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Tips, Quips, and Pearls

"Tips, Quips, and Pearls" is a special section in The Journal of Foot & Ankle Surgery®, *which is devoted to the sharing of ideas to make the practice of foot and ankle surgery easier. We invite our readers to share ideas with us in the form of special tips regarding diagnostic or surgical procedures, new devices or modifications of devices for making a surgical procedure a little bit easier, or virtually any other "pearl" that the reader believes will assist the foot and ankle surgeon in providing better care.*

Modified Percutaneous Hallux Abductovalgus Correction

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ABSTRACT

Percutaneous surgical techniques and minimally invasive procedures in foot and ankle surgery are gaining interest for both patients and surgeons. Percutaneous surgery is defined by a soft tissue or osseous procedure performed through the smallest possible incision without direct visualization of the underlying target structures. Percutaneous surgery has many potential advantages, including quicker operative times, multiplanar osteotomy correction, smaller incisions, decreased scarring, lower complication rates, and faster recovery times. The potential disadvantages include the need for specific equipment, that it cannot be used for large deformities, and that it requires an extensive learning curve. A commonly attempted percutaneous procedure is first metatarsal osteotomy for correction of hallux abductovalgus or bunion. We present our preoperative planning and intraoperative techniques for percutaneous hallux abductovalgus correction.

Percutaneous or minimally invasive surgical correction (1,2) of foot deformities have traditionally had a bad reputation because of perioperative pain, surgical imperfections, scarring, and the risk of recurrence. The indication for percutaneous bunion correction includes mild or moderate hallux abductovalgus deformity. Many of the complications were related to the execution of percutaneous surgery and improper indications. The first percutaneous hallux valgus surgery was performed in the 1940s (3,4). Bösch et al (1) modified the popular Kramer osteotomy into the so-called subcapital osteotomy technique (1), which was performed using a high-speed power bur. Bösch et al (5) and Markowski et al (6) reported their preliminary results with the subcapital osteotomy (percutaneous) technique in 1990 and 1991, respectively, with a <10% incidence of pin tract infection.

In 2000, Bösch et al (1) reported good results from a 7- to 10-year follow-up study. In 2000, Portaluri (7) reported a series of 182 feet using the Bösch technique with almost identical radiologic results to those of Bösch et al (1). Although Magnan et al (8) reported positive radiographic and clinical results, they also reported percutaneous distal metatarsal osteotomies for 118 cases in which 61% had plantar or dorsal displacement of the first metatarsal head. Multiple studies have shown similar results, including Iannò et al (9), Bauer et al (10), Radwan and Mansour (11), Roth et al (12), Maffulli et al (2), Giannini et al (13), and Enan et al (14).

Fig. 1. Patient placed supine on the operating room table with a leg holder. The leg holder is positioned posterior to the thigh to maintain a 90° bend of the knee. Also, a bump is placed beneath the foot to elevate the foot above the contralateral foot for lateral fluoroscopy. The bump is also inclined to maintain an orthogonal axis for fluoroscopic imaging during the entire procedure.

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Fig. 2. Anteroposterior illustration showing insertion of the medial hallux wire to the level of the metatarsophalangeal joint. Also note the 1.8-mm wire inserted at the neck of the first metatarsal for the multiple drill hole osteotomy procedure.

We believe our modified percutaneous abductovalgus correction technique provides an accurate pre-, intra-, and postoperative approach. This technique can decrease the operative time, improve cosmesis, reduce the recovery time, minimize pain, and, thus, improve the outcomes.

Surgical Technique

According to Wynes et al (15), the amount of lateral translation of the capital osteotomy for correction of hallux abductovalgus can be accurately calculated preoperatively. We used this same method by measuring the distance from the lateral aspect of the fibular sesamoid to the lateral aspect of the first metatarsal head on the preoperative anteroposterior weightbearing radiograph. This distance will typically measure 3 to 10 mm; thus, during the procedure, the capital fragment of the first metatarsal is translated the same distance laterally as determined by the preoperative plan. The first metatarsal head is lateralized and placed over the sesamoids to a final position, reestablishing the anatomy of the great toe joint.

The patient is placed supine on the operating table with a slight bump under the ipsilateral hip. A leg holder from the fracture table is used beneath the thigh to keep the knee bent such that the foot is flat

Fig. 3. Lateral illustration showing the multiple drill hole technique, with the 1.8-mm wire at the level of the first metatarsal neck.

Fig. 4. Anteroposterior illustration showing the osteotomy level created by the osteotome.

Fig. 5. Intraoperative photograph showing the percutaneous multiple drill hole osteotome osteotomy.

Fig. 6. Intraoperative anteroposterior fluoroscopic image showing insertion of a trocar device for lateral translation of the first metatarsal head.