Hallux Valgus Overview

Alex Schroeder, M.D.

Hallux Valgus

Background

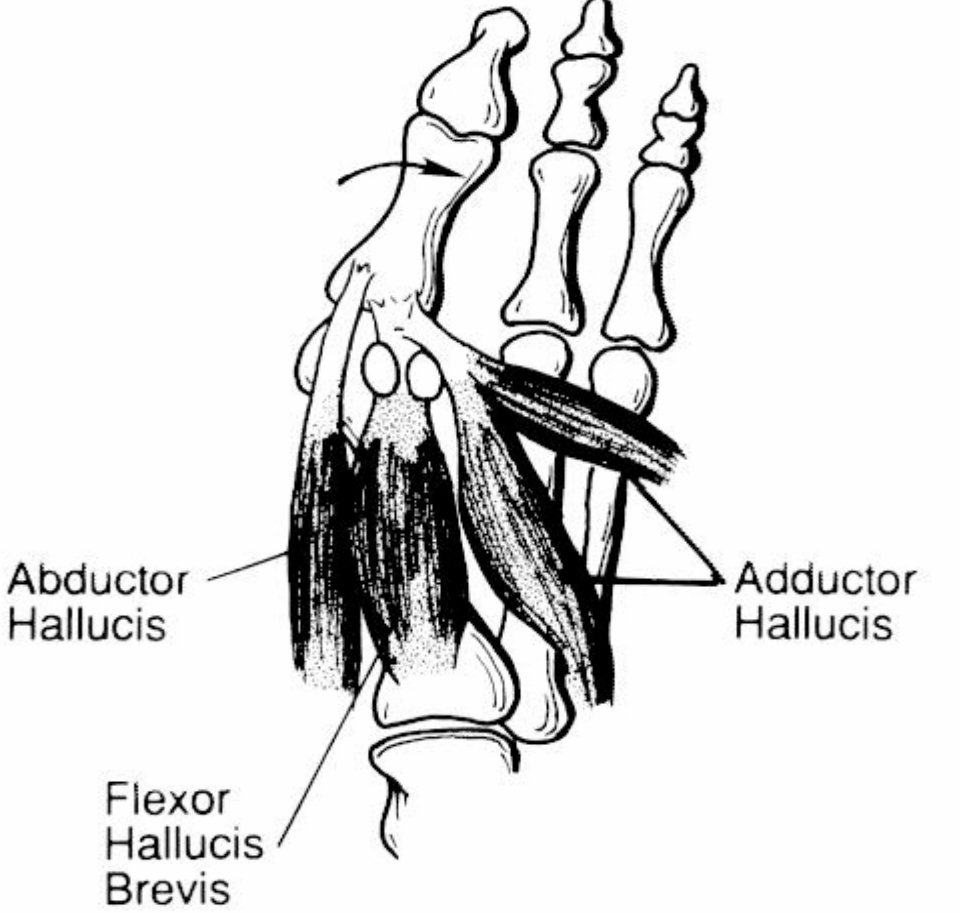
- Carl Hueter - Static subluxation of first MTP joint with lateral deviation of the great toe and medial deviation of the first metatarsal
- Commonly called bunions—Bunio-L. turnip
- Once the MTP joint is destabilized, muscle pull increases the deformity over time
- Often painful prominence of medial eminence

