Subtalar Joint Alignment in Ankle Osteoarthritis
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Introduction/Purpose: The influence of the subtalar joint on the evolution of ankle joint osteoarthritis is still a matter of debate. Although subtalar joint compensation of deformities above the ankle joint was proposed until mid-stage of ankle osteoarthritis, the evidence of this assumption is weak. In this study, we investigated the subtalar joint alignment in different stages of ankle joint osteoarthritis using weightbearing CT scans. The influence of the tibio-talar tilt and presence of subtalar joint osteoarthritis was additionally assessed. We hypothesized, that the subtalar joint compensates for deformities above the ankle joint in early- to mid-stage of ankle osteoarthritis. We also hypothesized, that subtalar joint compensation increases with a pronounced tibio-talar tilt and decreases with the presence of subtalar joint osteoarthritis.

Methods: We included patients with ankle joint osteoarthritis treated in our institution from January 2013 to April 2016. A control group of 28 patients was additionally assessed. Varus and valgus ankles were subdivided according to the modified Takakura classification, the tilt of the talus in the ankle mortise and stage of subtalar joint osteoarthritis. The type of ankle osteoarthritis was diagnosed on a plain weightbearing anterior to posterior radiograph of the ankle. The medial distal tibial angle (TAS) and the angle between the tibial shaft and the surface of the talar dome (TTS) were measured. The subtalar joint alignment was assessed using weightbearing CT scans. Two angles were assessed: The subtalar inclination angle (SIA) was measured to investigate the subtalar compensation. For assessment of the morphology of the talus, the infltal-subtal angle (ISA) was determined.

Results: This analysis showed significant differences of the subtalar inclination between varus feet and the controls (SIA, P=.001). Regarding the talar morphology, significant differences were found between varus/valgus feet and the controls (ISA, P=.001 and .036, respectively). No significant differences of the subtalar joint inclination and talar morphology could be identified comparing different stages of ankle joint osteoarthritis inside the varus or valgus group. No relationship between the tilt of the talus in the ankle joint mortise and the subtalar joint inclination or talar morphology was identified. Neither presence nor absence of subtalar joint osteoarthritis influenced the subtalar joint inclination and talar morphology.

Conclusion: Varus ankles compensate in the subtalar joint for deformities above the ankle joint. Compensation had no influence on the stage of ankle osteoarthritis, extent of the tibio-talar tilt and stage of subtalar joint osteoarthritis. Consequently, the progression of ankle joint osteoarthritis is more depended on the supramalleolar alignment and integrity of the periarticular structures (i.e. ligaments and tendons) than on the osseous alignment of the subtalar joint.