

ROUNDUP³⁶⁰

Foot & Ankle

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Multilayer compression bandaging superior for post-traumatic ankle oedema

x-ref Trauma

■ There is a broad consensus that oedema following traumatic injury to the hind-foot and ankle has a detrimental effect on outcomes. Patients are likely to wait longer for surgery, and when performed, surgical interventions in patients with oedematous swelling are associated with increased complication rates. There are a number of potential interventions to decrease swelling and reduce subsequent complication rates including elevation and ice, compression bandaging and intermittent pneumatic impulse compression. Researchers from [Lucerne \(Switzerland\)](#) have designed a randomised controlled trial using a repeated measures design to establish which method was most effective at reducing pedal oedema.¹ The primary outcome measure was the reduction in pedal oedema and patients were randomised to either control (elevation and ice), impulse compression or compression bandaging. The interventions were used pre- and post-operatively to reduce swelling. During the pre-operative period there were decreases in swelling in the control group (-5%) and the bandage group (-23%), although not in the impulse compression group (0% change).

Post-operatively, the median changes in swelling were again much improved in the bandage group (-22%) when compared with the control (+7%) and intermittent compression groups (+46%). While the results of this study suggest that compression bandaging can reduce swelling more rapidly than traditional elevation, it does not support the intermittent compression protocol used here (impulse compression without bandage or elevation during off periods).

Compression stockings for ankle fractures

x-ref Trauma

■ In a complementary study to the previous one, researchers in [Wythenshawe \(UK\)](#) set out to establish the value (or otherwise) of a specially designed ankle injury stocking with the aim of evaluating the potential for functional improvement associated with the use of the ankle injury stocking (AIS) following both conservative and operative treatment of ankle fractures.² Their randomised controlled trial evaluated AIS stockings *versus* tubigrip, both used in conjunction with an aircast boot following ankle fracture. The authors recruited 90 patients to the study (31 operative and 59 conservatively treated fractures). These were randomised to one treatment or another and treatment was instigated within 72 hours of injury. Primary outcomes were assessed with the functional Olerud-Molander Ankle Score (OMAS) and secondary outcome measures included the American Orthopaedic

Foot and Ankle Society score (AOFAS) and the Short Form (SF)-12 Quality of Life score. Frequency of deep vein thrombosis (DVT) was also reported as a secondary outcome measure. Despite the simple nature of this study the team yielded some interesting results. In line with the previous RCT the compression stockings significantly decreased the swelling in the ankle at all time points, while the OMAS score was remarkably better (98 vs 67) in favour of the compression group at six months. These improvements were mirrored in the AOFAS and quality of life scores, both showing significant improvements associated with compression at six months. It seems remarkable that a simple intervention such as compression stockings could make such a significant improvement in clinical outcomes over a sustained period of time. That said, patients complain of persistent swelling and associated pain for many months following ankle fractures. This of course can result in compromised functional outcomes although to be frank, here at 360 HQ, we are gobsmacked at the effect size associated with this simple intervention.

Weight bearing ok in Achilles tendon ruptures

■ Conservative management of the ruptured Achilles tendon can be challenging, but more for the patient than the surgeon. There is widespread recognition that conservative management provides acceptable results, and while the indications for operative treat-

ment vary between surgeons and institutions the majority would agree that conservative treatment is suitable for most patients. Although more convenient for the surgeon, a patient with a non-weight-bearing cast worn for extended periods of up to three months, in some older regimes, can find getting on with life difficult. The recent advent of lightweight, weight-bearing splints and boots for the treatment of Achilles tendon ruptures has not been met with any great influx of research supporting their use, despite the obvious advantages for the patient of earlier weight-bearing. We welcomed the report from colleagues in [Auckland \(New Zealand\)](#) investigating the outcomes of weight-bearing casts and traditional casts in the treatment of acute Achilles tendon ruptures.³ The research team enrolled 84 patients with an acute Achilles tendon rupture and randomised them to either treatment with a Böhler iron or a non-weight-bearing cast for eight weeks. Primary outcomes were assessed as the re-rupture rate during the study. Secondary functional outcomes were assessed with muscle dynamometry testing at six months, and further assessment at a minimum follow-up of one year. Other outcomes reported included complication rates, return to sports, patient-reported ankle pain, satisfaction and stiffness. By the time of final follow-up there were just three re-ruptures across the whole cohort (one in weight-bearing and two in

