Practical Pearls On Utilizing Fibular Nails In Athletes

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Those of us who practice in the military or work at large tertiary hospitals have seen our share of ankle fractures in all shapes and sizes. Accordingly, companies have devised every imaginable shape and size of plate to accommodate the fibula. Over the years, we have seen the transition from rush rods, buttress and neutralization plates to anti-glide locking plates, percutaneous plating techniques, TightRope (Arthrex) and absorbable screws/plates. We are now back to intramedullary nailing.

Acumed was the first company to come out with an intramedullary nail for the fibula in the United States but its Fibula Rod System never got the traction that Sonoma Orthopedics has gotten over the past year with its FibuLock product. Both companies have touted the advantages of intramedullary nailing for diabetic and osteoporotic bone. There have also been numerous case reports and clinical studies praising the reduced wound complication rates with the nailing technique.1,2

Despite the literature quoting complication rates as high as 30 percent with fibular plates, I personally have not seen that high of a rate in young, healthy soldiers or athletes.1-4 Minimal incision plating and nailing techniques have become extremely attractive to surgeons, especially for treating diabetic ankle fractures.

Both the Acumed and Sonoma Orthopedics nails have the capability of syndesmosis fixation and interlocking screws both distally and, with some fracture patterns, proximally to the fracture. However, there are some key differences between these devices. The primary difference is the ability of FibuLock to lock the nail in proximally by using the talons, which deploy within the medullary canal of the fibula. Neither nail is perfect but the advantages of both over open plating have been amazing in my experience. Patients have far less pain and swelling, and are able to ambulate far sooner with the nail versus plating.
A Closer Look At Fibular Nail Indications
The nail is not for every fibular fracture. Whether the origin of the fracture is transverse, spiral or oblique is not as critical as the height of the fracture. The fibular nail is ideal for supination-external rotation and supination-adduction ankle fractures. Pronation-external rotation and pronation-abduction injuries are appropriate if — and only if — the fracture is less than 5 cm proximal to the joint. Any higher fractures more often will have butterfly fragments that are impossible to control with the nail alone.

The Sonoma Orthopedics nails come in 130 mm and 180 mm lengths. Acumed nails come in 110 mm, 145 mm and 180 mm lengths. Both systems have two diameters: 3.0 mm and 3.8 mm for Sonoma Orthopedics; and 3.0 mm and 3.6 mm for Acumed. Personally, I haven’t needed to use anything wider than the 3.0 mm nail or anything longer than a 145 mm nail. In addition, one can use the fibular nail in conjunction with any tibial fixation and even external fixation.

What You Should Know About Contraindications And Caveats
There are contraindications for fibular nails. A distal avulsion fracture of the fibula is one contraindication. In this case, the nail would frankly be overkill when a simple screw would suffice. Open fracture of the fibula is another contraindication.

One should also avoid using fibular nails for comminuted fractures that are better suited to bridge or open plating. Also avoid using fibular nails in fractures with large butterfly fragments as these fragments are key to achieving stability of the fibula. While inserting the drills and nail, you will simply push the fracture pieces apart.

There are some caveats to the fibular nailing procedure.

• This technique is not easy. There is a significant learning curve. If you think Jones fractures are hard, then you will need a lot more patience nailing a fibula.
• This technique is not quick. Depending on the patient’s bone stock, it can take as long as 45 to 60 minutes to perform the intramedullary technique. However, the ability to avoid large incisions and periosteal stripping is well worth the extra time in the operating room. Avoiding potential wound complications is priceless.

Key Tips For Performing Fibular Nailing
Most importantly, reducing the fibula prior to starting the nailing procedure is critical to the success of the procedure. There are times that you can percutaneously reduce the fracture with a reduction clamp, and there will be times you will be forced to make a small incision so you can get a reduction clamp in place. Clearly, the timing of the procedure is crucial. The more mobile the fracture, the easier it will be to perform percutaneous reduction.

It is crucial that the reduction clamp remains in place throughout the drilling, the insertion and locking of the nail. If it does not remain in place, you will distract the fracture apart as you ream the fibula. Failure to reduce and hold the fracture during insertion of the nail will simply lead to a non-union or malunion.
Comparing Plating Versus Nailing Procedures

There have been numerous studies looking at complication rates and healing rates, but no one has studied the fibular nail in athletes or in active individuals. Historically, Army surgeons have been very aggressive in obtaining early range of motion and early weightbearing with plating techniques. We never cast. I have had Special Forces soldiers and Navy SEALS running a month to two months after surgery. With the average athletes and soldiers, we tend to get them running in four months and back to full duty or sports by six months. For the military, getting soldiers back into boots is the rate limiting step, which also refers to getting soldiers back to normal activities at work versus being in a controlled ankle motion (CAM) walker for six to eight weeks. Since we are minimizing our incisions, we are able to get our patients in military boots as soon as two weeks after fibular nailing. This avoids the need for a CAM walker.

Weightbearing status is a highly debatable topic. We routinely are walking our patients with plated fibulas at two weeks and, in some cases, at one week depending on the patient’s swelling and pain. As for the nail, we have been able to walk patients who have had percutaneous reduction the next day and we are encouraging patients who have had minimal incisions to walk at one week post-op. That is a huge departure in comparison to the results of average plate procedures and even nailing procedures published in many of the studies. I would caution everyone that our overly aggressive protocols are not for the elderly or patients with diabetes.

One issue that seems to be under debate is the rate at which we need to remove hardware. Studies have shown that rates can be as high as 30 percent. I am taking out a much higher rate of the newer anatomical fibular plates versus a standard 1/3 tubular-style plate. Especially within the military, boot irritation with anatomical plates has become a major issue. Adopting the fibular nail technique has gotten soldiers back into boots so much faster than we have seen with any open plating techniques.

Removing hardware in athletes is always problematic. More time off from competition is never acceptable to an athlete. So if we can avoid that potential with a nail versus a plate, then I am all for it.

The last major issue is cost. The cost difference between locking plates and screws versus a simple stainless steel 1/3 tubular plate and screws could be as much as $1,500 in my experience in our hospital. When you compare the nails from either Acumed or Sonoma Orthopedics, they are very comparable in price to using a locking plate with locking screws. For me, cost is not as critical as the results.
Case Studies In Fibular Nailing
A 19-year-old male trainee in Army Basic Training presented after being injured during combatives (hand-to-hand combat). His intraoperative c-arm stress exam proved that he had a supination-external rotation stage IV ankle fracture. We performed a fibular nail procedure and the patient was weightbearing at one week post-op. He was able to wear his Army boots at two weeks. With the aid of physical therapy, he started jogging on a treadmill at six weeks and passed his two-mile run test at nine weeks post-op, completing the run in 14 minutes and 17 seconds. Prior to injury, he had completed the two-mile run in 14 minutes and 13 seconds. His nine-week X-ray revealed complete healing with a stable mortise. A 32-year-old wife of a soldier twisted her ankle on the ice during an ice storm. She sustained a supination-external rotation stage II ankle fracture. The fracture was non-displaced. The patient refused a cast and I offered her the fibular nail. After fibular nailing, the patient started walking one day after surgery. Two weeks after surgery, she was already back to her Zumba class. By four weeks, she was riding the stationary bike for 60 minutes. At eight weeks, she was jogging on the treadmill. The patient ran a 5K race pain-free only three months post-surgery.

In Conclusion
The fibular nailing technique has proven early on to be a very reliable technique for getting soldiers and athletes back to running. Complications have been non-existent to date.

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References