

# HALLUX VALGUS

## DEFINITION

Lateral deviation of the great toe and the medial deviation of the first metatarsus with prominent of the head medially producing bunion



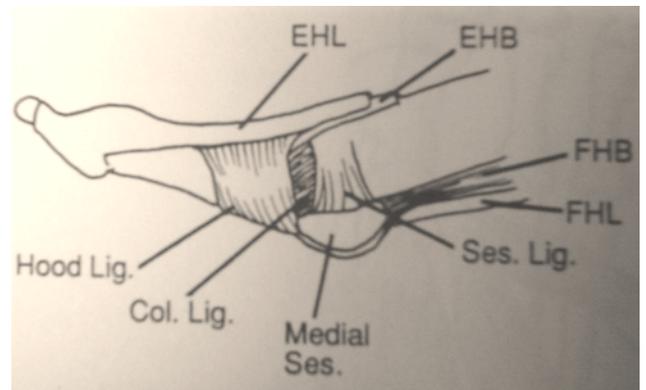
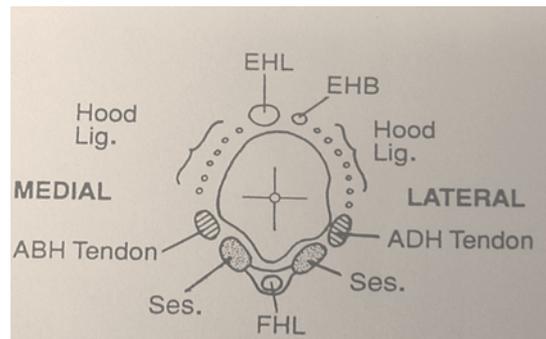
## PATHOGENESIS

EHL and dorsal hood connect to the collateral and sesamoid ligaments forming the capsule of MPJ

FHB inserted to medial and lateral sesamoids and distally the sesamoids are attached to the base of the proximal phalanx by the plantar plate

In Hallux valgus, the Abductor Hallucis is displaced plantarwards.

Pull of Adductor Hallucis and EHL produce lateral deviation and pronation of the great toe.



## CLINICAL

### History

- |                          |     |
|--------------------------|-----|
| 1. Foot wear problem     | 80% |
| 2. Pain over the toe     | 80% |
| 3. Cosmetic concerns     | 60% |
| 4. Lateral metatarsalgia | 40% |

### Examination

1. Gait     Toe off phase may be absent
2. Standing     Look for degree of Hallux Valgus  
                  Pronation of the great toe  
                  Is the deformity is passively correctible or not
3. Look for Lesser toe  
                  Valgus knee  
                  Flat foot  
                  Swelling of the Joint [?Rhematoid]  
                  Any signs of signs of generalized ligamentous laxity.
4. Sole for any callosity [Transfer lesions callosity over lateral part of the ball of the foot as there is change weight bearing in case of Hallux valgus]
5. Shoe wear
6. ROM of MTP, IP joint  
      ROM of Subtalar and Ankle [any tight TA]
7. Mobility of the Tarso-metatarsal joint  
      Metatarso-Cuniform joint (Plantar lateral to dorsomedial = 9 mm)  
      5% of Hallux Valgus will have Hypermobility metatarso-cunieforn joint
8. Look for instability of II metatarsophalangeal joint [Drawer test]
9. Circulation; Sensation

## X rays: Weight bearing X rays

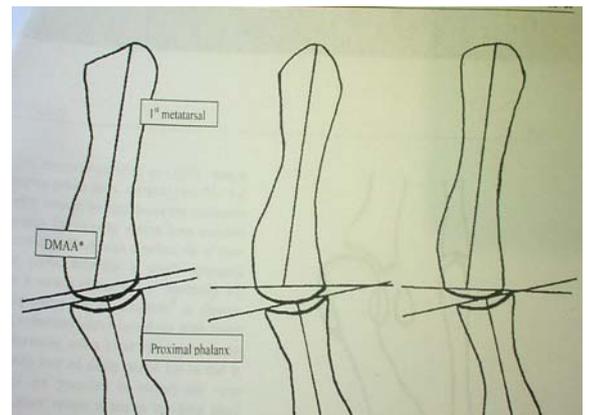
### Pigott's congruous and incongruous

#### Congruous joint

More common with Juvenile Hallux Valgus

Stable and subluxation is rare

Distal metatarsal articular angle [DMAA] is more  
Deformity worsens with the proximal osteotomy



#### Incongruous

Unstable and subluxates

Common with Adult Hallux Valgus

DMAA normal

### Radiological angles

Intermetatarsal angle [IMA]	9°
Hallux Valgus angle [HVA]	15°
Distal metatarsals articular angle [DMAA]	<10°
Interphalangeal angle [IPA]	5°



Sesamoid displacement

Mild 50%; Mod 50-75; Severe >75%

Look for osteoarthritis in I MPJ

Look for instability of the II MTP joint.

