to initial evaluation > 180 days (OR 3.69; 95% CI, 1.39-10.08; P = 0.0092), and nonoperative treatment duration > 180 days (OR 5.69; 95% CI, 2.10-16.14; P = 0.0007). Symptom duration prior to initial evaluation between 30-180 days (OR 0.34; 95% CI, 0.12-0.89; P = 0.0329) and nonoperative treatment between 30-180 days (OR 0.28; 95% CI, 0.11-0.69; P = 0.0058) were associated with decreased likelihood of surgery. AN morphology and sports participation were not significant factors.

DISCUSSION: In pediatric patients with symptomatic AN, the presence of an antalgic gait, a history of receiving nonoperative treatment at an outside institution, longer symptom duration prior to initial evaluation (>180 days), and prolonged nonoperative treatment duration (>180 days) were associated with increased odds of undergoing surgery. Conversely, symptom and treatment duration between 30 and 180 days were associated with decreased odds of surgical intervention. Our study exhibited several limitations, including: retrospective design, small sample sizes within certain subgroups, potential institutional bias based on individual practice patterns, and inability to stratify by level of sport participation (e.g., recreational vs. elite athlete). Our findings add to this limited body of literature by identifying specific clinical features, particularly gait impairment, prolonged symptom duration prior to initial evaluation, and prior nonoperative treatment failure, that may flag patients at higher risk for surgical intervention.

SIGNIFICANCE/CLINICAL RELEVANCE: In pediatric patients with symptomatic AN, antalgic gait, prolonged symptoms, and extended nonoperative treatment were associated with increased odds of surgery. Recognizing these factors may help clinicians better counsel families and optimize treatment planning.

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	Surgery (n=34)	Non-Surgery (n=109)	P Value
Age	16.0 (14.0, 18.0)	15.0 (13.0, 16.8)	0.0461
Sex			0.0774
Male	14.7%	31.2%	
Female	85.3%	68.8%	
History			
Flat Feet	47.1%	41.5%	0.6908
Unilateral AN Type 1	2.9%	1.9%	0.5660
Unilateral AN Type 2	38.2%	33.6%	0.6811
Unilateral AN Type 3	2.9%	12.1%	0.1875
Bilateral AN	55.9%	52.3%	0.8440
Sport	71.9%	82.0%	0.2190
Pain Level (0-10)	5.5 (3.3, 7.8)	5.0 (0.0, 7.0)	0.2279
Antalgic Gait	41.2%	22.4%	0.0450
Symptom Duration (Days)	210.0 (30.0, 655.0)	90.0 (30.0, 180.0)	0.0336
<30 Days	15.4%	21.8%	0.5817
30-180 Days	34.6%	55.1%	0.1119
>180 Days	50.0%	23.1%	0.0134
Non-Op Treatment Elsewhere	23.5%	8.3%	0.0301
Treatment			
Non-Op Treatment Duration (Days)	90.0 (60.0, 210.0)	60.0 (32.0, 120.0)	0.0427
<30 Days	6.1%	9.6%	0.7303
30-180 Days	54.5%	79.8%	0.0063
>180 Days	39.4%	10.6%	0.0004
PT/Stretching	58.8%	77.6%	0.0450
Orthotics	50.0%	43.5%	0.5565
Rest	94.1%	88.0%	0.5223
Boot/Cast	67.6%	61.1%	0.5468

AN, Accessory Navicular; Non-Op, Non-Operative; PT, Physical Therapy

Figure 1. Full binary logistic regression analysis evaluating factors of surgical management in symptomatic AN. Model was adjusted for patient age and sex. Reference categories for all ORs was the "Non-Surgery" group.

