

Wandering through the Wilderness: Treatment of the Displaced Intra-articular Calcaneal Fracture over the Last 80 Years

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When I started medicine in the 70s, what we knew about calcaneal fracture treatment could be put into a thimble. Standards included the use of plain X-ray for diagnosis and Steinmann pins were used in the OR for percutaneous reductions of some tongue-type fractures. Most joint depression fractures were treated nonoperatively. Essex-Lopresti had set the standard with a major significant publication in the 50s.¹ He had recognized the basic patterns of joint depression and tongue-type calcaneal fractures. Universally, the results were dismal and patients with calcaneal fractures were told that they may never work again at labor jobs. We were yet to see the significant jumps in clinical care that were the result of CT scans, CT classification of calcaneal fractures, RCTs, and patient-related outcome measures used for follow-up.

During my career as a trauma surgeon, I was lucky to be told to really dig into the research of this fracture as little was known about it. The Hannover group along with Sanders in Tampa, Bernirshke in Seattle, and the Canadian Orthopedic Trauma Society all started to do better and better research through the 80s. This culminated with the first and not to be repeated large multicenter RCT of nonoperative vs operative care of displaced intra-articular calcaneal fractures² that was done by the Canadian group, and I was lucky to be the leader of this group. Because of the level one evidence that comes from a prospective trial (over 500 hundred patients), we determined that certain groups of patient characteristics could lend one to start to make decisions about patient care. Before this time, witchcraft would have been more predictable about patient outcomes and decision-making with this fracture. Other, smaller RCTs from many centers followed, each with the same conclusions—that accurate surgery, with the good reconstruction of the posterior subtalar joint and foot shape resulted in moderate improvements in patient outcomes over nonoperative care. Overall, bad decision-making such as operating on an elderly diabetic, resulting in infection and wound compromise would provide poorer outcomes than nonoperative care and late fusions.

What we were finding out was that patient selection (young patients with simple fractures) helped with providing the best outcomes. Complications were always bad and provided patients with a poorer result.

So, the age of less and less invasive surgery began in the 2000s with centers comparing full open reductions with percutaneous reductions and small cut surgery, usually using the sinus tarsi approach. All the research comparing full open approaches and limited, smaller approaches has shown that complications are less with smaller approaches, but the reductions are more difficult and not usually as accurate as with open approaches. However, patient outcomes

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suffer if complications are not avoided with open approaches, and good foot shape and joint reduction are not maintained with limited fixation. The Sanders 4 calcaneal fracture has been tested with ORIF vs immediate subtalar fusion with a good Canadian Orthopedic Trauma Society multicenter RCT and fusions provide equal patient outcomes with no need for a second surgery.³ Our group has also written a patient algorithm paper that provides direction as far as decision-making when a patient presents.⁴ Each patient, of course, has multiple factors including patient, limb, and fracture factors that will direct care toward nonoperative care, ORIF, or fusion. It behooves each surgeon who has the training to operate on calcaneal fractures to know the indications for each type of treatment and just as important, to know when NOT to operate.

This special edition of the Journal features a wide array of papers to answer many still unresolved questions regarding displaced intra-articular calcaneal fractures. These include what to do with bony defects, the emergent care of tongue-type fractures, how best to use plain radiographs when dealing with displaced fractures, and fusion rates with arthroscopic arthrodesis. Many questions remain around this difficult fracture. But each calcaneal surgeon must remember a few key points that have become clear with the last 80 years of calcaneal research. If a surgeon is going to reduce a calcaneal fracture, do it well and use smaller incisions if possible. If a patient is older (more than 60 years of age), complications may outweigh surgical results. If a patient presents with a bad foot shape, then it needs to be corrected and the joint is secondary (if it can be reduced). And lastly, subtalar fusions work for Sanders 4 fractures with good patient outcomes despite patients not wanting them. Regardless of the type of presentation of a calcaneal fracture, it is rare to have a patient score more than 80 points on a 100-point scoring scale (100 is the best score). We, as surgeons, cannot put the broken egg back together perfectly, but we can help each individual patient by avoiding complications and doing the right operation at the right time on the right patient.

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