

Management Goals

- Pain relief
- Skin protection
- Skin healing
- Foot stability
- Improved patient health and function

Diabetes Related Problems

- Soft tissue changes
- Joint stiffness
- Tendon and ligament failure
- Neuropathy
- Neuropathic arthropathy (Charcot)

Peripheral vascular disease

Coincidental Problems

- Pre-existing deformity
- Trauma
- Arthritis
- Neuromuscular disorders

The Foot at Risk in Diabetes

- Underlying Pathology
 - Peripheral Vascular Disease
 - Tissue changes
 - Neuropathy

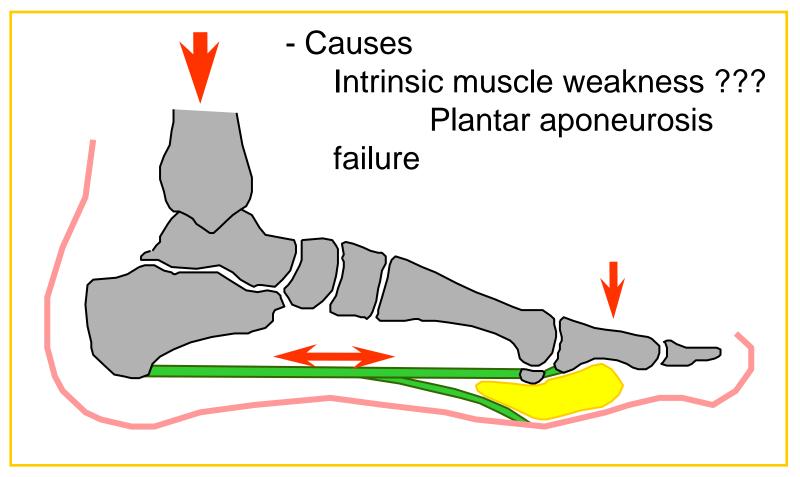
- Precipitating Factors
 - Deformity
 - Articular Instability
 - Change in mechanical function

Claw toes

Features



Claw toes



Green and Briggs, unpublished data



Joint Stiffness

Hallux rigidus



Joint Stiffness

Achilles tightness



Tibialis anterior





Tibialis anterior



Achilles tendon







Achilles tendon



Accommodative footwear



Shoe adaptations



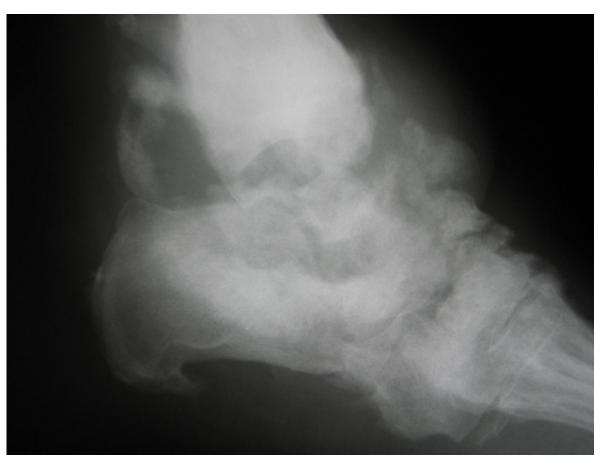
Liaison with Orthotist

- Surgery
 - Correction of deformity
 - Mobilisation of joints
 - Stabilisation of joints
 - Tendon reconstruction / transfer

Neuropathic Arthropathy

Bone and joint destruction

- Deformity
- Instability
- Peripheral neuropathy



Neuropathic Arthropathy

- Neurotraumatic
- Neurovascular



Sensorimotor Neuropathy

Autonomic Neuropathy



Trauma

Other Factors:

Metabolic bone disease Steroid induced osteoporosis Renal transplantation Immunosuppression Collagen glycosylation

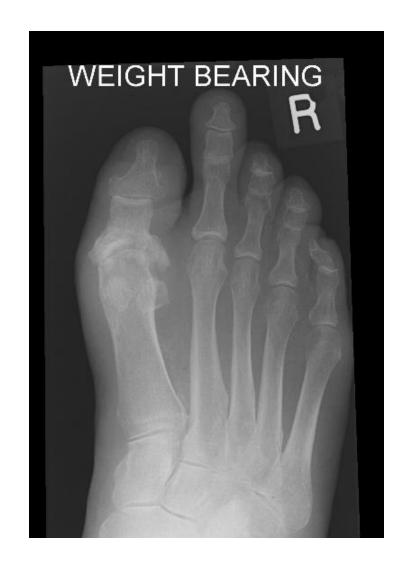
Incidence / Epidemiology

• Age: 40 - 60 years (26 - 73)

Duration of Diabetes: >10 years – 80%
 >15 years – 60%

• Bilateral: 6 – 39%

• Type 1 - Forefoot



- Type 1 Forefoot
- Type 2 Tarsometatarsal



- Type 1 Forefoot
- Type 2 Tarsometatarsal
- Type 3 Hindfoot



- Type 1 Forefoot
- Type 2 Tarsometatarsal
- Type 3 Hindfoot
- Type 4 Ankle



- Type 1 Forefoot
- Type 2 Tarsometatarsal
- Type 3 Hindfoot
- Type 4 Ankle
- Type 5 Calcaneus



