

The Varus-Hindfoot

Markus Knupp



Introduction

- (Cavo-) Varus Hindfoot deformity
 - Isolated deformity of the hindfoot



54y m, Varus malunion distal tibia

Arthritic Disorders of the Ankle
Diagnosis and Management
UNIKLINIK BALGRIST

September 9th, 2011

Introduction

- (Cavo-) Varus Hindfoot deformity

- Isolated deformity of the hindfoot

- Cavo-varus deformity

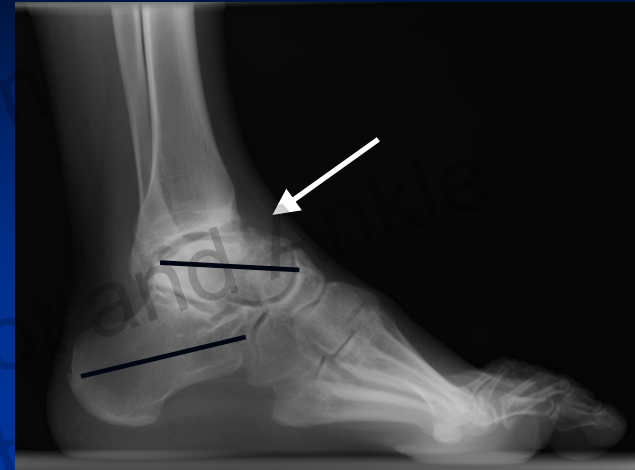
Neurological disease!



28y m, unclear neurological disease

Morphological presentation

- medial spin of the calcaneus underneath the talus
- parallelism between the talus and the calcaneus
- Increased rigidity
- Limited ankle dorsiflexion



Weight bearing Ct



Morphological presentation

- medial spin of the calcaneus underneath the talus
 - Muscular imbalance
 - PT stronger than peroneus brevis muscle
- Talonavicular subluxation



Morphological presentation

- medial spin of the calcaneus underneath the talus
- **Muscular imbalance**
 - PT stronger than peroneus brevis muscle
 - Peroneus longus stronger than anterior tibial muscle

→ Plantarflexed 1st ray



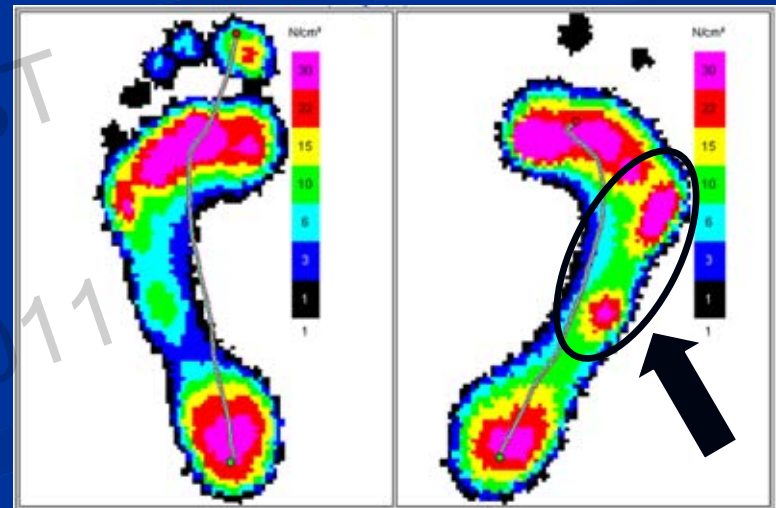
Morphological presentation

- medial spin of the calcaneus underneath the talus
- Muscular imbalance
 - PT stronger than peroneus brevis muscle
 - Peroneus longus stronger than anterior tibial muscle
- EHL, EDL attempt to dorsiflex the foot
- Clawing of the toes