Length of II M compared to I is it more than 7 mm

Sloping of MT-C joint

<b>Classification of Hallux valgus</b>			
	<b>HV angle</b>	<b>I MT angle</b>	<b>Congruent or not</b>
Normal	< 15°	< 9°	Congruent
Mild	15° – 20°	9° - 11°	Congruent
Moderate	20° - 40°	12 - 18°	Incongruent
Severe	> 40°	> 18°	Incongruent

## **TREATMENT**

### **Non-surgical treatment**

“Make the shoe fit the foot”

Local pressure relief

Wide fitting shoes with deep toe box

Analgesics

Antibiotics when infective bursitis

### **Surgical**

Any procedure chosen must take into account

1. Severity of Hallux Valgus
2. Arthritis of Metatarsophalangeal joint [MTP] and interphalangeal [ IP ]joints
3. Age and activity of the patient
4. Mobility of the first MC Joint
5. Congruent or not

### **Indications**

Pain is not adequately controlled by non-operative means.

The outcomes from Hallux valgus surgery are not always ideal and extensive pre-operative counselling is required.

### **Standard surgeries**

#### **Moderate Hallux Valgus [HVA < 40°]**

Chevron

Mitchell's osteotomy

#### **Severe Hallux Valgus [HV A>40°]**

Congruent            Double osteotomy

Incongruent        Distal soft tissue and  
Proximal osteotomy [Scarp or Mitchell  
or Modified Chevron]

Hypermobility TMTJ. Lapidus procedure

## MANN'S MODIFIED MCBRIDES PROCEDUR

### Indication

Noncongruous HV  $<30^\circ$  and IMA  $<15^\circ$  ie., Mild deformity

### Original McBride's procedure

Divide Adductor tendon, Excise Lateral sesamoid, attach Adductor to the neck of the metatarsal and medial capsulorrhaphy

Complications: High rate of Hallux Varus



### Modified McBrides [Mann]

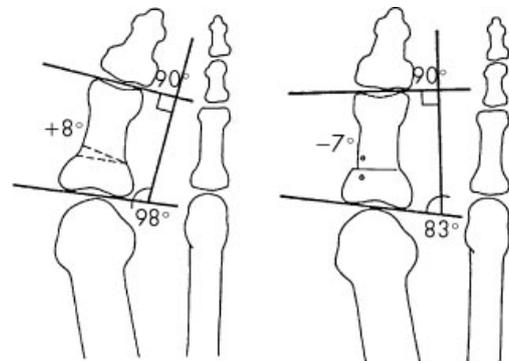
Lateral sesamoid is never excised. Release lateral capsule  
Release Adductor Hallucis and intermetatarsal ligament from the proximal phalanx.  
Then attach this to soft tissue between I and II toe [MTP capsule]  
Retain lateral collateral ligament  
Bunionectomy and Capsulorrhaphy

Results: 10% varus deformity; 90% satisfied

## AKIN'S OSTEOTOMY OF THE PROXIMAL PHALANX

**Indication** Mild Hallux Valgus and  
Hallux Valgus interphalangeus

**Procedure** Bunionectomy, Capsulorrhaphy and  
Medial closed wedge phalanx osteotomy



**Disadvantages** Only minimal correction  
High rate of postoperative dissatisfaction

Aki n's is usually combined with Chevron osteotomy.

## OSTEOTOMIES

Proximal osteotomies: When greater correction is required, this is indicated

Distal osteotomies: is indicated for moderate deformity; require a less exposure and early recovery

### Important principles

1. The technique should be technically easy to undertake and reproducible.
2. The osteotomy should be stable so that re-displacement does not occur.
3. The length of the first metatarsal should be maintained.
4. Avoid dorsiflexion, with the resultant elevation of the metatarsal head
5. The technique should be versatile: HVA, the IMA and the DMAA can be corrected.
6. The technique should be biological: avoid avascular necrosis of the metatarsal head.
7. The long-term outcome should show a low recurrence rate of the deformity

### CHEVRON OSTEOTOMY

#### Indication

Mild to Moderate HV [correction up to 30°]