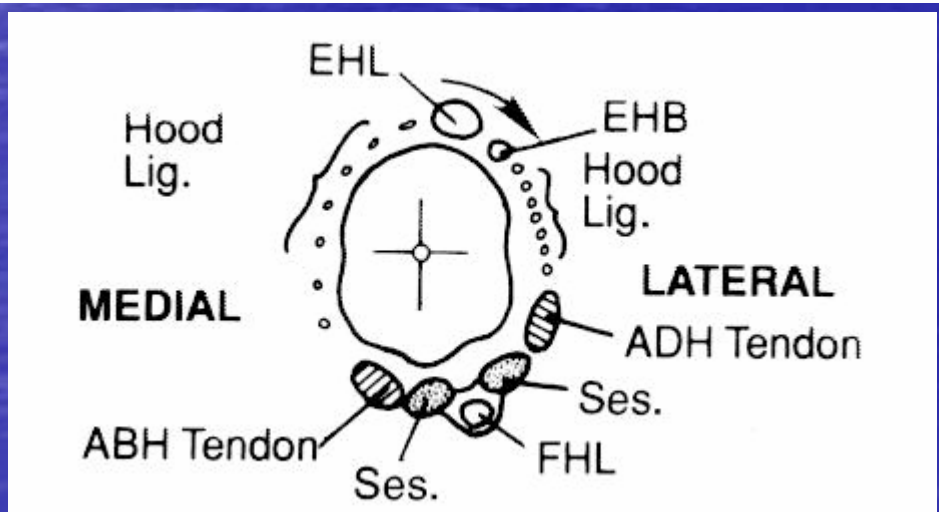
Common Causes

- Footwear- responsible for the vast majority of bunions
- Hypermobility of First MTC joint
- Neuromuscular disease
- RA
- Collagen deficiency
- Achilles contracture
- Second toe amputation
- Windlass mechanism disruption

Pathophysiology

- Once first MTP joint begins to sublux, the proximal phalanx moves laterally, exerting pressure against the MTH, pushing the MT medially and increasing the IM angle
- The abductor hallucis then slides underneath the MTH
- Intrinsic muscles no longer stabilize MTP joint
- Adductor hallucis becomes a deforming force, pronating the phalanx as it laterally deviates phalanx
- As the deformity continues, the EHL slides into first web space, further adducting the phalanx when contracted
- First metatarsal deviates medially away from sesamoid complex


Abductor
Hallucis
Adductor
Hallucis
Flexor
Hallucis
Brevis


EHL
Hood
Lig.
EHB
Hood
Lig.
MEDIAL
LATERAL
ADH Tendon
Ses.
ABH Tendon
FHL
Ses.