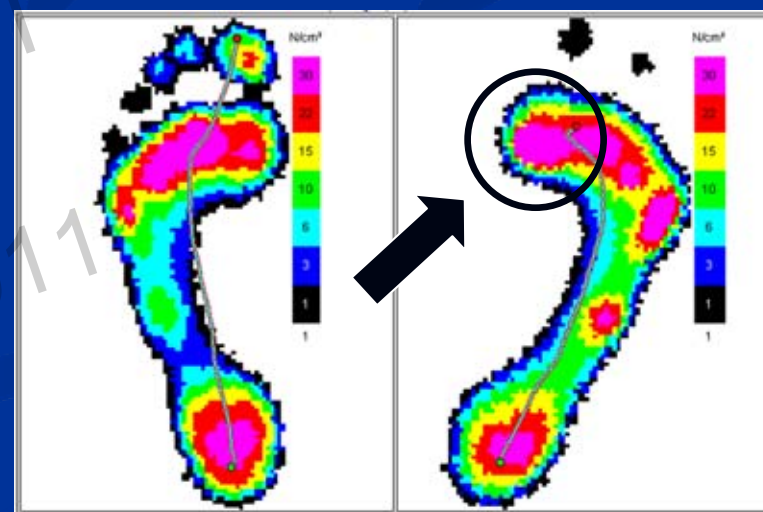
Functional presentation

- Varus hindfoot, adduction
→ Lateral overload



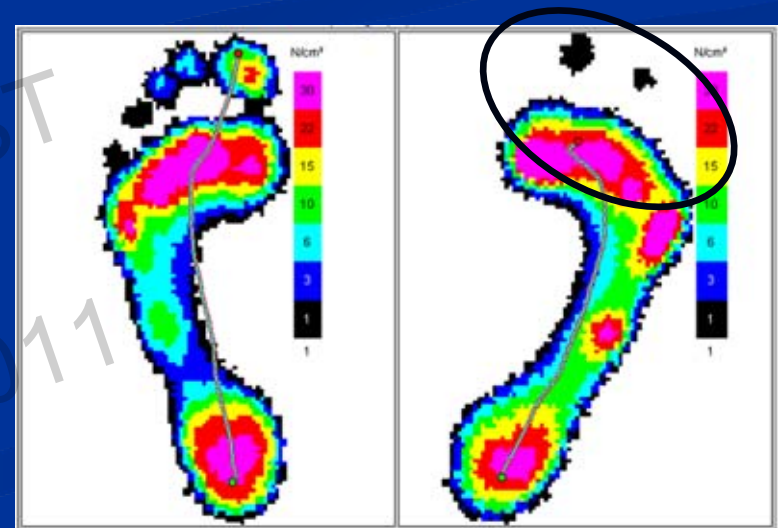
Functional presentation

- **Varus hindfoot, adduction**
 - Lateral overload
- **Plantarflexed 1st MT**
 - Overload 1st MTP Joint
 - Increases hindfoot varus



Functional presentation

- **Varus hindfoot, adduction**
 - Lateral overload
- **Plantarflexed 1st MT**
 - Overload 1st MTP Joint
 - Increases hindfoot varus
- **Extended MTP joints**
 - Functionally amputated toes
 - Overload on MT heads

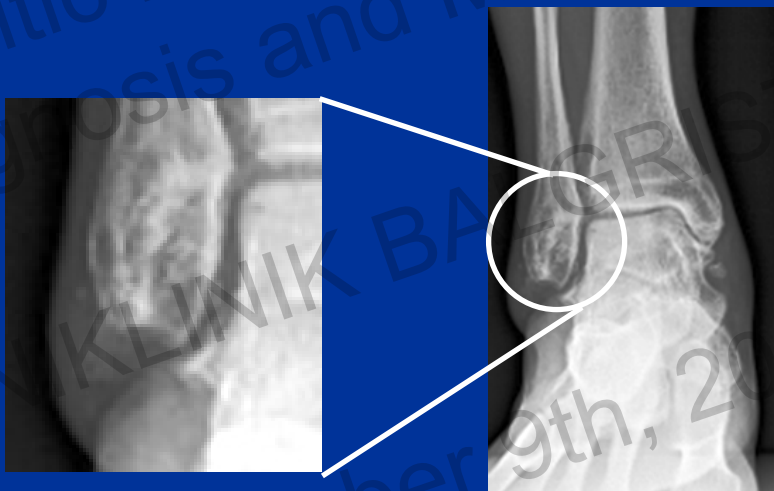


Associated problems

- **Varus hindfoot**

- **Lateral instability**

→ **Recurrent sprains due to supination forces**



Associated problems

- **Varus hindfoot**

- **Lateral instability**

- **Stress fx medial malleolus**

→ **Medial overload due to varus / supination forces**



Associated problems

- **Varus hindfoot**
 - Lateral instability
 - Stress fx medial malleolus
- **Stress fracture navicular bone**
- **Rigidity**
- **Adducted midfoot**



Associated problems

- Varus hindfoot
 - Lateral instability
 - Stress fx medial malleolus
- Stress fracture navicular bone
- Stress fracture MT V



