

Statement of Purpose

We propose that the minimally invasive technique can help correct a wide variety of bunion deformities, increases patient satisfaction, and provides better cosmesis to the operated foot.

Introduction & Literature Review

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”, 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 different procedures for mild, moderate, and severe angle deformities respectively (2). Most bunion procedures require open exposure to the joint]]and require internal fixation, which may lead to complications in painful hardware or painful scarring. However, as our surgical world evolves, more emphasis has been put on efficiency while maximizing patient outcomes. There are many advantages of Minimally Invasive Surgery (MIS) with percutaneous fixation for a variety of foot and ankle procedures. Patients and surgeons have been increasingly interested in the appeal of less scarring and reduction of complications with smaller incisions. The use of high speed tools for osteotomies can also be very destructive to bone with thermal necrosis. Lam et al reports that 3mm of shortening can occur with percutaneous burr osteotomy of the first metatarsal (4,5). Studies report good outcomes with percutaneous use of an osteotome since its first use in the 1940s (3,5). Percutaneous procedures have been proposed such as Kramer in 1975 and 1931 with Peabody. Both report good outcomes with their percutaneous use of osteotome. This procedure allows for correction of a wide range of intermetatarsal angles. Typically severe IM angle require Lapidus fusion and several weeks of non-weight bearing (6). A percutaneous Mitchell technique showed good outcomes with temporary pin fixation and early weight bearing (7).

