MANAGING ARTHRITIS OF THE FOOT AND ANKLE

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Orthopedics Symposium for the Primary Care Physician: Arthritis Update
OVERVIEW - ARTHRITIS

• 50 million Americans
• 20% adults, 50% over age 65
• #1 cause of disability
• Most lost work days than any other medical condition
  • 172 million workdays annually
• $156 billion in lost wages and medical costs
OVERVIEW – FOOT/ANKLE ARTHRITIS

• Forefoot
  • Hallux Rigidus
• Midfoot
  • Degenerative
  • Lisfranc
• Ankle
OVERVIEW – FOOT/ANKLE ARTHRITIS

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HALLUX RIGIDUS – INTRODUCTION

- Degenerative arthritis of 1st MTP joint
- Latin – “Stiff big toe”
- 2nd most common great toe condition
- Most common arthritis of foot
- 1/40 (2.5%) over age 50
- Females > Males
HALLUX RIGIDUS – BIOMECHANICS

• ROM
  • 15° Plantarflexion
  • 75° Dorsiflexion
  • 50% bodyweight during gait
  • 2-3x bodyweight during running
  • “Essential joint of foot”
HALLUX RIGIDUS – PRESENTATION

- Pain
- Stiffness
- Dorsal prominence
- Lateral overload
HALLUX RIGIDUS – PHYSICAL EXAM

- ROM
- Midrange pain vs. extremes
- Dorsal prominence
HALLUX RIGIDUS – TREATMENT

- Conservative
  - Extra-depth toe box shoe
  - Morton’s extension orthosis
  - Stiff-sole rocker bottom shoe
  - NSAIDs
  - Injection therapy
HALLUX RIGIDUS – TREATMENT

• Early stage – operative
  • Cheilectomy
    • Resection of dorsal osteophytes
    • Resection of degenerative metatarsal head (30-40%)
  • Synovectomy
  • Removal of loose bodies
• Joint-sparing
• Preserves ROM
• Does not burn bridges
HALLUX RIGIDUS – TREATMENT

- Early stage – operative
  - Results
    - Nicolosi *JFAS* 2015
      - 58 patients
      - 7.1 year follow up
      - 88% good-excellent results
      - 3% progress to fusion
    - Coughlin *JBJS Am* 2003
      - 93 patients
      - 9.6 year follow up
      - 92% good-excellent results
      - 8% progress to fusion
HALLUX RIGIDUS – TREATMENT

• Late stage – operative
  • Arthrodesis
    • Resection of degenerative articular surfaces
    • Fixation with screws, plates, staples
  • Fusion rates 90-100%
  • Adjacent joint arthritis
  • Activity limitations
  • Shoe wear limitations
HALLUX RIGIDUS – TREATMENT

- Late stage – operative
  - Arthroplasty
    - Replacement of phalanx or metatarsal joint surface with metallic implant
  - Preserves motion
  - Simpler post operative recovery

- Clement *Bone Joint J* 2016
  - 97 implants
  - Minimum 5 year follow up
  - 85.6% implant survivorship
  - 75% satisfied
  - Younger age predictive of failure
HALLUX RIGIDUS – OUTCOMES

- Raikin *JBJS Am* 2007
  - Cohort study
  - 21 hemiarthroplasties and 27 arthrodesis
    - 24% arthroplasty failures, 38% surviving cut-out
    - 57% good/excellent results
    - Pain 2.4/10
  - 0% nonunion of fusion
  - 81% good/excellent results
    - Pain 0.7/10
HALLUX RIGIDUS – OUTCOMES

• Brewster JFAS 2010
  • Systematic review
  • Arthroplasty vs. arthrodesis
  • Similar pain relief
  • 7% median revision rate for arthroplasty
  • 0% median revision rate for arthrodesis
HALLUX RIGIDUS – FUTURE

- Synthetic cartilage implant
- Hydrogel
  - Saline
  - Polyvinyl alcohol
- Baumhauer FAI 2016
  - Prospective, randomized, multicenter trial (Canada, UK)
  - Equivalent pain relief, functional scores
  - 6° improved ROM
  - 9% converted to arthrodesis at 2 years
  - No fragmentation, wear, or bone loss
HALLUX RIGIDUS – FUTURE
OVERVIEW – FOOT/ANKLE ARTHRITIS

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LISFRANC – INTRODUCTION

- Napoleon's military surgeon
- 0.2% of all fractures
- Missed approximately 20% of time
- Need high index of suspicion based on history and physical exam
  - Axial load on a plantarflexed foot
    - Someone falls onto the back of a person's foot
  - Twisting midfoot injury
  - Brake pedal injury
LISFRANC – INTRODUCTION
LISFRANC – INTRODUCTION
LISFRANC – BIOMECHANICS

- Lisfranc ligament – medial cuneiform to 2nd metatarsal base
- Roman arch/keystone
- Strong plantar ligaments
- ROM
  - 1st – 1.6°
  - 2nd – 0.6°
  - 3rd – 3.5°
  - 4th – 9.6°
  - 5th – 10.2°
LISFRANC – PHYSICAL EXAM

- Ecchymosis on plantar midfoot arch
- Swelling
- Tenderness at 1st TMT joint
- Increased pain with twisting of forefoot while holding heel steady
- Single limb heel rise
- Flatfoot deformity
LISFRANC – TESTS

