

## Minimally Invasive Bunionectomy

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Hallux abductovalgus (HAV) or “Bunion” is one of the most common problems that patients come to podiatrists in order to take care of. Many patients opt for the surgical option of the “Bunionectomy”. Although it is not as simple as “removing” the bunion like the name implies but there are a myriad of procedures a surgeon can choose in order to correct deformity. Coughlin describes causes of HAV that include hypermobility, hereditary growth, pes planus, and intrinsic intermetatarsal angle abnormalities (1). When selecting a procedure to perform a bunionectomy, the intermetatarsal angle is usually the primary variable. Coughlin and Mann suggest that mild deformity can be corrected by a chevron or Mitchell osteotomy, a moderate deformity corrected by a Mitchell and Akin osteotomy, and severe deformities would benefit mostly from a proximal joint fusion or proximal osteotomy plus distal soft tissue release/reconstruction (2). Most procedures require internal fixation and require exposure to the metatarsophalangeal joint.

However, as our surgical world evolves, more emphasis has been put on efficiency and patient outcomes. Studies report good outcomes with percutaneous use of osteotomes and saws since its first use in the 1940s (3,5). Minimally invasive surgery (MIS) is now being widely used for a variety of foot deformities and patients have been increasingly interested in the appeal of less scarring and reduction of complications. We believe utilizing the minimally invasive technique allows for shorter operative times, allows for better cosmesis in regards of reduced swelling and scarless surgery, and provides one reliable procedure to accommodate multiple deformities. Lam et al reports that 3mm of shortening can occur with percutaneous burr osteotomy of 1st metatarsal (4). In contrast, our technique does not require use of internal fixation that is used in other methods (4,5). Our use of a medial buttress pin allows for minimal heat necrosis risk and provides splintage of deformity correction as the initial bone healing occurs. Furthermore, our procedure allows for correction of a wide range of intermetatarsal angles. We have corrected IM angles as low as 8.1 degrees and as high as 18.1 degrees. Typically severe IM angles require Lapidus fusion and several weeks of nonweightbearing (6) but percutaneous procedures can allow for early weightbearing and allow patients to function during their recovery period.

Technique (with corresponding powerpoint slide):

The patient is placed in the supine position on the operating table. A pneumatic ankle tourniquet is placed. Our technique for the minimally invasive bunionectomy includes a 6mm incision just proximal to the first metatarsal head medial protuberance (slide 3). Soft tissue structures are reflected dorsally and plantarly using a freer periosteal elevator (slide 4). A Steinmann pin and fluoroscopy are used to mark the orientation of the desired osteotomy. The angle of cut is then marked on the skin (Slide 5). An osteotomy is performed via osteotome and mallet in the desired correctional plane under fluoroscopic guidance (slide 6). Once the osteotomy is completed through 3 passes of the osteotome (central, dorsal, and plantar) the entire lateral 1st metatarsal cortex, the capital fragment is manually manipulated and translated via heavy hemostat and confirmed under fluoroscopy (slide 7). Once desired position is confirmed, a K wire or Steinmann pin is placed lateral to the capital fragment and down the 1st metatarsal medullary shaft to buttress the metatarsal head (slide 8). The pin is then bent superiorly and cut and the incision is closed with one simple or horizontal non absorbable suture.

Postoperatively, the foot is dressed with a mild compressive dressing and the patient is able to partial weight bear with a surgical shoe. The suture is removed in 2 weeks and patient is transitioned to a walking boot. The pin is removed in 4 weeks and physical therapy for joint mobility is begun at 6 weeks postop.

The minimally invasive bunionectomy technique that we utilize has shown to be effective in correcting deformity while minimizing surgery time as our average tourniquet time is about 11min. Minimal dissection of periosteum, soft tissue, and no joint capsule incision allows for minimized scar risk, faster bone healing, and less postoperative swelling. However the option of a lateral release is still available if needed. Initial data collection from 25 patients, with at least 8 week followup, has shown our patient satisfaction very high with many patient returning for their contralateral foot within 1 month of their previous MIS bunionectomy. In comparison, a percutaneous Mitchell technique showed good outcomes with temporary pin fixation and early weightbearing (7). The average pain score at our patients at their two week followup is 2.5 out of 10 (with 10 being the highest amount of pain). There has been no bleeding or hypertrophic scar complications and only 1 instances of pin irritation but the pin was pulled at the regular 4 week mark and the patient healed without infection. All patient have been able to walk with surgical shoe or surgical boot on the surgical foot. Also, there has been no reduction of correction with puling the buttress pin at the 4 week mark. We will be continuing research in this techniques in terms of patient outcomes, bone healing, pain scores, and range of motion measures.

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