When Is A Fibula Rod Procedure Indicated For Ankle Fractures?

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Detailing the treatment of a 72-year-old patient with an unstable bimalleolar fracture, this author discusses the use of a minimally invasive fibula rod procedure to facilitate fixation and reduce the risk of incision healing issues.

Ankle injuries account for more than 5 million emergency department visits annually. Ankle sprains comprise approximately 85 percent of these ankle injuries and fractures make up the other 15 percent. The ankle fracture is the most common intra-articular fracture of a weightbearing joint, making up 9 percent of all fractures. The average age of a patient with an ankle fracture is 46 and women are slightly more at risk, experiencing 53 percent of ankle fractures. The most common causes of fractures are falls (37.5 percent), inversion injuries (31.5 percent) and sports-related injuries (10.2 percent).5

In the United States, approximately 25 percent of the 585,000 ankle fractures annually require surgical intervention. The cost of surgical treatment usually ranges from approximately $11,000 to $25,000.6 With the ankle joint bearing stress of 1.25 to 5.5 times the normal body weight, any displacement will cause abnormal abrasion and subsequent arthritis. The ankle will remain permanently painful when displacement occurs.7
Treatment of displaced fractures becomes more complicated and fraught with wound healing issues in patients with diabetes, elderly patients and others who are immunocompromised. One may recommend alternate techniques for these patient populations. It is unrealistic to expect traditional internal fixation techniques alone to maintain compression. Adjusting techniques and using supplemental fixation may enhance osseous stability. The less a surgeon disrupts the soft tissue envelope surrounding a diabetic ankle fracture, the better. Surgeons can often use percutaneous fixation or a combination of percutaneous and open locking plate fixation.\(^8\)

A Closer Look At The Patient Presentation

A 72-year-old African-American female with diabetes and significant neuropathy presented to the emergency department with a right ankle injury. X-rays demonstrated a bimalleolar ankle fracture with mild displacement of approximately 3 to 4 mm laterally. The patient also had a history of breast cancer, anemia, hypertension and hyperlipidemia. A stress test within the past year showed no abnormalities. Her most recent glucose was 216 mg/dL.

Upon the initial presentation, the patient noted that she did ambulate but not a huge amount. Her pulses were palpable but diminished to some extent. She clearly had neuropathy and it seemed there was some dementia as well.

Considering the bimalleolar fracture pattern and mild displacement, I had to take several considerations into account. The first consideration in a patient with diabetic neuropathy and mild ankle displacement is to treat this fracture conservatively with casting/immobilization of the affected ankle, accepting some displacement and the risk of arthritis setting in an early stage. Additionally, the patient may not remain non-weightbearing and this fracture can very easily become much more displaced or even dislocated. I have had this happen with a number of patients and it is a nightmare to deal with several months out. I have seen this type of injury progress to the point where it continues to become more displaced, arthritis sets in, and the patient needs an ankle fusion. I lean toward fixating most ankle fractures with even minimal displacement now since they can easily change position over time, the surgical risk is often low and outcomes are generally very good. Even with non-adherent patients who are walking on the
surgical site, I have much more confidence the fracture will remain reduced. In these cases, at least they have hardware to assist in preventing massive failure.

**Weighing The Surgical Options**

The surgical option for this patient is either to perform standard open reduction internal fixation (ORIF) with a plate and screw construct, or perform a minimally invasive fibula rod procedure with subsequent screw fixation of the medial fracture. The benefits of standard plate and screw fixation are an extremely strong construct and the ability to usually achieve perfect anatomic alignment. The drawback is that the incision does not always heal well, especially in an older person with diabetes, neuropathy, slightly diminished blood flow and possible dementia. In this patient, I assumed complications would occur with the standard open procedure.

The second surgical option for the patient in this case study is to perform a fibula rodding procedure. Currently, there are two companies (Acumed and Sonoma Orthopedics) that have a rod on the market. Generally, this procedure has a much lower risk of incision healing issues due to the percutaneous technique.

Fibula rods provide excellent stability and fixation of the fracture fragments. Fibular rods allow for slight shortening and posterior displacement of the fibula fracture fragment. Surgeons can generally achieve near anatomic reduction and fixate syndesmotic instability or rupture with this procedure as well. There are several screws that anchor the rod into the distal fibula and one or two screws that go from lateral to medial to stabilize the syndesmosis. I will often place syndesmotic screws to provide additional stability in a patient with osteopenia, even when there is no obvious diastasis.

This patient healed very well with the above procedure. I fixated the medial malleolar fracture with two Acutrak screws (Acumed) through a small incision. Although this side can look perfect on intraoperative fluoroscans, it is often rotated or has soft tissue interposition. For this reason, I almost always open medially through a small incision to ensure perfect reduction if possible. In this case, I opened the medial side through a 3 to 4 cm incision and this is the side that had delayed healing.
The fibula healed without any incident. The medial incision healed but took about six weeks to heal. No loss of reduction occurred throughout the healing phase. The patient is now fully weightbearing without pain.

**Key Pearls On The Fibula Rod Procedure**

The fibula rod surgery has a number of steps and one needs to insert the rod in a specific sequence. After becoming accustomed to inserting this rod, one can perform this procedure in less time than a standard ORIF of the ankle. It can take 20 to 25 minutes to fix the fibula component once you become proficient in the technique.

As I noted earlier, two companies produce a fibula rod. The Acumed rod is a titanium rod that comes in three separate lengths. Two screw holes are available distally and two holes are available for the syndesmosis stabilization. There is an external targeting guide that attaches to the rod for insertion. After tapping the rod into place with a mallet and confirming adequate positioning, the surgeon can use the targeting guide to facilitate percutaneous insertion of both distal screws and the syndesmotic screws.

Additionally, there is the FibuLock Nail stainless steel fibula rod (Sonoma Orthopedics). Similarly, this system has holes for two syndesmotic screws but they are angulated more anteriorly. Distally, there are options for insertion of three screws. At the most proximal aspect of the rod, there are small barbs that expand and purchase the proximal fibula from within the medullary canal. This prevents rotation and migration. Distally, there is a compression option available. The rod comes in two different lengths. The external targeting guide has holes for K-wire insertion to stabilize the fracture and confirm the exact depth of the rod insertion.

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