4th Foot & Ankle Symposium

RECURRENT INTERMETATARSAL NEUROMA

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Recurrence: General Topics

- **Pain or persistence of symptoms after surgery = main reason for reoperation**
- **Continuing complaints of pain in the affected interspace by 10-20% of patients after first attempt at excision**

Friscia DA, Orthopedics 14: 669, 1991
Mann RA, FA 3: 238, 1983

- **Pain free time after surgery: DD incomplete removal vs stump neuroma (= recurrent vs persistent symptoms)**

- **2/3 pats with persistent pain after surgery had an inadequate initial excision**

Johnson JE, JBJS (Am) 70: 657, 1988

Prognosis

- **Preop symptoms localized to one web space (2nd or 3rd) 80% of pats satisfied after neuroma resection**

- **Symptoms in both feet or more than one web space in the same foot**

  > satisfaction rate dropped significantly = relative contraindication for reoperation

Friscia DA, Orthopedics 14: 669, 1991

Pain: Type

- Different to pain before surgery?
  - Scar pain (hypertrohpy)
  - Surgically injured tissues (dorsal cutaneous nerve, accessory nerve)
  - Post-surgical stump-neuroma
  - Exostosis or callus after osseous correction
  - Postoperative fat pad atrophy

Pain: Localization

- Generally localized to webspace
- Usually plantar
- Electric type
- Slightly more proximal secondary to adhesions or neuroma formation
- Tenderness around MT heads might represent neuroma formation and / or adhesions to skin / fat pad

- **Location and type of pain important determinants, whether surgically treatable cause (incompletely resected primary interdigital neuroma, amputation stump neuroma, or other)**

Kitaoka HB, The foot and ankle, LWW, 2002

Neuroma

- **Stump neuroma of transected end more likely if it is attached to an area of friction, pressure or tension**

- **Neurotopic predilection: Transected nerves tend to grow towards the skin and towards cut surface of distal stump**

Levitsky KA, FA 14: 208, 1993

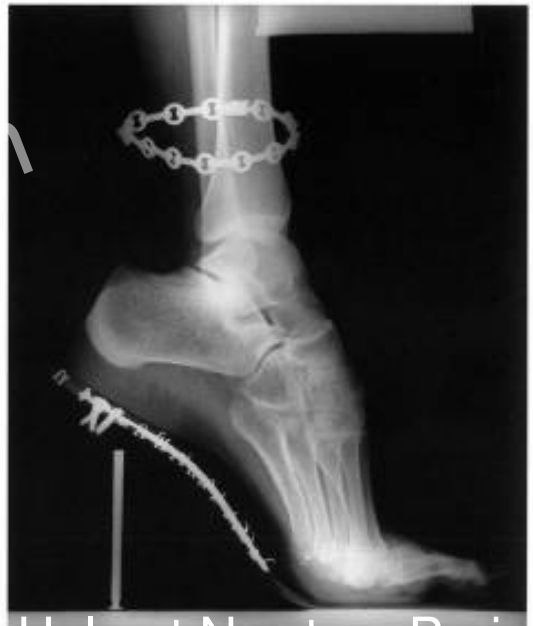
Caveat

- **2 neuromas in same foot (2/3 and 3/4) 3-13% (Ultrasound) > do not flood interspace with injection**
- **Bilateral: 13-15%**
- **Enlarged asymptomatic interdigital nerves on MRI: 33%**

Thompson FM, FA 14(1): 12, 1993

Redd RA, Radiology 171: 415, 1989

Problems post neurectomy


Helmut Newton, Paris

Predominantly female

- **88 - 93%**
- **Higher % in primary neuromas**
- **Higher incidence of fat pad atrophy and ligament weakness > toe deformity in females**
- **Return to wearing high heals, narrow toe box and thin flexible soles**

