Digital Surgery Complications

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Disclosures

• None
Presentation Outline

• **Differentials**
  – Neuroma
  – Plantar plate injury
  – Metatarsalgia
  – Hammertoe

• **Influencing factors**
  – Anatomy
    • Hammertoe
    • Rigidity
    • Plane(s) of deformity

• **Complications**
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• Differentials
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• Influencing factors
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• Complications

• Treatment options
  – Arthrodesis
  – Tendon transfers
    • Flexor tenotomy
    • Girdlestone-Taylor
      – Variations
    • EDB transfer
    • Hibbs

• What have I learned?
  – Arthroplasty needs to be retired
Plantar Plate

• **Subjective**
  – “Walking on pebble”
  – Wart under foot
  – Pain
    • Under MPJ
    • MPJ effusion

• **Biomechanical**
  – Hammertoe
  – Hallux abductovalgus
  – Elongated 2\textsuperscript{nd} metatarsal\textsuperscript{1}
  – Equinus

• **Iatrogenic**
  – Steroid\textsuperscript{2}

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Differential Diagnoses

- **Misdiagnosis**
  - Capsulitis / Synovitis
  - Freiberg’s disease
  - Arthritides
  - Stress fracture
  - **Neuroma**¹
    - Single 97/279
      - 3rd interspace 74.2%
    - Multiple 182/279
      - 2nd interspace 98.9%
      - 3rd interspace 100.0%

The Plantar Plate

**Plantar plate function**
- Stabilize MPJ with lumbricales and FDL
- Resists DF tensile forces
- Offers gliding surface for flexor tendons
  - **Weakest at base of phalanx**
  - Assists Windlass mechanism

**Lachman test**
- DF toe at 25°
- Translate dorsally / plantarily

Staging MPJ Instability

- **Stage 1**
  - Subtle edema with pain to plantar MPJ
  - Most (70-90%) alleviate in several days

- **Stage 2**
  - Moderate edema
  - Radiographic deviation of digit
  - Loss of toe purchase
  - Poor response to conservative treatment

- **Stage 3**
  - Moderate edema
  - Frank subluxation/dislocation
  - Often seen with HAV deformity
  - Rarely responds to conservative treatment

Staging MPJ Instability

• **Grade 0- No instability**
  - No joint pain, thickening, or swelling
  - Prodromal phase but no deformity

• **Grade 1- Mild instability**
  - Synovitis and mild deviation
  - Positive drawer sign without significant deformity

• **Grade 2- Moderate instability**
  - Dorsomedial deviation/subluxation
  - Positive drawer sign with deformity

• **Grade 3- Dislocated MPJ**
  - Positive drawer sign with cross-over deformity

• **Grade 4- Rigid dislocated MPJ**

Imaging

- Radiographs
- Ultrasound
  - Dynamic
- Arthrogram
- MRI
Imaging

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![Image of ultrasound with annotations](image)

- Base of phalanx
- MTH
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Hammertoe Complications

- **Reproducibility**
  - Predictable results
    - Arthrodesis
  - Retire the arthroplasty

- **Typical complications**
  - Incision contracture
  - Prolonged swelling
  - Floating toe
  - Poor purchase
  - Deviated toe if performing arthroplasty
  - Issues with K-wires
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• **Proposed algorithm**
  – Rigid?
    • PIPJ arthrodesis
  – Flexible?
    • Restore MPJ and PIPJ congruency with tendon transfer(s)

  – **Goals**
    • Restore FDL function
    • Joint congruency
    • Correct transverse plane deformity

• **Typical complications**
  – Incision contracture
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Literature

• Revision of failed foot surgery: a critical analysis
  – $n = 244$
  – Most common reason for revision
    • Transfer metatarsalgia
    • Recurrent bunion
    • Lesser digit deformity
  – Satisfaction rates after revision
    • Revisions- 176/244
    • 24% with reservations
    • 6% dissatisfied

• **Complications of digital and lesser metatarsal surgery**
  – Risk factors and co-morbidities
  – Wound healing and infectious complications
  – Smoking
  – Implant failure and management
  – Acute digital correction of longstanding toe deformities
  – AVN of lesser metatarsals following surgery
  – Floating and flail toe deformity

Distal Metatarsal Osteotomy

• **Indications**
  - Metatarsalgia
  - Metatarsal parabola
  - Plantar plate techniques

• **Floating toe rates**
  - Migues, *et al.*
    - Incidence
      - Osteotomy alone 28.5%
      - With digital correction 50.0%
  - Highlander, *et al.*
    - Incidence
      - Floating toe 36.0%

Malposition

• **Considerations**
  – Level of deformity
  – Influence of adjacent digits
  – Osseous versus soft tissue
Optimizing Results

- **Recognizing pathology**
  - Anatomy
  - Plantar plate injury?
  - Rigidity
  - Plane(s) of deformity

- **Predictable outcomes**
  - Arthrodesis
  - Tendon transfers
    - FDL
    - EDB
Case Scenario- Plantar Plate

- Direct plantar approach
Case Scenario - Plantar Plate

- **Dorsal surgical approach**
  - Metatarsal osteotomy
  - Plantar plate exposure
  - Suture plantar plate
  - Phalanx suture tunnels
  - Tension repair
  - Metatarsal fixation
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Case Scenario - Plantar Plate

- **What did I do?**
  - Repaired attenuated ligament
  - Will it hold?

- **Alternative**
  - FDL tendon transfer

Pre-op

Post-op

Reinforce correction with steri-strips
Case Scenario- FDL Transfer

- **Surgical approach**
  - PIPJ preparation
  - FDL tendon
  - Bone tunnel
  - Tension tendon
  - Bone anchor
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Case Scenario- EDB Transfer

• Surgical approach
  – Metatarsal bone tunnel
    • Pass suture under deep intermetatarsal ligament
  – Proximal phalanx bone tunnel
  – Adjust tension

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Post-operatively

- **Cicatrix contracture**
- **Splintage**
  - K-wire
  - Bandaging
  - Taping
  - Splinting
- **Weightbearing status**
  - Surgical shoe
Conclusions

- **Accurate diagnosis**
  - Determine deforming factors

- **Balance expectations**

- **Be definitive on surgical procedures**
  - Arthrodesis
  - Tendon transfers
Annual Surgical Conference 2018

Thank You

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