Characterization of Accessory Anterolateral Talar Facet on Computerized Tomographic Scan and Clinical Associations in Pediatric Patients

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INTRODUCTION:

The accessory anterolateral talar facet (AALTF) is an anatomic variation in talocalcaneal articulation. The AALTF has been implicated in painful flatfoot and talocalcaneal impingement, and it may be an underappreciated etiology of pain and pathologic biomechanics. However, its overall clinical significance and ideal treatment remains unclear. The purpose of this study was to investigate clinical and imaging characteristics of AALTF in the pediatric population, define diagnostic imaging criteria, and determine the clinical significance.

METHODS:

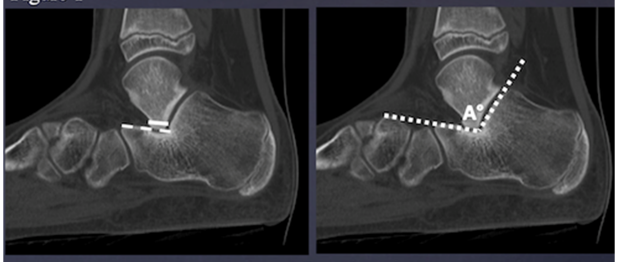
We identified pediatric patients who had foot/ankle computed tomography (CT) scans at our institution between March 2018 and March 2019. Scans were reviewed for presence or absence of an AALTF. Medical records were reviewed to obtain baseline demographics and patient characteristics. Using sagittal CT reconstructions, radiographic measurements (Figure 1) were made including the anterior to posterior accessory talar facet length, calcaneal neck length, and an angle created by the superior surface of the calcaneus. To illustrate relative size, we then calculated the ratio of accessory facet length to calcaneal neck length. Clinical association analysis was completed using generalized linear mixed models. Interclass correlation coefficient was used to calculate inter and intra-observer reliability. Receiver operating curve analysis was used to identify cutoff values of radiographic measurements.

RESULTS:

228 patients (351 feet) with CT scans were identified. 34 patients (48 feet) were positive for AALTF, for a prevalence of 15% of patients (13.7% of feet) in our population. The mean age was 13.1 years, 50% were male, and 45.4% were bilateral. Radiology detected 40.4% of the accessory facets on CT at time of initial imaging. Pes planovalgus was found in 23/48 feet (48%), tarsal coalitions in 32/48 (67%), and pain was present in 31/48 (65%). The mean accessory facet length was significantly greater in patients with an AALTF than in those without, 8.8 ± 3.5 mm versus 1.1 ± 0.5 mm ($p<0.001$). The mean ratio of accessory facet length to calcaneal neck length in patients with an AALTF was also significantly greater compared to patients without an AALTF, 0.42 ± 0.18 versus 0.05 ±0.02 ($p<0.001$). Feet with pes planovalgus had significantly greater mean accessory facet length ($p=0.027$) and mean accessory facet length to calcaneal neck length ratios ($p=0.014$) compared to those without pes planovalgus. The intraclass coefficients for intra-rater and inter-rater reliability for all radiological measurements were good to excellent. We performed receiver operating curve analysis to identify a size cutoff that correlated with foot pathology, which was possible for pes planovalgus. Cases with an accessory facet length to calcaneal neck length ratio <0.34 had a 24% rate of planovalgus, and cases with a ratio ≥ 0.34 had a 67% rate ($p=0.024$).

DISCUSSION AND CONCLUSION: In our cohort, pediatric patients with AALTF commonly had associated pes planovalgus or tarsal coalitions. Measurement of accessory facet length to calcaneal neck length ratio on sagittal CT reliably identifies the presence of an AALTF, and our analysis showed that patients with pes planovalgus had larger AALTF than those without pes planovalgus. We propose considering facets with an accessory facet length to calcaneal neck length ratio <0.34 small and ≥ 0.34 large due to the association of larger ratio with pes planovalgus. Evaluation for an AALTF should be considered in evaluating pediatric patients with foot pain and deformity. More studies are needed to determine the appropriate treatment of this diagnosis.

Figure 1



— Accessory Facet Length
- - - Calcaneal Neck Length
A° Superior Calcaneal Angle