

Dr John Negrine
Foot and Ankle Surgeon
(To the poor and ignomious)

www.orthosports.com.au

47-49 Burwood Road, Concord
29-31 Dora Street, Hurstville
160 Belmore Road, Randwick



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Plantar plate repair A “game changer”

John P. Negrine, F.R.A.C.S.

Foot and Ankle Surgeon

Sydney



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Foot surgeon's car vs knee surgeon's car



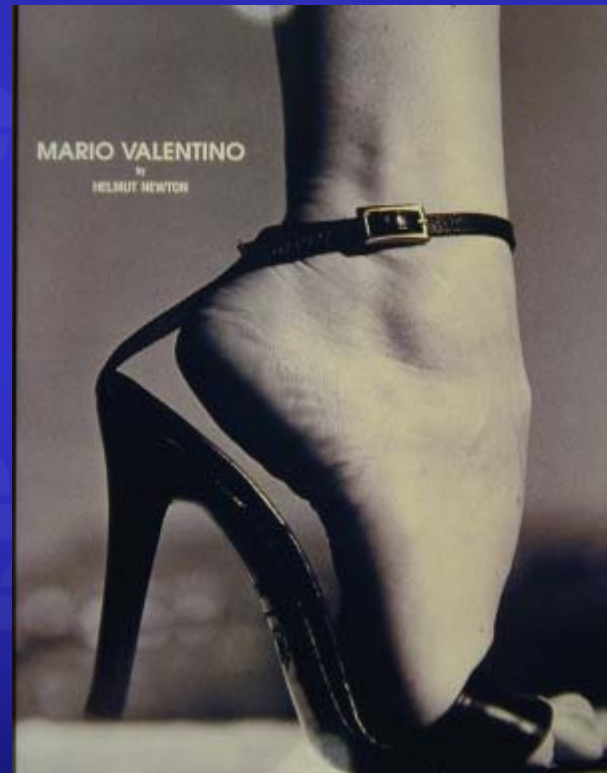
ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Patient expectations

- Always works on RPA
- The wardrobe full of sexy shoes
- Cosmesis a big issue
- Foot surgery definitely not glamorous!!



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Second MTP synovitis 1991



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

2nd MTP instability

- Very common cause of forefoot pain
- Patients describe walking on a stone
- Swelling
- Deviation of the toe
- Sometimes paraesthesia



There is a general lack of recognition of this condition among GP's, rheumatologists, podiatrists, physiotherapists and the general orthopaedic community.



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Second MTP synovitis

- Spectrum from mild pain to marked deformity
- Mostly misdiagnosed initially as 2,3 neuroma
- Much more common in my practice



Plantar plate

- Thick structure
- Blends with capsule
- From metatarsal neck proximal to articular surface to base of proximal phalanx
- Blends with collateral ligaments medially and laterally



Plantar plate anatomy

- Rectangular or trapezoidal in shape
- Approx 19 x 11 mm
- 2 – 5 mm thick
- Originated from the plantar aponeurosis and flimsy attachment to the metatarsal neck
- Firm attachment to the base of the proximal phalanx



