



# ***Hallux valgus***

## ***images of surgical procedures and algorithmic approach***

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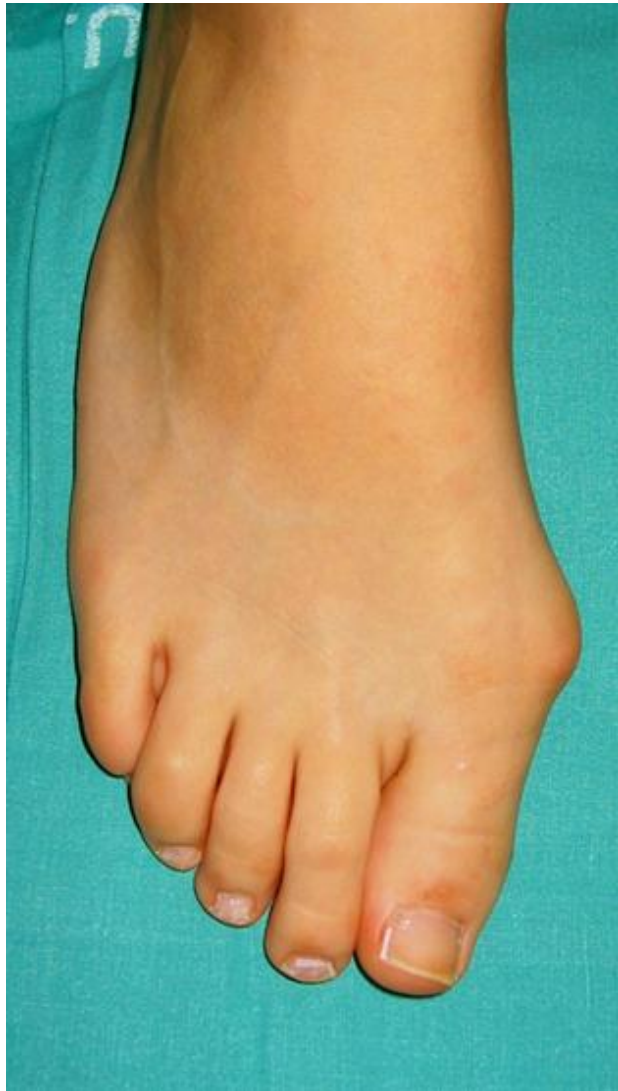
## ABBREVIATIONS AND CONCEPTS

- DSTP = distal soft-tissue procedure, the adductor hallucis tendon is detached from the fibular sesamoid and the proximal phalanx, the deep transverse metatarsal ligament is divided, the lateral aspect of the first metatarsophalangeal joint capsule is released with multiple stab incisions
- P = phalanx
- IM = intermetatarsal
- M/MT = metatarsal
- MTP = metatarsophalangeal joint
- Claw toe = dorsiflexion contracture at the metatarsophalangeal joint
- Mallet toe = flexion deformity only at the distal interphalangeal joint, with normal proximal interphalangeal and metatarsophalangeal joints, distal hammer toe deformity
- Proximal hammer toe deformity = only the proximal interphalangeal joint is affected

## ABBREVIATIONS AND CONCEPTS

- Keller-Lelièvre-Villadot procedure = resection of the proximal phalanx of the toe (F1) and sesamoids realignment according to Lelièvre's "cerclage fibreux" and a reefing point suture in the flexor tendon (Viladot)
- Exostectomy = resection of the pseudoexostosis at the first metatarsal head
- Chevron procedure = distal first metatarsal osteotomy
- Scarf osteotomy = diaphyseal osteotomy, metatarsal Z-sloped osteotomy of the first metatarsal
- Akin procedure = proximal phalangeal osteotomy (P1)
- Weil procedure = distal horizontal metatarsal osteotomy, when the metatarsal head is to be preserved

