

ARTHROFIBROSIS AFTER BUNION SURGERY

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Arthrofibrosis is defined as “a complication from injury or surgery with excessive scar tissue that leads to painful restriction in joint motion” (1). This condition can occur in any patient, sometimes with no warning signs. When this problem occurs, it can offer significant challenges to the patient and the surgeon. The authors would like to discuss ways to prevent symptomatic joint stiffness from occurring and the options available to treat arthrofibrosis. Also, common questions regarding arthrofibrosis including: How soon after surgery should the joint be moved or put through range of motion? How much stiffness is tolerable after bunion surgery? What are the inherent risks factors for the development of arthrofibrosis? And finally, does the fixation or osteotomy type make a difference?

When performing hallux valgus surgery, the main goal of correction is restoring alignment of the first metatarsophalangeal joint (MPJ) and creating normal motion at the joint (2). Prolonged inflammation is a well known risk when performing a soft tissue release and a distal osteotomy at the head of the first metatarsal. Although rarely encountered, one complication that can be problematic is joint stiffness after hallux abducto valgus surgery. Patients who restrict their postoperative motion usually are at greatest risk for developing arthrofibrosis. The authors believe it is better to have patients move the first MPJ sooner because capsular adherence and excessive scar tissue formation become less of a factor. Movement can be

performed by allowing patients to bear weight earlier or by sending them to physical therapy for passive range of motion exercises as soon as the soft tissue and bone healing integrity allow it. The authors typically begin range of motion at 1 to 3 weeks depending on the age of the patient and type of osteotomy performed.

It is hard to gauge how much stiffness is tolerable after surgery. Most patients are told that the joint will be swollen for about 4-6 months after surgery but they should expect to return back to full range of motion earlier. Loss of plantar flexion is common in patients who undergo distal osteotomies for hallux valgus surgery. Axis guides inherently plantarflex the first metatarsal, which allows for adequate dorsiflexion, but sacrifices the plantar flexion seen preoperatively (3). The authors' experience is that loss of plantarflexion is more tolerable than stiffness with dorsiflexion. The authors present a case with a 17-year-old healthy female who had ~70 degrees of dorsiflexion and 30 degrees of plantarflexion preoperatively (Figure 1). She was instructed at 2 weeks to begin range of motion exercises with physical therapy. She was noncompliant with her postoperative course and had complete loss of plantarflexion and only 10 to 15 degrees of dorsiflexion (Figure 2). It has been the authors' experience that anything less than a 10 to 15 degree range of motion of the first MPJ places the patient at risk for becoming symptomatic.

Risk factors involved with the development of

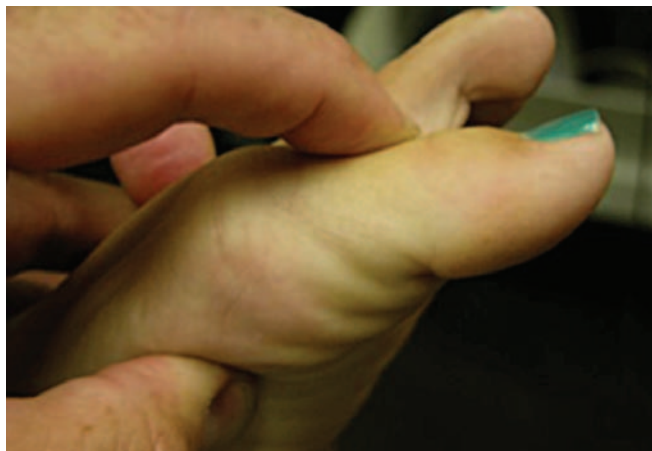


Figure 1. First metatarsophalangeal joint plantarflexion end range of motion.