Acknowledgments

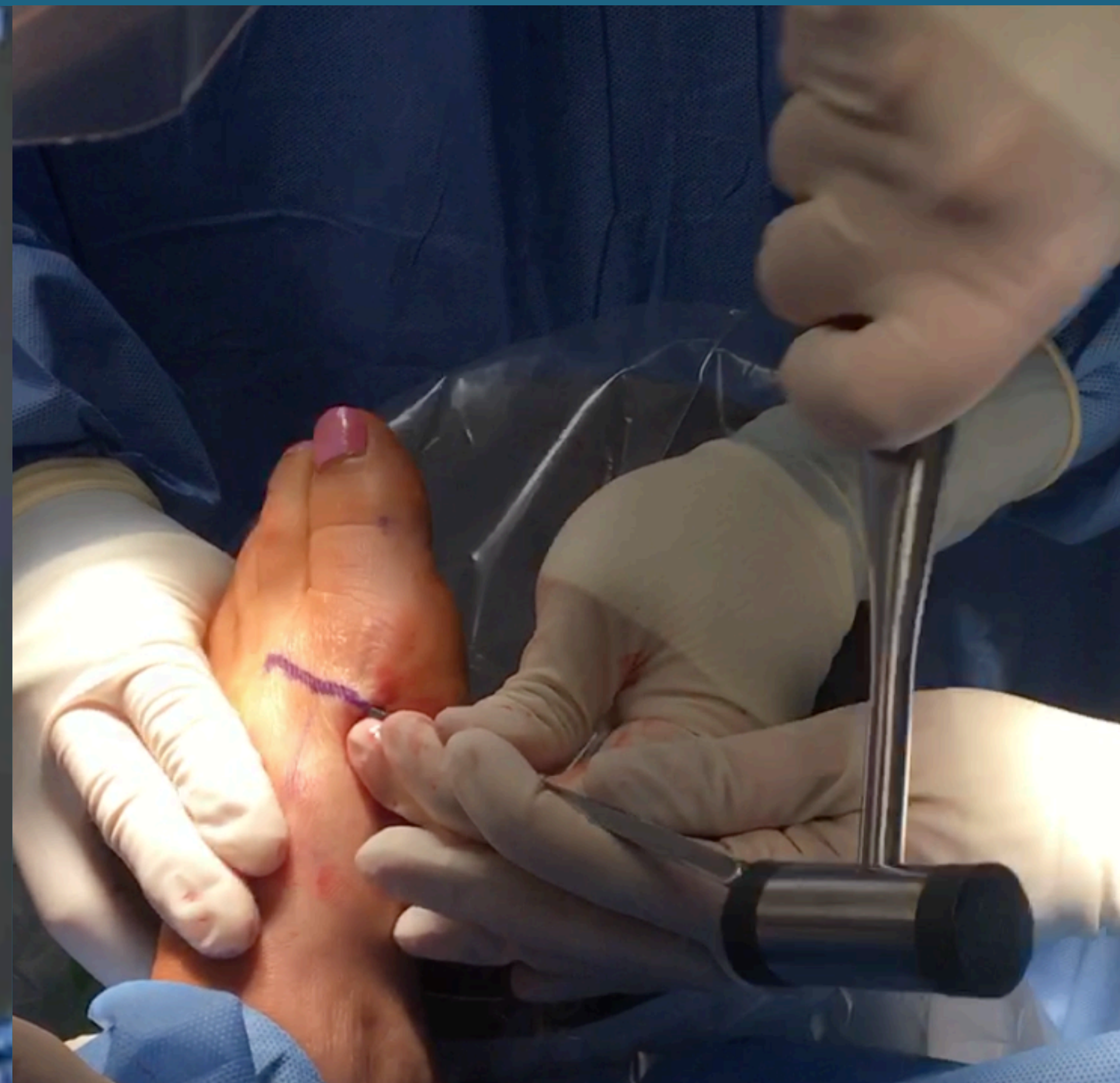
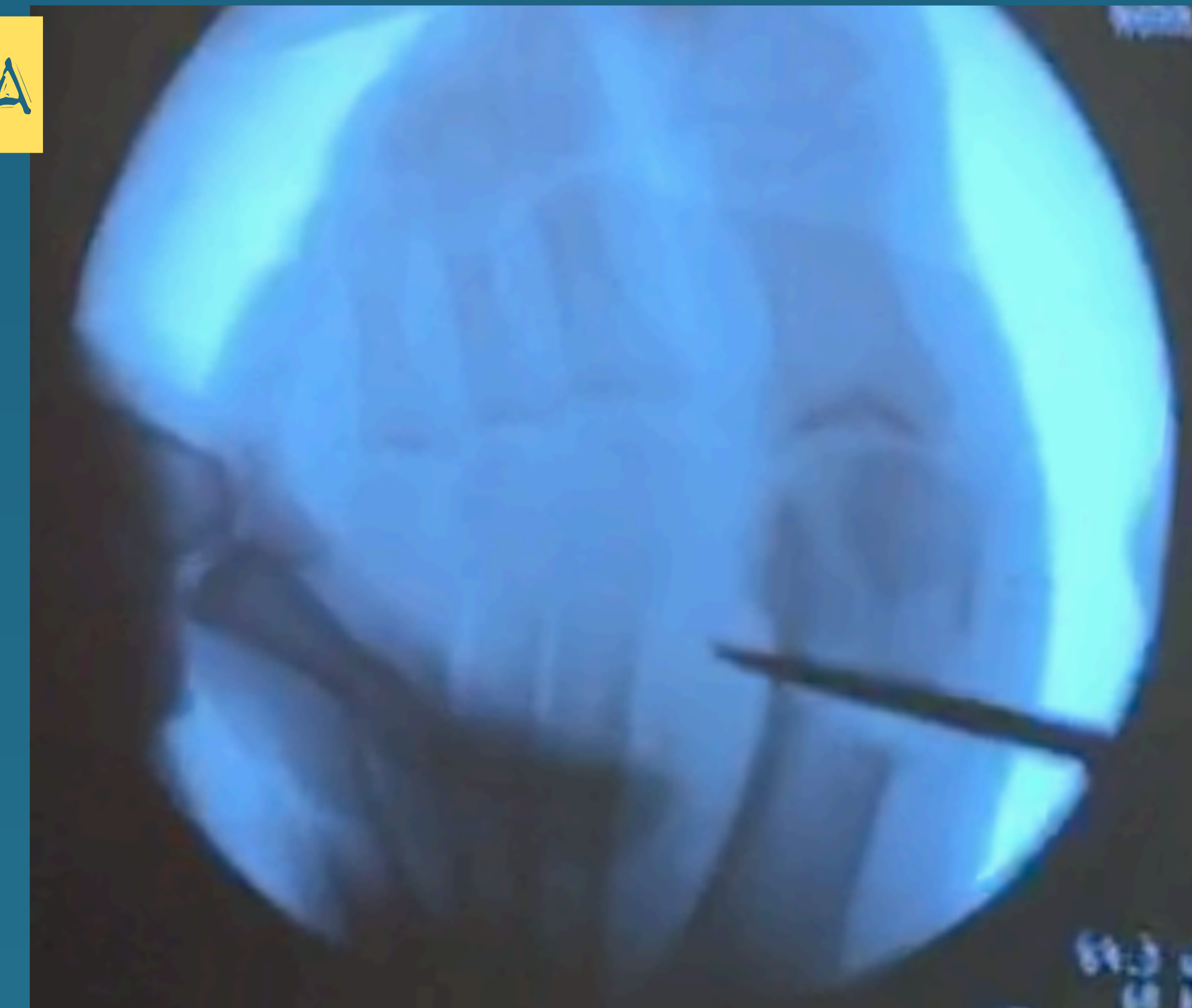
Special thanks to the staff of Family Foot & Leg Center and Collier Endoscopy & Surgery Center.