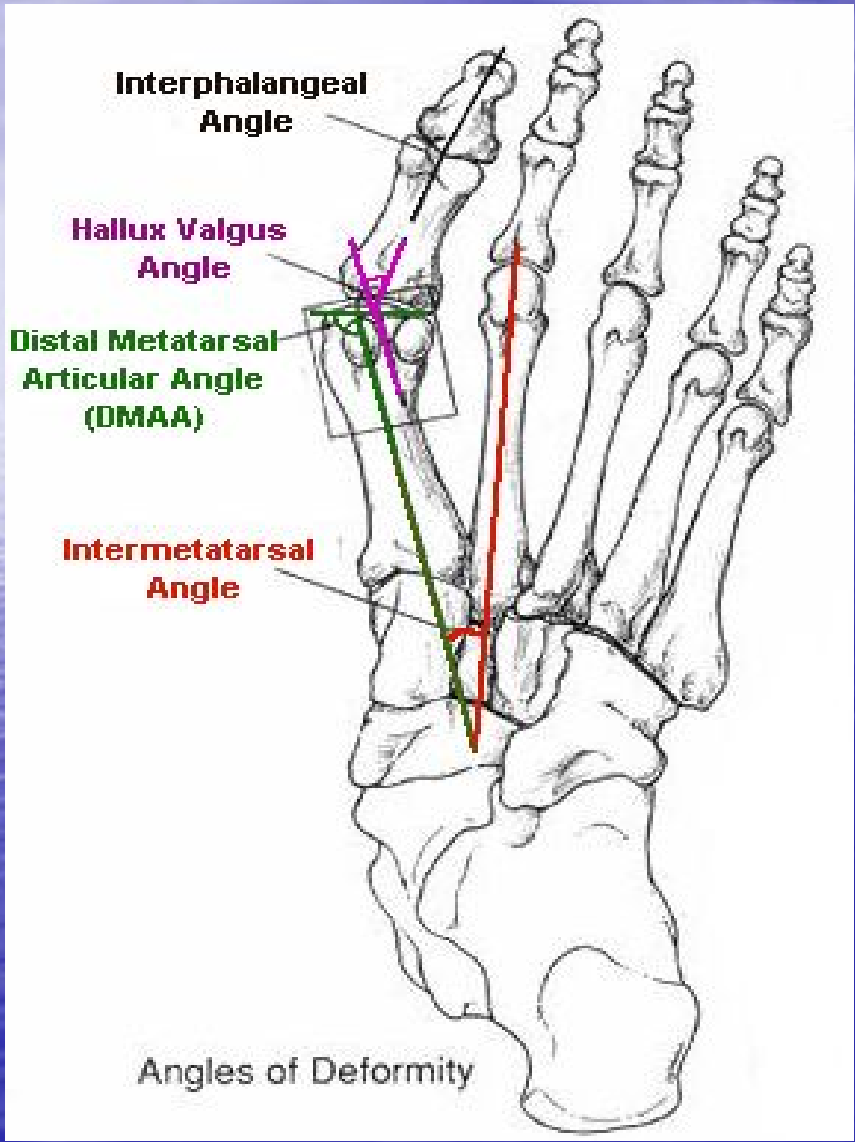
Physical Exam

- Gait-normal push off
- Pronated forefoot
- Ankle and ST motion
- Calluses
- Lesser toe deformities
- Achilles contracture
- MTC hypermobility
- ROM of MTP and IPJ
- Correctability
- Pain with motion
- Neurovascular exam
- Pes planus

Weight Bearing Radiographs

- Hallux valgus angle
- Intermetatarsal angle
- Distal Metatarsal articular angle (DMAA)
- Joint Congruency
- Degenerative changes
- First MCP joint
- Length of first and second metatarsals
- Sesamoid position

Angles



- HV angle- between log axis of phalanx and MT; <15 deg.
- IM angle- intersection of long axis of 1st and 2nd metatarsals: <9 deg
- DMAA-between articular surface and long axis of 1st metatarsal

Severity of Deformity

- Mild: HV angle < 30°, IM angle < 13°, < 50% lateral subluxation of fibular sesamoid (FS)
- Moderate: HV angle < 40°, IM angle > 13°, 75-100% lateral subluxation of FS
- Severe: HV angle > 40°, IM angle > 20°, 100% lateral subluxation of FS

General Algorithm

- DJD → MTP Fusion
- Mild → Chevron, DSTP, Mitchell
- Moderate → DSTP + prox. osteotomy, Mitchell
- Severe → DSTP + prox. osteotomy, MTP fusion

Conservative Treatment

- Soft leather shoes with wide toe box
- Modification of existing shoes
- Bunion pads
- Night splints
- Orthotics not proven to prevent progression of deformity

Decision Making

- Chief complaint, occupation, activity level
- History and PE findings
- Radiographic findings
- Age
- Neurovascular status
- Patient expectations

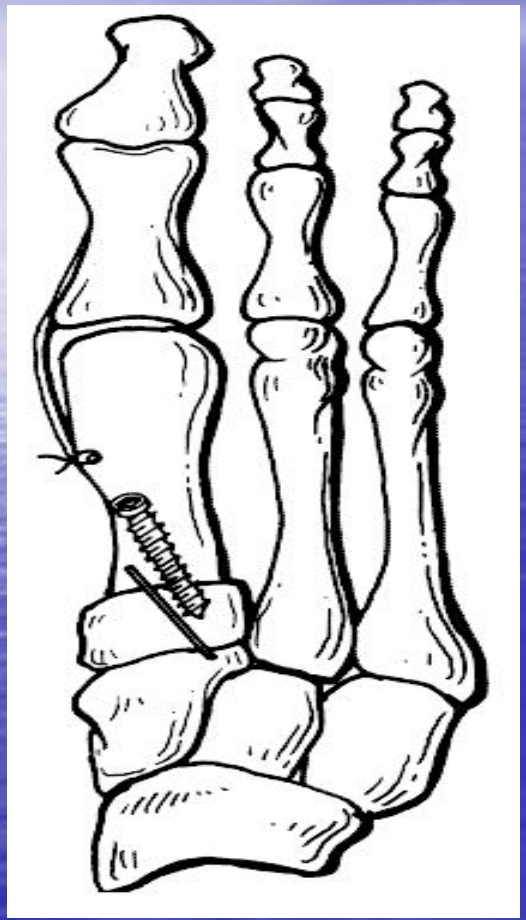
Operative Options

- Soft tissue reconstruction
- Proximal or distal MT osteotomy
- Arthrodesis of first MTP joint
- Excisional arthroplasty
- Combination of procedures
- No single procedure works for all deformities

