

Bunionectomy

Surgical Indications and Considerations

Anatomical Considerations: Normal biplanar flexion and extension of the metatarsophalangeal joint is maintained by counterbalance between muscles acting on the first metatarsophalangeal joint. The action of the long and short toe extensors is normally counteracted by the long and short toe flexors, and the abductor hallucis is counterbalanced by the adductor hallucis. Also, no muscle inserts into the metatarsal head. Therefore, once the hallux becomes destabilized and begins to sublux laterally, the muscles, which previously acted to stabilize the joint, become a deforming force since their pull is lateral to the long axis of the metatarsophalangeal joint.

Pathogenesis: Bunion is associated with imbalance of the soft tissues and abnormal bony configuration of the first cuneiform/metatarsophalangeal joint complex. As the proximal phalanx moves laterally on the metatarsal head, it exerts pressure against the metatarsal head, pushing it medially. As this occurs, there is progressive attenuation of the medial joint capsule, as well as a progressive contracture of the lateral joint capsule. While this deformity is occurring, the sesamoid sling, which is anchored laterally by the insertion of the adductor hallucis muscle and transverse metatarsal ligament, remains in place, creating pressure on the medial joint capsule. As a result, the abductor hallucis muscle gradually slides beneath the medially deviating metatarsal head. Once the abductor hallucis slides underneath the metatarsal head, two events occur. First, the intrinsic muscles no longer act to stabilize the metatarsophalangeal joint but actually help to enhance the deformity. Second, as the abductor hallucis rotates beneath the metatarsal head, because it is connected to the proximal phalanx, it will spin the proximal phalanx around on its long axis, giving rise to varying degrees of pronation.

Hallux valgus occurs due to hereditary and environmental factors. Tends to occur in families with a genetic predisposition for laxity of the ligaments and excessive pronation of the foot (flat feet). What generally causes the problems of pain and deformity result due to improper fitting footwear. Wearing shoes with a narrow toe box (the part of the shoe that surrounds the front part of the foot) squeezes the toes and cause the crowding of the big toe into the other toes. The problem is also caused by wearing high heels that force the body weight forward onto the toes.

Epidemiology: Adult acquired hallux valgus is found most often in women and is commonly associated with long-term wearing of fashionable, narrow box, pointed-toe shoes. According to the study of Lam Sim-Fook and Hodgson, 33% of shod individuals had some degree of hallux valgus, compared with 1.9% of unshod persons. Other associated findings, which may be implicated in the biomechanical cause of hallux valgus, include contracture of the Achilles tendon complex, hypermobility of the first metatarsal-medial cuneiform joint, and pes planus. The static foot posture of pes planus, however, has not been found to contribute directly to hallux valgus formation. In contrast, the observation of dynamic forefoot pronation has been found to be present in as many as 84% of cases with hallux valgus. Pronation contributes to midtarsal joint (calcaneal-cuboid joint – oblique axis) instability, and as a result, midfoot horizontal abduction at terminal stance. This occurrence creates insufficient first ray plantarflexion and an inefficient length-tension relationship for proper peroneous longus function in stabilizing the first metatarsal.

Bunions are relatively unknown in non shoe wearing populations. It is suggested that between 30 to 50% of the people in shoe wearing populations have some degree of hallux valgus. According to the American Orthopedic Foot and Ankle Society, bunions are nine times more likely to be seen in women than men. This is probably due to ill fitting shoes with a narrow toe box and high heels. Feet naturally widen as we age so bunions do not generally become a problem until middle age.

Diagnosis: A diagnosis of hallux valgus can usually be made based upon appearance of the big toe.

The symptoms can include;

- Red, calloused skin at the base of the big toe
- A bursa or bony bump at the base of the first metatarsal
- Pain at the MTP joint aggravated by pressure from shoes
- Big toe turned toward the other toes.

Associated findings can include;

- Second digit hammertoe
- Callous on the bottom of the foot
- Pronated foot
- Ingrown toenail

Radiographic findings include;

- Medial prominence of the first metatarsal head
- + or – joint space abnormality
- increased HVA
- increased IMA
- lateral displacement of the sesamoids

Differential diagnosis includes;

- Hallux rigidus which presents a distinguishing distal osteophyte on radiograph
- Hallux arthrosis which presents with loss of the entire joint space on radiograph
- Gout presents as an acute condition with laboratory tests indicating elevated uric acid and sodium urate crystals.

Diagnosis is further determined by severity. Severity is based upon the HVA and IMA and joint deviation.

Stage 1 or mild hallux valgus indicates a HVA < 25 degrees, IMA of < 12 degrees

Stage 2 or moderate hallux valgus indicates a HVA of > 25 degrees, IMA of < 16 degrees

Stage 3 or severe hallux valgus indicates a HVA of > 35 degrees, IMA of > 16 degrees

Nonoperative Versus Operative Management: Most bunions do not require surgery. Those that do end with surgical interventions produce debilitating pain or deformity that is not relieved with conservative measures. Because most pain is produced during gait, patients limit their activity which can lead to secondary problems of general deconditioning. Conservative measures usually begin with patient education regarding appropriate footwear. Wide, low heeled shoes such as athletic shoe, soft leather shoes or sandals are recommended. Protect the bunion with moleskin or gel filled pads. Over the counter or prescribed nonsteroidal anti-inflammatory medications may relieve the inflammation and subsequent pain. Semi soft orthotics can be inserted into the shoe to help position the foot properly. Night splints can hold the toe straight. Physical therapy can also be recommended with exercise instruction, stretching, taping, application of modalities as well as education as to prevention. If these conservative measures are not successful the patient should seek medical consultation for surgical bunionectomy.