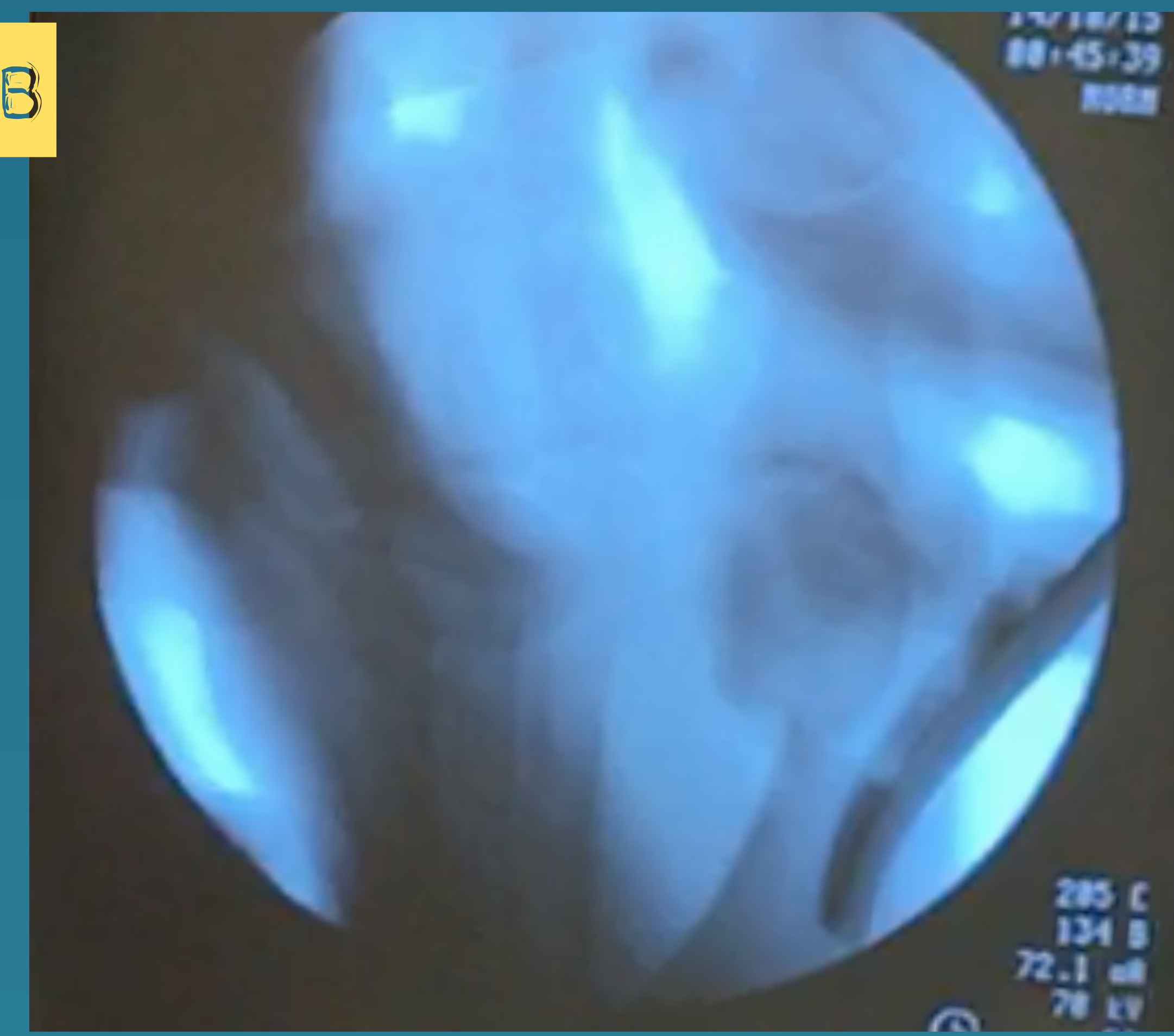
Minimally Invasive Bunionectomy - A Case Series