Beskin JL, FA 9: 34, 1988

Johnson JE, JBJS (Am) 70: 651, 1988

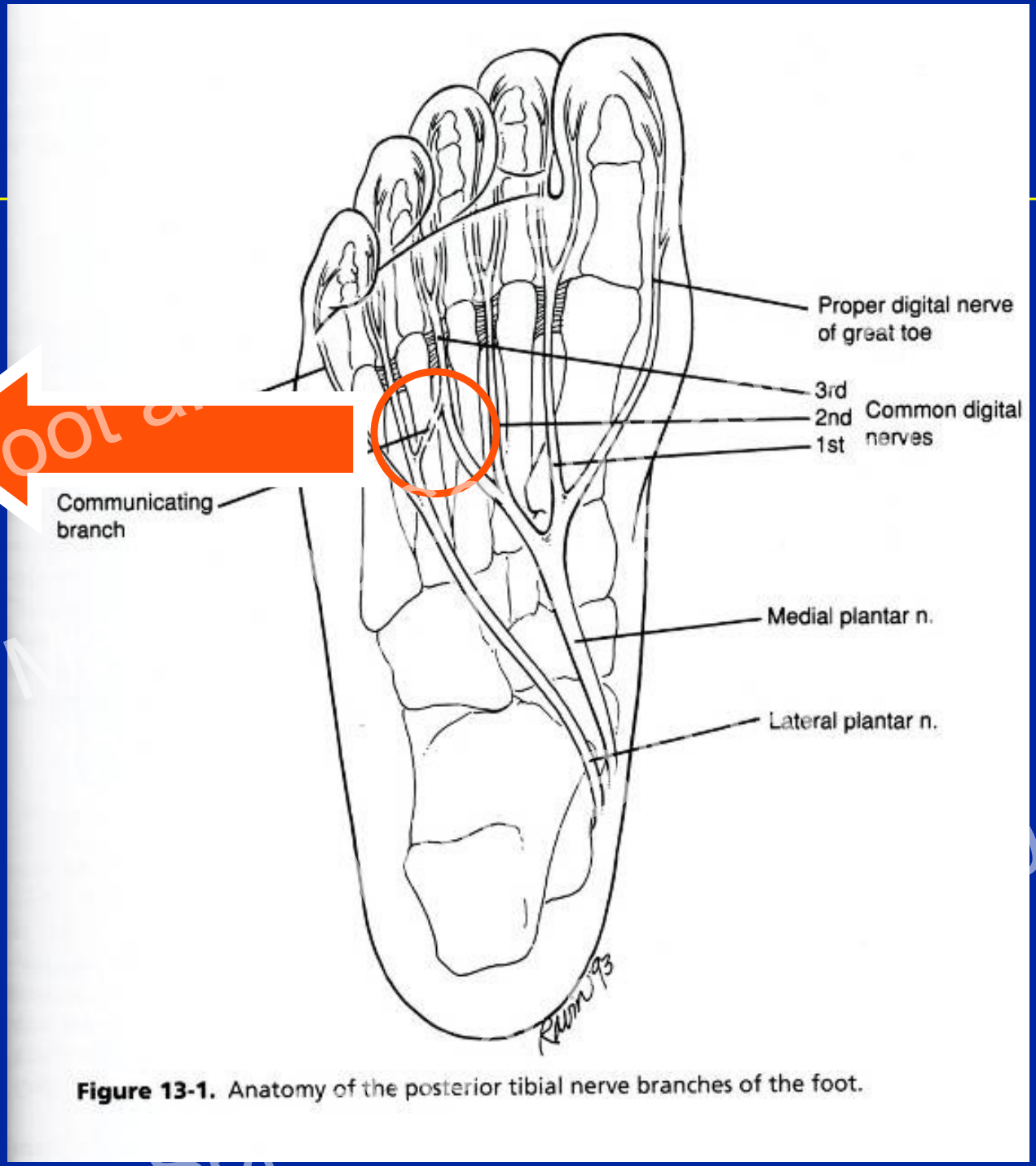
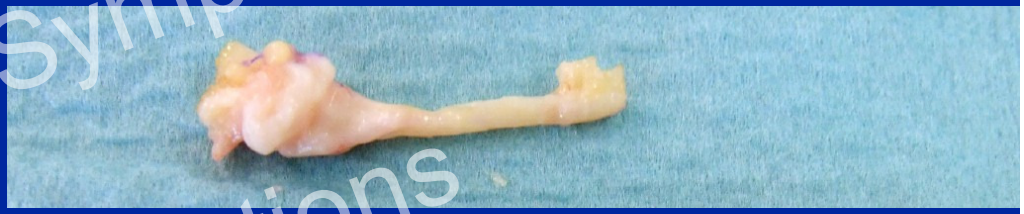


