PAPER SESSION 17: FOREFOOT

Moderators:

John E. Femino, MD (Iowa City, Iowa)
James R. Holmes, MD (Ann Arbor, Michigan)

11:11 am

Variations in Peroneus Longus Attachment Correlate with Tarsometatarsal Morphology, Biomechanics and Hallux Valgus

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Summary:

The 1st TMT joint is a key structure in the etiology of hallux valgus and also in the mainenance of its operative correction. There are 3 basic types of joint and these are directly correlated with the incidence of hallux valgus. We have studied the dynamic stabilisers of the joint and have shown that there are two variations in peroneus longus tendon attachment and that they correlate with joint morphology and hallux valgus. the biomechanical differences are studied. Introduction

Introduction:

The 1st Tarsometatarsal joint (TMTJ) has an important role to play in the aetiology and thus the surgical management of hallux valgus but there has been little study of its basic anatomy and mechanics. We have previously shown that it has between one to three joint facets and, furthermore that the number of facets present correlated directly with the existence of pathology. Thus, a tri-facet joint only occurred in normal subjects whereas a mono-facet joint was associated with a hallux valgus deformity. The only dynamic stabilizers of the of the 1st Metatarsal are the Peroneus Longus (PL) and Tibialis Anterior and both of these insert proximally in the area of the 1st TMT joint and therefore have an important role in its control of the 1st Metatarsal. We demonstrated a Lateral Plantar Prominence on the proximal plantar surface and this included the peroneus longus tubercle. Variations in the anatomy of this structure correlated directly with the incidence of hallux valgus. The aim of this study was to study the distal PL and its relationship with the TMTJ and in particular to the facet joints and the Lateral Plantar Prominence.

Methods:

A total of 53 cadaveric 1st TMTJs were dissected being careful to preserve the PL insertion. The specimens were analyzed for variations in the insertion of the PL and nature of the 1st TMTJ facet morphology.

Results:

The existence of the three joint types in the 1st TMTJ was confirmed. We found two types of PL insertion with an Apical insertion or a Lateral insertion demonstrated in all specimens. The Apex insertion was situated on a small surface area of a hypertrophied tubercle and Lateral Plantar Prominence that possessed its own articular facet. The Lateral insertion was a broad insertion along the lateral border of the 1st metatarsal base. 100% of the mono-facet joints possessed a Lateral insertion. The bifacet joints had an Apex insertion in 31% of subjects and Lateral insertion in 69% of subjects. The trifacet joints had an apex insertion in 71% of subjects and lateral insertion in 29% of subjects.

Conclusion:

Hypemobility of the first metatarsal segment is hypothesized as a causative factor in hallux valgus and the 1st TMTJ and its stabilizers are the key to this. We have shown a correlation between variations in the PL attachment and the TMTJ morphology which is in turn correlated with a hallux valgus deformity. We hypothesise that the lateral insertion of PL is found in a 1st metatarsal that is rotationally unstable and thus supinates during gait. Conversely, a more effective PL may lead to the development of a hypertrophied tubercle, which is evidenced by the 3rd facet and Apex insertion. We discuss the implications in hypermobility and surgical management.