Lesser Toe Anatomy
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- 1st dorsal interosseous muscle
- Extensor tendons
- Extensor hood
- Flexor digitorum longus
- Lumbrical
- Deep transverse metatarsal ligament
Lesser Toe Anatomy

- Peroneus tertius
- Extensor digitorum longus
- Flexor hallucis longus
- Extensor retinacula
- Superior retinaculum
- Inferior retinaculum
- Extensor digitorum brevis
- Tibialis anterior tendon
- Dorsal interossei
- Metatarsals 1, 2, 3, 4, 5
Intrinsic Plus
Intrinsic Minus
Lesser Toe Deformities

- **Mallet toe**
- **Hammer toe**
- **Claw toe**

Painful Spot
Claw Toes

• Two Main Causes
  – Neuromuscular
    • Anything that wipes out the intrinsics
    • Usually multiple and bilateral
  – Mechanical
    • Bad Shoes, Bad Fit
Mechanical Pathoanatomy

• A small toebox squashes the MTPJ into extension
• In MTPJ extension, the extensors have no mechanical power
• The intrinsics are small and easily overpowered
Mechanical Pathoanatomy

• With Time:
  – The plantar plate becomes attenuated
  – The flexors become contracted
  – The MTP, PIP, and DIP joints become rigid
Hammertoes

• Deformity is isolated to the PIPJ
  – The DIPJ is happily in neutral
• The MTPJ is less involved, early
  – MTPJ Extension is usually a product of bearing weight on a bent toe
Mallet Toes

- Deformity is confined to the DIPJ
- Can be traumatic (like mallet fingers)
- Isolated FDL tightness
- Iatrogenic
To Summarize...
Presentation

Ugly Toes

Calluses

MTP Joint Pain
Exam

• Sitting and Standing!
• Are the joints flexible, semi-rigid, or rigid?
• Are there calluses dorsally (PIP/DIPJ)?
• Are there calluses plantarly (MTPJ)?
• Are there toe-tip ulcers?
• Are the MTP joints contracted, lax, or dislocated? Are there cross-over toes?
  – We’ll cover this in a minute
Radiographs

Get some. Make sure they’re weightbearing.
Conservative Treatment

• Wide, high toebox shoes
  – Soft upper sole

• Whizzbangs and Whatsits
  – Toe crest
  – Budin Splint
  – Pads
  – Sleeves
Toe Taping

• Daily toe strapping/taping

• May add MT pad
Surgery for Flexible Problems

• These are generally tendon (FDL) related
• They are dynamic and positional
  – Present when standing or ankle dorsiflexed
  – Absent when NWB or ankle plantarflexed

So If you’ve established that FDL tightness is the only problem....
  Address it.
Surgery for Flexible Problems

Hammers and Claws:

Girdlestone-Taylor Flexor-to-extensor xfer

- Cut FDL from P3
- Split it
- Sew it into the extensor hood
Surgery for Flexible Problems

Mallets (etc):
Even Easier!

Just percutaneously tenotomize the tendon.

Poke!
Surgery for Fixed Problems

• DuVries PIP / DIP Arthroplasty
The DuVries Arthroplasty

- Use a horizontal incision to remove the callus
- Soft tissue release around joint
- Excise the condyles right as they flare out
- The union will be bone or fibrous. The pin just holds the alignment during scar formation
DuVries Complications

- Swelling
- Pin problems – Infection, Patient Freak-Out
- Molding / Crooked Healing
- Flail Toe (excessive resection -> Nonunion)
- Iatrogenic Mallet toe
Lesser MTP Subluxation

• Generally coexists with other forefoot deformities
• Ranges from minor laxity to subluxation to frank dislocation
• Deformity is frequently multiplanar
The Plantar Plate and MTP Capsule
Many Faces

Capsular Weakness / Plantar Plate Rupture

Bunion Casualty

Arthridites / Neuromuscular

Tenodesis Effect
The Long Second Toe

• Causes increased pressure against the toebox of the shoe

• Causes overload on the plantar surface because of the prominent MT head
Physical Exam

Are there other toe problems (HT/CT/HV)?

Does a drawer test reveal that the MTP joint is actually unstable?

Is there dorsal pain or swelling to suggest synovitis?

Is there ball pain, a long second toe, or plantar callus to suggest overload?
Imaging

How is the cascade? Are there long toes?

Is there a frank dislocation?

Is there a Freiberg Infraction, or any other zebra?
Conservative Management

• Wide/Tall Toebox Shoes
• Taping
• Metatarsal Pads
  – If metatarsalgia / plantar overload
• Achilles Stretching
  – If equinus
• NSAIDS / US-Guided Steroid Injection
  – If synovitis
Surgical Management

- A bunion must be fixed before the second toe can be expected to heal straight
- Fix HT/ CT/ MT/ neuroma at the same time

- If the toe is reducible and not too long (no plantar pain / callus / overload symptoms), don’t cut the bone!
Soft Tissue Procedures

The Dorsal Incision

Capsulotomy

Collateral Release

Extensor Z-Lengthening
Weil Osteotomy

- Allows for reduction of a dorsally dislocated MTP joint
- Shortens a long toe to relieve overload
- Increases the load on the next toe (“transfer metatarsalgia”)

![Image of osteotomy procedure]
Weil Osteotomy

Expose the MT Head. Capsular Releases as necessary.

Obliquely cut the metatarsal in line with the plantar surface of the foot.

One screw holds the osteotomy in place.
Two Important Points

• Surgery addresses the discrete structures: Bones, ligaments, tendons.
• Skin, subcutaneous tissue, fibrous bands (everything else) is critical to good alignment and should be held with tape.
The End