

Retrospective Comparison of Tarsal Coalition Resection Versus Fusion Among Providers at a Single Tertiary Care Hospital

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BACKGROUND

Symptomatic tarsal coalitions have been identified in those with rigid congenital flat feet previously (1,2), but there remains concerning levels of morbidity associated with surgical intervention, including adjacent joint arthrosis, revision surgeries, and functional impedances. The landmark 1994 study by Wilde et al demonstrated that coalitions involving more than 50% of the posterior facet with more than 16 degrees of rearfoot valgus produced less favorable outcomes with resection alone, highlighting arthrodesis as the recommended procedure for patients meeting these criteria (3). Conversely, a retrospective Canadian cohort study of 304 patients demonstrated that those undergoing initial tarsal joint fusion were 10 times more likely to undergo revisional surgery than those with resection alone at minimum of 2 years after initial surgery (4). Given the controversy within the literature regarding optimal treatment regimen, it is pertinent to compare long-term outcomes among those undergoing joint-sparing versus joint-destructive treatment of tarsal coalitions.

PURPOSE

The purpose of this study is to compare subjective and functional outcomes as well as rate of return to the operating room among those undergoing talocalcaneal coalition (TCC) or calcaneonavicular bar (CNB) resection via open or arthroscopic approach versus arthrodesis. Our hypothesis is that tarsal coalition resection with interposition may have better subjective and functional outcomes with no increase in rate of return to the operating room.

METHODOLOGY

IRB approval was obtained to conduct a retrospective chart review of patients undergoing surgical treatment of TCCs or CNBs at Cambridge Health Alliance (CHA) between 2005 and 2017. Patients who underwent initial operation to address the tarsal coalition at CHA with a minimum of one year follow up were included in the study. Patients with previous midfoot/rearfoot/ankle injury or procedure prior to initial presentation at CHA were excluded.

Demographic information was extracted for all subjects, and patient telephone interviews were conducted by research personnel to evaluate subjective and functional outcome scores. Functional outcome measures were assessed via modified AOFAS ankle-hindfoot scores (total of 94 points in which the STJ motion question was eliminated).

T-tests were used to calculate p values ($\alpha = 0.05$) for each of the following outcome measures: modified AOFAS ankle-hindfoot scores, number of surgeries on the respective foot, pain level after return to activity, subjective improvement in mobility, and age at the time of surgery. Additionally, multivariate regression analysis was performed for all outcome measures previously listed.

DISCLOSURES

We do not have any financial interests to disclose. Dr. Harry Schneider is a consultant for Osiris Therapeutics, Inc. but has no financial interests in this study.

