Thursday: Deformity: 1:40 – 1:42 pm

Geometrical Analysis of First Metatarsal Dorsiflexion Osteotomy for Cavo Varus Feet

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Summary
In cavo varus feet, the first metatarsal dorsiflexion osteotomy is usually performed. No measure of how much of elevation will be obtained is known, nor we know how much of elevation is needed. It was determined geometrically that the elevation obtained corresponds approximately to 2.5 times the amount of milimeters of dorsal wedge removed. This information is useful when treating a cavo varus feet if a first metatarsal osteotomy is considered.

Introduction
In the surgical treatment of cavo varus feet, the first metatarsal dorsiflexion osteotomy is of paramount importance. No clear way of measuring how much did we elevate the metatarsal head after the osteotomy is known. The objective of this study was to perform a geometrical analysis of an oblique proximal metatarsal dorsiflexion osteotomy in order to provide a guide to know beforehand how much elevation of the metatarsal head will be obtained.

Methods
A geometrical model was designed of a first metatarsal bone measuring 60mm in length, a proximal width of 20mm and a metatarsal head diameter of 18mm. The metatarsal declination angle was set at 25 degrees. An oblique proximal metatarsal dorsiflexion osteotomy was performed, removing a dorsal wedge of bone. A geometrical relation was determined, associating the distance between the osteotomy, the metatarsal head, and the wedge of bone removed.

Results
For an osteotomy angle of 60 degrees relative to the metatarsal long axis, the amount of elevation of the metatarsal head is approximately 2.5 times the amount of mms of dorsal wedge resection. In other words, if we resect 6 mms of dorsal wedge when performing the osteotomy, the metatarsal head will elevate approximately 15 mms.

Conclusions
No clear guide exists to decide how much of an elevation we need when performing a dorsiflexion osteotomy of the first metatarsal in a cavo varus foot, nor there is a way of measuring how much of an elevation we are obtaining. This study shows a simple way of estimating the elevation obtained when performing a modified proximal dorsiflexion osteotomy of the first metatarsal bone.