## *Different types and aetiologies of hallux valgus*



Juvenil hallux valgus



Right severe hallux valgus, arthrosis

## *Different types and aetiologies of hallux valgus*



arthrosis



Diabetic feet



arthrosis



## *Different types and aetiologies of hallux valgus*



Systemic lupus erythematosus

## Diabetic feet, hallux valgus, 2<sup>nd</sup> and 3<sup>rd</sup> MTPs dislocation with claw toes



# ***Surgical treatment of hallux valgus***

- Age
- Patient's occupational and recreational requirements
- Systemic disorders
- Neurological disorders (sensory and motors)
- Venous and vascular disorders
- Skin diseases
- Patient expectations



# ***Surgical treatment of hallux valgus***

- Indications for surgical treatment:
  - Symptoms present - Painful joint ROM
  - Activity or lifestyle restrictions
  - Important or fast evolution joint deformity
  - Footwear painful or uncomfortable
  - Associated foot disorders

***And...***

- Shoe modification fails

***Note: Cosmetic concerns are not a surgery indication!***

# ***Surgical treatment of hallux valgus***

Gait analysis and shoes assessment

Hindfoot assessment

Digital index

Metatarsal index

Range of motion (first MTP joint)

Reducible deformity

Lesser toe deformities (claw and hammer toes)

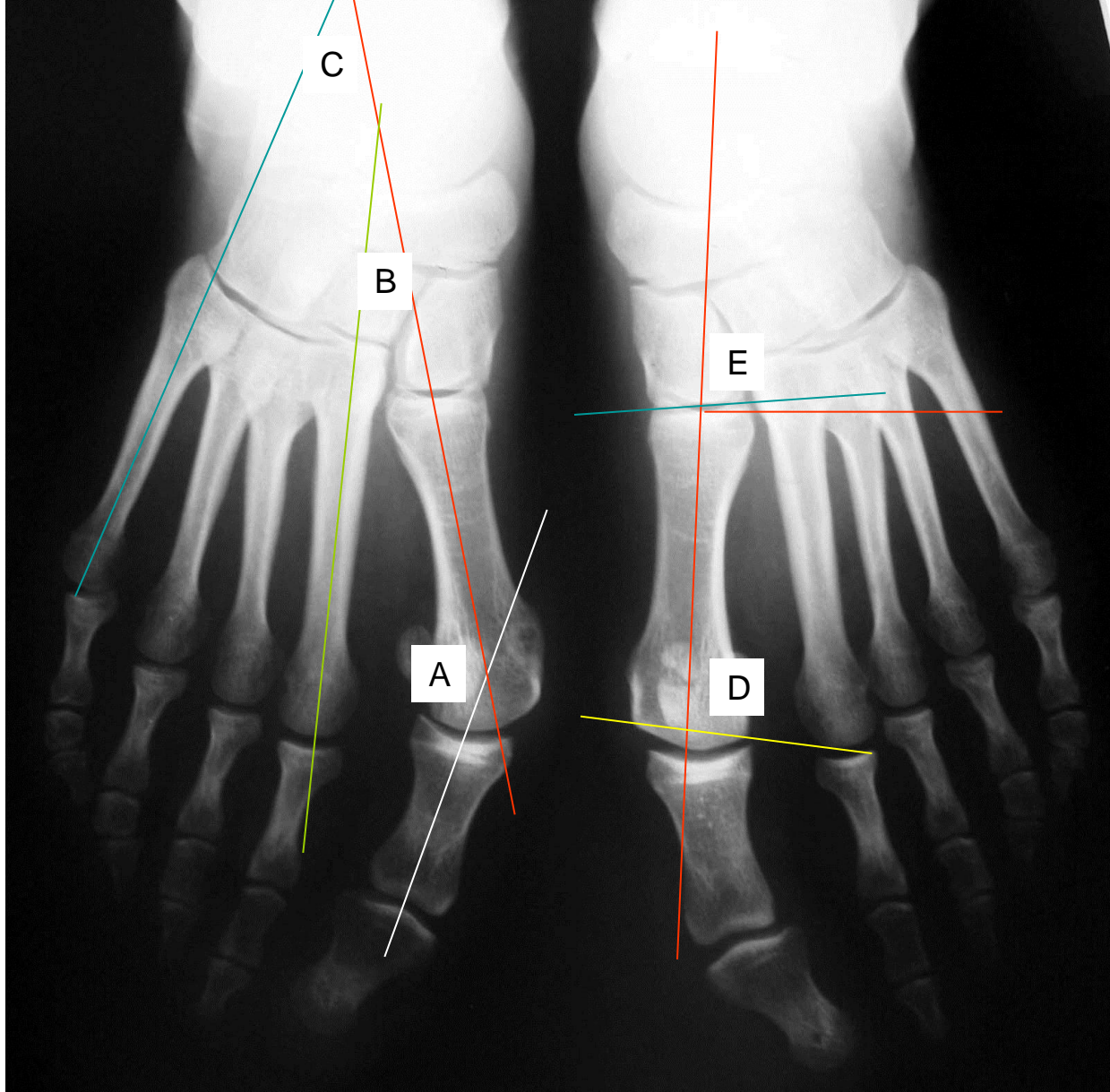
# ***Surgical treatment of hallux valgus***