Algorithm

Supramalleolar OT

- Medial open wedge



distal tibia



correct



varus



tibial osteotomy

Algorithm

Supramalleolar OT

- Medial open wedge

distal tibia



correct



varus



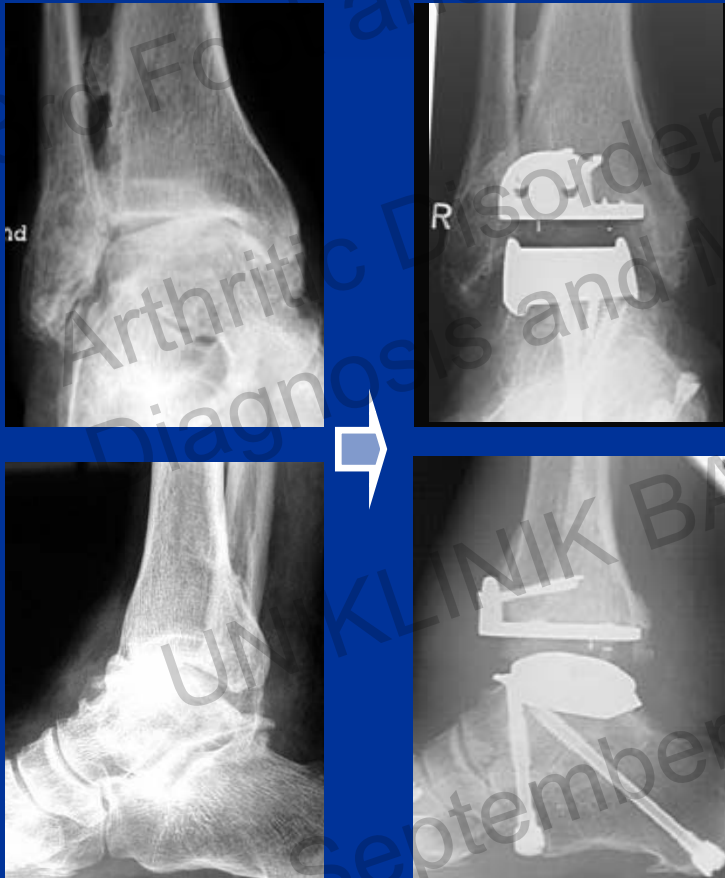
tibial osteotomy



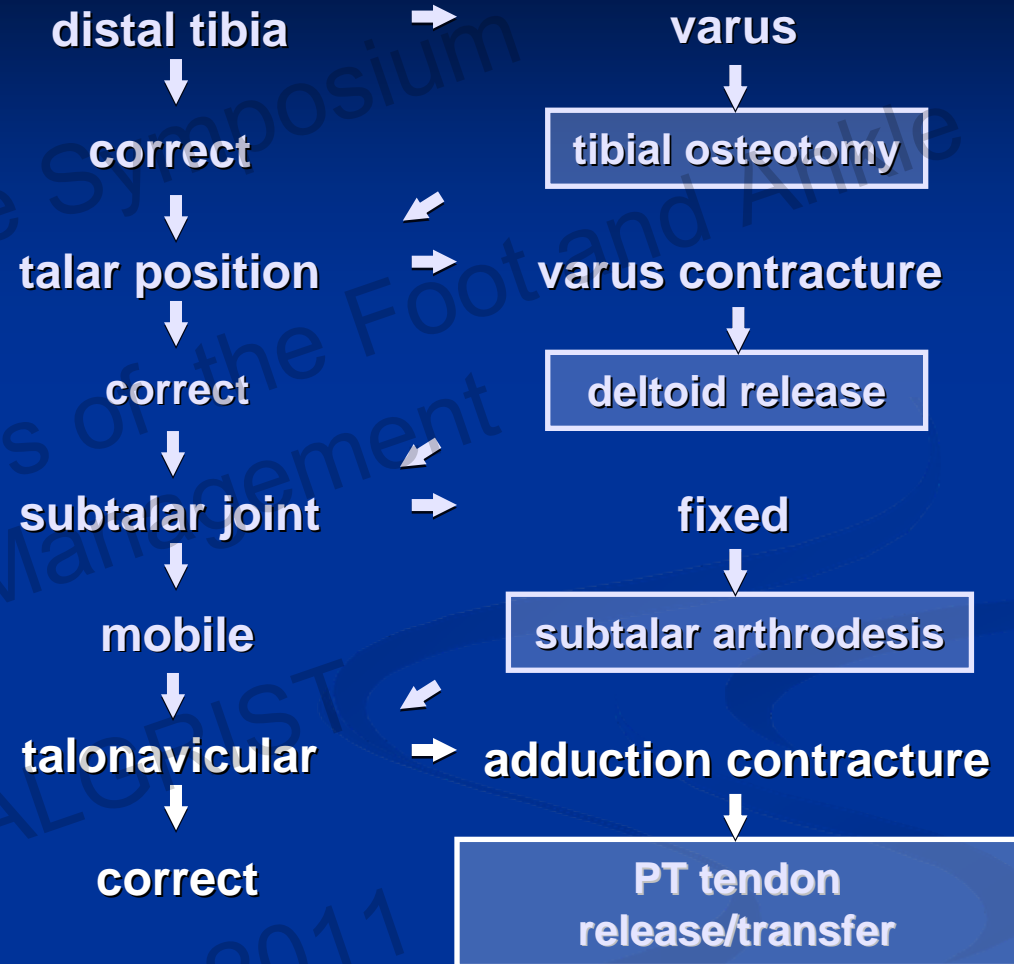
Algorithm



Algorithm



Algorithm



Algorithm

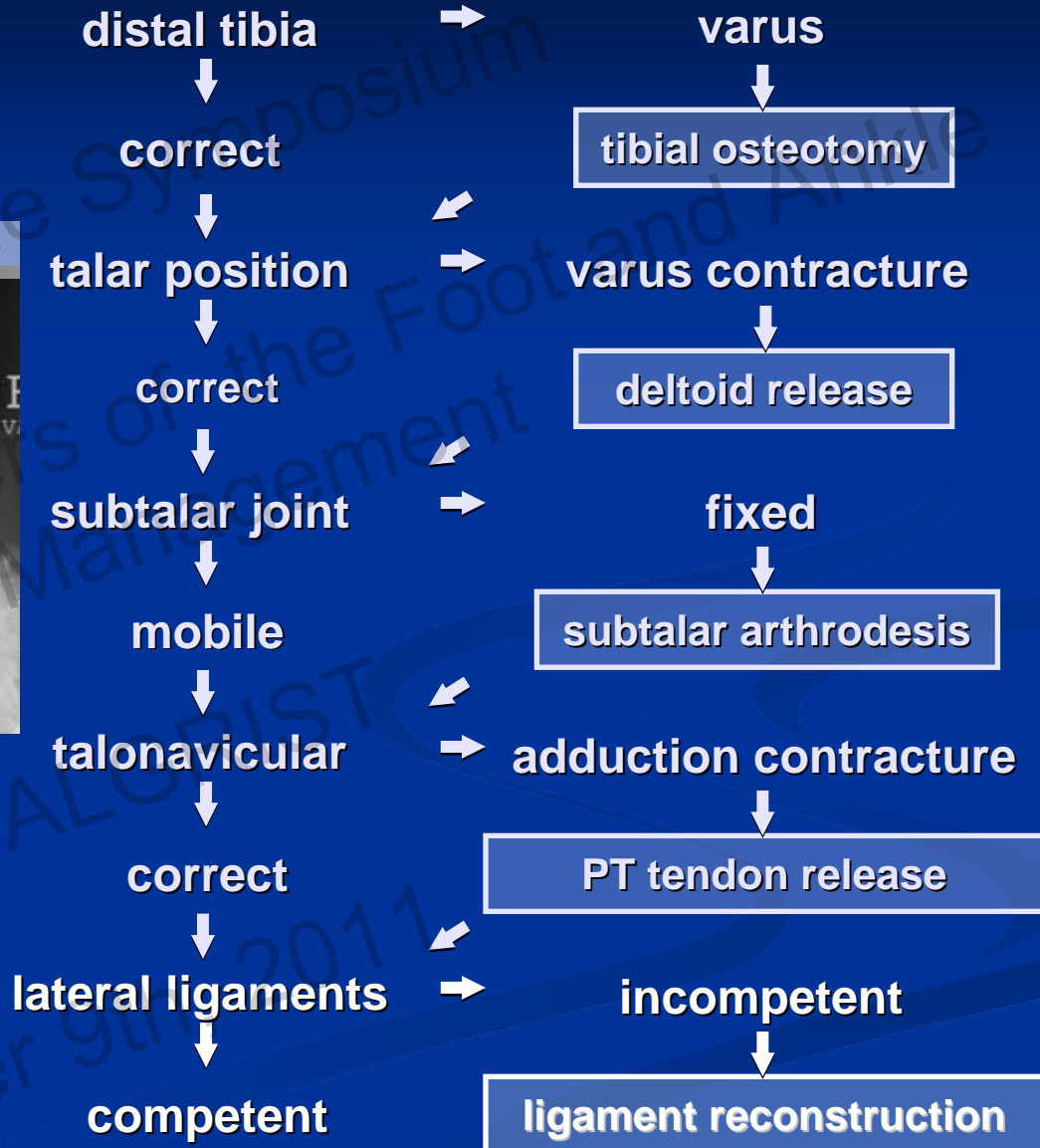
PT tendon release/transfer

Technique