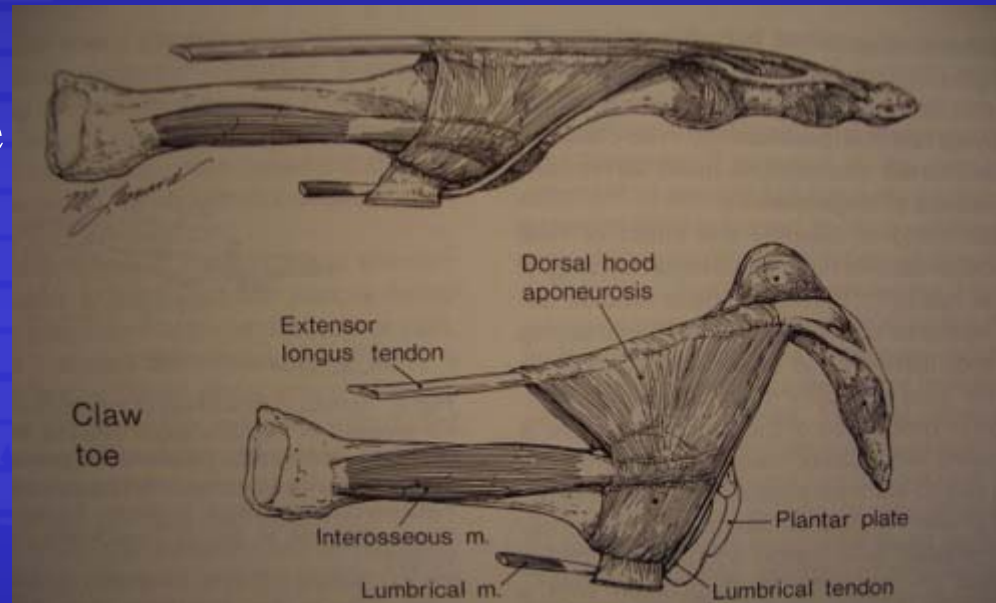
ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Patho-anatomy

- Once plantar plate ruptures interossei become extensors at MTP joint
- EDL will only extend PIP joint when proximal phalanx is flexed or in neutral
- EDL therefore a significant deforming force when MTP is hyper-extended



Fortin and Myerson 1995



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Is this where hammer toes begin?



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Isn't that exciting???



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Causes of 2nd MTP instability

- Long second metatarsal
- Hallux valgus
- Impact runners
- Arthritides
- Neuromuscular disease

- “Wear and tear”



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

What is the incidence of plantar plate tears in the normal population?

- 20 specimens
- 6 male average age 56.7
- 14 female average age 71.1
- 14/20 plantar plate tears 70%
- 3/6 males 50%
- 11/14 females 78.6%

(Intervertebral disc, rotator cuff, meniscus)



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Lowell Weil Jr. August 2012

Dr John Negrine
Adult Foot & Ankle Surgery

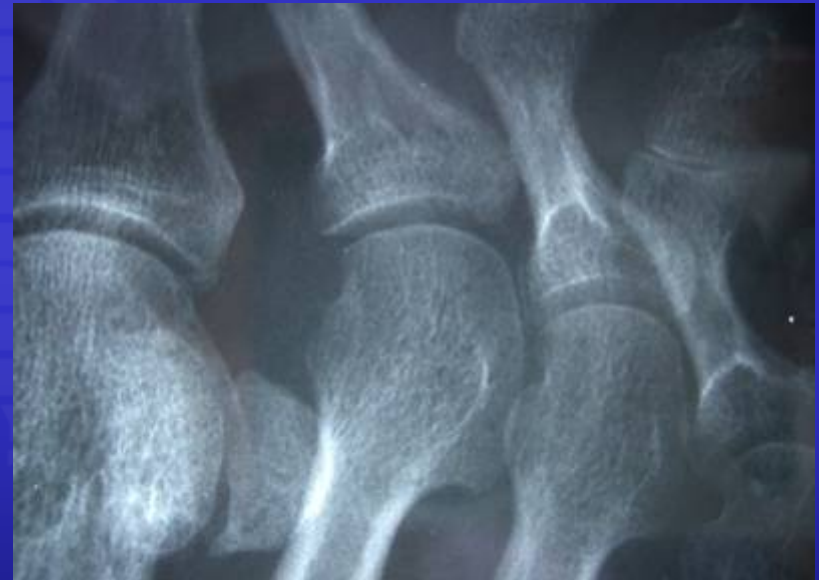
Diagnosis

- Clinical and usually obvious
- DD: Early arthropathy rheumatoid, Tumours such as PVNS, metatarsal stress fracture, neuroma