Distal Soft Tissue Procedure (McBride)

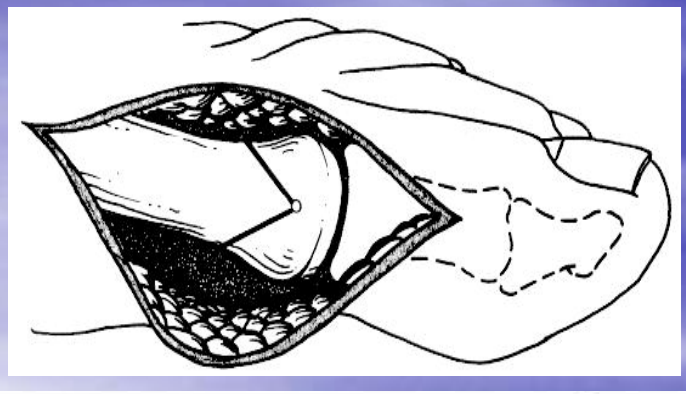
- Release of contracted lateral structures—adductor hallucis, transverse metatarsal ligament, lateral capsule
- Exostectomy of medial eminence
- Indications: HV < 30°, IM < 13°
- Contraindications: mod. to severe deformity, arthrosis, spasticity, DMAA > 12-15°
- If more than 20° correction needed, should combine with MT osteotomy

Proximal Osteotomy



Chevron Osteotomy

- Indications: mild deformity, age < 60
- Contraindications: large deformity, age > 60
- Procedure
  - expose medial MTP joint, excise medial eminence in plane of foot
  - Apex of osteotomy centered in MTH
  - MTH displaced laterally < 1/3 rd MT width
  - +/- pin fixation- K-wire, PLA pin
- 80% good to excellent results
- Complications: pain, recurrence, transfer metatarsalgia, neuritis, arthrofibrosis,



