Do the first metatarsophalangeal joint's tendons and sesamoid bone(s) change their position in subjects with hallux valgus deformity? An MRI study.

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Abstract.

Background: The aim of this study is to investigate possible variations of the anatomical position of tendons of the first metatarsal phalangeal joint to evaluate the presence, absence and eventually shortening of the Transverse head of Adductor Hallucis and position of sesamoid bones in subjects with hallux valgus compared to healthy subjects. These observations intended to investigate if anatomical changes could produce functional changes and increase the degree of valgization. The study is divided into two parts: dissection of two embalmed cadaver feet and observation by Magnetic Resonance Imaging of the first metatarsal phalangeal joint.

Design: A systematic dissection of tendons was performed on two embalmed cadaver feet . Ten subjects were recruited for Magnetic Resonance Imaging with clinical diagnosis of hallux valgus with angles above 15°, and 10 subjects with normal hallux. Magnetic Resonance Imaging was performed on different planes to investigate the tendons, muscles and sesamoid bones position

Results:

Magnetic Resonance Imaging shows, in Subjects with hallux valgus, a lateralization of the tendons of Flexor Hallucis Longus (9 cases), Extensor Hallucis Longus (8 cases), Flexor Hallucis Brevis (8 cases) and Extensor Hallucis Brevis (5 cases) compared to normal hallux Subjects. The sesamoid bones were lateralized in 9 cases. The transverse head of the Adductor Hallucis appeared shortened in 9 cases, and was absent in 1 case.

In embalmed cadaver feet the tendons of Flexor Hallucis Longus and Extensor Hallucis Longus followed the pronation of metatarsus and the lateralization of the phalanks due to fixation by their retinacula. The Extensor Hallucis Brevis was not lateralized, the Transverse Head of Adductor Hallucis was present and the sesamoid bones were relocated.

Conclusion: Magnetic Resonance Imaging highlighted the significant variations in tendons position that control first the metatarsal phalangeal joint, the dislocation of sesamoid bones and the shortening of the Transverse head of Adductor Hallucis in subjects with hallux valgus. The lateralization of Flexor Hallucis Brevis coincides with a dislocation of the sesamoid bones. Together with the retraction of the Transverse head of the Adductor Hallucis this suggest an influence on the development and maintenance of hallux valgus.

Dissection and observation of embalmed cadaver feet highlighted that all structures change their position in Subjects with HV. Magnetic Resonance Imaging could confirm the above – mentioned assertion.

Key words. Hallux valgus, metatarsal phalangeal joint, tendon position, transverse head of adductor hallucis muscle, sesamoid bone, Magnetic Resonance Imaging.