- Weightbearing x-rays (? single-limb)
- Additional radiographic studies
  - CT
    - Shows alignment, subtle fractures, pre-op study of choice
  - MRI
    - Shows injury to ligament
    - Does not answer question of stability
- Exam under anesthesia
LISFRANC – TREATMENT

- Malreduced – 60% arthrosis
- Bony injury/stable/aligned
  - Non weight bearing immobilization for six weeks
- Pure ligamentous/displaced
  - Surgery
    - ORIF
    - Arthrodesis
LISFRANC – OUTCOMES

- Ly JBJS Am 2006
  - Prospective randomized trial
  - 41 patients
  - ORIF vs. arthrodesis
  - Average follow up 42.5 months
  - AOFAS score – 68 for ORIF, 88 for arthrodesis
  - 25% ORIF converted to arthrodesis
  - Return to preinjury level of activity – 65% ORIF, 92% arthrodesis
• Sheibani-Rad *Orthopedics* 2012
  • Systematic review
  • 6 articles, 193 patients
  • ORIF vs. arthrodesis
  • Average follow up 1 year
  • AOFAS score – 72.5 for ORIF, 88 for arthrodesis
  • No significant difference for anatomic reductions
LISFRANC – CASE

INJURY FILM – NWB

7 WEEKS – NWB
LISFRANC – CASE

9 WEEKS - STANDING

POST-OP
LISFRANC – CASE 2

INJURY FILM - NWB

WB FILM
LISFRANC – CASE 2

INTRA-OP STRESS

POST-OP
OVERVIEW – FOOT/ANKLE ARTHRITIS

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- Midfoot
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ANKLE ARTHRITIS – INTRODUCTION

- Tibiotalar joint disease
- Most often post traumatic

<table>
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<th>Hips</th>
<th>Knees</th>
<th>Ankles</th>
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<tr>
<td><strong>Total</strong></td>
<td>167</td>
<td>424</td>
<td>48</td>
</tr>
<tr>
<td><strong>Primary</strong></td>
<td>109 (65%)</td>
<td>347 (82%)</td>
<td>9 (19%)</td>
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<tr>
<td><strong>Post-traumatic</strong></td>
<td>14 (8%)</td>
<td>53 (12.5%)</td>
<td>26 (54%)</td>
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<tr>
<td><strong>Rheumatoid</strong></td>
<td>3 (2%)</td>
<td>15 (3.5%)</td>
<td>7 (14.6%)</td>
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<tr>
<td><strong>Neuropathic</strong></td>
<td>0 (0%)</td>
<td>3 (0.7%)</td>
<td>3 (6%)</td>
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<tr>
<td><strong>Dysplastic</strong></td>
<td>18 (11%)</td>
<td>2 (0.5%)</td>
<td>3 (6%)</td>
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<tr>
<td><strong>AVN</strong></td>
<td>18 (11%)</td>
<td>2 (0.5%)</td>
<td>0 (0%)</td>
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<tr>
<td><strong>Other</strong></td>
<td>5 (3%)</td>
<td>2 (0.5%)</td>
<td>1 (2%)</td>
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ANKLE ARTHRITIS – BIOMECHANICS

- ROM
  - 20° dorsiflexion
  - 50° plantarflexion
- Talocrural angle
- “Mitered hinge”
- Center of rotation
ANKLE ARTHRITIS – PRESENTATION

- Pain
- Stiffness
- Swelling
- Mechanical symptoms
- Shoe wear
ANKLE ARTHRITIS – PHYSICAL EXAM

- Standing alignment
- ROM
- Ligament stability
ANKLE ARTHRITIS – TREATMENT

- Conservative
- Bracing
- NSAIDs
- Injection therapy
ANKLE ARTHRITIS – TREATMENT

- Operative
  - Arthrodesis
    - Resection of degenerative articular surfaces
    - Fixation with screws, plates
  - Fusion rates 90-100%
  - Adjacent joint arthritis
  - Activity limitations
ANKLE ARTHRITIS – TREATMENT

• Operative
  • Arthroplasty
    • Replacement of both joint surfaces with metallic implant, poly insert
  • Preserves motion
  • Simpler post operative recovery
ANKLE ARTHRITIS – TREATMENT

- Surgical preference changing
- 13% TAA – 2007
- 26% TAA – 2010
- 2014 – 25,000 TAA vs 80,000 arthrodesis
  - 300,000 THA
  - 700,000 TKA
    - 2030 projection – 3,500,00 TKA!!!!
ANKLE ARTHRITIS – OUTCOMES

- Haddad *JBJS Am* 2007
  - Systematic review
  - Arthroplasty vs. arthrodesis
  - 852 vs. 1262
  - 68.5% vs. 68% good/excellent results
  - 7% vs. 9% revision rate
  - 78% TAA survivorship at 5 years, 77% at 10 years
ANKLE ARTHRITIS – OUTCOMES

- Daniels JBJS Am 2014
  - Prospective cohort study
  - Arthroplasty vs. arthrodesis
  - 281 vs. 107
  - Mean follow up 5.5 years
  - 17% vs. 7% revision rate
  - No statistical difference between patient outcome scores
ANKLE ARTHRITIS – FUTURE

- Goldberg *BMJ Open* 2016
  - TARVA – TAR vs. arthrodesis
  - Prospective randomized trial
  - 328 patients, age 50-85
  - 16 UK centres
  - Primary outcome – validated patient-reported outcome measure
  - Cost-effectiveness analysis