#### Technique

Medial incision

Longitudinal incision on the I MTP joint

Bunionectomy

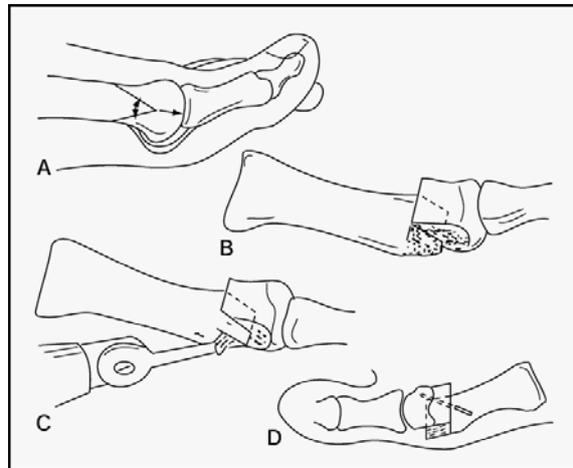
Chevron osteotomy is marked

Apex at 1 to 1.5 cm proximal to the joint  
with an angle of the V is 60°

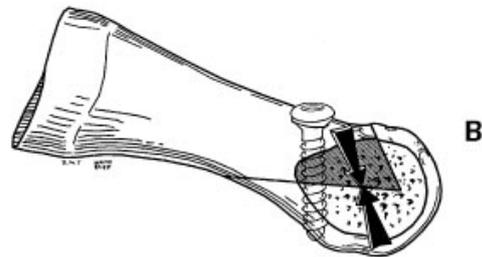
Displacement of fragment about 3-4 mm

Remove the prominence of the proximal head

Stabilise with a K wire or a screw



Johnson further modified Chevron osteotomy by changing the length and position of the limbs of the osteotomy which extended indication for severe deformity ie., up to 15° of IMA. Stabilised with 2.7 mm screw or cannulated 3.0 screw



#### Disadvantages

Does not correct Pronation of the toe

AVN of the head : 5 – 20%

[Avoid releasing lateral capsule].

## MITCHELL'S OSTEOTOMY

**Indication:** Moderate to Severe HV with subluxation  
Upper limit: HV 35° and IMA 15°

**Osteotomy** 2 cm proximal [Chevron 1.5 cm]

Take out 2mm wedge and

Displace laterally

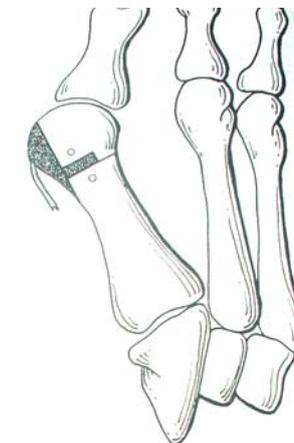
Stabilise with suture of wire

No lateral release is required

**Results:** Satisfactory in 82-97%

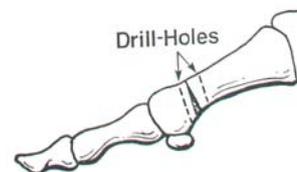
Beware of shortening is 7mm.

Good procedure



■ Bone Resection

FIG. 23-A



## WILSON'S OSTEOTOMY

An oblique metaphyseal osteotomy from distal medial to proximal lateral

Displace the metatarsal head laterally and proximally.

It allows correction of the IMA and HVA.

Satisfactory results have been described in approximately 90% of patients.



Pouliart reported

1. An average of 8.5 mm shortening of the first metatarsal
2. 24% incidence of dorsal angulation.
3. Lateral metatarsalgia in 35%  
Is correlated with the shortening.
4. Callosities under the second metatarsal head in 78%
5. Poor results when: > 5 mm



Due to these shortcomings this operation was discredited. Recently following modifications like obliquity of the osteotomy is reduced to 22.5° from 45°; displaced only by 3mm and fixation with a head less screw shown to improve outcome.



