The Varus-Hindfoot

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3rd Foot and Ankle Symposium
Arthritic Disorders of the Foot and Ankle
Diagnosis and Management
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**Introduction**

• (Cavo-) Varus Hindfoot deformity

  • Isolated deformity of the hindfoot

54y m, Varus malunion distal tibia
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 ↓

Algorithm
tibial osteotomy
Algorithm

Supramalleolar OT

• Medial open wedge

distal tibia → correct

varus

tibial osteotomy

Introduction

Morphology

Clinical presentation

Treatment

Summary
Algorithm

- distal tibia
- correct
- talar position
- correct
- varus
- tibial osteotomy
- varus contracture
- deltoid release
Algorithm

distal tibia
\[\downarrow\] correct
\[\downarrow\] talar position
\[\downarrow\] correct
\[\downarrow\] subtalar joint
\[\downarrow\] mobile
\[\Rightarrow\] varus
\[\downarrow\] tibial osteotomy
\[\Rightarrow\] varus contracture
\[\downarrow\] deltoid release
\[\Rightarrow\] fixed
\[\downarrow\] subtalar arthrodesis
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

- distal tibia correct
- talar position correct
- subtalar joint mobile
- talonavicular correct
- lateral ligaments competent
  - varus
  - tibial osteotomy
  - varus contracture
  - deltoid release
  - fixed
  - subtalar arthrodesis
  - adduction contracture
  - PT tendon release
  - incompetent
    - ligament reconstruction

Weight bearing
Algorithm

peroneal tendons \(\rightarrow\) dysfunction

competent

PL to PB-transfer
Algorithm

peroneal tendons  →  dysfunction
↓  
competent

PL to PB-transfer
Algorithm

peroneal tendons
↓
competent
↓
heel position
↓
correct

→

dysfunction
↓
varus

PL to PB-transfer

calcaneal osteotomy
Algorithm

Calcaneal osteotomy

Technique:
Three Plane-Correction
Frontal plane: valgisation

peroneal tendons
competent
heel position
correct

dysfunction
PL to PB-transfer
varus
calcaneal osteotomy
Algorithm

Calcaneal osteotomy

Technique:
Three Plane-Correction
Frontal plane: valgisation
Horizontal plane: translation

peroneal tendons →
competent
heel position →
correct
dysfunction
PL to PB-transfer
varus
calcaneal osteotomy
Algorithm
Calcaneal osteotomy

- peroneal tendons
  - competent
  - heal position
    - correct

- dysfunction
  - PL to PB-transfer
    - varus
      - calcaneal osteotomy

24 mo
Algorithm

peroneal tendons
competent
heel position
correct
first ray
correct
dysfunction
PL to PB-transfer
varus
calcaneal osteotomy
plantar flexed
1st ray osteotomy
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

- peroneal tendons
  - competent
  - downhill
- heel position
  - correct
- first ray
  - correct
- foot dorsiflexion
  - > 10°
- dysfunction
  - varus
  - calcaneal osteotomy
  - PL to PB transfer
- plantar flexed
  - 1st ray osteotomy
  - fixed
  - heel cord lengthening

Introduction, Morphology, Clinical presentation, Treatment, Summary
Hemisection tenotomy
Algorithm

- peroneal tendons dysfunction
  - competent PL to PB-transfer
  - varus calcaneal osteotomy
  - plantar flexed 1st ray osteotomy
  - fixed

- heel position
  - correct
    - first ray correct
      - foot dorsiflexion
        - > 10° fixed
          - wound closure
            - dressing
              - splint in neutral
                - foot position

- plantar flexed
  - fixed
    - heel cord lengthening
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

Il Congruent type

corrective bone cuts

>10° TAR + SMOT
Varus in TAR

II Congruent type

corrective bone cuts

>10° TAR + SMOT

Orthopade, 2011
Summary

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

Morphology

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

Treatment

Various entities
----> Instability
----> Osseous deformity / malalignment
----> Muscular dysbalance
Summary

Morphology
1. Rigid foot (tripod load distribution)
2. Lateral overload
3. Plantarflexed 1st MT
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Treatment
Various entities
→ Instability
→ Osseous deformity / malalignment
→ Muscular dysbalance

Individualized treatment: address
→ Ligamentous / tendon dysfunction
→ Malalignment