- ***Radiographic assessment***

- Foot and ankle anteroposterior and lateral weight-bearing preoperative radiographs
- Sesamoids axial radiographs

## ***Preoperative radiographic assessment***

- Hallux valgus (HV) angle, normal  $< 15^{\circ}$
- Intermetatarsal (IM) angle, normal  $< 9^{\circ}$
- Distal metatarsal articular (DMA) angle, normal  $< 10^{\circ}$  of lateral deviation, relationship between the distal articular surface and the long axis of the first metatarsal
- Angle M1/M5, normal  $> 14^{\circ} < 35^{\circ}$
- Angle of the metatarsocuneiform joint, medial deviation  $> 15^{\circ}$  indicate possible joint instability
- Metatarsal index
- M1/ M2 relationship in lateral plain
- Sesamoid position
- MTP joint congruence
- MTP joint arthrosis

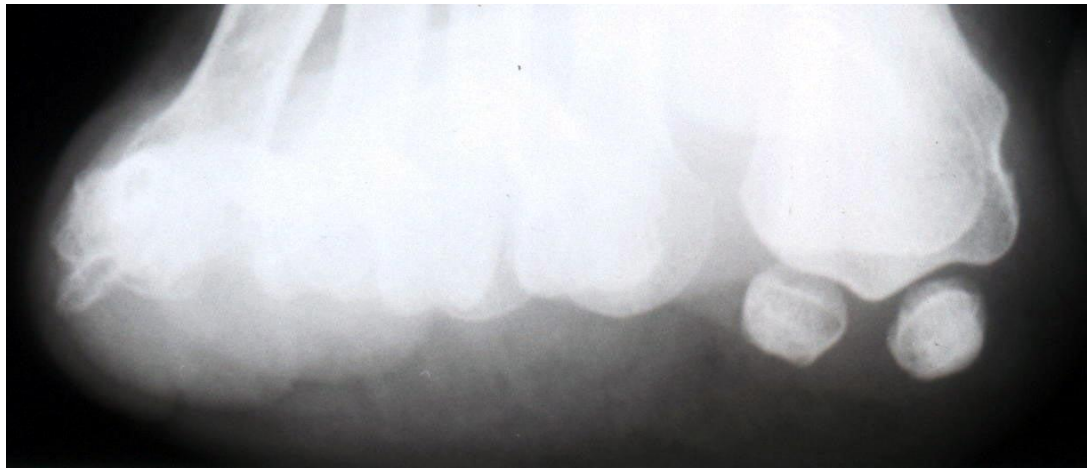


**A-** HV angle; **B-** IM angle; **C-** M1/M2 angle; **D-** DMA angle; **E-** metatarsocuneiform joint angle.





M1/ M2 relationship in lateral plain



Sesamoid position

# ***Surgical treatment of hallux valgus***

## Decision making

Hallux valgus without MTP arthrosis

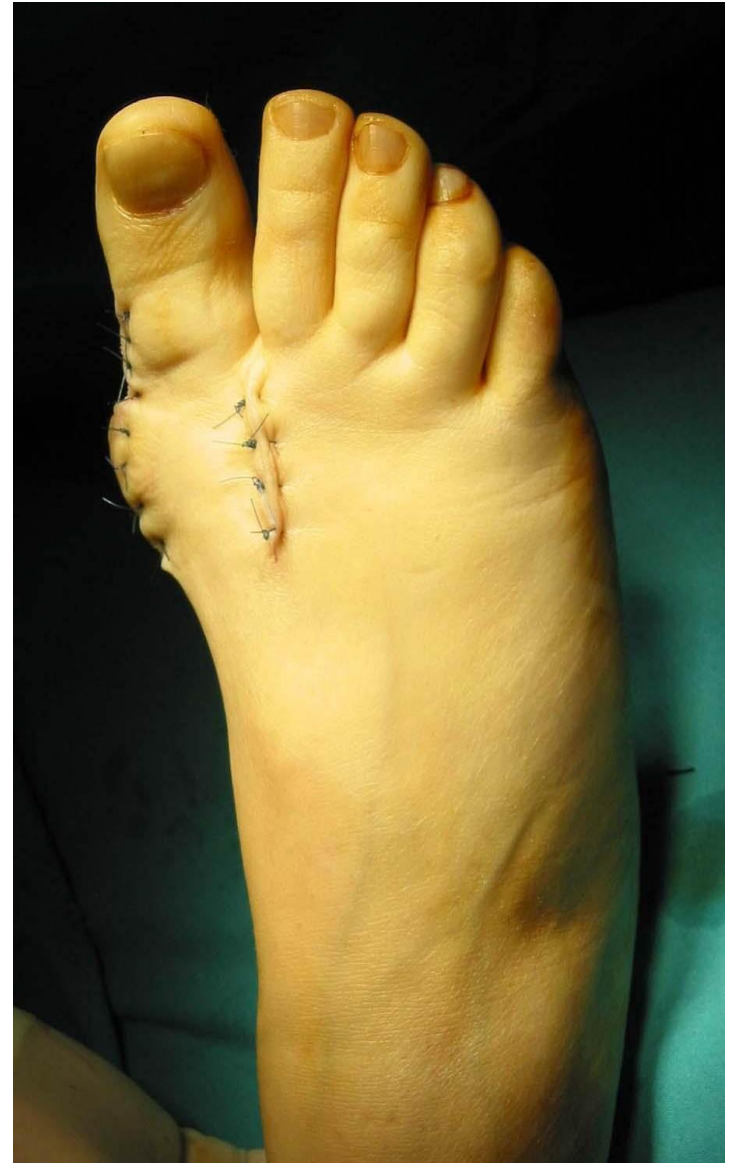
Hallux valgus with MTP arthrosis

Juvenile hallux valgus

# ***Surgical treatment of hallux valgus***



DSTP + exostectomy + chevron osteotomy



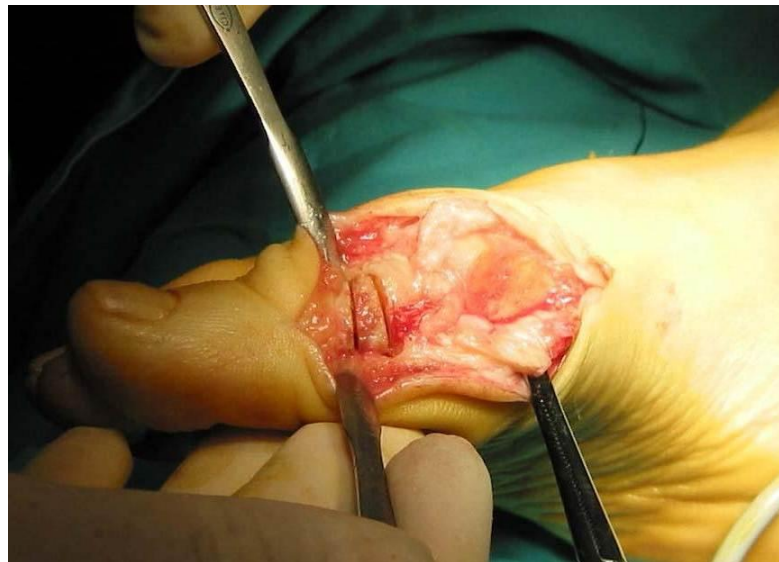


Distal soft-tissue procedure