Stages

- 1 Stage of Development
- 2 Stage of Coalescence
- 3 Stage of Reconstruction



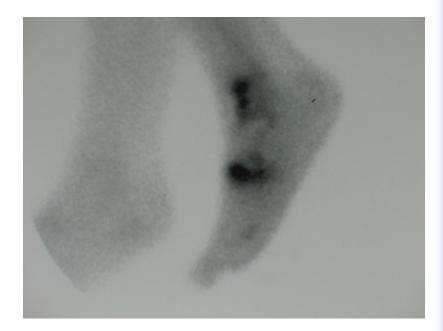


Eichenholtz, 1966

Stages

Stage 0

- Pain
- Swelling
- Warmth
- No radiographic changes



- +ve Tc^{99m} isotope bone scan
- +ve MRI scan

Schon and Marks, 1995 Yu and Hudson, 2002

- Goals
 - Pain relief
 - To achieve bone healing
 - Minimise risk of soft tissue breakdown and ulceration
 - Restore ambulatory function

Stage 0 and 1

Aim to get into Stage 2

- Rest and elevation
- Non-weight bearing
- Support
 - Total contact cast
 - Pneumatic walkers
- Pamidronate ??



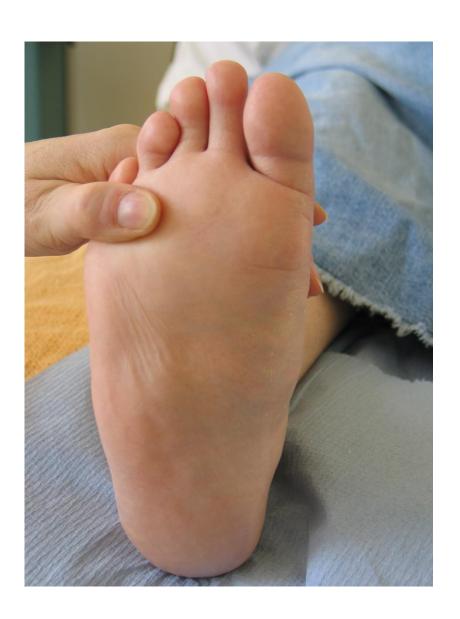




Surgery

- Goal
 - Skin protection

- Removal of bony prominences
- Arthrodesis
 - Correction of deformity
 - Restoration of stability







Instability





Reduction and Arthrodesis



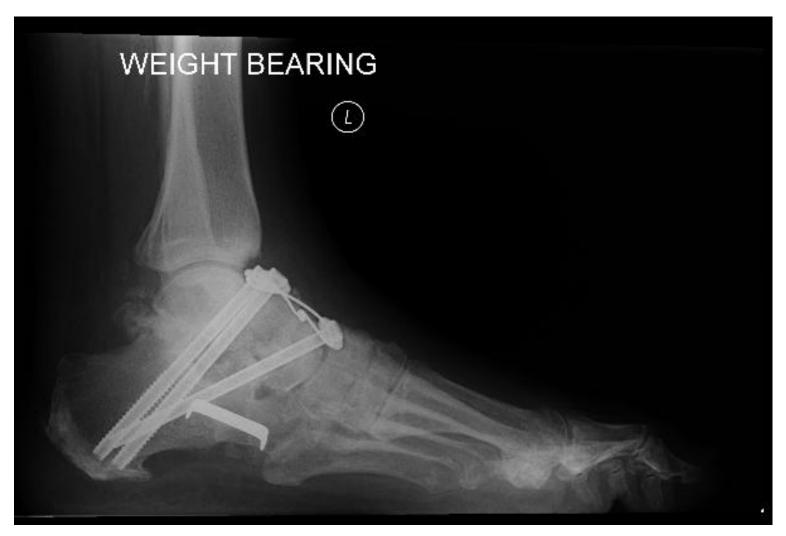


Reduction and Arthrodesis





Reduction and Arthrodesis



Young and Briggs, 2006

Age: 27 to 73 at referral

Bilateral: 5 of 21

Sex: 10 male: 11 female

- Type 2: Tarsometatarsal12
- Type 3: Hindfoot
- Type 4: Ankle
- Type 3 and 4: Ankle/Hindfoot
 2
- Type 5: Calcaneus

Type 2 Tarsometatarsal (12)

Conservative treatment	4
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- Arthrodesis
- Awaiting surgery

Type 3 Hindfoot (6)

Conservative management		Conservative	management		3
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Arthrodesis

Type 3 and 4: Ankle and Hindfoot (2)

External fixation

Subtalar arthrodesis (nonunion)

■ Type 4: Ankle (5)

 Conservative management 	2
Arthrodesis	1
 Amoutation after failed arthrodesi 	s 2

	No.	Nonunion	Amputation
Tarsometatarsal	12	0	0
Hindfoot	6	0	0
Ankle/Hindfoot	2	1	0
Ankle	5	0	2

Amputation rate

Overall8%

Surgical patients14%

Neuropathic Arthropathy

- The disease process
 - Unpredictable disease
 - Poor understanding of the pathological processes
 - Difficulties in diagnosis
 - Difficulties in staging

Summary

- Disease management
 - Patient compliance
 - Conservative management is essentially physical and empirical
 - Surgery has a defined place
 - Technically challenging

Summary

- Restore foot shape
- Restore articular stability
- Restore tendon / ligament balance

Eradication of infection

Pressure Sores



Pressure Sores



Conclusions

 There is more to musculoskeletal problems in the diabetic foot than Charcot arthropathy

 It is the mechanical problems that compromise the integrity of the skin

 Mechanical problems may not be immediately obvious

Choosing Your Orthopaedic Surgeon

Ask:

"What is the cause of foot ulceration in the diabetic foot?"

Answer: "Neuropathy"



Answer: "Deformity or

Biomechanical problem



