A Biomechanical Comparison of Suture-Button Suspensionplasty and LRTI for Basilar Thumb Arthritis

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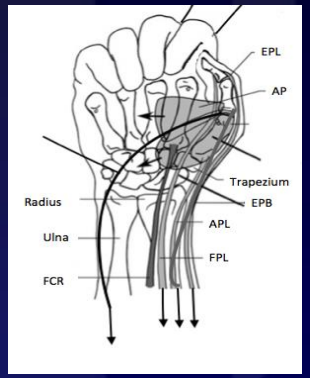
Study Purpose:

To biomechanically compare strength of two techniques for basilar thumb arthritis:

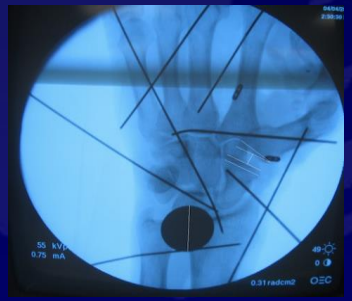
- LRTI
- Suture Button Suspensionplasty (SBS)

Methods:

- 8 matched pairs below-elbow cadaveric arms
- Prepared using previously described protocols
- Motor Units for key-pinch:
  EPL, EPB, FPL, Adductor Pollicis
- LRTI Group vs. SBS Group
- Testing Scenario 1:
  - Simulated Physiological Key Pinch
- Testing Scenario 2:
  - Incremental Metacarpal Loading
- Primary Outcome: metacarpal subsidence
  - Radiographically measured trapezial space height (TSH)



Muscle-tendon units loaded for pinch



Radiograph of specimen under testing of key-pinch.

Results:

- Simulated Key Pinch
  - SBS group: 8mm TSH
  - LRTI group: 5.5mm TSH
- Incremental Metacarpal Loading:
  - SBS group
    – significantly greater TSH at each load

Conclusions:

Suture-Button Suspensionplasty:

- Stronger than LRTI in withstanding metacarpal subsidence in both tests:
  - Simulated Key-pinch
  - Incremental metacarpal loading
- Promising technique with clinical and biomechanical support