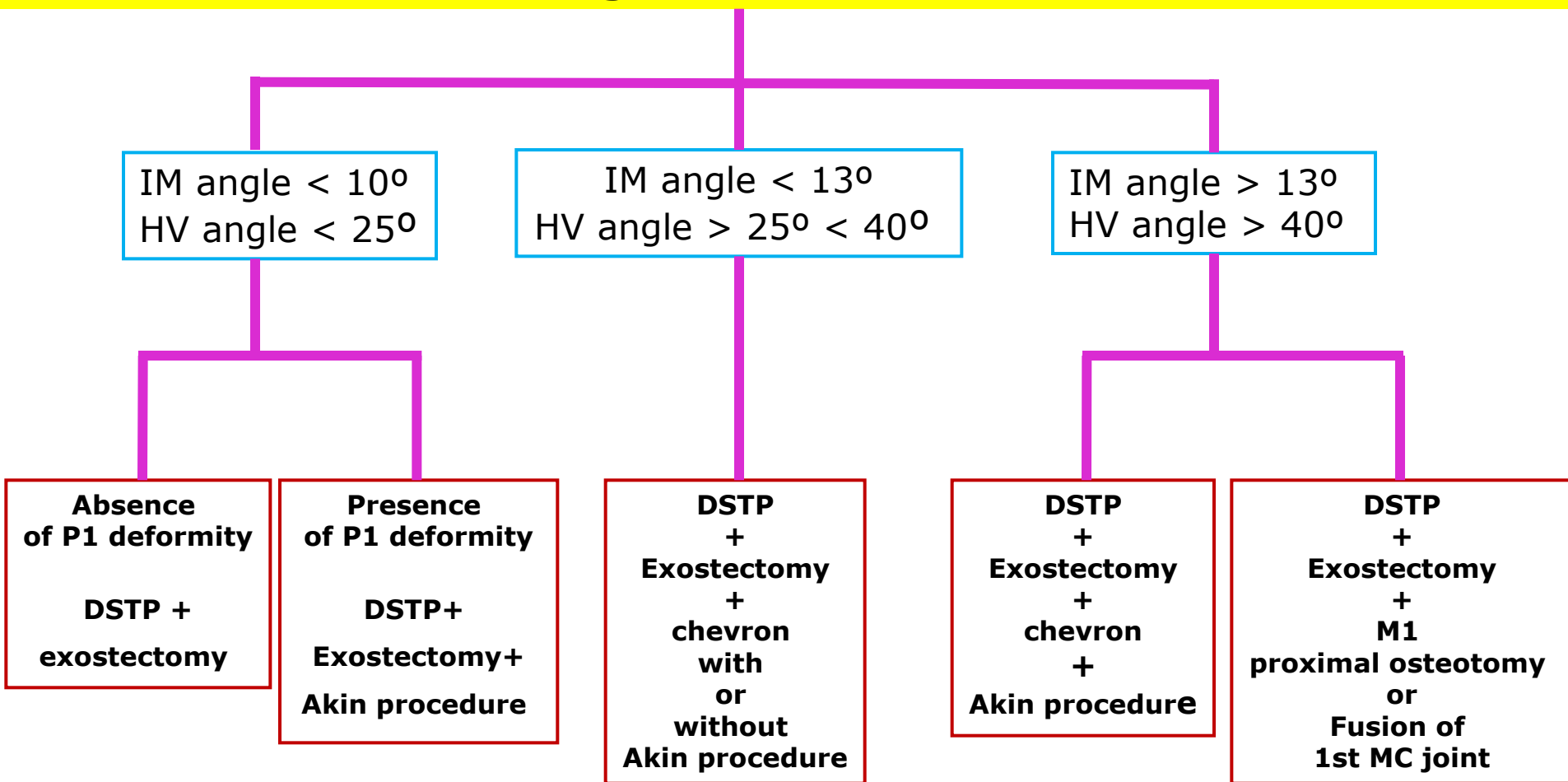
Chevron osteotomy



Akin osteotomy



## ***Hallux valgus without MTP arthrosis***



**DSTP = distal soft-tissue procedure; chevron = M1 distal osteotomy; MC = metatarsocuneiform joint**

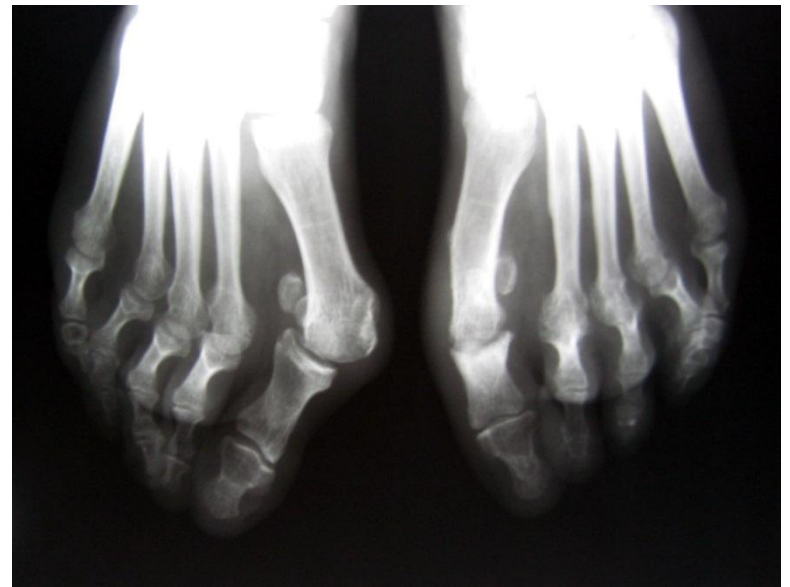
# *Hallux valgus with MTP arthrosis*

Active patient

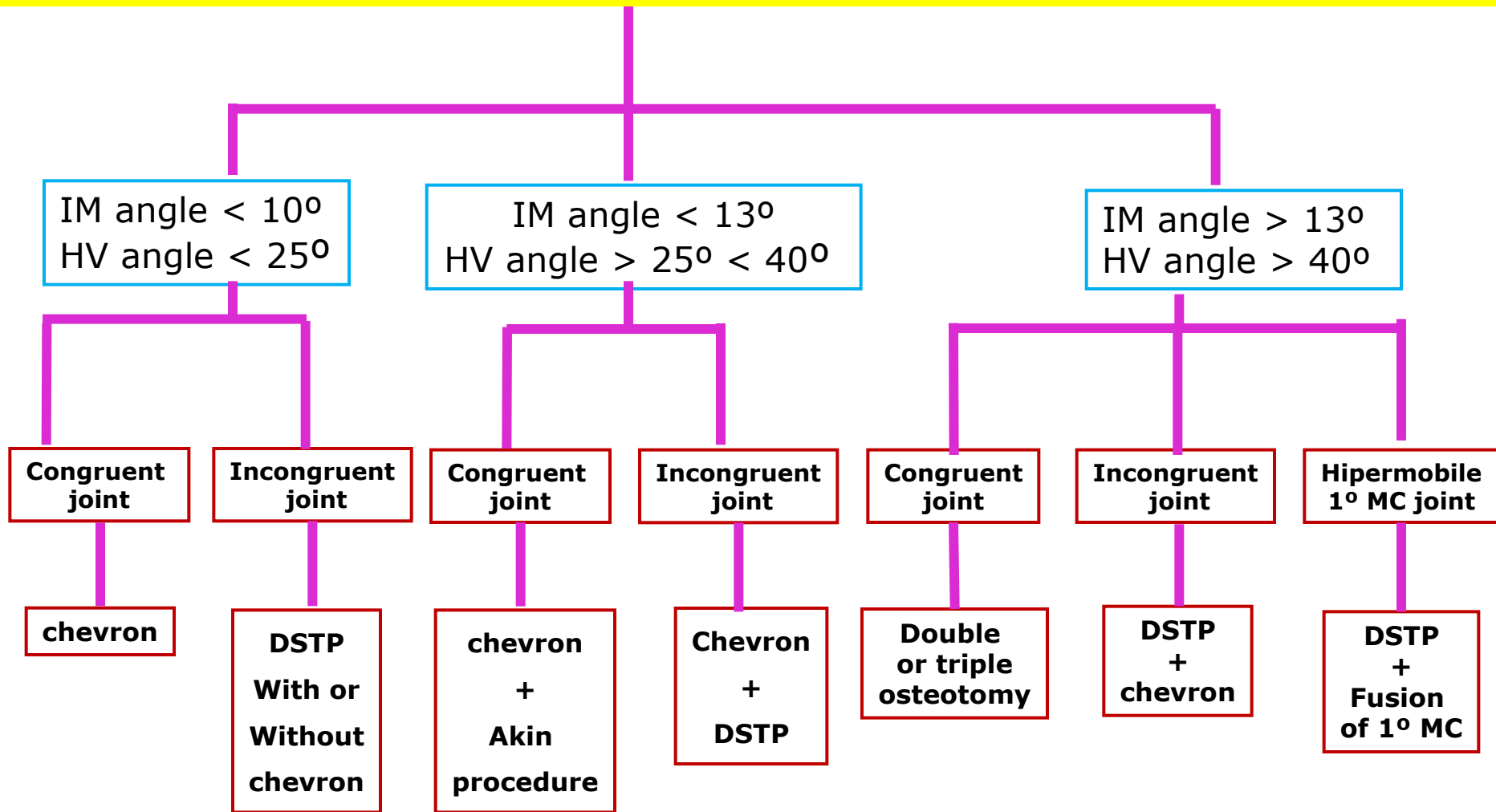
less active patient

**Fusion of the 1st MTP**

**Keller-Lelièvre-Villadot procedure**



# *Juvenile hallux valgus*



DSTP= distal soft-tissue procedure; chevron= M1 distal osteotomy; MC = metatarsocuneiform joint

## Case 1

Distal soft-tissue procedure, exostectomy and chevron osteotomy



