Location of Activation of Tarsal Joints on SPECT CT Scan Predicts Preoperative Functional and Pain Scores on Supramalleolar Osteotomy Patients

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Introduction/Purpose: Combined single-photon emission computed tomography and conventional computed tomography (SPECT/CT) is a hybrid imaging modality that shows a combination of metabolic and structural information about the ankle. Recently, its use has expanded for pre-operative evaluation of supramalleolar osteotomies (SMO) for asymmetric ankle arthritis. It is unclear if the location of bone scan activation in other locations in the hindfoot is related to pre and post-operative functional and scores. We hypothesize that uptake in specific locations within the hindfoot can be associated with worse pre- and post-operative functional and pain scores.

Methods: 85 pre-operative SMO patients with varus (37), valgus (41), or neutral (7) alignment of the hindfoot were assessed using SPECT/CT. The level of activation on SPECT/CT scans was measured. Activation was assessed on both the tibia and talus including the talonavicular, subtalar, calcaneocuboid joints and subfibular region. Pre- and post-operative functional and pain scores (AOFAS Hindfoot, FAOS, and VAS) were recorded for each patient at an average of 3.7 years post-operatively. We compared SPECT/CT imaging with pre-operative patient scores assuming equal group variance and used a Chi-square analysis to determine if failure can be related to having activation in other joints besides the hindfoot.

Results: Those with talonavicular (6) activation had worse malalignment as measured by the AOFAS Hindfoot-A (alignment) subscore; they had worse a functional status as measured by the AOFAS-F (function) subscore. Patients with subtalar joint activation (10) had significantly worse (p<.05) pre-operative VAS pain scores. They also had worse AOFAS-F, AOFAS Hindfoot, and FAOS-S (symptom) scores. Those with calcaneocuboid activation (1) did not have any correlation to pre-operative pain or functional scores. Patients with subfibular impingement (7) had worse alignment based on the AOFAS-A scores. Patients with hindfoot joint activation did not have a higher rate of failure relative to other locations in the ankle. Activation in these areas were not associated with any post-operative functional or pain scores.

Conclusion: Pre-operative SPECT/CT evaluation of the hindfoot before a SMO can be used to clinically correlate patient-specific factors such as pain and function in the pre-operative period. Results from this study provide prognostic information the locations of lesions that may cause patients more functional disability and pain pre-operatively and in the future.

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