Posterior and Middle Facets of the Subtalar Joint: The Retrospective Search for an Early Sign of Peritalar Subluxation and Progressive Flatfoot Deformity

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INTRODUCTION | Adult acquired flatfoot deformity (AAFD) is a complex three-dimensional (3D) pathology characterized by peritalar subluxation (PTS) of the hindfoot. The objective of this study was to compare the amount of subluxation between the middle and posterior facets in patients with AAFD.

METHODS | In this IRB-approved retrospective comparative study, seventy-six AAFD patients (87 feet) who underwent weightbearing CT (WBCT) were included. Two blinded Fellowship-Trained Orthopedic Foot and Ankle Surgeons with >10 years of experience measured subtalar joint subluxation at the posterior and middle facets as well as the Foot and Ankle Offset (FAO). Intra- and interobserver agreement was measured for PTS measurements using intraclass correlation coefficient (ICC). Inter-method agreement was assessed using Spearman’s Correlation and Bivariate Analysis. Paired comparison was performed using Wilcoxon. A multivariate analysis and a partition prediction model were used to assess influence of PTS measurements on FAO values. P-values of <0.05 were considered significant.

RESULTS | ICC for intra- and interobserver reliabilities were respectively 0.97 and 0.93 for posterior, and 0.99 and 0.97 for middle facet subluxation. The inter-method Spearman’s correlation between subluxation of posterior and middle facets was measured at 0.61. In a bivariate analysis, both measurements were found to be significantly and linearly correlated (P<0.0001; R²=0.42). Measurements of middle facet subluxation were found to be significantly higher than the posterior facet subluxation, with a median difference (using Hodges-Lehman factor) of 17.7% (p<0.001; 95% CI, 10.9 to 23.6%). We also found that for every 1% increase in posterior facet subluxation there was a corresponding 1.6-fold increase in middle facet subluxation. Only middle facet subluxation measurements were found to significantly influence FAO calculations (p=0.003). The partition prediction model demonstrated that a middle facet subluxation value of 43.8% represented an important threshold for increased FAO.

CONCLUSION | This study is the first to compare WBCT measurements of subtalar joint subluxation at the posterior and middle facets as markers of PTS in patients with AAFD. We found a positive linear correlation between the measurements with subluxation of the middle facet being significantly more pronounced than that of the posterior facet by an average of almost 18%. This suggests that middle facet subluxation may provide earlier and more pronounced marker of progressive PTS in patients with AAFD.