## Case 2

Hallux valgus, 2<sup>nd</sup> and 3<sup>rd</sup> MTs are long





## Case 2

1<sup>st</sup> MTP arthrodesis, 2<sup>nd</sup> and 3<sup>rd</sup> MTs Weil osteotomies



## Case 3

**Hallux valgus, 2<sup>nd</sup> and 3<sup>rd</sup> MTs are long**



## Case 3

Distal soft-tissue procedure, exostectomy, Chevron/Akin osteotomies, 2<sup>nd</sup> and 3<sup>rd</sup> Weil osteotomies



## Case 4

Hallux valgus (short first MT), 3<sup>rd</sup> MTP Freiberg infraction



## Case 4

Distal soft-tissue procedure, exostectomy, Chevron osteotomy, 2<sup>nd</sup> MT Weil osteotomy and 3<sup>rd</sup> MT Gauthier procedure





## Case 5

Surgical treatment of severe hallux valgus by distal soft-tissue procedure, exostectomy and Scarf osteotomy



## Case 5

### Scarf osteotomy in severe hallux valgus



Hallux valgus surgery in a broad forefoot: distal soft-tissue procedure, exostectomy, 1<sup>st</sup> MT and 5<sup>th</sup> MT proximal osteotomies.



**Case 6**

## Case 7

### Severe hallux valgus



## Case 7

Distal soft-tissue procedure, exostectomy, 1<sup>st</sup> MT opening wedge proximal osteotomy and 1<sup>st</sup> phalanx Akin osteotomy



## Case 8

Hallux valgus, 2<sup>nd</sup> MT is long





## Case 8

Distal soft-tissue procedure, exostectomy, Chevron/Akin osteotomies,  
2<sup>nd</sup> MT Weil osteotomy