- Dissection of posterior tibial tendon
- Rerouting on lateral side peroneal tendon sheath
- End to side-suture to peroneal tendons



Algorithm



Algorithm

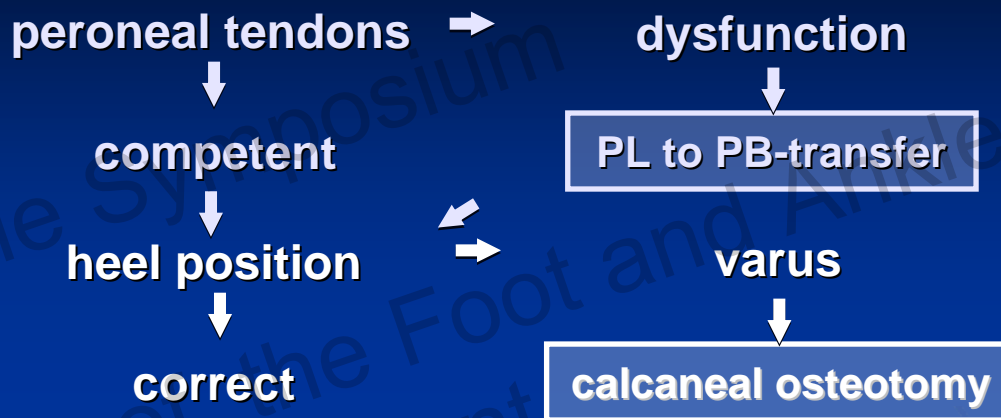


Algorithm



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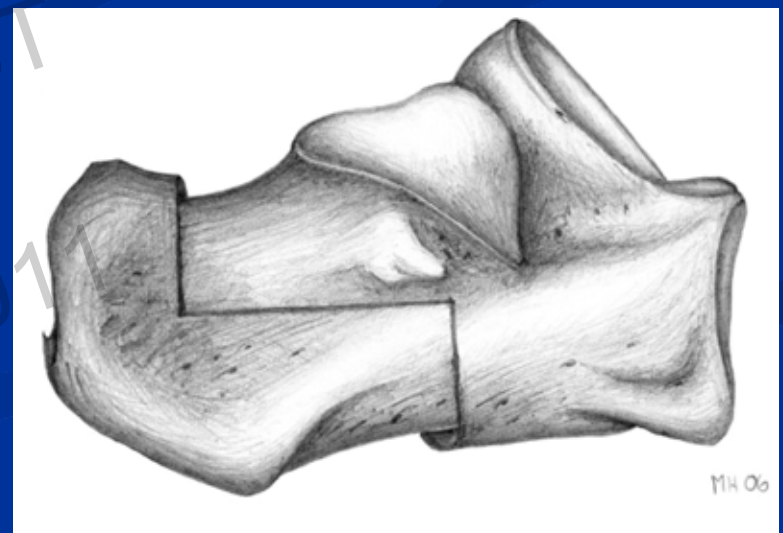
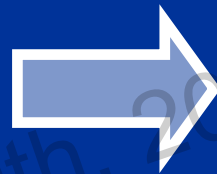
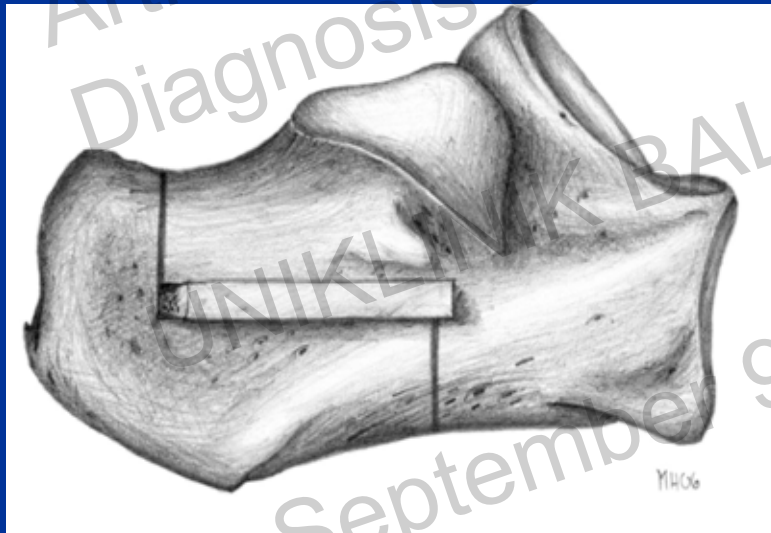
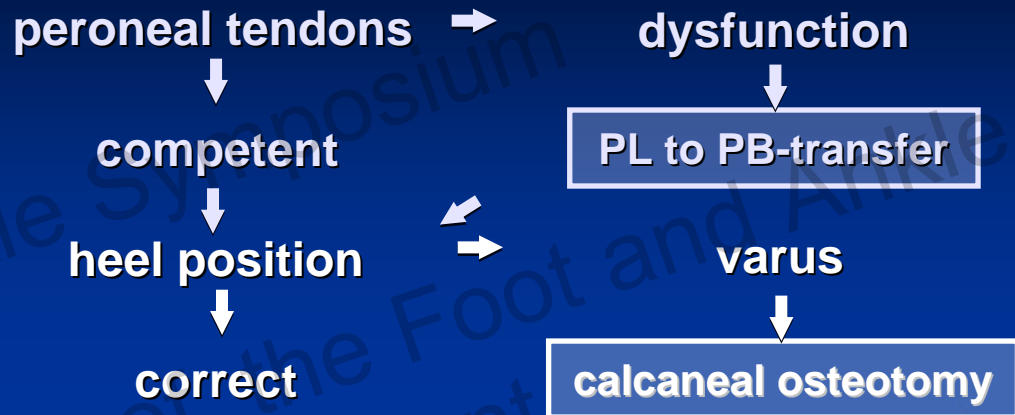
Algorithm

