noticed during surgery. A superficial infection can usually be treated with oral antibiotics and daily wound care.

## **Loss of Correction**

An early loss of correction is a possible complication in percutaneous techniques. If this secondary displacement occurs in the toes, an early corrective taping may be very helpful (Fig. 16). A dedicated follow-up decreases the risk of this complication.

## Swelling

Limited swelling is normal and can last 3 to 4 months. The patients should be informed about the long duration of swelling. Severe swelling can be caused by a lack of elevation in the immediate postoperative period. This is often associated with overuse or noncompliance. The patient should be instructed to keep the foot elevated and to refrain from any standing or walking activities for the first 3 to 4 days. After this initial period of time, activities can be resumed progressively. Patients with venous insufficiency are more at risk of longstanding and/ or severe swelling.

#### Stiffness

Excessive postoperative stiffness is related to inflammation. Patients with postoperative infections, severe swelling, or early overuse are at risk. Limiting inflammation is important during the early postoperative period. If inflammation is controlled, early mobilization can be recommended safely. At 6 weeks postoperatively, physiotherapy is often considered. In the case of persistent stiffness after the bone is healed, an injection with corticosteroids and manipulation can be considered.

#### **CONCLUSIONS**

Due to the limited use of hardware in percutaneous forefoot techniques, the dressing becomes instrumental as a way to provide primary stability. The first postoperative dressing should be seen as part of the surgery and should be applied by the surgeon. Following some general principles, the specific technique is adapted to the preoperative deformity and the surgical goals. During the entire surgical aftercare period, bandage techniques will be paramount to keep the foot in a corrected position while healing occurs.

# POSSIBLE CONCERNS, FUTURE OF THE TECHNIQUE

A major concern is the tendency of limiting the training to purely surgical technical aspects. Training should not only be limited to performing the percutaneous techniques but also include different other aspects of patient care. First, dressing techniques are extremely important as mentioned above. The surgeon should master different bandage techniques and apply them according to the specific needs. Second, knowledge about how to avoid and how to handle complications is also very important, and this includes those complications that arise from inappropriate dressing application. Third, as surgery is performed within a team, the surgeon introducing new techniques should also train and inform other team members.

Colleagues, physiotherapists, and radiologists should be made aware of key characteristics of the newly introduced surgery and the impact on the aftercare. Finally, the surgeon should have sound insight into the limitations and possibilities of the percutaneous techniques. They are nothing more than an extra tool in the toolbox of the foot and ankle surgeon and must be indicated sensibly. Only those surgeons mastering both open and Minimally Invasive Surgery procedures will be able to decide which one to use for the benefit of their patients.

### **REFERENCES**

- 1. Isham S. The Reverdin-Isham procedure for the correction of hallux abductovalgus. A distal metatarsal osteotomy procedure. Clin Podiatr Med Surg. 1991:8:81-94.
- 2. De Prado M, Ripoll PL, Golano P. Cirugia Percutanea Del Pie. Barcelona: Masson Elsevier; 2003.
- 3. De Prado M, Ripoll PL, Golano P. In: Golano P, eds. Minimally Invasive Foot Surgery, 1st. Barcelona: About Your Health Publishers;
- 4. Malagelada F, Dalmau-Pastor M, Sahirad C. The Foot Anatomical considerations for minimally invasive osteotomy of the fi fth metatarsal for bunionette correction—A pilot study. Foot. 2018;36:39–42.
- 5. Dalmau-Pastor M, Vega J, Malagelada F, et al. An anatomical study of nerves at risk during minimally invasive hallux valgus surgery. J Vis Exp. 2018;17:56232.
- 6. Malagelada F, Dalmau-Pastor M, Fargues B, et al. Foot and ankle surgery increasing the safety of minimally invasive hallux surgery—an anatomical study introducing the clock method. Foot Ankle Surg. 2018:24:40-44.
- 7. Hernandez JL, Chauveaux D, Laffenêtre O. Treatment of moderate hallux valgus by Chevron (PERC) osteotomy. Bone Joint J. 2016;98-B: 365-373.
- 8. Johansen JK, Jordan M, Thomas M. Foot and ankle surgery clinical and radiological outcomes after Weil osteotomy compared to distal metatarsal metaphyseal osteotomy in the treatment of metatarsalgia-a prospective study. Foot Ankle Surg. 2019;25:488-494.
- 9. Kaufmann G, Dammerer D, Liebensteiner M, et al. Minimally invasive versus open Chevron osteotomy for hallux valgus correction: a randomized controlled trial. Int Orthop. 2019;43:343-350.
- 10. Michels F, Van Der Bauwhede J, Guillo S, et al. Percutaneous bunionette correction. Foot Ankle Surg. 2013;19:9-14.
- 11. Laffenêtre O, Millet-barbé B, Darcel V, et al. Percutaneous bunionette correction: results of a 49-case retrospective study at a mean 34 months' follow-up. Orthop Traumatol Surg Res. 2015;101:179-184.
- 12. Cordier G, Nunes GA. Minimally invasive advances: lesser toes deformities. Foot Ankle Clin. 2020;25:461-478.
- 13. Redfern DJ, Vernois J. Percutaneous surgery for metatarsalgia and the lesser toes. Foot Ankle Clin. 2016;21:527-550.
- 14. Frey-ollivier S, Catena F, Hélix-giordanino M, et al. Treatment of flexible lesser toe deformities. Foot Ankle Clin. 2018;23:69-90.
- 15. Frey S, Hélix-Giordanino M, Piclet-Legré B. Percutaneous correction of second toe proximal deformity: proximal interphalangeal release, flexor digitorum brevis tenotomy and proximal phalanx osteotomy. Orthop Traumatol Surg Res. 2015;101:753-758.