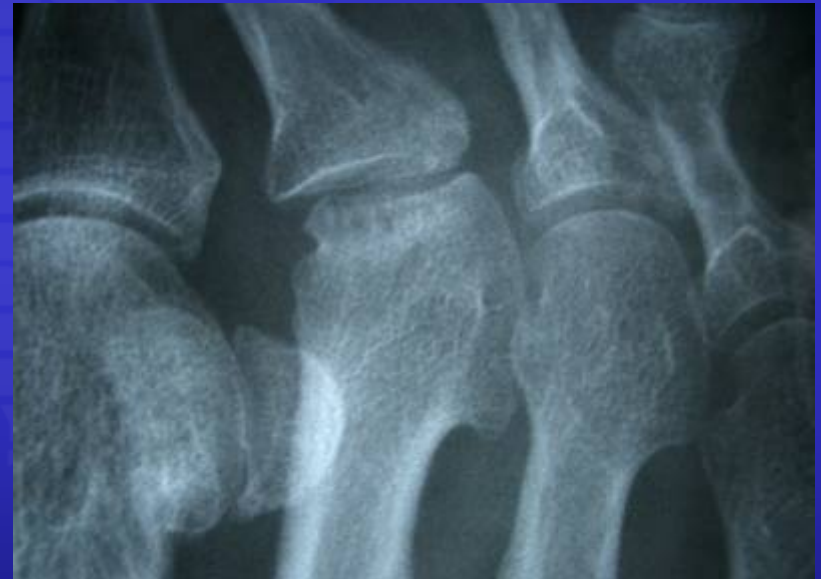
65 year old GP

- Avid walker
- Presents with 2nd MTP pain and swelling
- Initial x-rays normal June 2001
- Settled with taping/insole returned to walking



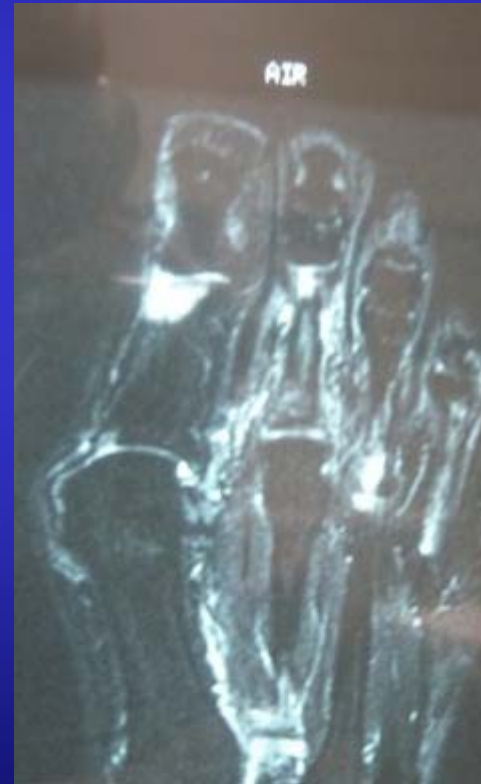
Re-presents 2003

- Pain and swelling 2nd MTP joint
- Restriction of movement
- X-rays Freiberg's' infraction
- Adult cases rare but well described in the literature



45 year old lady

- 3 month history of 2nd MTP pain
- Clinically no instability
- MRI – Stress reaction proximal phalanx – normal plantar plate – normal metatarsal head



“Doctor do I need an M.I.R.?”

My iridologist said they were real
good!!



