Hallux valgus
images of surgical procedures and
algorithmic approach

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• 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
- Keller-Leliévre-Villadot procedure = resection of the proximal phalanx of the toe (F1) and sesamoids realignment according to Leliévre’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

Diabetic feet

arthrosis
Different types and aetiologies of hallux valgus

Systemic lupus erythematosus
Diabetic feet, hallux valgus, 2nd and 3rd 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
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

- IM angle < 10º
  - HV angle < 25º
    - Absence of P1 deformity:
      - DSTP + exostectomy
    - Presence of P1 deformity:
      - DSTP + Exostectomy + Akin procedure

- IM angle < 13º
  - HV angle > 25º < 40º
    - DSTP + Exostectomy + chevron with or without Akin procedure

- IM angle > 13º
  - HV angle > 40º
    - DSTP + Exostectomy + chevron + Akin procedure
      - or
      - DSTP + Exostectomy + M1 proximal osteotomy or Fusion of 1st MC joint

DSTP = distal soft-tissue procedure; chevron = M1 distal osteotomy; MC = metatarsocuneiform joint
Hallux valgus with MTP arthrosis

- Active patient
  - Fusion of the 1st MTP

- Less active patient
  - Keller-Leliévre-Villadot procedure
Juvenile hallux valgus

IM angle < 10º
HV angle < 25º
- Congruent joint
  - chevron
- Incongruent joint
  - DSTP
    - With or Without chevron

IM angle < 13º
HV angle > 25º < 40º
- Congruent joint
  - chevron + Akin procedure
- Incongruent joint
  - Chevron + DSTP

IM angle > 13º
HV angle > 40º
- Congruent joint
  - Double or triple osteotomy
- Incongruent joint
  - DSTP + chevron
- Hipermobile 1º MC joint

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\textsuperscript{nd} and 3\textsuperscript{rd} MTs are long
Case 2

1\textsuperscript{st} MTP arthrodesis, 2\textsuperscript{nd} and 3\textsuperscript{rd} MTs Weil osteotomies
Case 3

Hallux valgus, 2\textsuperscript{nd} and 3\textsuperscript{rd} MTs are long
Case 3
Distal soft-tissue procedure, exostectomy, Chevron/Akin osteotomies, 2\textsuperscript{nd} and 3\textsuperscript{rd} Weil osteotomies
Case 4
Hallux valgus (short first MT), 3rd MTP Freiberg infraction
Case 4
Distal soft-tissue procedure, exostectomy, Chevron osteotomy, 2nd MT Weil osteotomy and 3rd 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, $1^{st}$ MT and $5^{th}$ MT proximal osteotomies.
Case 7
Severe hallux valgus
Case 7

Distal soft-tissue procedure, exostectomy, 1\textsuperscript{st} MT opening wedge proximal osteotomy and 1\textsuperscript{st} phalanx Akin osteotomy
Case 8

Hallux valgus, 2nd MT is long
Case 8

Distal soft-tissue procedure, exostectomy, Chevron/Akin osteotomies, 2\textsuperscript{nd} MT Weil osteotomy
Case 9

Lupus feet, hallux valgus with 1st MTP dislocation
Case 9

Lupus feet, hallux valgus with 1\textsuperscript{st} MTP dislocation
Case 9

Triple arthrodesis and 1st MTP arthrodesis
Case 9
Clinical aspect: triple arthrodesis and 1st MTP arthrodesis
Case 10

Rheumatoid forefeet, left severe hallux valgus, MTPs dislocation
Case 10

1st 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\textsuperscript{nd}- 4\textsuperscript{th} MTPs reduction and respective proximal interphalangeal joints arthrodesis
- left foot -
Case 12
Left severe hallux valgus, 2\textsuperscript{nd} and 3\textsuperscript{rd} MTPs dislocation, with 2\textsuperscript{nd} and 3\textsuperscript{rd} claw toes
Case 12

1\textsuperscript{st} MTP Arthrodesis + 2\textsuperscript{nd} and 3\textsuperscript{rd} MTP reduction and respective PIF joints artrodesis
References


• Disorders of the Foot and Ankle: Medical and Surgical Management, 2nd ed, Melvin H. Jahss, W.B. Saunders Co; 1991.