Calcaneal osteotomy

Technique:

Three Plane-Correction

Frontal plane: valgisation



Algorithm

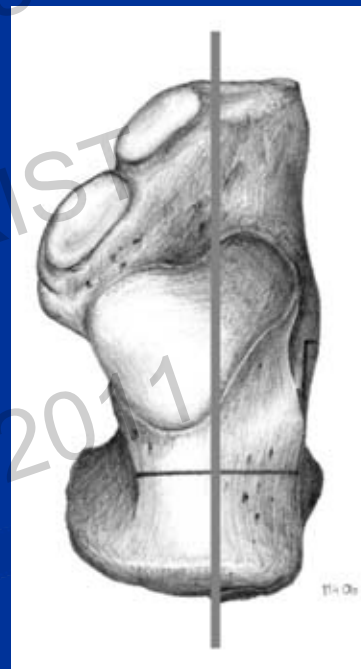
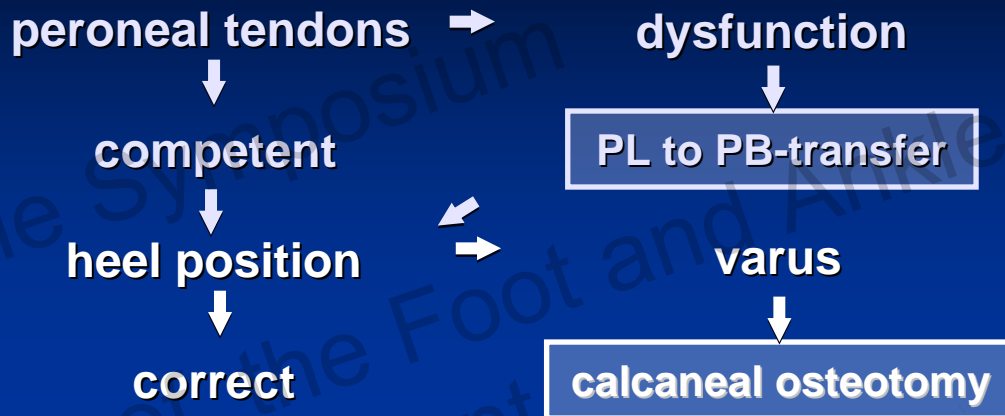
Calcaneal osteotomy

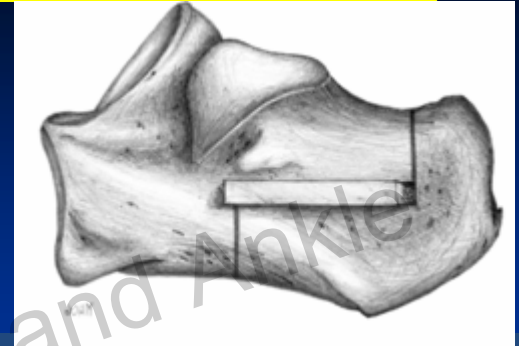
Technique:

Three Plane-Correction

Frontal plane: valgisation

Horizontal plane: translation

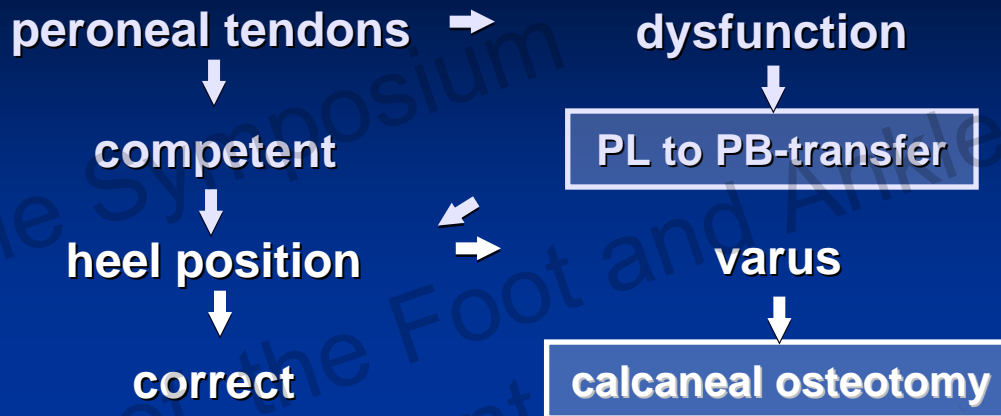




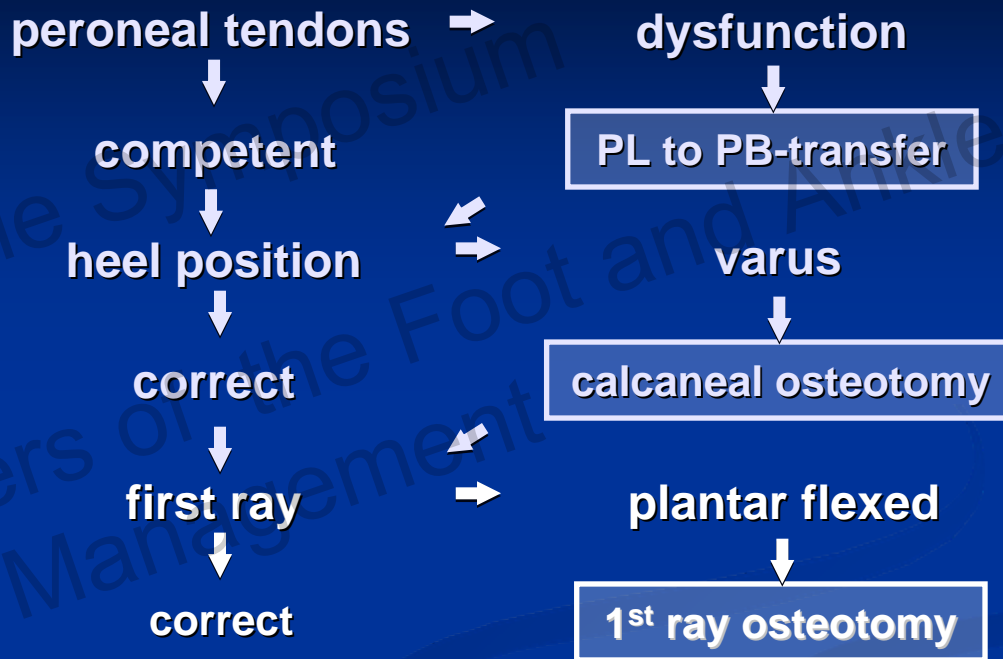
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Algorithm

Calcaneal osteotomy



Algorithm



Plantarflexed 1st MT

Wanted correction:

- Dorsiflexion of first ray

- 1st cuneiform

- base of 1st metatarsal



Plantarflexed 1st MT

Surgical technique

Closing Wedge Osteotomy

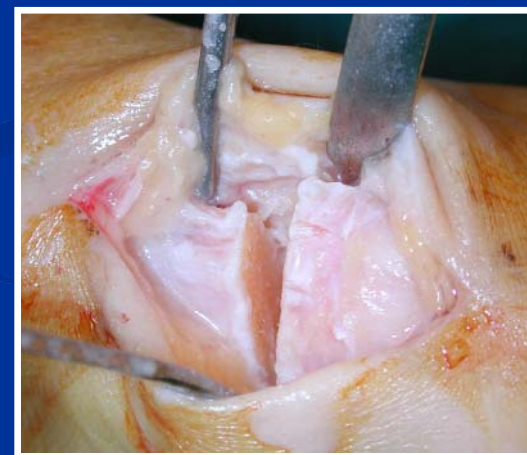
- Dorsomedial Approach

 - 1st metatarsal

 - 1st cuneiform

- Osteotomy

- Removal of wedge



Plantarflexed 1st MT

Surgical technique

Closing Wedge Osteotomy

- Dorsomedial Approach

 - 1st metatarsal

 - 1st cuneiform

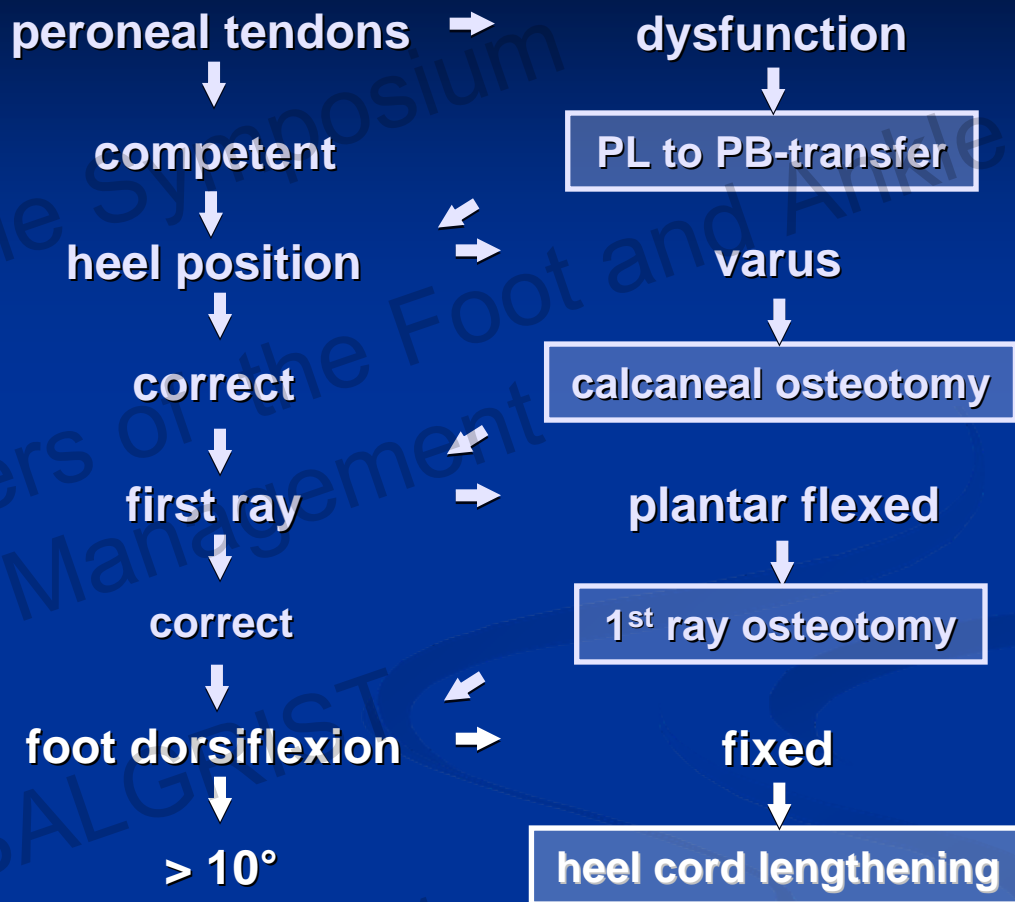
- Osteotomy

- Removal of wedge

- Internal fixation: screws



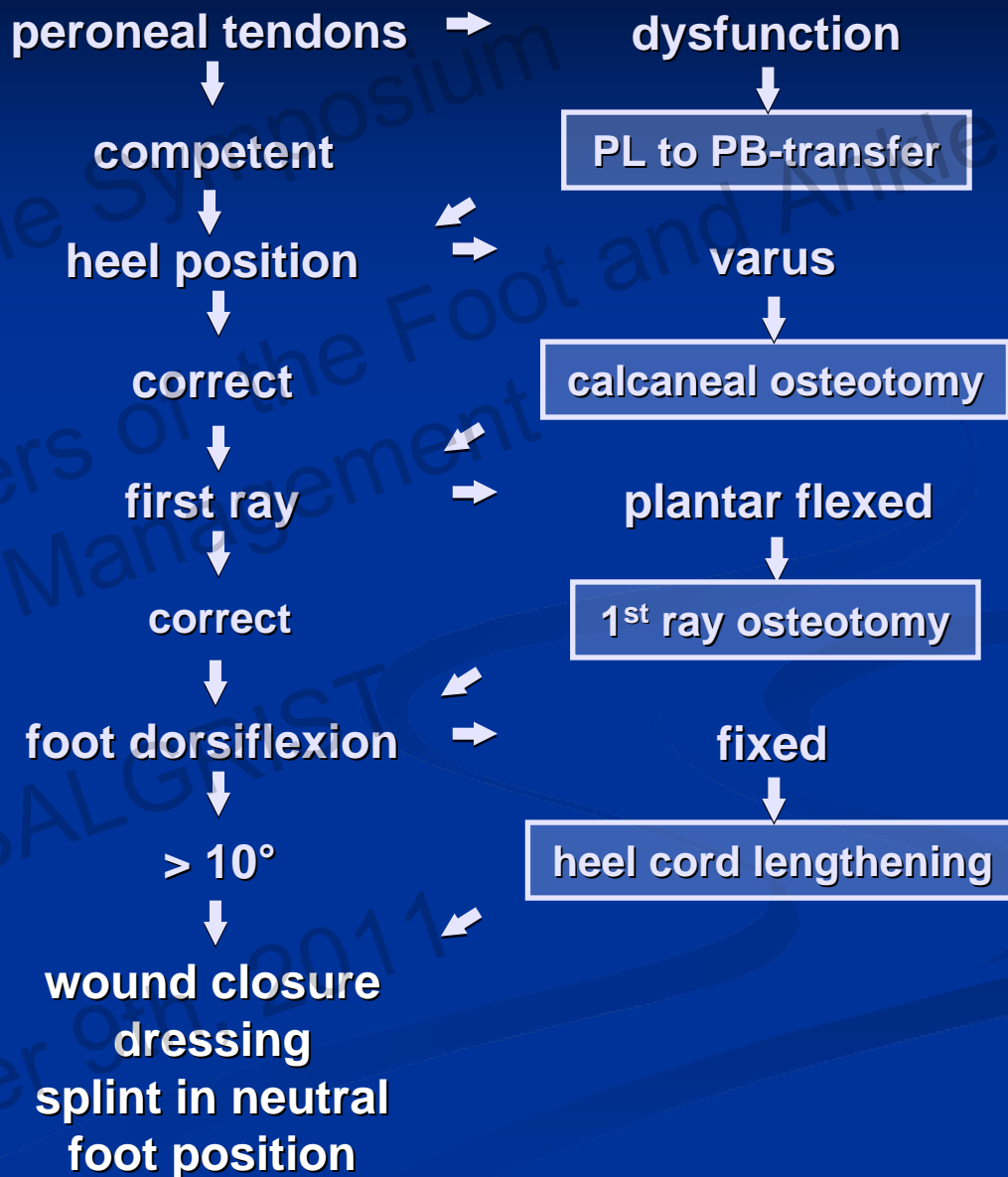
Algorithm



Hemisection tenotomy



Algorithm

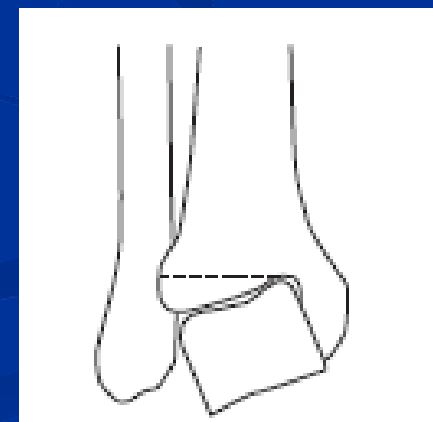
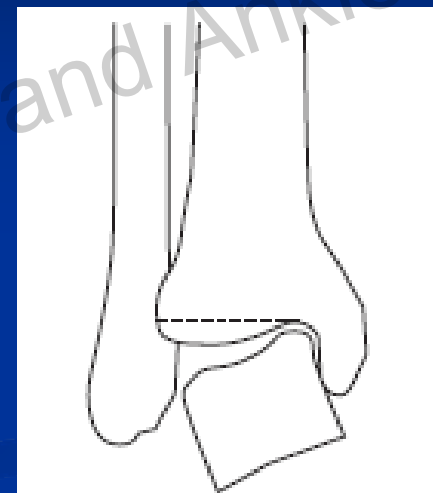


Varus in TAR

Two types

I Incongruent type

II Congruent type



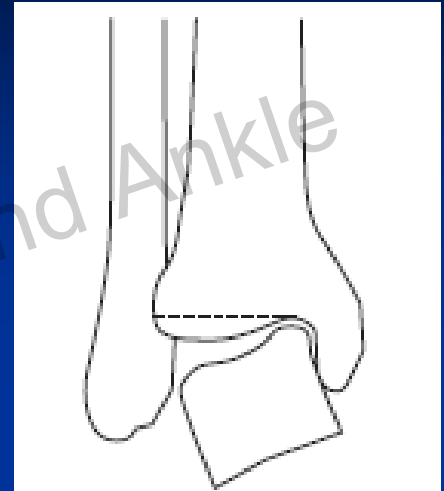
Varus in TAR

I Incongruent type

Removal of osteophytes