Figure 13-1. Anatomy of the posterior tibial nerve branches of the foot.

Post surgical neuromas



- True stump neuroma
- Accessory nerve neuroma
- PDNB (Plantary Directed Nerve Branches) neuroma
- PDNB prevents retraction of common digital nerve
- SPN neuroma (Superficial Peroneal Nerve)
- SPN traction neuroma
- Adhesion between transected end and adjacent structures in weight-bearing area

Mann RA, Surgery of the foot, Mosby, 1986

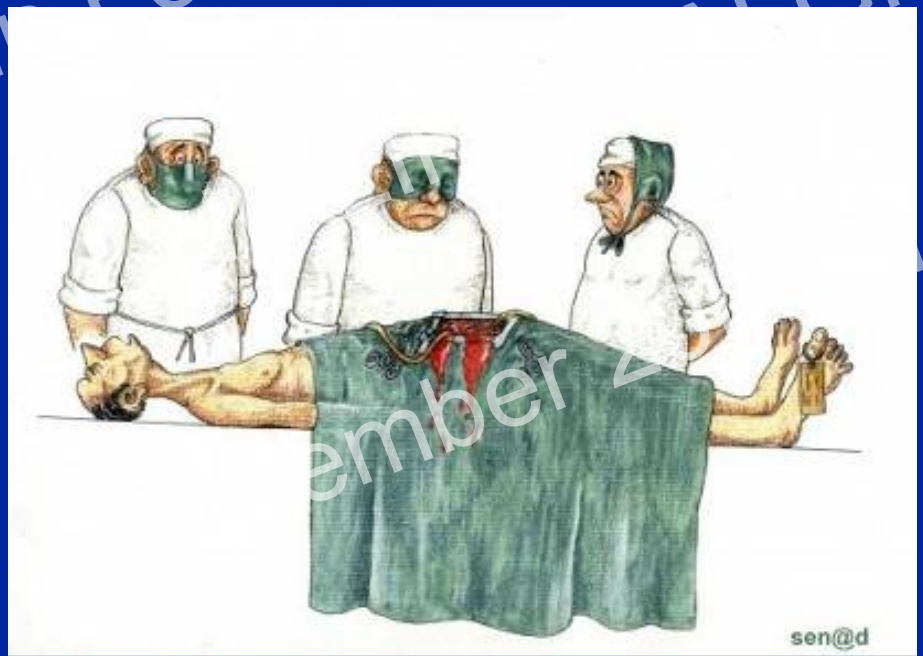
Amis JA, FA 13(3): 153, 1992

Investigations

- Anamnesis (change of habits: sports, shoes, etc)
- Previous treatments (conservative, injections (cortisone, alcohol sclerosing), surgical)
- Clinical examination
- Plain x-ray (Sesamoids!)
- Problem of US / MRI: previous surgery

Previous surgery: details?

- Approach?
- Nerve excision or decompression and neurolysis?
- Excision: nerve cut, cauterized, ligated, burried?
- Osseous corrections?



