

ROUNDUP³⁶⁰

Foot & Ankle

Syndesmosis and outcomes in ankle fracture

■ The general understanding of syndesmosis injury and the outcomes of differing treatment modalities have matured significantly over the past few years. We were delighted here at 360 to see that published research surrounding this injury has progressed to include useful secondary outcome analysis from multicentre randomised controlled trials (RCT). Researchers from **Texas (USA)** have published a secondary outcome analysis of their operatively treated Weber B fractures.¹ They report a multicentre prospective evaluation of outcomes stratified by injury type from a multicentre randomised trial including 242 patients recruited from nine trauma centres in the USA. All patients underwent operative fixation of their Weber B SE4 ankle fractures. The surgical cohort consisted of 81 patients (35%) with syndesmosis instability. The trial protocol included functional evaluation at six, 12, 26 and 52 weeks with analysis of patient-reported outcome measures, clinician-administrated measures and the Bother index. The research team evaluated the recovery curves based on observations at these time points of the two groups using a mixed methods model. There was a slightly poorer outcome recorded in both the absolute outcome scores and the recovery trajectory in those with syndesmosis injury, however, the differences were only

just at the threshold for clinical significance. Based on syndesmosis injury, the recovery curves following ankle fractures were different. Syndesmosis injury has a slightly detrimental effect on outcomes of operatively treated Weber B SE4 fractures.

Ankle arthrodesis or arthroplasty: a complications-based analysis

■ Following hot on the heels of last month's 360 feature article on ankle arthritis and the role of arthroplasty, investigators in **Chicago (USA)** set out to establish the relative merits of arthrodesis or arthroplasty, but looking on a much broader scale using the National Inpatient Sample (NIS) to establish what the outcomes of both procedures were in terms of complications.² The investigators included a large sample of patients from 2002 to 2011 and analysed data from the NIS using the ICD-9 codes to identify patients treated for ankle arthritis. There were 12 250 patients available for analysis who underwent fusion and a further 3002 who underwent arthroplasty. Although the groups were far from matched, the researchers did the best they could to adjust for confounders with a multivariate analysis to account for demographics and comorbidities (although obviously in this type of registry study factors such as deformity, previous surgery, etc. are not collected). The research team established that ankle

arthroplasty was associated with a decreased risk of blood transfusion, discharge to an alternative location, non-home discharge and overall complication rates. The medical complication rates such as pneumonia and myocardial infarction did not differ in incidence, although there was a \$24 431 excess hospital charge associated with arthroplasty (despite a comparable length of stay). Although this is a selected series and subject to significant selection biases, the lack of difference in medical peri-operative complications is an interesting observation, as indeed is the massive extra health economic cost of nearly \$25 000 associated with arthroplasty.

Crosslinked polyethylene and ankle arthroplasty

■ Despite being an industry-funded and published paper, we were interested to see this paper from Zimmer in Warsaw, **Indiana (USA)** investigating the potential benefits of crosslinked polyethylene on outcomes of ankle arthroplasty.³ Crosslinked polyethylene has been a real success in hip arthroplasty, offering lower rates of volumetric wear and potentially lower rates of aseptic loosening. There have been some concerns that highly crosslinked polyethylene may be associated with a larger burden of biologically active particles despite the lower overall wear rates, although these seem to be unfounded with clinical studies supporting improved survivorship in patients with newer polyethylene. The

story hasn't been quite the same with the knee, where the implant survival benefit seen in hips has not been translated. These potential advantages in newer polyethylene technology have not yet been seen in clinical use in ankle arthroplasty, and we were delighted to see this report of a favourable wear simulator study. The research team used identical semiconstrained bicondylar total ankle arthroplasties with either highly crosslinked polyethylene or standard polyethylene in an ankle simulator, and subjected the prosthesis to five million wear cycles. The simulator was set up to simulate a physiological environment with specific kinematic and kinetic loading profiles designed to simulate natural gait. Analysis of volumetric loss and particulate profile was undertaken at regular intervals. The highly crosslinked polyethylene perhaps unsurprisingly demonstrated a remarkable wear reduction of 74%, with similar particulate morphology seen in other joints. With a significant failure rate associated with ankle arthroplasty in the medium term, we do wonder here at 360 if this may well represent a significant advance in ankle arthroplasty.

Reducing screw removal in calcaneal osteotomies

■ Although hindfoot osteotomy is a commonly used procedure to correct hindfoot angular deformity, the procedure carries with it a not insignificant risk of screw removal. Patients report improved functional

scores but rates of screw removal are reported to be up to 30%. Researchers in **Stanford (USA)** set out to establish if these rates could be reduced.⁴ The study team undertook a retrospective analysis of 159 patients, 30 of whom required screw removal. Hypothesising that screw removal requirement was associated with fixation method, the study team analysed technical factors associated with the surgery including screw type, number and placement to determine if there were any factors that would reliably reduce the need for screw removal. Their study used a mixture of fixation methods, with 43 patients having two smaller screws inserted, and 104 a single larger screw. There were markedly different rates of removal requirement, with hardware removal required in 25% of the large screw group (n = 26/104) and 9% of the dual small screws (n = 4/43). Although the placement of two screws adds a little to the operative time and has some small cost considerations, the authors are quick to point out that the savings associated with lower rates of screw removal outweigh the added costs.