Surgical Procedure: There are over 100 surgical procedures for bunionectomy or osteotomy and the procedure is determined based upon the severity of the hallux valgus as well as the patient's age, health, and activity level. The goals of surgery are to remove the bump, realign the joint, relieve the pain and restore normal function particularly during gait. The goal is not to fit the patient into stylish shoes with a narrow toe box. In fact the surgery is not for cosmetic reasons. Usually bunionectomy is performed as an outpatient procedure. However as the procedure becomes more complicated, hospital stay may involve 1 to 3 days. Simple surgical removal of the medial eminence can be performed if the primary complaint is a prominent medial eminence, the deformity is mild, and rapid recovery is desirable. Distal metatarsal osteotomy such as a chevron osteotomy is performed for mild-to-moderate deformity in a young person with no degenerative joint disease. This procedure affords limited realignment by lateral displacement of the head of the first metatarsal, removal of the medial prominence, and plication of the medial capsule. For a more extensive deformity, the distal soft tissue procedure, which is a modification of the procedure originally described by McBride, is performed. Its major components are: 1) release of lateral metatarsophalangeal joint capsule, adductor hallucis tendon, and contractures about the lateral sesamoid. 2) removal of medial eminence of the metatarsal head and realignment of the sesamoid sling. 3) Osteotomy at the base of the first metatarsal. Arthrodesis or resection arthroplasty is a choice of procedure if there is severe degenerative joint disease. The Cochrane Library review of evidence from clinical trials showed that about one third of all patients were dissatisfied with the result of surgery even if pain and toe alignment were improved. This may be due to unrealistic expectations of surgery, poor post surgical rehab or a lack of a suitable way to measure patient satisfaction. Also the survey found little evidence to support whether conservative or surgical intervention worked best. Results from a 2001 randomized controlled trial of 209 patients performed by Torkki et al found that pain intensity, number of painful days, cosmetic disturbance and foot wear problems were the least following surgery as compared with the use of orthoses or watchful waiting. Functional status and satisfaction with treatment were also the best in the surgical group. As of 2003, it is estimated that 209,000 people in the United States undergo some type of bunion surgery each year making it one of the most common orthopedic surgeries in western industrialized countries.

Preoperative Rehabilitation

- Evaluation and recommendation of proper footwear specifically width of toe box.
- Foot exercises including toe spread, eat the towel, marble pick up, toe raises and toe curls.
- Stretching of Achilles tendon if indicated
- Shoe inserts or orthotics
- Night splints
- Bunion pads or moleskin
- Pain relieving modalities such as ice packs, whirlpool, ultrasound and massage.
- Post op rehab plan instruction in the use of assistive devices if limited or non weight bearing.
- Post op rehab plan instruction in donning and doffing brace if indicated.

POSTOPERATIVE REAHBILITATION

The rehabilitation following surgical intervention is based upon the procedure itself and the physician's determination. Below are some of the procedures and the post op rehab for that procedure.

Chevron Osteotomy

- a gauze and compression dressing is applied in the operating room (OR), changed weekly for a duration of six weeks
- Kirschner wire is removed three to four weeks post op
- PROM exercises begun when wires are removed
- Gait training allowed with weight on the heel and lateral aspect of the foot
- At 4 weeks plantigrade walking wearing a wooden-soled postoperative shoe.

McBride Procedure

- a gauze and tape compression dressing is applied in the OR and changed weekly for eight weeks
- Gait training WBAT wearing a postoperative wooden-soled shoe
- P and AROM exercises allowed six weeks after the surgery

Triple Distal Osteotomies

- Gauze and tape compression dressing
- Gait training with walker or crutches for NWB below the knee cast.
- At four weeks, cast changed to allow weight bearing
- Cast removed in six to eight weeks dependent upon radiographic confirmation of healing
- ROM exercise initiated when cast is removed

Mitchell or Wilson Osteotomy

- Gauze and tape compression dressing applied in OR

- Gait training NWB with assistive device, cast applied one week after the operation. NWB maintained for 4 weeks.
- Weight bearing cast applied at 4 weeks
- Rom begun when cast is removed usually 6 to 8 weeks post op

Keller Excisional arthroplasty

- Gauze and tape compression dressing, changed weekly for 6 weeks
- Gait training WBAT with the patient wearing a wooden soled shoe.
- Kirschner wires removed at 4 weeks then ROM and plantarflexion exercises are begun.

Phase I: Weeks 1-6/8

Goals: Control edema and pain
Protect incision site

Intervention:

- Dressing
- (Ambulation in a postoperative shoe as tolerated if patient had arthrodesis)

Phase II: Week 6/8-12

Goals: Increase range of motion
Continue edema control
Progressive weight-bearing status

Intervention:

- Passive and active range of motion
- Contrast bath and manual lymph drainage techniques
- Grade I joint mobilization
- Metatarsophalangeal stretch
- Gastrocnemius stretch
- Ambulation as tolerated in postoperative shoe or soft, wide shoe

Phase III: Weeks 12-16

Goals: Full range of motion
Normal gait

Intervention:

- Strengthening exercises for foot and lower quarter muscular power/control deficits
- Grade II-IV joint mobilizations performed at end range, as symptoms allow
- Gait training
- Orthotics, as needed, to address overpronation and/or intrinsic foot deformities, which may contribute to impaired healing and/or recurrence of hallux valgus.

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