Figure 2. First metatarsophalangeal joint plantarflexion end range of motion following hallux abducto valgus correction.

arthrofibrosis after hallux valgus surgery are seldom. However, if unaddressed, it can lead to an unpredictable outcome. Early arthritis and erosion of cartilage on both surfaces of the MPJ should be noted intraoperatively. Joints with lesions on both sides of the articular cartilage (“kissing lesion”) are at greater risk to develop stiffness (4). When performing distal osteotomies, it is also better to avoid excessive exposure of cancellous bone (Figure 3). This helps avoid capsular adherence to the osteotomy area and reduces the possibility of arthrofibrosis. Surgical planning should also involve minimizing bundled surgery. Combining rearfoot surgery with hallux valgus surgery sometimes restricts the patient in a cast or in a non-weightbearing device for longer than 6 weeks. This could potentially keep the first MPJ in one position for a period of time and make it harder for a patient to regain range of motion in the joint. Another risk factor that greatly influences the occurrence of arthrofibrosis is revision surgery. Scar tissue formation is inevitable after surgery; the second time operating on the first MPJ will increase the amount of scar tissue formation. Patients need to be aware that the chance of joint stiffness escalates with revision surgery. Advanced arthritis, previous trauma, and other metabolic disorders should be taken into consideration when discussing arthrofibrosis at the first MPJ (5). However, most patients can avoid this complication if the risk factors are known and preemptively treated during the postoperative course.

The development of postoperative arthrofibrosis after hallux valgus surgery is seldom discussed in the medical literature. Solan et al described joint manipulation with therapeutic injection for hallux rigidus with limited success. Another study described 150 patients who underwent distal osteotomies for bunion correction; 3 patients had joint stiffness and 1 became symptomatic (6). The podiatric literature will commonly deem arthrofibrosis as a complication of hallux valgus surgery (7). However, to date, we have not found published information on rates of occurrence, etiology, and treatment protocols. The most common treatment options include physical therapy, splinting, anti-inflammatories, and surgical revision. Most of these treatments cannot be initiated until the osteotomy site is considered stable. In this regard, fixation and osteotomy type do make a difference. The more inherently stable the osteotomy, the sooner passive and active range of motion can begin on the joint.

Another option to consider when treating arthrofibrosis of the first MPJ is closed manipulation of the joint. The orthopedic community uses similar techniques to

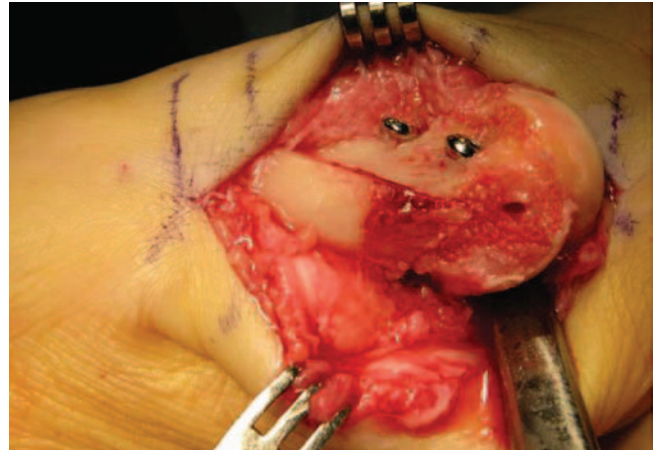


Figure 3. Exposed cancellous bone around the first metatarsal following Chevron osteotomy.

treat frozen shoulders and knees when they become symptomatically stiff after surgery (8). When evaluating a patient to perform a closed manipulation, the joint should be radiographically congruent with no signs of impingement, and the osteotomy site should be consolidated. The technique can be performed under local block or with general anesthesia. The joints proximal and distal to the first MPJ are stabilized in a neutral position. Next, forced dorsiflexion and plantarflexion are applied to the joint to break up adhesions and create motion. An intra-articular steroid injection with local anesthetic can also be used to diminish capsular adhesion and provide adequate pain relief after manipulation.

In conclusion, arthrofibrosis is an uncommon complication that involves excessive scar tissue causing symptomatic joint restriction postoperatively. If not treated properly, arthrofibrosis at the first MPJ can be a very frustrating complication to manage. Ultimately, arthrofibrosis can be treated with arthrodesis; however, if the patient’s expectations were to restore joint range of motion it may be difficult to convince the patient a fusion is necessary. There are risk factors that include arthritic changes to the joint, surgical technique, and postoperative treatment that should be greatly valued in order to avoid arthrofibrosis. To date there are no studies to determine how much stiffness is tolerable, and no current studies to support the best way to treat arthrofibrosis following hallux valgus surgery. The authors believe that closed manipulation should be added to the protocol of modalities used to manage arthrofibrosis.

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