Friday, 7:30 – 8:05 am

Session VI: Forefoot

Moderators: James W. Brodsky, MD - a – DePuy, A Johnson & Johnson Company; Synthes; Smith & Nephew; Integra; e – Integra
James R. Ficke, MD - n – nothing to disclose

7:30 am
Metatarsus Primus Elevatus and Hallux Rigidus – A Pathognomonic Factor?
Results of a Radiographic Analysis

Presenting: Norman Espinosa, MD - n – nothing to disclose
Additional Authors:
Samy Bouaicha, ND - n – nothing to disclose
Beat Moor, MD – n – nothing to disclose
Gerardo Maquieira, MD – n – nothing to disclose
Christine Ehrmann, MD - n – nothing to disclose

Summary:
We investigated metatarsus primus elevatus (MPE) as a possible pathognomonic factor in hallux rigidus. We present a reproducible assessment method and new threshold values for MPE.

Abstract:
Background:
Controversy exists about the role of metatarsus primus elevatus (MPE) in the pathogenesis of hallux rigidus. Previous studies could neither confirm nor reject this hypothesis. In addition, there is also no clear information whether it is associated with other MP-I-pathologies as for example hallux valgus. When measuring the true elevation of the first metatarsal according to current techniques those lack either precision or accuracy or both. This, however, is fundamental when trying to draw adequate conclusions and choosing optimal treatment for hallux rigidus. The present study introduces a reproducible method of radiographic assessment and analyses the relationship of MPE with hallux rigidus and hallux valgus.

Methods:
Standing and weightbearing dorso-plantar and lateral radiographs of 295 feet (221 patients; average age 54 years) were randomly selected from our databank and reviewed. According to general radiographic and clinical criterias from the literature 99 were defined as hallux rigidus and 99 as hallux valgus deformity without osteoarthritis. Ninety-seven radiographs with normal MP-I-joints and forefeet served as control group. The elevation of the first metatarsal bone in relation to the second metatarsal (MPE), the first metatarsophalangeal-inclination-angle (MIA), the metatarsophalangeal-angle, the intermetatarsal-angle (IM), the interphalangeal-angle and degeneration of the first metatarsophalangeal joint were measured. Three independent raters were involved in order to assess the inter-rater reliability of the measurement method.

Results:
MPE was significantly greater in patients with hallux rigidus (+5.2mm; 95%CI: 4.7-5.7) when compared with hallux valgus (+2.8mm; 95%CI: 2.2-3.4) or the control group (+2.6mm; 95%CI: 2-3.2; p<0.0001). The MIA was found to be statistically significant lower in the hallux rigidus group (9°; 95%CI: 8-10) when compared with those measured in the hallux valgus (14°; 95%CI: 13-16) and control group (11°; 95%CI: 10-12; p<0.0001). There was a low but statistically significant positive correlation between MPE and osteoarthritis at the MP-I-joint (r=0.35; p<0.0001). A higher correlation was found between MPE and MIA (r=0.5; p<0.001). The interrater reliability for the measurement method was found to be statistically highly significant and thus reproducible (r=0.9; p<0.0001).
Conclusions:
Based on the findings of this study MPE could be a pathognomonic factor in hallux rigidus. Additionally, the threshold value of MPE has been found to be lower than previously reported. The method to measure MPE has been found to be highly reproducible.