Differential Diagnoses

- **Neurological**
  - More than one neuroma
  - Different interdigital space
  - Different neurological involvement (TTS, radiculopathy)
  - Neuropathy (diabetes, alcoholic, etc)
  - CRPS

Differential Diagnoses

- **Intermetatarsal region**
  - Thickened ligament
  - Aberrant band of ligament
  - Bursitis
  - Rheumatoid nodules

Differential Diagnoses

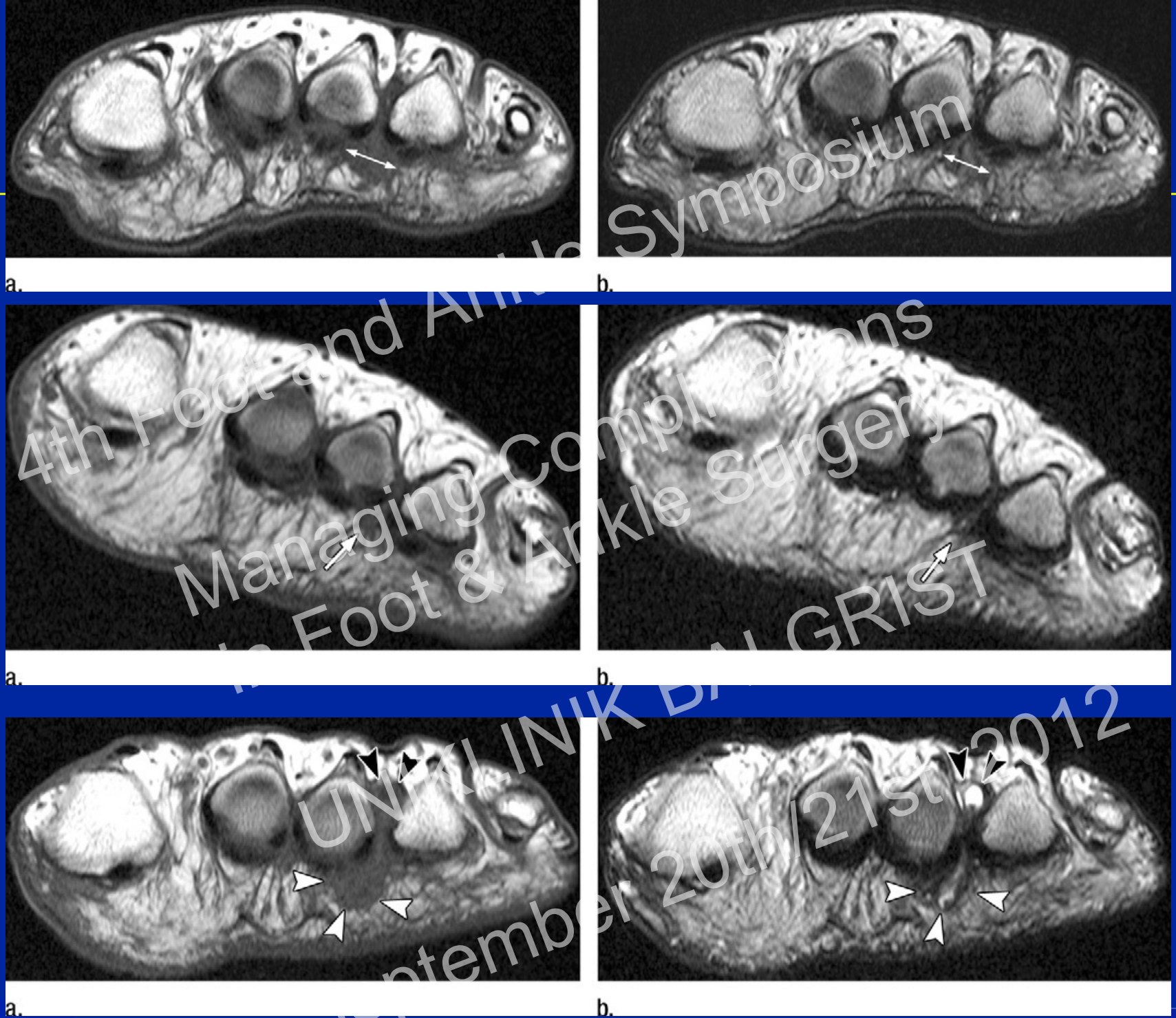
- **Osseous**
  - Metatarsal (stress) fracture
  - Metatarsal mal- / non-union
  - Metatarsal length issues
- **Cutaneous**
  - Plantar wart