Chevron Osteotomy

FIG. 21-A

FIG. 21-B

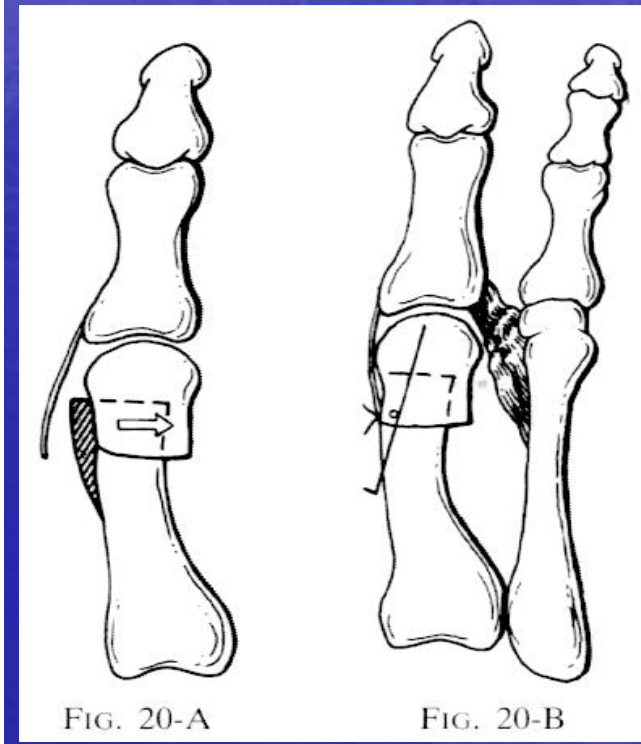


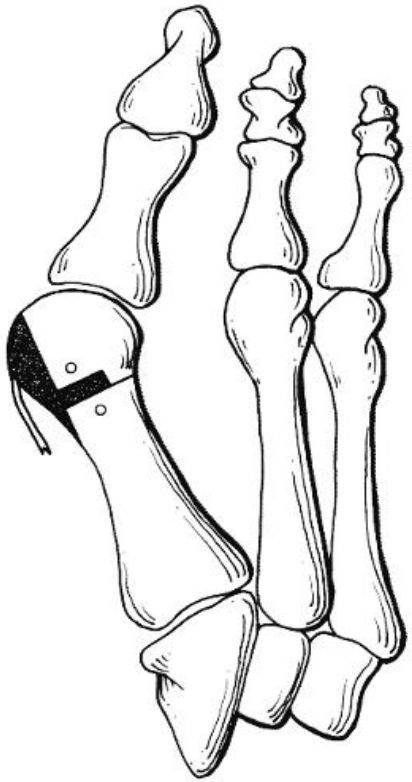
FIG. 20-A

FIG. 20-B

Mitchell Osteotomy

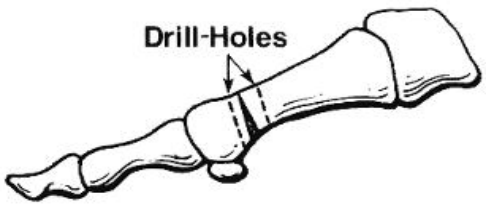
- Double step cut osteotomy through neck of 1st MT, displacing head laterally and plantarward
- Indications: mod. to severe deformity, age < 50
- Contraindications: mild deformity, short 1st MT, congruent joint, arthrosis
- Complications: shortening 1st MT, transfer metatarsalgia, loss of osteotomy position, instability, arthrofibrosis, AVN, delayed union, malunion, non-union

