Hallux Valgus

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Definitions

- Bunion: Any enlargement or deformity of the first MTP joint.
- Hallux valgus: Static subluxation of the first MTP joint characterized by lateral deviation of the great toe and medial deviation of the first metatarsal.
- Juvenile hallux valgus can originate due to lateral deviation of the articular surface of the first metatarsal head without subluxation of the first MTP joint.
- Hallux valgus can be associated with pes planus, contracted Achilles tendon, cerebral palsy, stroke, and rheumatoid arthritis.

Anatomy

- First MTP characterized by sesamoid mechanism, strong collateral ligaments, and sesamoid ligaments.
- Plantar plate – formed by condensation of the two tendons of flexor hallucis brevis, abductor and adductor hallucis, the plantar aponeurosis, and the joint capsule.
- Sesamoids – tibial (medial) and fibular (lateral) sesamoids located on the plantar aspect of the first metatarsal head separated by a bony ridge called crista.
- Sesamoids connected together by intersesamoidal ligament and to the base of the proximal phalanx by the plantar plate. They have no connections to the metatarsal head.
- The tendons and muscles that move the great toe are arranged around the MTP in four groups:
  - Dorsal group – long and short extensor tendons
  - Plantar group – long and short flexor tendons
  - Medial group – abductor hallucis
  - Lateral group – adductor hallucis
- The base of the metatarsal – mildly sinusoidal articular surface that articulates with the distal articular surface of the medial cuneiform.
- The first tarsometatarsal (TMT) joint has a slight medial plantar inclination. It permits motion in a dorsomedial to plantar-lateral plane.

Pathoanatomy

- Because no muscle inserts on the metatarsal head, it is vulnerable to extrinsic forces, in particular, and constricting footwear.
- Once the metatarsal head is destabilized and begins to sublux medially, the tendons around the metatarsal head drift laterally.

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- The laterally drifted muscles becoming deforming forces as their pull is lateral to the longitudinal axis of the first ray.
- The soft tissues on the lateral aspect of the first MTP become contracted, and those on the medial side become attenuated.
- Deformity is associated with lateral displacement of the sesamoid sling and pronation of the hallux.
- Hallux valgus deformity is associated with transfer of more of the weight-bearing function to the lesser metatarsal heads which leads to the development of a transfer lesion beneath the second or third metatarsal head.

Demographics

- Age of onset – can develop before the age of 20 or during third to fifth decade of life. Early onset hallux valgus associated with increased distal metatarsal articular angle (DMMA).
- Gender – 90% patients are female.
- Majority of patients have bilateral hallux valgus deformities of differing magnitude.
- 2–4% incidence in the general population.

Etiology

- Extrinsic causes – constricting footwear and the type of occupation.
- Intrinsic causes – positive family history in up to 88% of patients, pes plans with pronation of hallux, hyper mobility of the metatarsocuneiform joint, ligamentous laxity, Achilles contracture, amputation of the second toe, and cystic degeneration of the medial capsule of the first MTP joint.

Angular Measurements

- Hallux valgus angle – angle between the long axis of the first metatarsal and the long axis of the proximal phalanx. Normal 15°, mild less than 20°, moderate 20–40°, and severe greater than 40°.
- 1–2 intermetatarsal (IM) angle – angle between the long axis of the first and second metatarsals. Normal is less than 9°, mild 11°or less, moderate 11–16°, and severe is greater than 16°.
- Hallux interphalangeus angle – angle between the long axis of the proximal phalanx and the long axis of the distal phalanx. Normal angle is less than 10°.
- Distal metatarsal articular angle (DMMA) – angle between the line perpendicular to the articular surface line of the distal metatarsal and the line along the longitudinal axis of the first metatarsal. Normal angle is 6° or less of lateral deviation.
- Proximal phalangeal articular angle (PPAA) – angle between the line perpendicular to the articular surface line of the proximal phalangeal articular surface and the line along the longitudinal axis of the proximal phalanx. Normal is 5° or less of valgus inclination.
- Metatarsophalangeal joint congruency – congruent or noncongruent hallux valgus deformity.
- Size of the medial eminence – distance from the line along the medial border of the diaphysis of the first metatarsal at the widest extent of the medial eminence.
- First metatarsocuneiform joint – straight MTC joint, curved MTC joint, or oblique MTC joint.

History and Physical

- Symptoms include pain over the medial eminence due to shoe wear and symptomatic metatarsalgia.
- Physical examination includes the severity of the deformity and any lesser toe deformities.
- Assess active and passive range of motion, tenderness over the MTP, mobility of the first MTC joint, vascular status of the foot, and a neurologic examination.

Conservative Treatment

- First line of treatment.
- Shoe modification with roomy footwear, a soft upper shoe with a wide toe box and a soft sole.

- The use of prefabricated custom orthotics is controversial. It has not been demonstrated that they prevent progression of the deformity.
- Orthotics may be useful to correct pes planus.

Surgical Treatment

- Type of surgical procedure based on the presence of congruent or incongruent joint, the presence of any degenerative joint disease in the first MTP or TMT joint, and the severity of the deformity.
- Mild to moderate hallux valgus with congruent joint with increased DMAA >11° – chevron procedure, double/triple first ray osteotomy, and akin procedure with exostectomy.
- Incongruent hallux valgus deformity:
  - Mild deformity with 1–2 IM angle <13° – Chevron osteotomy
  - Moderate deformity with 1–2 IM angle >13° – distal soft tissue procedure with or without proximal metatarsal osteotomy
  - Severe deformity – distal soft tissue procedure with or without proximal metatarsal osteotomy or MTP arthrodesis
- Hallux valgus deformity with degenerative joint disease of first MTP joint – first MTP arthrodesis.
- Hallux valgus deformity with hypermobile first TMT joint or degenerative joint disease of first TMT – Lapidus procedure (distal soft tissue procedure with arthrodesis of first TMT joint).