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 wood 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 [?Rheumatoid]
   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 Hypermobile metatarso-cunieform 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
<table>
<thead>
<tr>
<th>Classification of Hallux valgus</th>
<th>I MT angle</th>
<th>Congruent or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt; 15°</td>
<td>&lt; 9°</td>
</tr>
<tr>
<td>Mild</td>
<td>15° - 20°</td>
<td>9° - 11°</td>
</tr>
<tr>
<td>Moderate</td>
<td>20° - 40°</td>
<td>12 - 18°</td>
</tr>
<tr>
<td>Severe</td>
<td>&gt; 40°</td>
<td>&gt; 18°</td>
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</table>

**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]

Hypermobile TMTJ. Lapidus procedure
MANN’S MODIFIED MCBRIDES PROCEDURE

Indication
Noncongruous HV <30° and IMA <15° 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
Bunienectomy 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

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 22.5º from 45º; 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 30º 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 35º and IMA 13 º with subluxation of MTP joint

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

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

**ARTHRODESIS OF METARSO-CUNIEFORM JOINT**

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

**ARTHRODESIS OF METARSO-PHALANGEAL 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 º  
Dorsiflexion  30 º to Metatarsal axis [10 º 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

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