Mitchell Osteotomy



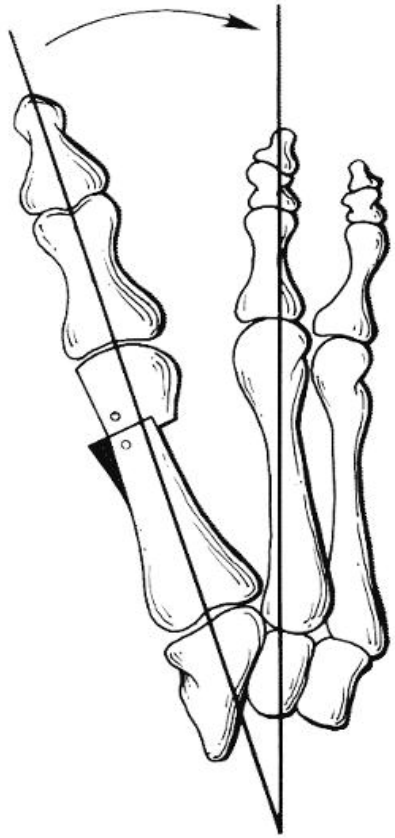
Bone Resection

FIG. 23-A



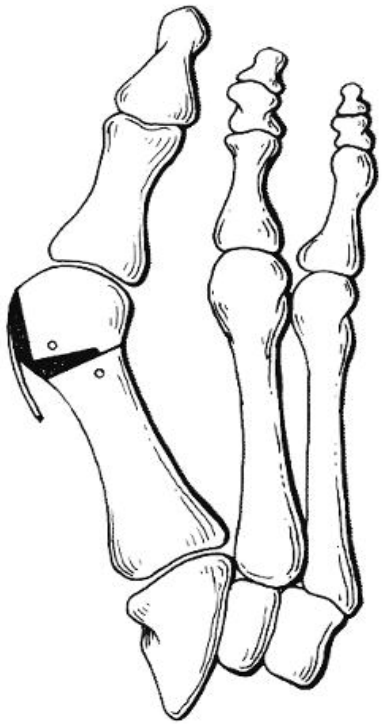
Bone Resection

FIG. 23-B



Bone Resection

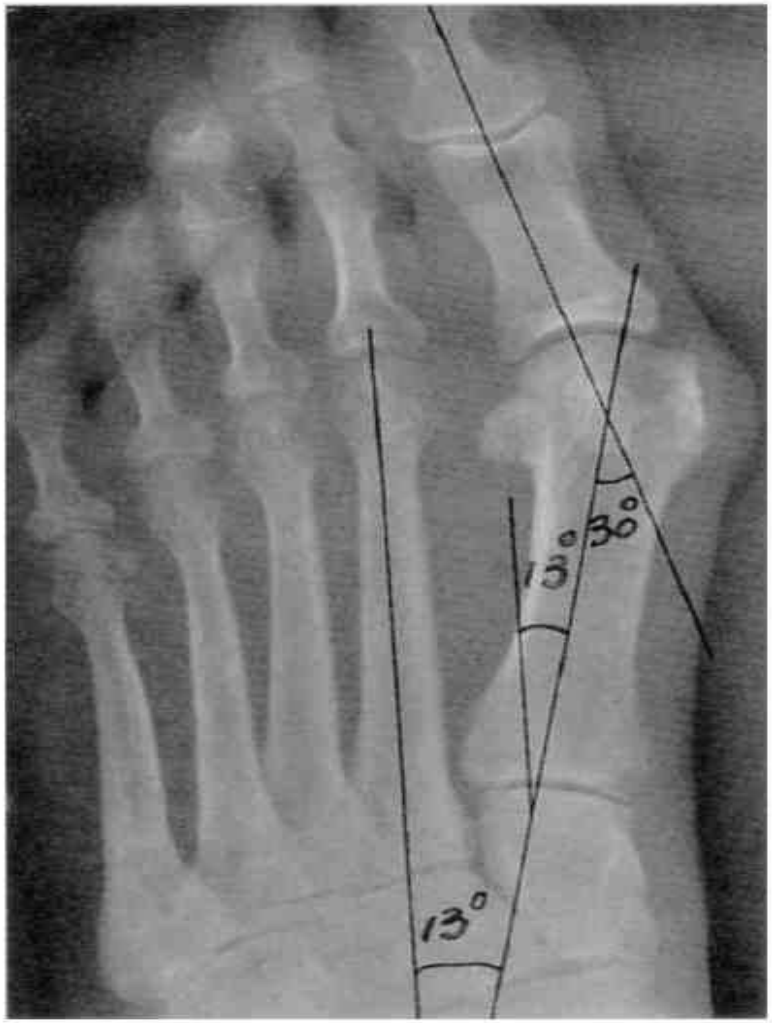
FIG. 23-C

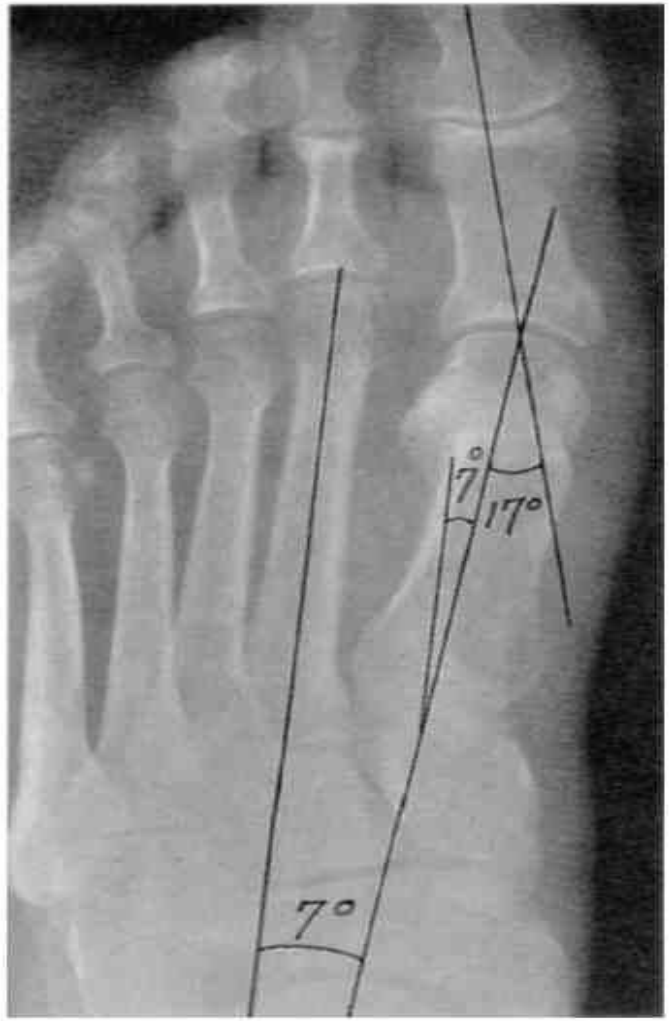


Bone Resection

FIG. 23-D

Mitchell Osteotomy





Akin Procedure

- Excision of medial eminence and closing wedge osteotomy of proximal phalanx
- Fixation with heavy suture or oblique pin
- Good salvage procedure for residual HV
- Indications: HV interphalangeus, increased DMAA
- Contraindications: subluxed 1st MTP joint
- Complications: recurrence, non-union/malunion, AVN, transection of FHL