Differential Diagnoses

- **MTP joint**
  - Synovitis
  - Capsulitis
  - Arthritis
  - Instability – subluxation / dislocation
  - Freiberg‘s
  - Plantar plate injury
  - Collateral ligament injury / attenuation
    - Varus / valgus drift reduces IM space
  - Ganglion

Recurrence / Persistent pain Investigations

- **Exclude other pathology (bursitis, synovitis, arthritis, stress fx)**
- **Difficulty imaging neuroma, etc**
- **To localize: diagnostic / therapeutic injection (US controlled)**



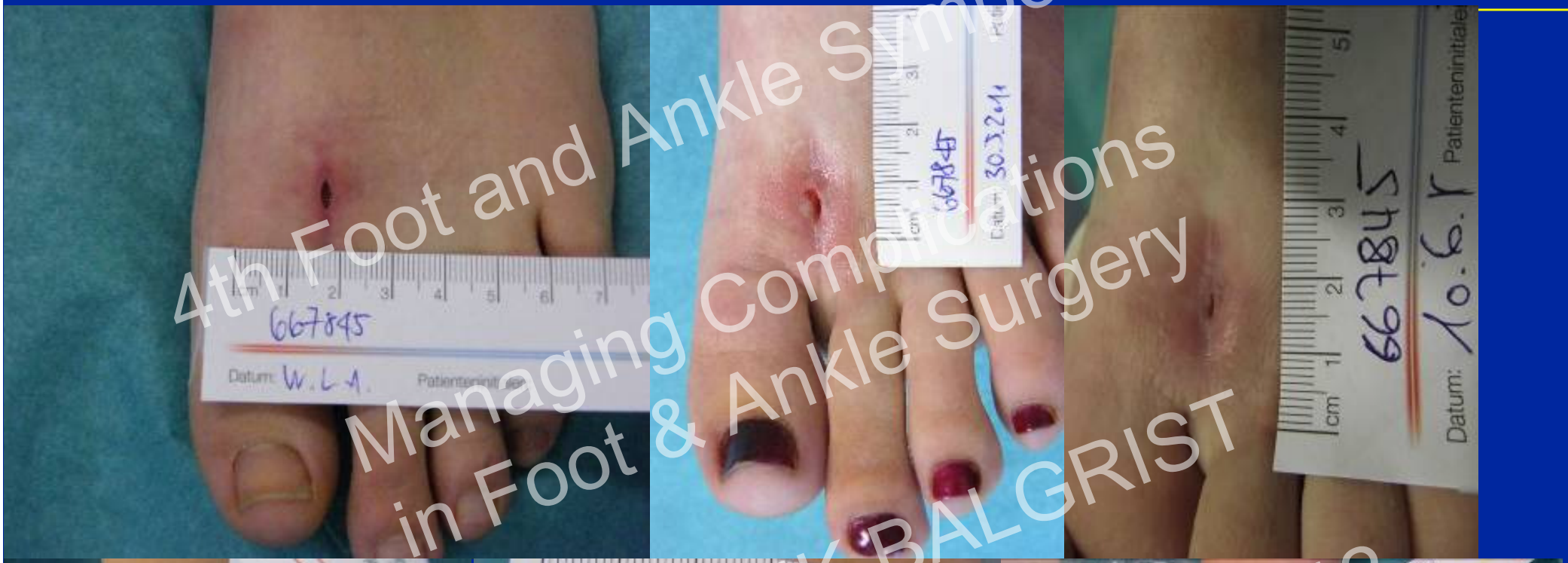
Espinosa N: Radiology 255(3): 850, 2010

MRI scanning post-Morton resection:

