THE FIFTH METATARSAL BASE: ANATOMIC EVALUATION IN REGARDS TO FRACTURE MECHANISM AND TREATMENT ALGORITHMS

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Disclosure

The fifth metatarsal base: Anatomic evaluation in regards to fracture mechanism and treatment algorithms

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Study Goal

• Anatomic evaluation of the base of the fifth metatarsal

• Correlate anatomy with fracture pattern to understand mechanism

• Relate to treatment algorithms
Methods

• 10 fresh frozen adult BK cadaver limbs
• All soft tissue removed other than section of PF and PB
  – Later removed to measure foot print or attachment
• Digital caliper used for all measurements
Results – 5th Metatarsal

- Length (tip to tuberosity)
  = 75.1 +/- 8.0 mm
- Length (tip to cuboid articulation)
  = 69/7 +/- 6.7 mm
Results – 5th Metatarsal Base

- Articular surface shape = Triangular
- Height of articular surface = 13.7 +/- 2.3 mm
- Width of articular surface = 15.2 +/- 2.4 mm
- Height of nonarticular surface = 12.4 mm +/- 1.7 mm
- Width of nonarticular surface = 11.5 +/- 0.9 mm
Results – Plantar Fascia

- Shape = Oval
- Height as it attached = 7.2 +/- 2.1 mm
- Length of attachment = 9.5 +/- 2.9 mm
- Width of attachment = 4.0 +/- 0.9 mm
- Height of attachment = 5.5 +/- 1.4 mm
- From plantar metatarsal = 0.5 +/- 1.0 mm to 6.0 +/- 2.0 mm
- From articular surface = 6.9 +/- 1.9 mm
Results – Peroneus Brevis

- Shape = Oval
- Height as it attached = 6.9 +/- 1.8
- Length of attachment = 10.2 +/- 2.2 mm
- Width of attachment = 3.5 +/- 1.0 mm
- Height of attachment = 5.2 +/- 1.2 mm
- From plantar metatarsal = 6.7 +/- 2.6 mm to 12.0 +/- 2.2 mm
- From articular surface = 4.7 +/- 2.1 mm
Results – Zones

- Zone A: PF only and non-articular
  - 6.6 +/- 2.2 mm from inferior, 9.5 +/- 2.9 mm from proximal, and 11.5 +/- 0.9 mm from the lateral
  - Subject to static tension from PF
- Zone B: PB and is non-articular
  - 12.0 +/- 2.2 mm from inferior, 10.2 +/- 2.2 mm from proximal, and 11.5 +/- 0.9 mm from the lateral
  - Subject to dynamic tension of PB
- Zone C: Articular Surface
  - From the border of Zone B to the cuboid
  - Involves the articular surface

Zone have implications for:
- Fracture mechanism
- Stability needed in treatment

Attachment shape has implications for hardware considerations.
References