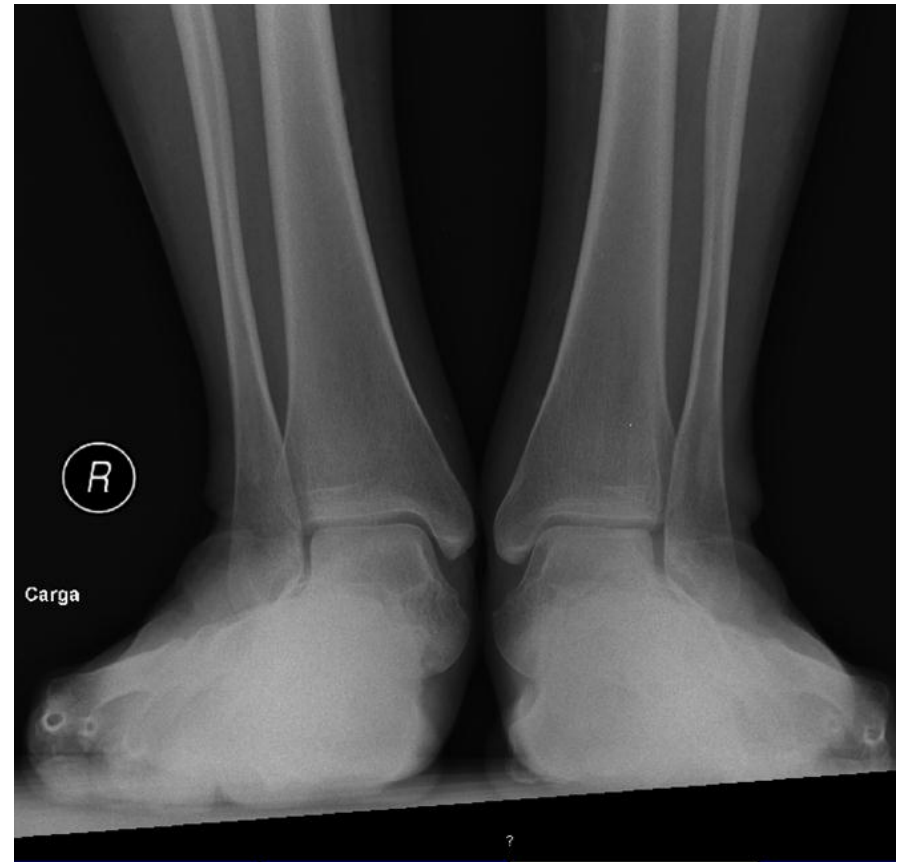
## Case 9

Lupus feet, hallux valgus with 1<sup>st</sup> MTP dislocation



## Case 9

Lupus feet, hallux valgus with 1<sup>st</sup> MTP dislocation



## Case 9

### Triple arthrodesis and 1<sup>st</sup> MTP arthrodesis



## Case 9

Clinical aspect: triple arthrodesis and 1<sup>st</sup> MTP arthrodesis





## Case 10

Rheumatoid forefeet, left severe hallux valgus, MTPs dislocation





## Case 10

1<sup>st</sup> MTP arthrodesis and metatarsal heads resection



## Case 11

### Rheumatoid forefeet



## Case 11

Distal soft-tissue procedure, exostectomy , Chevron and Akin osteotomies -  
right foot -



## Case 11

DSTP, exostectomy, Chevron and Akin osteotomies, 2<sup>nd</sup>- 4<sup>th</sup> MTPs reduction and respective proximal interphalangeal joints arthrodesis

- left foot -



## Case 12

Left severe hallux valgus, 2<sup>nd</sup> and 3<sup>rd</sup> MTPs dislocation, with 2<sup>nd</sup> and 3<sup>rd</sup> claw toes





## Case 12

1<sup>st</sup> MTP Arthrodesis + 2<sup>nd</sup> and 3<sup>rd</sup> MTP reduction and respective PIF joints  
arthrodesis



# References

- **Patologia del pie, 4ª ed, J. Lelièvre, J.-F. Lelièvre, Masson; 1982.**
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- **Disorders of the Foot and Ankle: Medical and Surgical Management, 2nd ed, Melvin H. Jahss, W.B. Saunders Co; 1991.**
- **Surgery of the Foot and Ankle, 7th ed, Michael J. Coughlin, Roger A. Mann, C.V. Mosby; 1999.**
- **Mann RA. Disorders of the first metatarsophalangeal joint. J Am Acad Orthop Surg 3: 34-43, 1995.**