The Enhanced Lapidus Arthrodesis: Crossed Screw Technique with Middle Cuneiform Fixation Further Reduces Sagittal Mobility

Melissa M. Galli, DPM, MHA, AACFAS
Jeffrey E. McAlister, DPM
Gregory C. Berlet, MD
Christopher F. Hyer, DPM, MS, FACFAS

Advanced Orthopedic Foot & Ankle Fellowship
Orthopedic Foot & Ankle Center, Columbus
Disclosure

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Melissa M. Galli, DPM, MHA, AACFAS

Our disclosures are in the Final AOFAS Program Book. This research was supported with a grant from DJO Global.
Background

• Persistent medial column instability can be encountered despite a successful 1st tarsometatarsal (Lapidus) stabilization. There is a need for stabilization of 1st and 2nd columns in many cases.
Purpose

• To **objectively quantify** the effect of a third point of fixation from the base of the first metatarsal to the middle cuneiform

• To **compare** this construct to the traditional isolated 1\textsuperscript{st} TMT fixation construct
Study Protocol

- 20 fresh frozen BK cadaveric specimens
- Sagittal 1\textsuperscript{st} TMT motion measured via Klaue
  - Each state measured 3 times & averaged
    - Pre Fixation. Post-2 point fixation. Post-3 point fixation
  - Modified AFO
    - With a first ray cut out & an attached micrometer
  - Has been validated
    - Found reliable interobserver & intraobserver
- All fixation via 2.0 mm Steinmann pins placed percutaneously under C-arm
  - 2 points across 1\textsuperscript{st} TMT
  - 3\textsuperscript{rd} point into middle cuneiform
Raw Sagittal Motion (mm) per cadaver

- Preop 1st TMT ROM
- s/p 1st TMT pinned ROM (2 wires)
- s/p 1st TMT w/ IC pinned ROM (3 wires)
Relevance

- Mean motion (mm) reduced
  - By 40.8% S/P 1st TMT
  - By 58.2% with addition of middle cuneiform fixation

- Significant reduction in motion (p=0.00027) with middle cuneiform fixation compared to Lapidus construct
Literature Review

• Our documented 7.4 mm of sagittal motion prior to fixation is similar to that found in the prospective *in vivo* literature
  – Coughlin & Jones measured a mean pre-operative first ray mobility of 7.2 mm via the Klaue device⁵

• The relationship to sagittal motion & patient outcomes (pain, function, etc) has not been reported
Conclusions

• The addition of a third point of fixation into the middle cuneiform significantly decreased sagittal first ray motion compared to the two point construct.

• A mean of 3.1 mm of 1st TMT motion remained
  – Allowing for midfoot compensation, if needed.
References