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Interpretation is the key

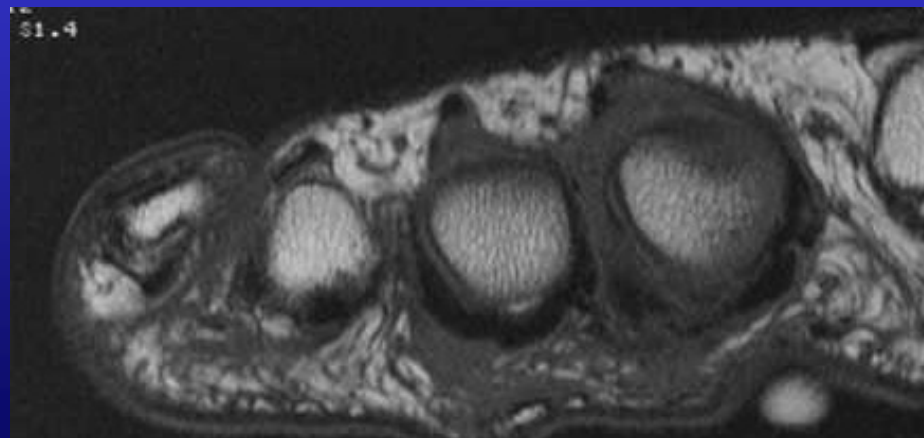
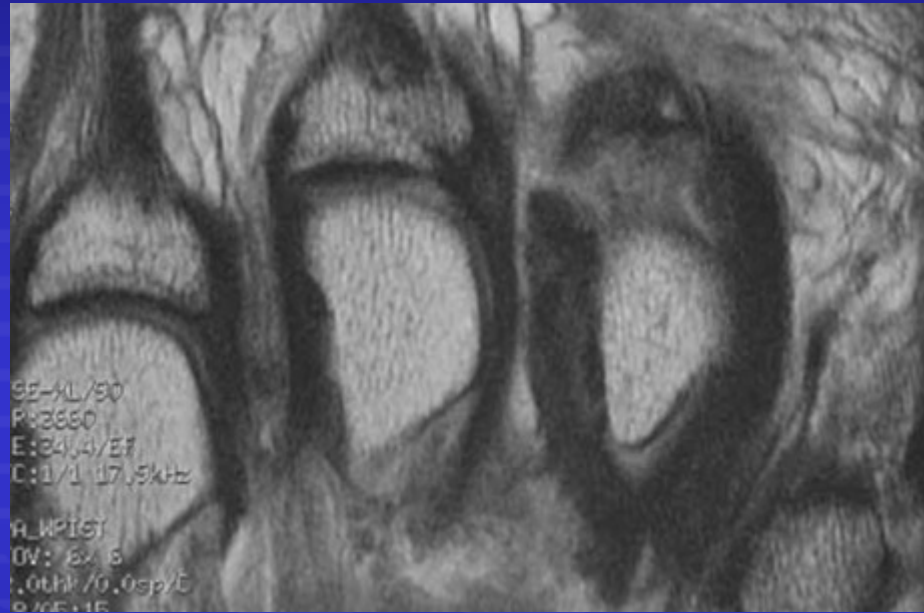


ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

2nd MTP JT capsulitis and lateral plantar plate tear



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Linklater
Foot & Ankle Surgery

Table 2. Anatomic Grading of Plantar Plate Tears – Coughlin et. al 2011

Grade Patterns of Injury

0 Plantar plate or capsular attenuation, and/or discoloration

1 Transverse distal tear (adjacent to insertion into proximal phalanx [$<50\%$]; medial/lateral/central area) and/or midsubstance tear ($<50\%$)

2 Transverse distal tear ($>50\%$); medial/lateral/central area and/or midsubstance tear ($>50\%$)

3 Transverse and/or longitudinal extensive tear (may involve collateral ligaments)

4 Extensive tear with button hole (dislocation); combination transverse and longitudinal plate tear



2nd instability treatment

- ??50% can be treated non-surgically
- Tape the toe, toe splint
- Metatarsal dome
- ?Judicious cortisone injection



Non-operative treatment





ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Adult Foot & Ankle Surgery

When plantar plate ruptures pain
often subsides but deformity
increases



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Once the toe no longer touches the ground the only way to bring it down is surgically



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Bad operations

- Phalangeal or hemiphalangeal resection
- Isolated metatarsal head resection
- Second toe amputation (except in the very elderly)



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Plantar plate repair

- 34 so far (began 21 November 2011)
- 30 female/4 male
- Age Range: 44 – 84
- Average age 61
- Second MTP 33/Third MTP 1