Revisiting infection control policies

■ Many a smirk has been caused by orthopaedic surgeons' views on infection control procedures, including laminar flow theatres, double-gloving and even surgical masks – all are cause for mirth in some quarters. Most orthopaedic surgeons firmly believe that in fact this is key to maintaining low infection rates, and will argue that with post-operative deep infection rates hovering in many orthopaedics subspecialties at well under 5%, there is a good reason for patients to have confidence that the orthopaedic fraternity is doing all it can to reduce these infection rates. Foot and ankle practice suffers from higher infection rates than many other subspecialties, with delayed wound healing and post-operative

infection more common than elsewhere in the limbs. Surgeons in **Aintree (UK)** refocused on traditional infection control policies (surgical and environmental risk factors) in order to reduce their peri-operative infection rates.⁵ Auditing their results over the change of practice period yielded some interesting results. The authors report the results of 1737 patients undergoing elective foot and ankle procedures. The first tranche of patients (December 2005 to March 2008, n = 818) had standard care. The comprehensive policy included the ring-fencing of beds, pre-operative MRSA screening, strict wound care and ward cleanliness (deep cleaning, etc) and a further 919 patients went through the new pathway. The results were remarkable, with a significant reduction in superficial infection (3.3% to 1.8%) and similar changes in deep infection rates (0.7% to 0.3%). It is always difficult interpreting observational studies such as this where other factors may have changed over time, but it certainly seems to be the case that the institution of 'bundles of care' focused on peri-operative infection including theatre, ward, patient and surgical interventions, makes a difference to infection rates in observational studies. Picking out which bits of the 'package' make a difference to infection rates is always much more tricky. Although RCTs have often failed to demonstrate an effect of individual components of this sort of comprehensive care pathway in observational 'bundled' data, it does appear that 'old fashioned' infection control measures make a difference.

Chevron osteotomy: proximal or distal?

■ Although there are some arguments surrounding restrictions in

correction of complex deformities and a minor (saw blade width!) level of unwanted first ray shortening associated with the procedure, the Chevron osteotomy remains one of the more widely accepted osteotomies for mild to moderate hallux valgus. Researchers in **Iowa City (USA)** have reported their RCT investigating the differences between proximal and distal Chevron osteotomy when indicated for moderate to severe hallux valgus.⁶ The study cohort consisted of 50 patients (100 feet) undergoing simultaneous bilateral hallux valgus correction. The cohort consisted exclusively of women and only four had incomplete follow-up. Outcomes were assessed at a minimum of two years (mean 40 months) using primarily the American Orthopaedic Foot and Ankle Society Hallux Metatarsophalangeal-Interphalangeal (MTP-IP) score. Outcome measures of complications, radiographic angle and patient satisfaction rates were also reported.



This study used the 'internal control' method so one foot on each patient received each procedure providing a very robust comparator group. The headline results of this study

were that in terms of all outcome measures, both procedures gave very similar results. Interestingly, not only were functional scores almost identical in each group, but the radiographic appearances (and crucially the sesamoid position) were also identical. It appears from the results of this study that a distal Chevron with additional soft-tissue procedures is as effective at correction of moderate to severe hallux valgus deformities as are the proximal procedures, with both options yielding very satisfactory results.

Ankle distraction for osteoarthritis

■ Ankle distraction is somewhat

of an unknown quantity in the treatment of osteoarthritis. A popular treatment in some quarters, it has never really been proven to have widespread benefits but there are some initial studies suggesting that in certain patients this may be a viable treatment option. There is, however, little in the way of long-term follow-up reports for this controversial treatment. Surgeons in **Iowa City (USA)** have been fans of ankle distraction for some time and are able to report a five- to ten-year follow-up of a previously reported cohort.⁷ Their series consists of 36 patients, all with ankle arthritis, who underwent ankle distraction between October 2002 and October 2006. The authors are able to report the results of 29 of these at a minimum of five years' (mean 8.3 years) follow-up. As perhaps the more cynical amongst us would have predicted, around half of the patients had undergone either arthrodesis or arthroplasty by final follow-up. The positive predictors of 'successful' outcome of distraction at five years included better AOS scores at two years (Hazard Ratio (HR) 0.048), older age at surgery (HR 0.91) and fixed distraction (HR 0.94). Despite half of patients not undergoing further treatment, all radiographs and imaging studies demonstrated progression in the ankle arthritis. This study doesn't convince us of the benefits of ankle distraction – the cohort selected were young, and given the significant adverse effect on quality of life from frame wear during distraction, we would find it hard to recommend to our patients here at 360 bearing in mind these poor five-year results.

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