Deltoidrelease (prox. or dist.)

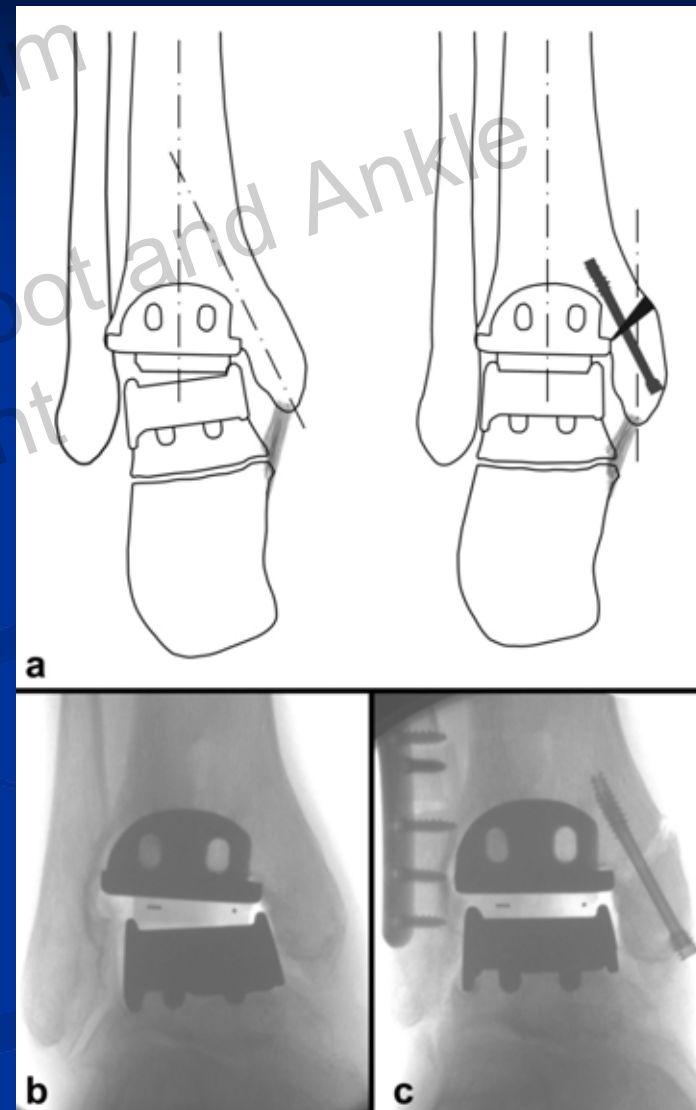
Osteotomy med. Mall.



Varus in TAR

I Incongruent type

'Flip-Osteotomy'

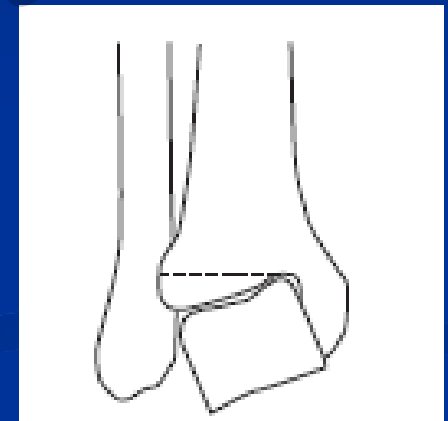


Varus in TAR

II Congruent type

corrective bone cuts

$>10^\circ$ TAR + SMOT



Varus in TAR

II Congruent type

corrective bone cuts

$>10^\circ$ TAR + SMOT



Summary

Morphology

1. Rigid foot (tripod load distribution)
2. Lateral overload
3. Plantarflexed 1st MT
4. Clawing of the toes



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Treatment

Various entities

- Instability
- Osseous deformity / malalignment
- Muscular dysbalance

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Treatment

Various entities

- Instability
- Osseous deformity / malalignment
- Muscular dysbalance

Individualized treatment: address

- Ligamentous / tendon dysfunction
- Malalignment