**X-ref** ***For other Roundups in this issue that cross-reference with Foot & Ankle see: Trauma Roundup 1; Children's orthopaedics Roundup 5.***

### Scarf versus a long chevron in hallux valgus: a prospective randomized controlled study

■ The deceptively simple problem of 'bunions' requires a substantial amount of healthcare resources, with tens of thousands of operations performed every year for cosmesis, deformity, and pain. There are a huge range of operations available, with the aim of maintaining length in the first ray to avoid transfer metatarsalgia, to correct the proximal angulation that drives the deformity, and sometimes to also correct the distal deformity. Despite the resource burden, there are few studies evaluating the various different treatment options and, here at *360*, we were delighted to come across this randomized controlled trial from **Cairo (Egypt)** comparing two of the most commonly performed osteotomies for hallux valgus: the scarf osteotomy and long chevron.[1] Patients were randomized to one of the two osteotomies, and outcomes that were assessed included the American College of Foot and Ankle Surgeons (ACFAS) scores. In addition, secondary outcomes were reported in terms of operative variables and radiological correction achieved. Of the original 48 patients, five were lost to follow-up during the course of the trial, leaving 21 treated by scarf and 22 treated by long chevron osteotomy, with no crossovers for reporting as part of the primary outcome. Mean patient age was 36 years, and mean follow-up time reported was 25.9 months. Overall, in this series, the scarf osteotomy took longer than the long chevron (69 mins vs 63 mins), which is indicative of the more challenging technique. There were no overall differences in the level of radiological correction achieved between the two groups. Interestingly, the functional improvement in ACFAS score was in favour of the long chevron group (69.1%) compared to the scarf group (57.5%). The authors concluded "both osteotomies possess almost identical corrective power of the IMA (intermetatarsal angle) and similar clinical outcomes with slightly shorter operative time and subjective technical simplicity for the long chevron osteotomy". Despite the small size of this study, it should certainly set surgeons thinking. While the scarf has been considered the best osteotomy by many, it does look like the long chevron potentially offers several of the benefits, does not suffer from longer operative times, and may result in better outcomes.

### Replace or fuse (open or arthroscopic) for non-deformed end-stage ankle arthritis

■ While the jury is still out on whether fusion or arthroplasty is the best treatment for arthritis of the ankle, perhaps the UK's Total Ankle Replacement Versus Arthrodesis (TARVA) trial will shed some light on the topic. Indeed, there is a lot that can be gained through the use of large data or cohort studies. This cohort study from **Vancouver (Canada)** is important in that the authors have included only those patients with isolated non-deformed end-stage ankle arthritis.[2] In what is essentially a registry study, the authors utilized the Canadian Orthopaedic Foot and Ankle Society (COFAS) Prospective Ankle Reconstruction Database. They identified their cohort of patients from those who were aged over 18 years with a minimum of two years' follow-up. Clinical outcomes reported as part of this study included the Ankle Osteoarthritis Scale (AOS) and 36-Item Short-Form Health Survey questionnaire (SF-36). Their case series comprised the outcomes of 238 ankles in 229 patients: 88 total ankle arthroplasty (TAA); 50 arthroscopic ankle arthrodesis (AAA), and 100 open ankle arthrodesis (OAA) in patients with isolated, non-deformed end-stage ankle arthritis. There were no marked differences in preoperative AOS pain, disability, and overall scores between groups. The SF-36 Physical and Mental Component Summary scores were also broadly similar. In terms of the main outcomes reported in this cohort, the mean improvement in clinical scores (AOS total) was better for TAA (34.4 (SD 22.6)) and AAA (38.3 (SD 23.6)) when compared with OAA (25.8 (SD 25.5)). This picture was also mirrored in the mean AOS disability score (TAA 36.7 (SD 24.3); AAA 40.5 (SD 26.4); OAA 26.0 (SD 26.2)). However, the greater improvements reported in the TAA and AAA group did not meet the minimal clinically important difference thresholds. Overall, as perhaps would be expected, the TAA group underwent more reoperations than the AAA and OAA groups; however, revision rates were similar for all three groups. One of the enduring difficulties in interpretation of the outcomes in ankle arthritis studies is that the patient groups are somewhat different. The relatively narrow indications for ankle arthroplasty and the broader inclusion criteria for fusion make drawing inferences from cohort or data studies difficult. This is a relatively small study with two comparator groups and clearly there will be appreciable selection biases here. Nevertheless, what can be said from this data is that TAA patients are likely to do marginally better in terms of clinical outcomes than patients who have undergone open fusion. The interesting observation here, however, is that arthroscopic fusion appears to have similar functional outcomes to TAA, albeit in a small and highly selected series.

