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# Calcaneus Fracture Repair - Minimally Invasive Surgery (MIS)

Calcaneus fractures are severe injuries the cause damage to the heel bone (calcaneus), the joint above the bone (subtalar joint – side to side motion) and the pad of fat on the bottom of the heel. In more severe injuries the tendons on the side of the foot (peroneal tendons) and the nerve on the inside along with the tendons that go to the toes can be damaged and scarred as well. Currently there is controversy on what the most appropriate method of treatment is best for the patient. Traditionally, surgery has been performed with a large incision on the side of the foot – termed an extensile approach. Although this surgical treatment provides excellent visualization of the bone, there is a large amount of soft tissue elevation and scarring that occurs and the data that is available has shown that the risk of stiffness and infection may outweigh the benefits of surgery. The goal of the surgery is to restore the alignment of the bones to improve the anatomy of the foot (restore the height and alignment of the bone) to a more neutral position. Understanding that a large incision to achieve this goal has risks that may mitigate the benefit, we utilize smaller incisions and in some cases small as 1cm (percutaneous) to realign the bones without creating significant scarring and minimizing the risk of infection. No surgical approach can normalize the foot and this is type of injury that we tell patients is a "life altering injury". By using these minimally invasive techniques combined with our experience we have able to achieve favorable outcomes in our patients while lowering the rate of wound complications and infection. One compromise with minimally invasive surgery is that the bones are not directly visualized as they would be with an extensile approach. The data that is available has demonstrated that despite in some cases not achieving an anatomic reduction with a minimally invasive approach, the functional outcomes for the patient are superior on average compared to those treated with an extensile approach. Depending on the experience and skill of the surgeon – they may prefer an extensile approach and this is appropriate as well, however at our institution, we have experience with the minimally invasive approach and this our technique of choice. The timing of the surgery does also dictate what type of surgical approach may be appropriate. Given the smaller incisions and less soft tissue trauma, minimally invasive techniques are best done early as possible for calcaneus fractures. This is in contrast to the traditional extensile approach where the skin should show "wrinkling" and resolution of swelling that can take 3-4 weeks to occur. Once 3-4 weeks has progressed, the bones have started to become sticky and do not move easily, making it very difficult to reconstruct through small incisions.

Surgery is performed on an outpatient basis with regional anesthesia using a peripheral nerve block. A small incision is made along the side of the heel bone to allow for mobilization of the fracture fragments to a more anatomic position. Using techniques that involve placing temporary pins into the bones and using fluoroscopy (surgical xray), the bones are realigned and the joint surfaces are positioned to a more anatomic position. Once satisfactory alignment has been achieved, a combination of screws or plates and screws are used to hold the bones in place. Bone graft may be required in some cases depending upon the severity of the fracture. Recovery requires 6 weeks of no pressure on the foot, however, range of motion with physical therapy is begun 2 weeks from surgery to minimize stiffness. Weightbearing in a boot is

allowed approximately 6 weeks from surgery with transition to a gym shoe at 10-12 weeks depending on comfort. Return to activity as tolerated may be considered 6 months from the surgery, however, given the severity of this trauma, most patients are unable to perform high impact activity such as running and sports. Residual heel pain on the bottom of the foot may be present as this tissue was traumatized at the time of the injury and currently there is no reliable method to correct this damage. Some limitation with uneven ground, grass, gravel is common after this injury secondary to the trauma to the cartilage. Non-surgical use of heel pads and shoes that minimize the pressure on the foot will be recommended. Arthritis may occur regardless of the treatment that is rendered and in this case, pain and discomfort will be present on the outside of the foot that may require a fusion is severe. If the fracture is so severe that the joint cannot be salvaged, a fusion of the joint – the subtalar joint – may be recommended as the initial surgery.