The Tripod Index Part 2: Diagnostic Accuracy in Symptomatic Flatfoot

Foot & Ankle Category: Other

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Introduction
The Tripod Index (TI) has been created to allow assessment of complex foot deformities involving multiple planes and levels such as flatfoot and cavovarus deformities. It utilizes the relationship between center of the heel, medial/lateral borders of the forefoot, and center of the talar head. This study aimed to verify diagnostic accuracy of the TI in symptomatic flatfoot.

Methods
Weight-bearing radiographs including foot AP with a hemispherical marker around the heel, lateral, and hindfoot alignment views were obtained on 91 patients (110 feet) presented with medial foot and ankle pain between June 2010 and May 2011 including 20 surgically indicated symptomatic flatfoot, 9 surgically indicated tarsal tunnel syndrome, 6 surgically indicated FHL tenosynovitis, 15 surgically indicated anteromedial ankle impingement, and 60 non-operatively treated plantar fasciitis. Radiographs were evaluated blindly for the TI, AP talonavicular coverage angle, lateral talo-first metatarsal angle, calcaneal pitch angle, medial cuneiform-fifth metatarsal height, and coronal plane hindfoot alignment. The sensitivity, specificity, likelihood ratios, and predictive values were calculated. Clinically diagnosed flatfoot deformity indicated for surgical reconstruction by one of the senior foot and ankle orthopaedic surgeon was used as the accepted standard for diagnosis.

Results
The sensitivity of the TI was 100%, comparable with coronal plane hindfoot alignment (95%), AP talonavicular coverage angle (95%), lateral talo-first metatarsal angle (100%), and medial cuneiform-fifth metatarsal height (100%). The specificity of the TI was 93%, comparable with coronal plane hindfoot alignment (98%) and lateral talo-first metatarsal angle (87%), but superior to AP talonavicular coverage angle (64%), calcaneal pitch angle (61%), and medial cuneiform-fifth metatarsal height (82%). The positive likelihood ratio of the TI was 14.29, which was less than coronal plane hindfoot alignment (47.5), but more than the AP talonavicular coverage angle (2.64), lateral talo-first metatarsal angle (7.69), calcaneal pitch angle (2.31), and medial cuneiform-fifth metatarsal height (5.56). The negative likelihood ratio of the TI was 0. The positive and negative predictive values were 77% and 100%, respectively.

Conclusion
The Tripod Index showed high accuracy as a quantitative assessment in the diagnosis of a symptomatic flatfoot.