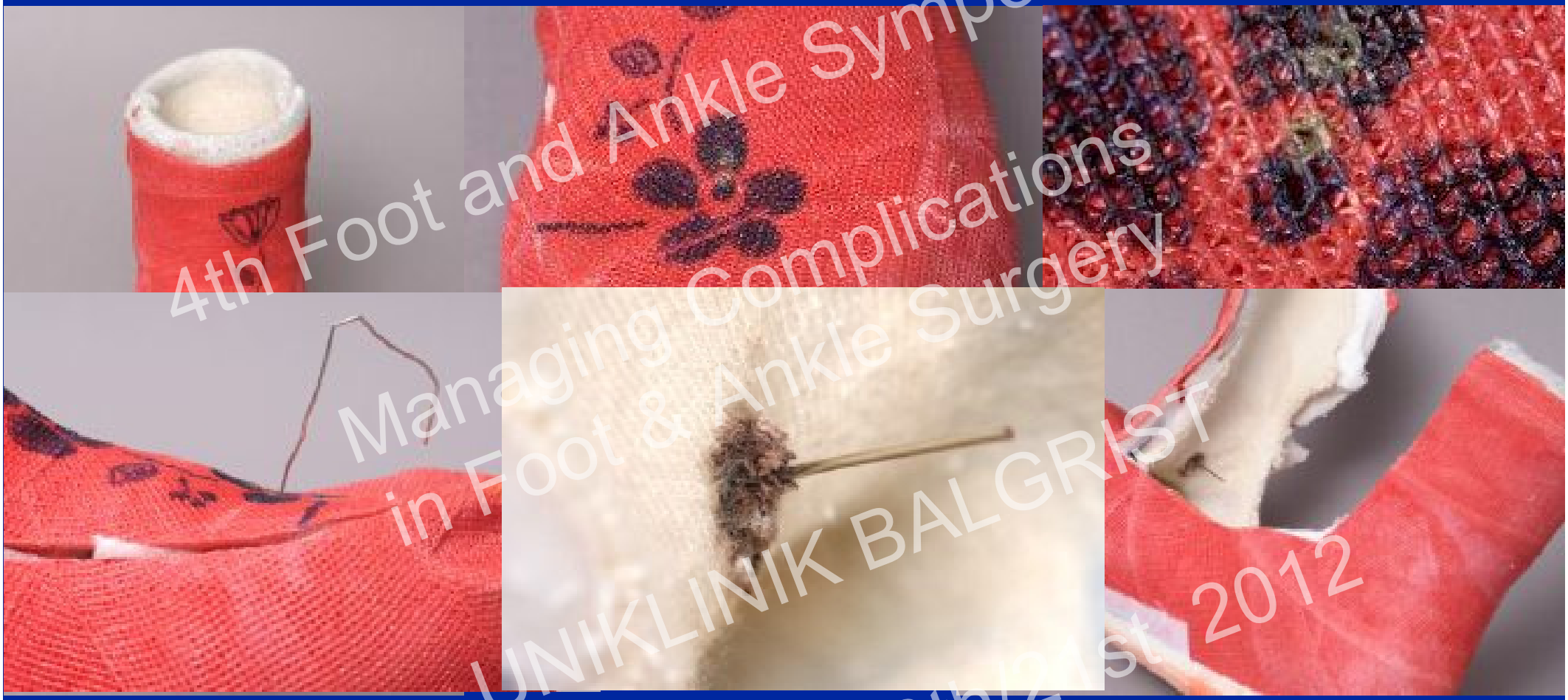
- **26% Morton‘s neuroma recurrences seen in asymptomatic patients**

- **Intermetatarsal bursitis: MRI abnormalities seen more commonly in symptomatic than in asymptomatic intermetatarsal spaces**

WL, 18 yo F, 02/11 – 05/12



The cast



Contraindications for Reoperation

- Significant peripheral vascular disease
- Peripheral neuropathy
- Pain not characteristic of a recurrent neuroma of the interdigital nerve (i.e., pain at multiple areas, inconsistent physical findings)
- Reflex sympathetic dystrophy syndrome

