Update on Total Ankle Replacements
(and other cool foot & ankle stuff)

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Objectives

• What does an orthopedic foot & ankle specialist do?

• Review ankle arthritis

• Cover treatment options
  – Nonoperative (meds, pt, brace, injection, etc)
  – Surgical (joint-sparing, replacement, fusion)

• Learn about total ankle replacement
  – Preop optimization
  – Surgery
  – Postop care
  – Long-term maintenance
  – Interesting cases
My Background
At 10 years, the rate of adjacent joint subtalar arthritis after ankle fusion is:
1. 20%
2. 40%
3. 60%
4. 90%
At 10 years, the rate of implant survivorship after ankle replacement is:

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My Practice

• Foot & Ankle
  – **Ankle Arthritis**: replacement, fusions, arthroscopy, osteotomies
  – **Sports**: ligament/tendon repairs, Achilles repair, cartilage lesions
  – **Trauma**: Lisfranc midfoot, fractures (ankle, pilon, calcaneus, talus, metatarsal)
  – **Deformity**: flatfoot, cavus foot, varus, valgus, bunions, hammertoes
  – **Diabetes**: Charcot arthritis, ulcers, osteomyelitis, amputations
  – **Rheumatoid**: fusions, deformity corrections
  – **Nerves**: Morton’s neuroma, Tarsal tunnel syndrome

• General Orthopedic Trauma
  – **Adult**: fractures (hip, wrist, elbow, shoulder, ankle, knee, etc), infections
  – **Pediatric**: fractures (wrist/forearm, ankle, elbow, femur, tibia), infections

• Knee
  – **Meniscal Tears**: arthroscopic partial meniscectomy
Metatarsal Collapse (Freibergs)
Bunions
Supersized Bunions
Would you like hammertoes with that?
(Rhuematoid Forefoot)
Rhuematoid Forefoot
Rhuematoid Forefoot
A night on call...
(or a weekend)
Gifts from Galbraith Mountain
Open, Comminuted, Segmental (with a prior ACL screw)
Day Care “Oopsie Daisy”
Type III Pediatric Elbow Fracture
Mossy rooftops are slippery...
Comminuted, Intra-articular Calcaneus Fracture
“This year I’m going to put Christmas lights on the big tree...”
Open Comminuted Pilon Fracture
Ankle Arthritis
Ankle Arthritis

• Less common than hip/knee arthritis

• Types:
  – Post-Traumatic Arthritis (65%)
  – Primary Osteoarthritis (10%)
  – Inflammatory Arthritis
    • Rheumatoid, Psoriatic, Gout, Pseudogout
  – Neuropathic
  – Osteonecrosis
  – Septic Arthritis
  – Hemophilia
Ankle Arthritis

• Radiographs:
  – Weightbearing 3 views ankle
    • AP, Lateral, and Oblique

• Weightbearing shows us true cartilage wear and how close the bones get with functional loading
Ankle Arthritis

- Nonoperative Treatment Options
  - Activity Modification
    - Avoid hills, uneven ground, impact
    - Try unloaded exercise (pool, bike, kayak, rower)
  - Weight loss
  - Rocker sole shoe
  - Orthotics
  - Immobilization/Bracing (ASO, boot, SMAFO, Arizona)
  - PT
  - NSAIDs
  - Injections
  - Alternative (acupuncture, Willow Curve?, Australian Dream?)
Ankle Arthritis

• Ankle Injection
  – Antero-Medial (my first choice)
    • Soft spot between medial malleolus, medial talar dome, and anterior tibial tendon
  – Antero-Lateral
    • Soft spot between lateral malleolus, lateral talar dome, lateral tibia, and extensor digitorum longus tendons
  – Go where the spurs aren’t
    • Find the wide open space
    • Range the ankle to help
    • Ankle distraction can help get needle in
Ankle Arthritis

• Operative Treatment Options
  – Debridement, Excision spurs
  – Distraction Arthroplasty
  – Supramalleolar Osteotomy
  – Ankle Fusion
  – Total Ankle Allograft Replacement
  – Total Ankle Replacement
Ankle Arthritis

• Outcome Issues:
  – Debridement, Excision spurs
    • Possible faster progression of arthritis
  – Supramalleolar Osteotomy
    • Short term success, nonunions
  – Distraction Arthroplasty
    • Short lived, if it works
  – Allograft Arthroplasty
    • Less than 50/50 chance of success
Ankle Arthritis

• Fusion or Replacement?

• **Fusion:**
  – Nonunion rate 10%
  – **Subtalar arthritis rate 90% at 10 years**

• **Replacement:**
  – Range of motion increase of 11 degrees
  – Lucency rate 23% at 4.5 years
  – Total reoperation rate 11% (impingement, cysts, loosening, failure)
  – **Implant survival 90% at 10 years**

• Both patients are generally happy
• Replacement patients score higher due to motion

• Does replacement protect against adjacent joint arthritis?
  – Yes, compared to fusion.
Ankle Fusion, Subtalar Arthritis

- 52 y.o. healthy woman
- MVA 30 years ago, tibia fx
- Ankle and knee arthritis
Ankle fusion 3 years ago