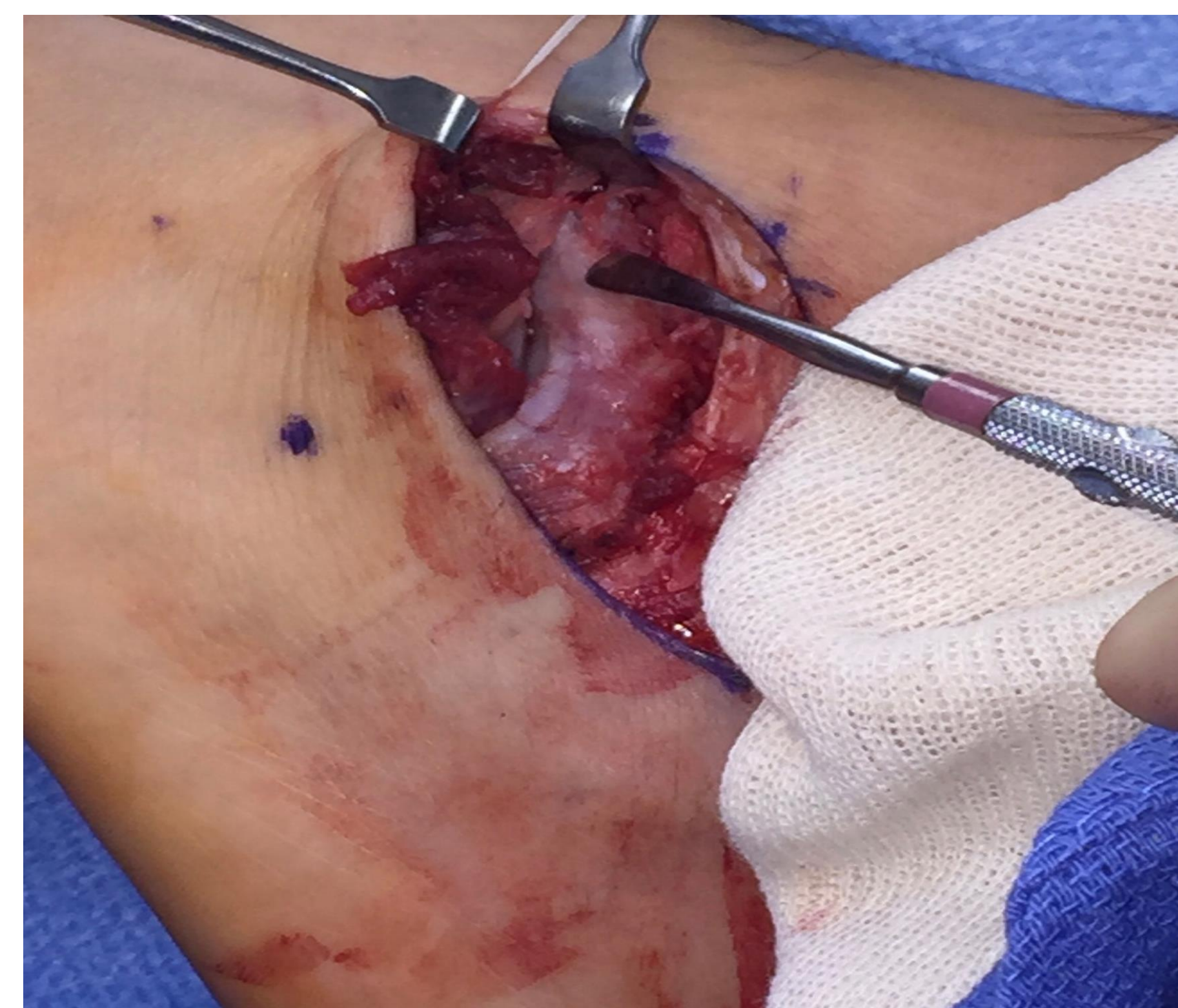


Figure 1: Surgical Resection of CN Bar



Figure 2: Surgical Resection of TCC

RESULTS

Group 1: Resection

Group 1 included 10 patients with 11 feet operated on: 9 TCCs and 2 CNBs. 8 tarsal coalitions were resected via an open technique, and 3 were resected arthroscopically. Interposition of material was performed in all cases and was subdivided into four types: arthroereisis, cryopreserved umbilical allograft, extensor digitorum brevis (EDB) muscle belly, and bone wax. Arthroereisis was performed in five cases, allograft was used in one case, the EDB was interposed in both cases of CNB, and bone wax was used in three cases.

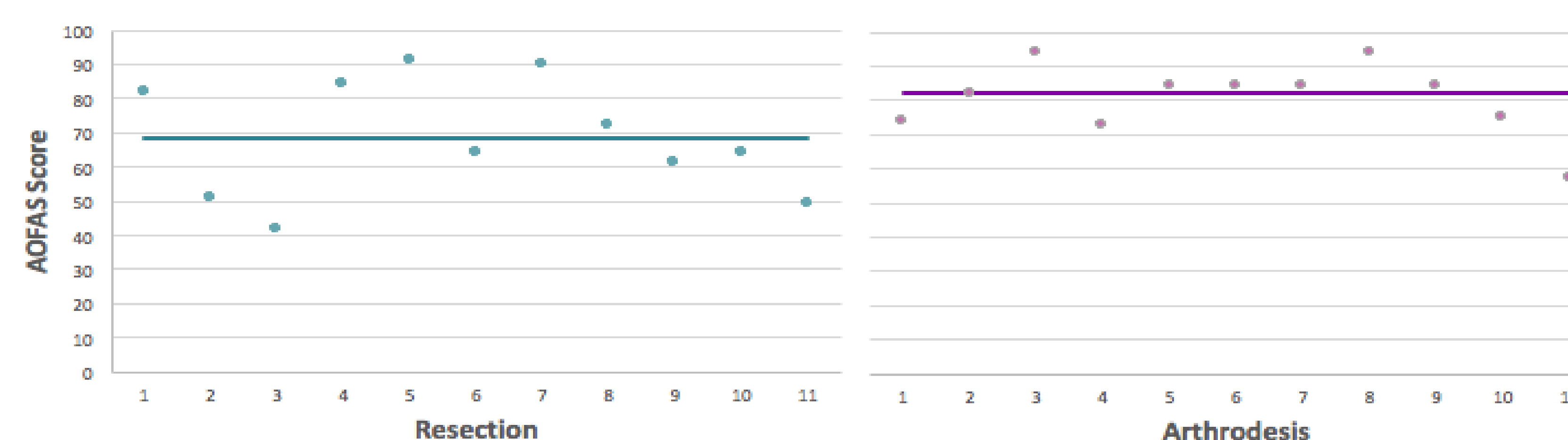
Group 2: Arthrodesis

Among the 11 feet in 7 patients undergoing arthrodesis initially, all patients presented with TCCs. The initial surgery involved isolated STJ arthrodesis in 8 cases, triple arthrodesis in two feet, and medial double arthrodesis in one case.

Statistical analysis demonstrated no significant difference between groups with regard to age at the time of surgery ($p=0.39$), preoperative pain level ($p=0.91$), pain level after return to activity ($p=0.052$), difference in pain after return to activity from preoperatively ($p=0.13$), subjective improvement in mobility ($p=0.19$), and number of total surgeries on each respective foot ($p=0.15$). However, there was a statistically significant difference in AOFAS scores between group 1 ($\mu=68.18 \pm 10.04$) and group 2 ($\mu=82.09 \pm 4.37$) at a p value of 0.022 (See Figure 3).