Akin Procedure

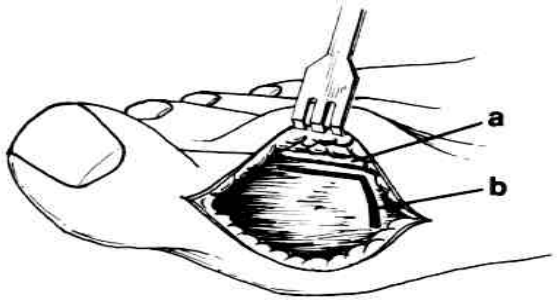


FIG. 12-A

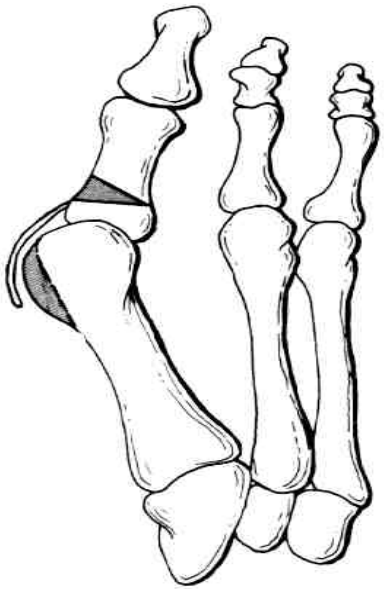


FIG. 12-B

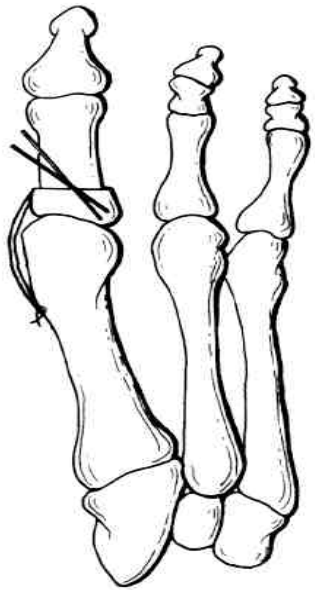


FIG. 12-C

FIG. 12-D

Keller Procedure

- Resection of 1/3 of proximal phalanx
- Pin fixation or suturing plantar aponeurosis to FHL to prevent cock-up deformity
- Indications: elderly, household ambulator, poor circulation, salvage procedure
- Contraindications: young, active, high demand of great toe
- Complications: transfer metatarsalgia, cock-up deformity, recurrence

MTC Arthrodesis (Lapidus)

- Indications: hypermobility of 1st MTC joint- > 25-35° of motion, IM angle > 15°
- Relative Contraindications: young patient, open epiphysis
- Failure rate up to 20%

MTC Arthrodesis

MTP Arthrodesis

- 6 hole ¼ tubular plate or 4.0 cannulated screw
- 15° valgus, 10-15° dorsiflexion
- Indications: severe HV deformity > 50°, RA, hallux rigidus, arthrosis, CVA, head injury, CP, salvage procedure
- Relative contraindications: Insensate foot, arthrosis of 1st MTC joint