- Presents to me with subtalar arthritis
Her Theoretical Timelines

**Ankle Fusion**
- Year 0: ankle fusion
- Year 3: subtalar fusion
- Year 4: total knee
- Year 5: convert to total ankle
- Year 7: doing well
- 4 surgeries
- 5 years of pain needing surgeries

**Ankle Replacement**
- Year 0: Total Ankle
- No need for subtalar fusion?
- No need for total knee yet?
- Would total ankle need revision? Hopefully not for 10+ years.
- 1 surgery?
- = less than a year of pain?
Total Ankles: Our Series

• My Training:
  – 75 total ankles during fellowship year at Duke
    • 3 surgeons, large academic center

• 4 Years at PeaceHealth in Bellingham
  – Now over 60 total ankles (Taranow combined)
  – Only 3 re-operations = 5%, (compared to 11%)
    • 2 spur debridements, 1 cyst grafting
    • No failures, no infections, no wound problems
Patient Selection & Pre-op Optimization

- **Diabetics**
  - HbA1C < 7
  - Tight perioperative glucose control

- **Smokers**
  - Must quit prior to surgery

- **Rheumatoid Arthritis**
  - Consult with rheumatologist, many meds can be taken

- **Lymphedema controlled**

- **Hypovitaminosis D**
  - Correct to > 30

- **Dental Infections resolved**
Contraindications

• Absolute:
  – Neuropathic Joint
    • Charcot Arthropathy, severe peripheral neuropathy
  – Severe ankle or foot deformity
  – Severely scarred soft tissues, plastics flaps
  – Open Ulcer or active infection
  – Extreme laxity (Marfan’s)
  – Motor functional weakness/paralysis
  – High functional demand patients (contact sports, construction)

• Relative:
  – Osteonecrosis
  – Previous ankle infection
  – Uncontrolled diabetes
  – Severe Lymphedema
  – Severe vascular insufficiency
  – Young age?
Total Ankle Surgical Team

In The Room:
• Dr. Kiesau
• Dr. Taranow
• Ortho PA Assist
• Anesthesiologist
• Scrub Technician
• Nurse Circulator
• Radiology Technician
• Device Representative
• The patient, too!

Peri-operative:
• many clinic/hospital providers & staff
Anesthesia

• Popliteal Block
  – Intra- and Post-operative pain control
  – Lasts about 16 hours

• Combined with general anesthesia
Total Ankle Surgery Info

• 2-3 hours if straightforward
• 4-8 hours if complex
  – Additional procedures to correct other deformities
• 1 night admission
• Can usually bear weight at 2 weeks postop

• Reimburses only 70% of a total knee or hip
  – takes twice as long to perform
  – Typically uses two surgeons
Typical Postop Care

- 1 night admission
- Splint, nonweightbearing, elevation, scooter
- Stitches out at 10-14 days
- Start walking in a boot
- Work on range of motion
- Wean to ASO brace at 6 weeks
- Can do PT if needed
- Regular activities at 3 - 4 months
- Gradual improvements over the year
Maintenance

• Similar to arthritis management:
  – Weight loss
  – Activity modification
    • Low impact exercise/sports ok (hiking, biking, groomers)
    • High impact are not (running, soccer, moguls)
  – Radiographs every 1 – 2 years
A Few Cases

• The awesome ones, of course!
Post-traumatic Ankle Arthritis

- 64 y.o. lady
- Prior tibial shaft fracture
- Healed in valgus angulation deformity
- Developed knee, ankle and subtalar arthritis
- Total knee replacement
Post-traumatic valgus arthritic
After osteotomy, subtalar fusion
After osteotomy, subtalar fusion
Total Ankle Bone Cuts
STAR after Osteotomies
1 Year Postop
Disaster Strikes!

• But, it’s not her.
Failed Buechel-Pappas Ankle

- 70 y.o. male, healthy
- Ankle replacement 14 years ago in NYC
- Previous triple arthrodesis
- Wears SMAFO brace
- Constant pain, instability
OR Plan

- Fusion hardware in room
- Ex-plant
- Ankle reduction
- Inbone total ankle
- Bone grafting tibia and fibula
- ORIF fibula
- Allograft tendon lateral ligament repair
- Say a prayer
INBONE
1 Year
1 Year
Not everyone gets a total ankle

- 28 y.o. female, healthy
- Open ankle fracture, ORIF
- 1 year later: Tibial AVN, equinus, pain
- Infectious workup negative
1 Year later

Weight Bearing
6 Weeks
STAR
Speaking of disasters...
Severe Varus

• 58 y.o. male, no medical problems
• Post-traumatic arthritis, MVA, multiple surgeries
• Uses Arizona brace daily
• 22 degree varus deformity
• equinus
Preop Video
OR Plan

- Inbone Total Ankle
- Medial Malleolar Osteotomy
- Lateral Ligament Reconstruction
- 1st MT Dorsiflexion Osteotomy
Walking Videos

Pre-Op

3 Months
Walking Videos

Pre-Op

6 Months
1 ½ Years Postop
1 ½ Years Postop
1½ Years Postop
Photos

Pre-Op

Post-Op
Sydney, Aus
Celebrated my one year anniversary with the Bridge Climb in Sydney, Australia. 1,400 + stairs to climb and my ankle handled it wonderfully.

Thanks again to both of you. Yeah, given me my mobility and quality of life back.

Thanks.

Stephen Winn
Thank You
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