the non-weight-bearing group). There were also no differences in secondary outcome measures of any type. There are two reasonable conclusions that can be drawn from this study: that early weightbearing is equivalent to traditional cast treatment (although we were disappointed to see two antiquated treatments – where is the functional bracing?) and that the re-rupture rate remains very low with both types of conservative treatments.

MRI findings can predict ankle sprain symptoms

■ Correlating the ‘shadows of reality’ seen in MRI scans with real hard clinical symptoms can be rather problematic. The high false positive rate and uncertain meaning of many MRI scan findings can make clinical interpretation of symptoms rather tricky. Ankle sprains are classic ‘difficult to interpret’ scans. With a high rate of symptomatic ligament tears seen in the community, discerning the value of an MRI scan as an isolated diagnostic image can be difficult in itself. Researchers in **Incheon (South Korea)** set out to try and establish the clinical significance of abnormalities of an MRI scan in patients with chronic ankle sprains.⁴ The research team scanned 40 patients with ankle pain following an inversion injury and then ten normal volunteers as a comparison group. Each patient underwent standardised clinical examination and history taking, in addition to the diagnostic imaging. The research team established that patients presenting with a complete tear of the anterior talofibular ligament had a strong correlation between ankle pain during varus stress in the neutral position and tenderness at the anterior talofibular ligament. While not exactly game-changing or rocket science, it is heartening to know that, in this study at least, pathological changes of ligament tears were associated with abnormal symptom in those patients with the signs on MRI scanning.

Salvage for malreduced ankle fractures

x-ref Trauma

■ Ankle fractures are the most common injuries seen in the foot and ankle, and one of the most common fractures treated worldwide. While there is widespread use of both conservative and operative treatment modalities there is little information on salvage following failed open reduction and internal fixation. Revision fixation is a complex and difficult procedure fraught with difficult decision making and the spectre of complications. All orthopaedic surgeons are aware that the rates of complication following revision fracture fixation are high, but the precise complications profile and incidence rates have never been studied. Surgeons in a regional trauma centre in **Bristol (UK)** undertook a retrospective review of adult closed ankle fractures undergoing revision surgery over a three-year period.⁵ Patients with severe or contaminated wounds were also excluded from this paper. The authors were able to report the outcomes of nine patients undergoing revision surgery for failed ankle fixations. Sadly, of the nine patients included in the study, three (33%) developed a deep infection, all with positive microbiology cultures. All of the infected patients grew *Staphylococcus aureus* and ultimately required debridement and coverage of the soft-tissue with a free flap. Aside from the infectious complications, there were three other complications (one CRPS, one failure of plate and one persistent pain). Overall, around two thirds of patients in this small but unique series suffered complications following revision fixation of their fracture. This serves to highlight the importance of ‘getting it right first time’ – revision fracture surgery really does carry with it poor outcomes.



Locking fibular plates are more expensive

x-ref Trauma, Research

■ With the onward march of progress in implant technologies, the use of newer implants does not always follow a period of appropriate biomechanical and clinical evaluation. The use of polyaxial locking plates has become more and more frequent with the cited advantages of improved biomechanical strength. Researchers in **Jena (Germany)** have set out to establish in a cadaveric study how polyaxial locking plates vary with construct stiffness and risk of plate loosening when placed as a posterior buttress plate compared with standard lateral plate fixation.⁶ In addition, they measured the achieved range of movement following fixation with either plate method. The researchers used a standard model of a Weber B fracture created in seven pairs of cadaveric ankles, one fixed with a lag screw and a lateral plate, the other with a posterior plate. There were no statistically significant differences in bending stiffness, range of movement or torsional stiffness, although the posterior-placed buttress plates performed better in all tests.