Multivariate regression revealed a weak relationship between all demographic parameters and outcome measures except between AOFAS scores and pain level after return to activity (See Figure 4), which demonstrated a moderate inverse correlation ($PCC=-0.6347$).

Figure 3: Comparison of Functional Outcome Scores Between Resection (Group 1) and Arthrodesis (Group 2) Patients

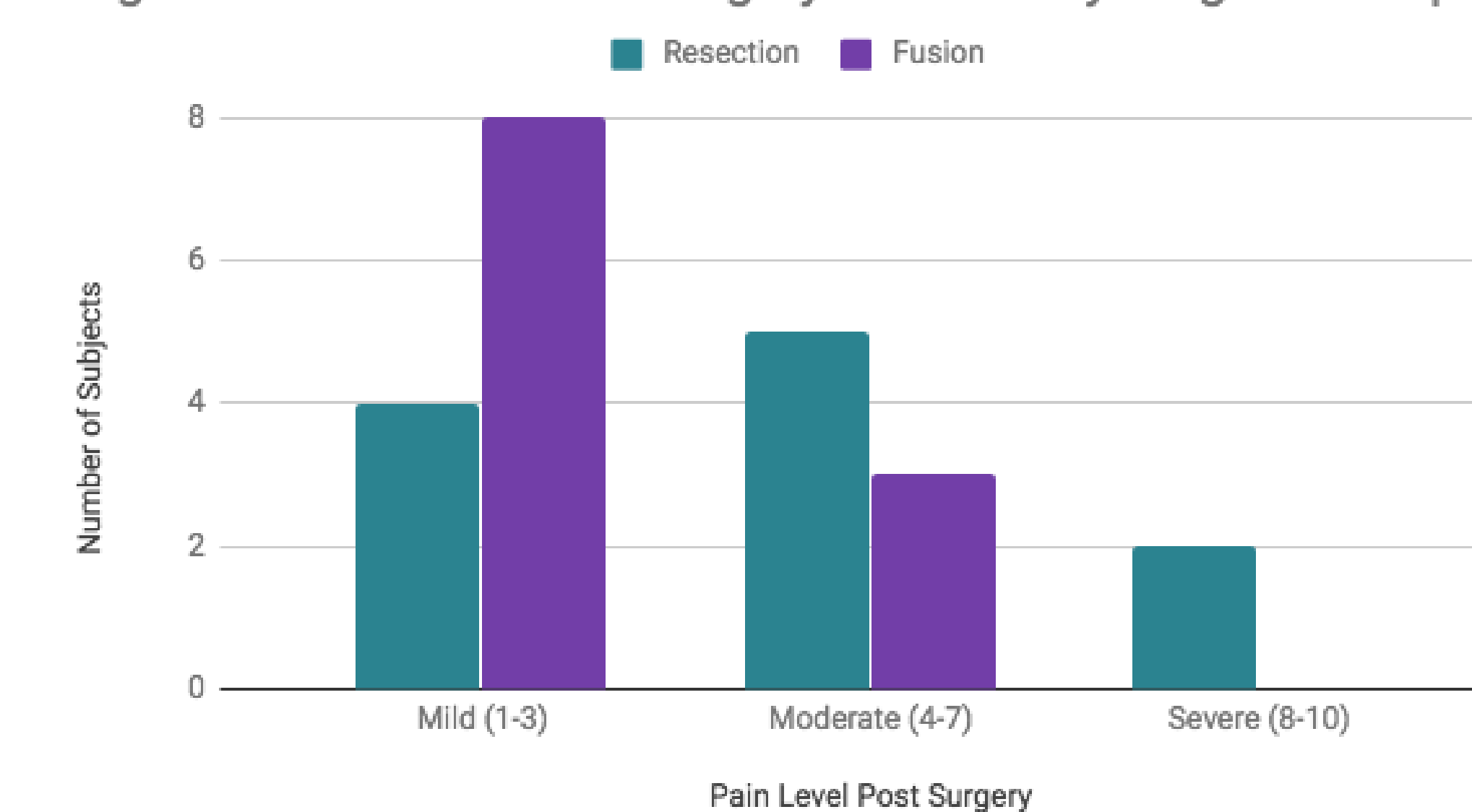


ANALYSIS & DISCUSSION

Contrary to our hypothesis, our results suggest that those initially undergoing arthrodesis have improved functional results than resection patients. There were no statistical differences in rate of reoperation or in subjective improvement. This differs from results shown by Khoshbin et al, in which those undergoing arthrodesis were more likely to require additional surgery to address the coalition or its sequelae (4).

The current study represents a combination of short, mid, and long-term follow up telephone interviews following tarsal coalition surgery. Interestingly, multivariate regression analysis confirmed that there was a lack of strong correlation between time since surgery and outcome measures assessed, which suggests that increased functional outcome score in the arthrodesis group is likely not due to time since surgery or other demographic factors. Additionally, pain level after return to normal activity may represent a valuable predictor of long-term functional outcomes.

Figure 4: Pain Level Post Surgery Stratified by Surgical Group



ACKNOWLEDGEMENTS

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