Associated procedures

- Scarf 22 patients
- First MTP fusion 2 patients
- Akin (phalangeal osteotomy) 1 patient



Plantar plate repair

- New instruments make it possible from “the top”
- Direct repair and advancement is performed
- Morbidity is less



Small pin distractor



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

McGlamry Elevator



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Mini scorpion



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Mini scorpion



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

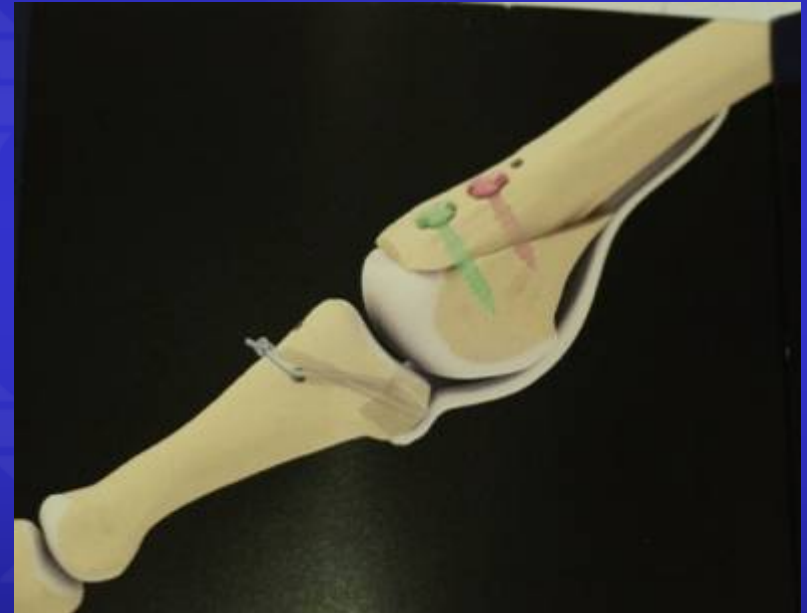
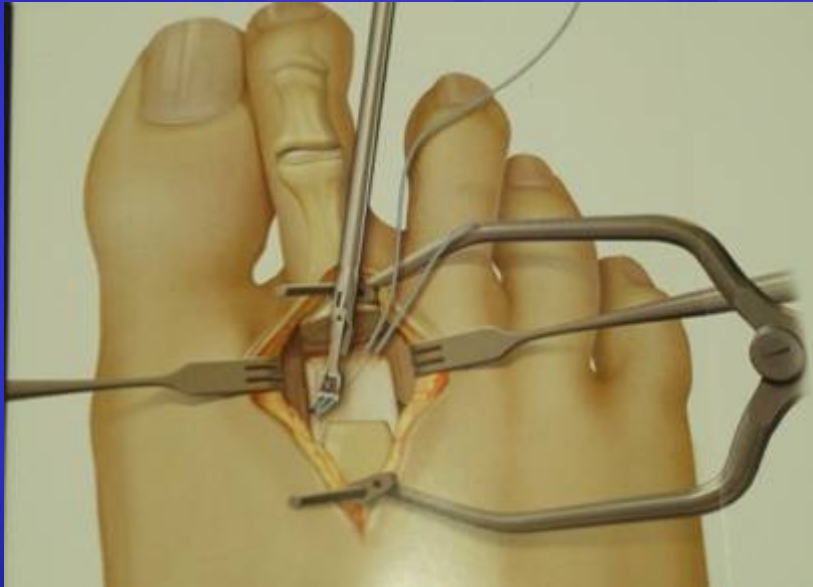
Dr John Negrine
Adult Foot & Ankle Surgery

Steps of the procedure

1. Pass McGlamry elevator to release plantar plate adhesions to metatarsal head
2. Weil Osteotomy provisionally fix 1.6mm k-wire
3. Place pin in base of proximal phalanx
4. Section collateral ligaments
5. Expose and debride plate tear
6. Put 0-fibrewire sutures in plate
7. Drill holes in base of proximal phalanx
8. Pass sutures
9. Tie sutures
10. Replace and fix Weil osteotomy