### DIAPHYSEAL OSTEOTOMY

**A. Ludloff's osteotomy.** Technically demanding

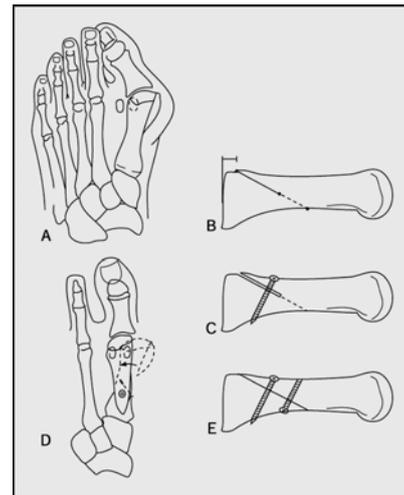
**Indication** Moderate and Severe HV with high IMA

**Advantages**

- Less metatarsalgia
- Good correction
- Minimal shortening
- Inherently stable

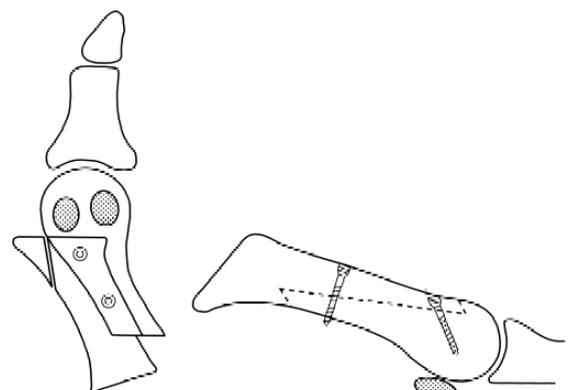
#### Ludloff's osteotomy

This osteotomy consists of a bone cut extending distally and inferiorly from the dorsal cortex, 2 mm distal to the Tarso-metatarsal joint to the plantar cortex. The osteotomy forms an angle of 30° to the long axis of the metatarsal. The distal fragment is rotated laterally on the proximal fragment and held with two screws.

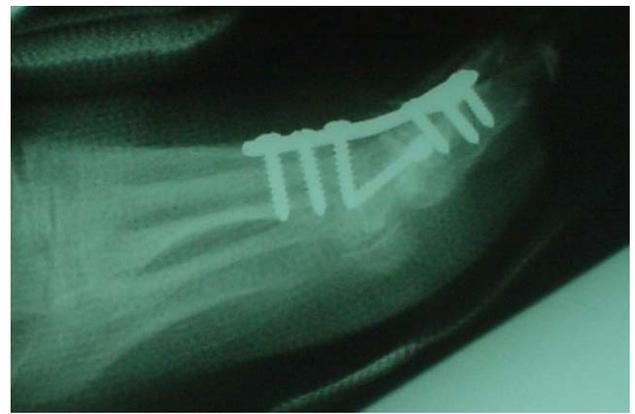


#### B. Scarp osteotomy

This is a Z-shaped step-cut osteotomy in the diaphyses  
 Named after its woodworking equivalent  
 Widely used because of its great versatility.  
 Helpful in Severe deformity



Plantar displacement to increase the load of the first ray and vice versa, elongation in cases of a short first metatarsal, and shortening in cases of a long first metatarsal



This is combined with a lateral release, excision of the medial bony eminence and a medial capsulorrhaphy.

The head and the plantar cortical fragment are then translated laterally and the osteotomy held with two compression screws

This osteotomy has a high degree of inherent biomechanical stability

### **BASAL OSTEOTOMY**

**Indication** Severe HV with HVA  $35^\circ$  and IMA  $13^\circ$  with subluxation of MTP joint

**Technique** Through a dorsal incision, a crescentic osteotomy is performed about a centimeter distal to the joint, at about  $120^\circ$  to the shaft and move the distal fragment laterally by 2-3 mm and fix with a screw . This is combined with a bunionectomy and a medial capsulorrhaphy.

**Disadvantages** Extensive soft tissue dissection is required.  
Technically demanding

### **ARTHRODESIS OF METARSOCUNIEFORM JOINT**

**Indications** HVA  $>30^\circ$  and IMA  $>16^\circ$   
Gross subluxation of the MTP joint  
A hypermobile Metatarso-Cunieform joint  
Revision bunion surgery

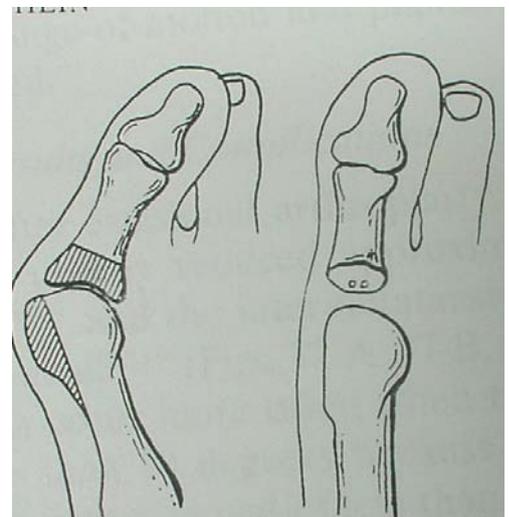
### **ARTHRODESIS OF METARSOPHALANGEAL JOINT**