Sadly, we do wonder if these investigators have asked the wrong questions. There is already a wealth of evidence (including randomised controlled trials) to suggest that posterior-lateral buttress plating and lateral neutralisation plating are equivalent; what there is not is any evidence to support the use of the new polyaxial locking plates over the standard ‘third tubular’ plates. So for now all options appear equal.

Is fixation better early or late in pilon fractures?

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■ One of the biggest mistakes that a foot and ankle surgeon can make is operating too early on compromised soft-tissue. The AO mantra of ‘span,

scan, plan’ has guided generations of surgeons through the successful management of AO 4.3C fractures with the minimum of complications. A great deal of research, much from European trauma centres, suggests that waiting at least five days reduces the complication rates significantly. Recently, some groups have been taking a more direct approach and questioned whether in all cases swelling really needs to subside before surgery. Researchers in **Chengdu (China)** have entered the fray with a matched series of 46 patients, all of whom underwent surgical treatment of their 4.3C fracture.⁷ The investigators matched patients for age, gender, soft-tissue conditions and fracture pattern. They then divided them into an early group (fixation within 36 hours) and a delayed group who underwent surgery at ten days to three weeks. Outcomes were assessed in terms of soft-tissue or bony complications, and follow-up was achieved to just over two years in both groups.⁷ This study demonstrates no observable differences in complication rates or functional outcomes in this group of patients. The difficulty in interpreting the results is that this type of study suffers from the worst kind of selection bias. It is impossible to match these patients retrospectively – one group has been selected for late fixation due to the state of their soft-tissue, while the other has been deemed suitable for early fixation. A clear difference in the patients’ presentations. It seems that very few conclusions can be drawn from this paper except perhaps to say that if the soft-tissue is suitable then early operation can yield comparable results in selected patients.

Calcaneal fracture fixation not for subtalar arthropathy

x-ref Trauma

■ Calcaneal fractures are relatively common injuries and are often displaced intra-articular fractures associated with significant joint surface depression. In the longer term these injuries are associated with a high

incidence of subtalar arthrosis and long-term disability. There is division among surgeons about how best to treat these patients and there is, to date, no consensus as to the best method. Researchers in **Warwick (UK)** set about running a large pragmatic, multicentre, two-arm, parallel-group, assessor-blinded, randomised, controlled trial: the UK Heel Fracture Trial.⁸ The study was designed to assess whether surgery with open reduction and internal fixation or non-operative treatment provides the best outcomes for displaced, intra-articular calcaneal fractures. The study was conducted in 22 hospitals within the United Kingdom and included 151 patients with acutely displaced intra-articular calcaneal fractures. These were allocated in roughly even groups to operative (n = 73) or non-operative (n = 78) treatment. The primary outcomes were assessed with the Kerr-Atkins score which assesses both pain and function. This study

was set up particularly to assess for symptoms relating to subtalar arthrosis and so outcomes were assessed two years following injury. Other outcome measures including, but not restricted to, complications, hind-foot pain and function (American Orthopaedic Foot and Ankle Society score) and quality of life scores (measured with both the SF-36 and EQ-5D) were reported. Unusually for this type of study, the authors were able to achieve just 5% loss to follow-up with the primary outcome measures, and a complete set of secondary outcomes was available for 75% of participants. The headline results of this study are that there is no difference in the primary outcome measures of the Kerr-Atkins score (69.8 operative vs 65.7 non-operative), nor in any of the reported secondary outcome measures in either treatment arm. The authors conclude that “operative treatment compared with non-operative care showed no sympto-

matic or functional advantage after two years in patients with typical displaced intra-articular fractures of the calcaneus”, and further, that “treatment by open reduction and internal fixation is not recommended for these fractures”. A bold statement from a relatively small study, and one that we do not completely agree with, here at 360, which is discussed further in the editorial.

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