Technique

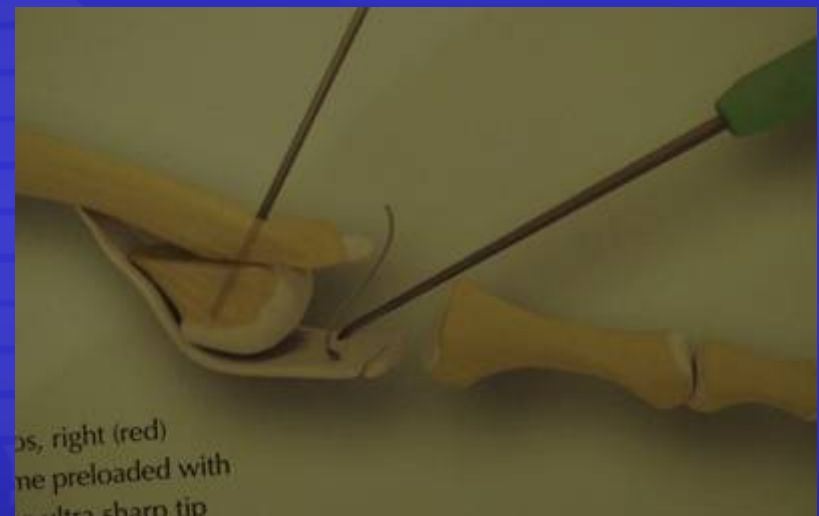


ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

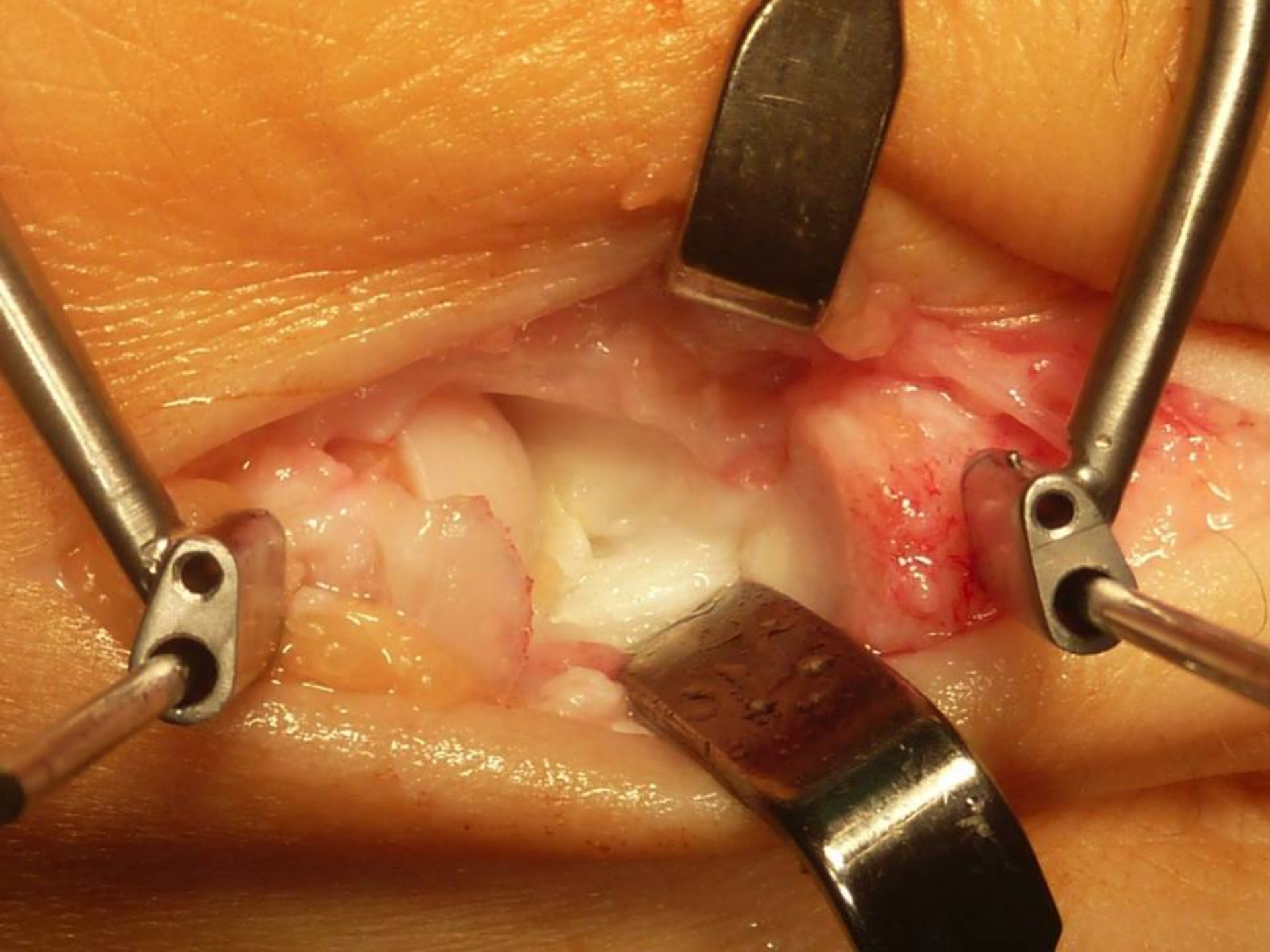
Technique



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery



Plantar plate repair



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Passing the suture

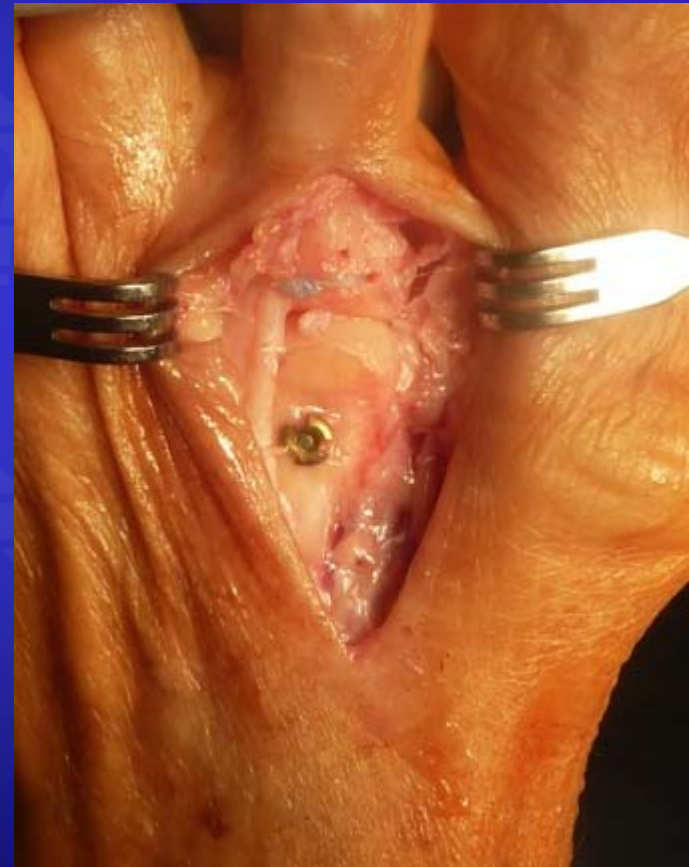


ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Final steps



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Recovery

- 6 weeks in a recovery shoe
- Swelling 6 months
- So far 75% good results in 34 cases follow up < 12 months



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

Word of caution: The plantar plate is composed of type 1 collagen...we wouldn't repair a meniscus in a 60 year old woman



ORTHOSPORTS

ORTHOPAEDIC & SPORTS MEDICINE SERVICE

Dr John Negrine
Adult Foot & Ankle Surgery