**Indications** 1.Osteoarthritis of Metatarso-phalangeal joint  
2.Rheumatoid arthritis

**Remark** Remember consent and discuss about the limitation of shoes with heel fitment

**Results** Average 90%

**Position** Valgus  $15^\circ$   
Dorsiflexion  $30^\circ$  to Metatarsal axis [ $10^\circ$  to flat]  
Neutral rotation



**Post op:** Cast or heel walking until X ray evidence of healing

### **KELLER'S PROCEDURE**

Moderate to severe HV with Osteoarthritis  
Sedentary patients who have limited expectations with regard to walking

#### **Procedure**

Dorsomedial skin incision [medial to EHL]  
Distally based capsulorrhaphy

Bunionectomy

Excision of the proximal one fourth of the proximal phalanx

Releases adductors from the proximal phalanx

Preserve FHL

K wire

Compression dressing, wooden soled shoe

Pain relief seen in 72%

#### **Disadvantages**

Lateral metatarsalgia: 20-40%

Weak Great toe: Plantar flexor weaker by 50%

Cock up deformity: (FHL damage)

The salvage of a failed Keller's procedure is difficult. Fusion of the first metatarsophalangeal joint is often the only viable operative option, but this is made more difficult by the shortening and loss of bone stock.

### **COMPLICATIONS OF HALLUX VALGUS SURGERIES**

#### 1. Recurrence of Hallux Valgus

More common in Juvenile HV (up to 30%)

More common in Pronated great toe

Inadequate post-operative immobilization

Assessment: Degree of deformity

Whether deformity is completely flexible

Presence of arthritis

Treatment: Arthrodesis

#### 2. Hallux varus

More common with original McBride

3. .Hallux extensus  
Damage to FHL in Keller's operation
- 4.. Neuroma: cutaneous branch
5. Infection
6. Excessive plantar flexion of the head  
Surgery can cause an intractable plantar keratosis beneath I Metatarsal
7. Excessive dorsiflexion or shortening  
Lateral metatarsalgia  
More common with: Wilson's osteotomy  
or Keller's or Arthrodesis
8. AVN of Metatarsal head – more common in Chevron osteotomy
9. Non-union of osteotomy: Lapidus  
Juvenile Vs Adolescent Hallux Valgus



	Juvenile	Adult
Genetic/Bilateral	+++	+; Mainly from shoe
MTP Joint	More congruent No Osteoarthritis	Incongruent
Medial bunion	Less prominent	More prominent
Hypermobility of I metatarsal	Present	Absent
Pronation of the toe	Absent	Present
Hallux Valgus deformity	Moderate	Can be severe
Surgery	Always: bony  May need double osteotomy	Various options
Surgery	Inconsistent results with high incidence of recurrence; 15%	Consistent results

## Treatment for adolescent Hallux valgus

Discourage from using narrow toed shoes with elevated heels.

Discourage surgery until growth is over. Recurrence as high as 50%

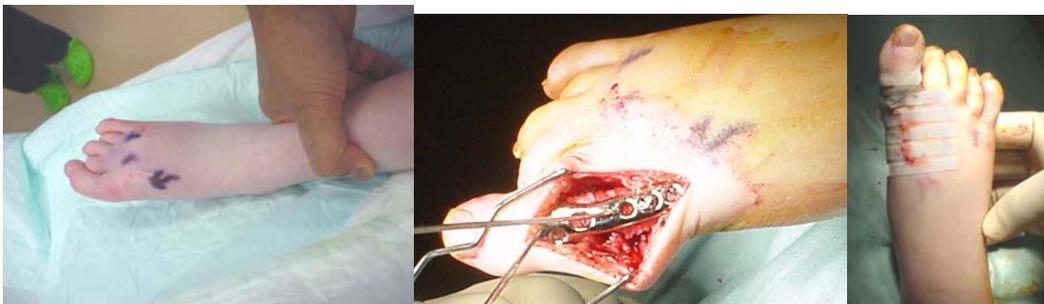
When surgery: Chevron: mild to moderate

Basal osteotomy for severe deformity

Or Lapidus procedure

MTP fusion in case of Hallux valgus in cerebral palsy

## Lapidus operation



MTP fusion in cerebral palsy patient

H