Utilization of novel double-ended screw for PIP fusion for treatment of hammer toes

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Disclosures

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Authors have no potential conflicts with this presentation
Rigid hammertoe deformity requires realignment of the proximal interphalangeal joint.

Traditionally done with resection arthroplasty and K-wire fixation:
- Prone to complications
  - Pin migration, pin breakage, pin tract infection
  - Nonunion, malunion

This study investigates a novel internal fixation screw that has been developed to address these concerns.
Implant Design Rationale

- **reliable fixation**
  - Internal device
  - Rigid fixation
  - Compression
    - Dual threaded design with opposite threading directions opposite ends

- **Ease of use**
  - Minimal dissection
  - Simple insertion
    - Drill/driver combination for simple insertion
    - Ease of use – patented drill/driver
Retrofusion System

- Dual threaded design with opposing threads allows for “all inside” screw placement
- Intramedullary implant that will compress across PIP joint
- Double ended screwdriver/drill combination design for ease of insertion
Materials and Methods

- Retrospective review
- 55 screws placed in 40 patients by 2 surgeons
- At last follow up, radiographs and clinical condition were interpreted through chart review
- Fusion and alignment were evaluated by a foot and ankle orthopaedic attending, a MSK radiologist, and a PGY3 orthopaedic resident

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<tr>
<th>Toe</th>
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<td>2</td>
<td>39</td>
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Surgical technique

- Joint preparation
- Take care to remove enough bone centrally so that screw will catch in middle phalanx
- Drill pilot hole
- Ream (by hand) first proximally
- Insert drill prograde distally and continue until almost all the way through
- Insert screw proximally with driver
- Re-align toe and engage screw
- Turn **Counter clockwise** to first distract fusion site
- This allows for the threads to catch distally
- Turn **Clockwise** to compress
Outcomes

- 76% of toes with definitive radiographic fusion
- 13% difficult to judge with available x-rays
- 11% with nonunion by final (typically asymptomatic) follow up
- 96.4% with appropriate alignment
- **96.4% with satisfactory outcome**
- Average follow up length: 76.8 days
- Median follow up length: 69 days
Complications

- 2 (3.6%) toes with symptomatic pain and swelling at last visit
- 2 (3.6%) toes with malalignment (>5 degrees)
- No changes in alignment from immediate postoperative position
- No evidence of post operative infection
- No toes necessitated a return to the operating room
Conclusion

- Intramedullary compression screw fixation is an effective method of treatment of hammertoe deformities
- Reasonable union rates
- Extremely high symptomatic relief
- Minimal complications
- Even in patients without firm evidence of radiographic union, the intramedullary implant maintains alignment and provides symptomatic relief

• Granberry WM: Arthrodesis of the PIP Joint Using a Headless Intramedullary Screw. Presented American Orthopedic Foot and Ankle Society Summer meeting, Toronto Canada July 2007