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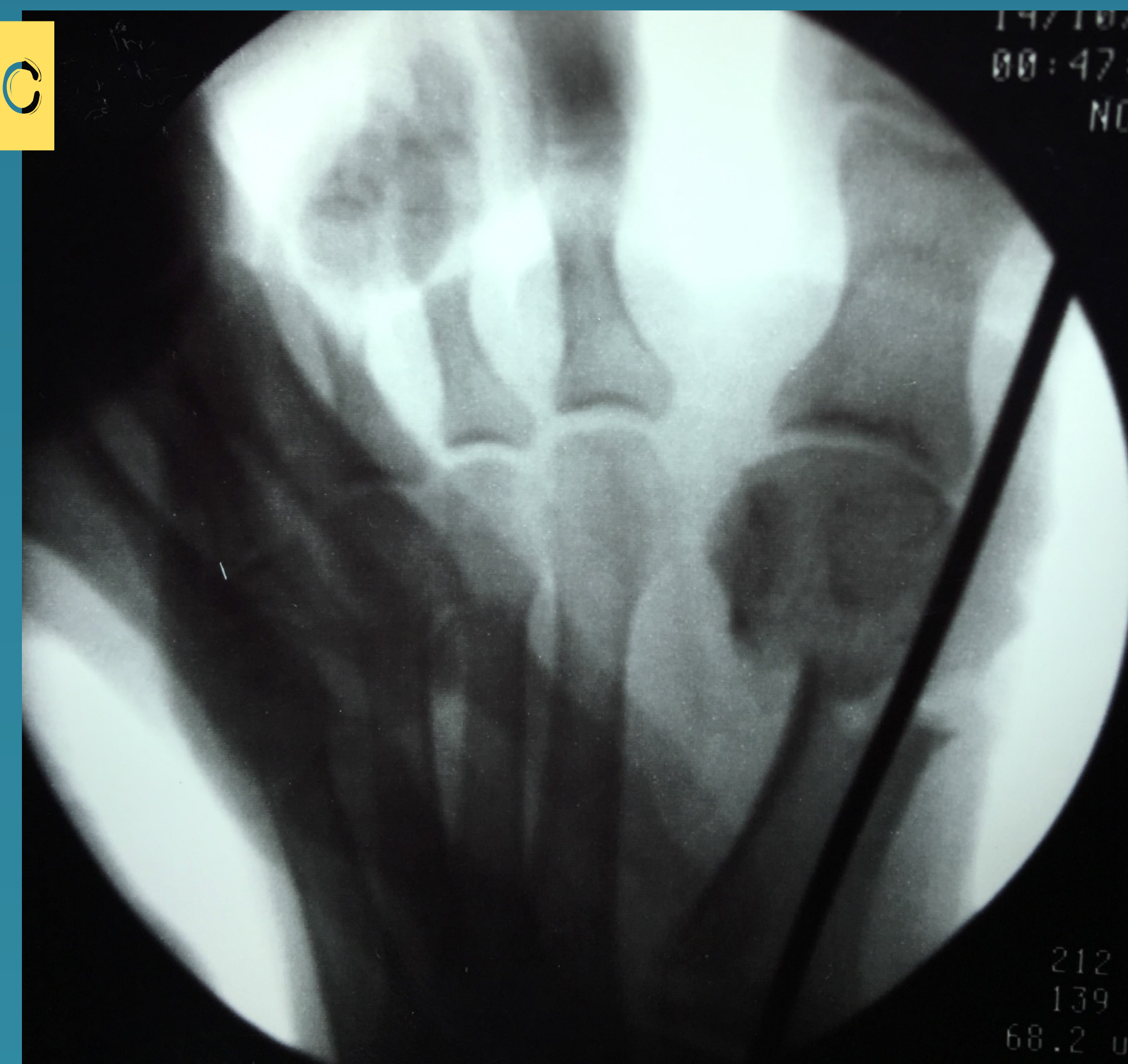
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Osteotomy with mallet and osteotome through 6mm incision (orientation of cut marked it on skin)