Other Contraindications

- **Pain not caused by a surgically treatable nerve lesion (diffuse peripheral neuritis, musculoskeletal pain, or neoplasm)**
- **Long history of chronic pain**
- **Unrealistic patient expectations**

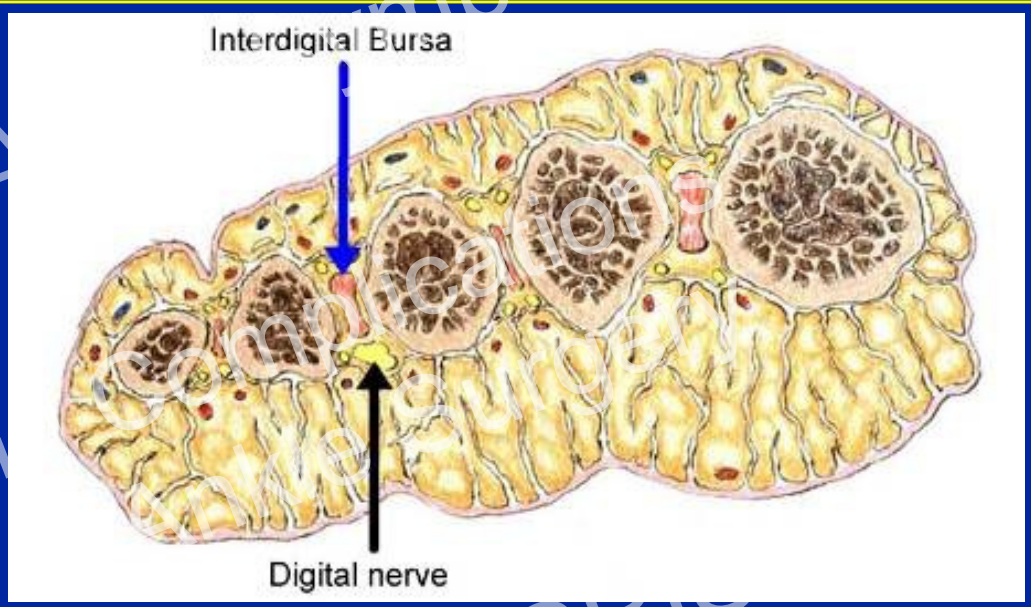
Surgery: Tipps

- **Best under any type of regional blockade > dorsal horn of the spinal cord is protected from the noxious stimuli of manipulating the already excitable nerve lesion (i.e. preemtive anesthesia)**

Myerson MS, FA 13: 282, 1992

Surgery – Which Approach?

- **Dorsal !**



- **Plantar approach only if the neuroma can not be localized from dorsal**

Problems: weight bearing surface, hypertrophic callus, later return to weight-bearing and work

Image: F&A online journal

Alternative Techniques

Neuroma resection and muscle implantation:

- **Minimal neuroma formation with significantly less scar tissue**

- **Suitable muscles(minimal excursions): Quadratus plantae and adductor hallucis**

Results

- **Many pats have after surgery some type of symptoms, only small group not improved or worse**
- **20 – 82% (completely) satisfied**
- **Up to 47% residual pain**

Mann RA, FA 3: 238, 1983

Beskin JL, FA 9: 34, 1988

Bradley N, South Med J 69: 853, 1976

Recurrence – Conservative treatment

- **Same as primary treatment options**
  - Shoe wear modification
  - Rocker bottom shoes
  - Orthotics
  - Drugs: injection, oral medication
- **Outcome:**

  Up to 82% better after injection only vs 63% better shoe modification only

Baransel S et al, FAI 26(7): 556, 2005

Shoe wear modification

Without modification

Ball of the foot roller bar

Midfoot roller bar

Internal roller bar

Stiffening

In-sole stiffening

Carbon stiffening of the in-sole

Thank you very much!