Arthrodesis

FIG. 35-A

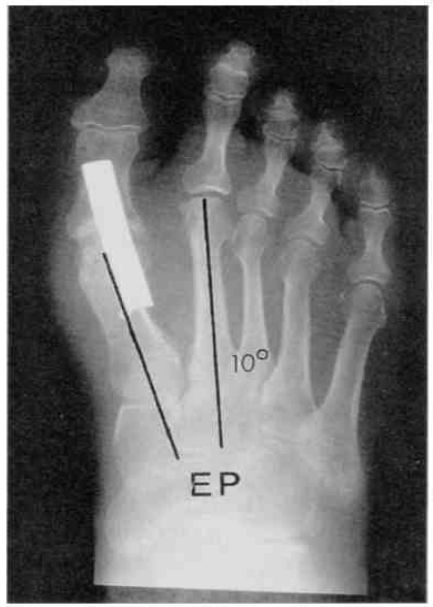


FIG. 35-B

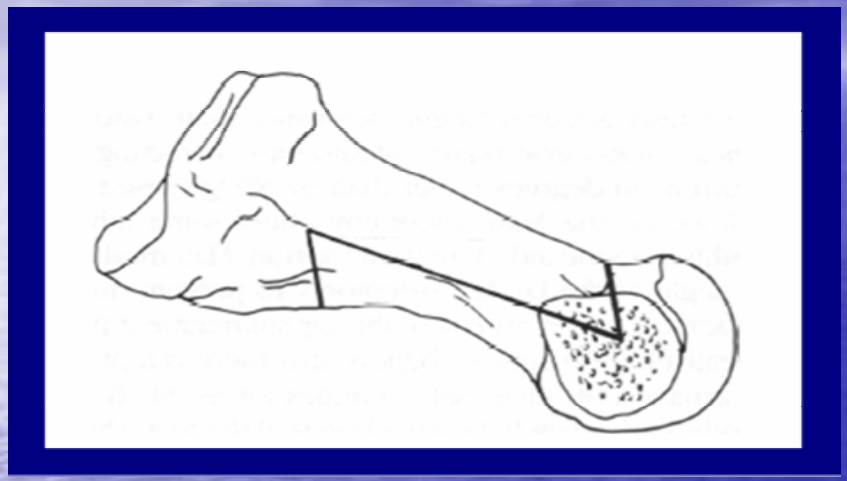
FIG. 34-A

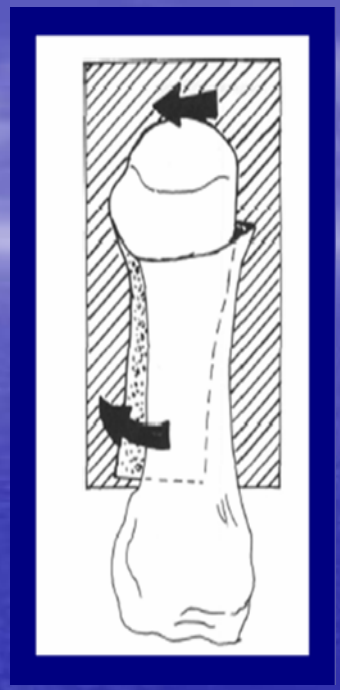
FIG. 34-B

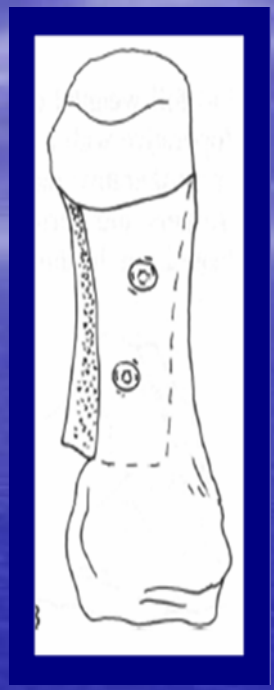
Scarf or Z - Osteotomy

- Scarf- technique used by carpenters to lengthen beams
- Also used in correction of HV deformity
- Can lengthen or shorten MT, as well as control rotation and dorsiflex or plantarflex MT
- Technically challenging
- Strong fixation=early function

Z Osteotomy







Goals of Surgery

- Correction of HV and IM angles
- Correction of incongruous joint
- Removal of medial eminence
- Retention of functional ROM
- Maintenance of normal weight bearing mechanics

Complications

- Infection
- Delayed wound healing
- Skin slough
- Scarring
- Paresthesias
- Shortening of MT
- Recurrence
- Overcorrection
- Malunion/non-union
- AVN
- Cock-up deformity
- Transfer metatarsalgia
- Hallux varus
- Loss of fixation