Shift of capital fragment and reduction of deformity



Buttressing capital fragment with pinning and hallux splintage

References

1. Michael J. Coughlin, MD. Hallux Valgus. JBJS - VOL. 78-A, NO. 6, JUNE 1996
2. Mann, R. A., and Coughlin, M. J.: Adult hallux valgus. In Surgery of the Foot and Ankle, edited by R. A. Mann and M. J. Coughlin. Ed. 6, pp. 167-296. St. Louis, Mosby-Year Book, 1993.
3. Alireza Khosroabadi, DPM, Bradley M. Lamm and DPM, FACFAS. Modified Percutaneous Hallux Abductovalgus Correction. The Journal of Foot & Ankle Surgery 55 (2016) 1336-1342
4. Peter Lam, MB BS (Hons), FRACS, Moses Lee, MD, Jerry Xing, MD, Martin Di Nallo, MD. Percutaneous Surgery for Mild to Moderate Hallux Valgus. Foot Ankle Clin N Am 21 (2016) 459-477. <http://dx.doi.org/10.1016/j.fcl.2016.04.001>
5. Joel Vernois, MD, David J. Redfern, FRCS (Tr&Orth). Percutaneous Surgery for Severe Hallux Valgus. Foot Ankle Clin N Am 21 (2016) 479-493. <http://dx.doi.org/10.1016/j.fcl.2016.04.002>
6. William D. Harrison, MBBS, MRCS, MSc and Christopher R. Walker, MCh(Orth), FRCS(Orth), FRCS(Eng), FRCS(Ed). Controversies and Trends in United Kingdom Bunion Surgery. Foot Ankle Clin N Am 21 (2016) 207-217. <http://dx.doi.org/10.1016/j.fcl.2016.01.001>
7. Mini-invasive Mitchell-Kramer Method in the Operative Treatment of Hallux Valgus Deformity. Artur Ga,dek, MD, PhD, and Henryk Liszka, MD. Foot & Ankle International 34(6) 865-869. DOI: 10.1177/1071100713475356
8. Hans-Joerg Trnka & Sabine Krenn & Reinhard Schuh . Minimally invasive hallux valgus surgery: a critical review of the evidence. International Orthopaedics (SICOT) (2013) 37:1731-1735. DOI 10.1007/s00264-013-2077-0

Methods

A retrospective analysis of twenty random patients were chosen from an EMR generated 135 patients who underwent MIS bunionectomy from April 1, 2014 to March, 2016. Patients who had MIS proximal phalanx osteotomies or soft issue release were excluded from this study. Angles were measured through Xray software and pain scale were noted from EMR by the same author
Our technique for the MIS bunionectomy includes a 6mm incision just proximal to the first metatarsal head medial protuberance. Soft tissue structures are reflected dorsally and plantarly using a periosteal elevator. The joint capsule is not opened and the medial condyle is not resected. However the option of an exostectomy or lateral release is still available if desired. A Steinman pin and fluoroscopy are used to mark the orientation of the desired osteotomy. The angle is then marked on the skin. An osteotomy is made with an osteotome and mallet in the desired correctional plane under fluoroscopic guidance and completed through three passes of the osteotome (central, dorsal, and plantar) and then the lateral metatarsal cortex bone cut is completed [A]. The capital fragment is manually manipulated and translated via heavy hemostat and confirmed under fluoroscopy[B]. We are able to direct the capital fragment to create a decompressive, plantarflexory, or a parabola correcting direction with the angle of the osteotome. Once desired position is confirmed, a K wire or Steinmann pin is placed medial to the capital fragment and down the first metatarsal medullary canal to buttress the metatarsal head[C]. 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 mild compression 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.

Results

	Age in yrs	Preop IM Angle	Postop IM Angle	Preop Pain Scale	Postop 2 week Pain Scale	Postop 4 week Pain Scale	Postop 6 week Pain Scale	Tourniquet Time
MEAN	51.2	13.2	6.6	4.5	1.8	0.6	0.2	8.2 min
RANGE	25 to 76	9.9 to 16	1.2 to 11.9	1 to 8	0 to 7	0 to 4	0 to 1	5 to 14 min

Discussion

The distal first metatarsal osteotomy bunionectomy utilizes the basic concepts of minimal skin incision, limited soft tissue dissection, less traumatic bone cut and temporary percutaneous fixation to improve this procedure. Utilizing a minimally invasive technique allows for a fast and efficient operative time. A smaller incision can produce less soft tissue trauma, less swelling, less pain and certainly a smaller scar. Using an osteotome and mallet instead of a power saw produces less heat and less bone necrosis. All osteotomies have shown full radiographic healing at 6 weeks, likely due to preservation of periosteum. The use of a temporary percutaneous medial buttress pin allows for minimal tissue dissection and provides splintage of deformity correction as the initial bone healing occurs. The adhesions of the medial capsule to the exposed medullary bone are avoided. Future research will include pre and postoperative range of motion data and a larger sample size.