### Return to sports after first metatarsophalangeal joint arthrodesis

**X-ref**

■ First metatarsophalangeal joint (MTPJ) arthrodesis is the gold standard for the management of patients with end-stage hallux rigidus. However, surgeons often find it difficult to convince young patients that turning the first MTPJ into a stiff construct is unlikely to adversely affect their ability to take part in physical exercise. A common question often asked by the patient is: "I like to run; will I be able to run afterwards?" There is a lack of published evidence on which informed advice can be based. Here at *360*, we were delighted to see this paper from researchers in **New York, New York (USA)**, which aims to answer precisely that question with a retrospective study.[3] The patient cohort was gathered using a database search, which identified all patients aged between 18 and 55 years who underwent first MTPJ arthrodesis. The database spanned a period between October 2006 and December 2014 and, for inclusion, patients needed to have at least two years of follow-up. Patients who had concomitant metatarsal osteotomies, midfoot or hindfoot fusions, and inflammatory, systemic, or other musculoskeletal disease that would otherwise impact physical activity participation, as well as patients with malunion or nonunion after first MTPJ arthrodesis, were excluded. The authors identified 73 eligible patients, of whom 50 were available for follow-up as part of the study. Patients were emailed a sports-specific questionnaire that enquired whether they had participated in a range of low- and high-impact exercise, the number of sessions per week, the duration of each session, the time taken to return to sports, and the time taken to return to maximum activity. Patients also reported difficulty, if any, in engaging in physical activity compared to preoperative level, and whether resumption of physical activity was to their satisfaction. Overall,

the mean age of the respondents was 49.7 years (range 23 to 55), and the majority were female (n = 33) with a mean follow-up in this series of 5.1 years (2.2 to 10.2). Most of the respondents were highly or extremely active (28/50, more than five hours of exercise/week). Patients were reportedly more active in physical activities postoperatively. None of the activities performed preoperatively had to be abandoned and the ratio of low- to high-impact activities remained unchanged (34% high impact activities both preoperatively and postoperatively). It took around a year for 50% of participants to return to physical activity. Median time to return to physical activity was between six and nine months, and the median time to reach maximum physical activity was three months later. Although some physical activities were reported as more difficult, almost all participants (48/50) were reportedly satisfied with their ability to participate in physical activity. Functional outcomes here were assessed by the Foot and Ankle Outcome Score (FAOS), and demonstrated highly significant improvement in all domains. Patients who reported higher improvement in the symptoms subscore of the FAOS scale engaged in longer duration of physical activity after surgery. Since this is a retrospective study, with a ten-year delay between surgery and recall in some cases, a degree of recall bias is likely. Patients were included from a number of different surgeons with varying surgical technique and postoperative rehabilitation protocol, which may also have affected the results. Overall, however, the methodology here appears sound, and the decision to enrol patients from different surgeons with differing practices would give the results a wider external validity in the community of foot and ankle practice. We can say, with relative certainty, that there is a decent likelihood of return to sports following arthrodesis of the first MTP, and on average this takes between nine and 12 months.

### Is left-footed driving safe after surgery on the right foot?

Despite the promotion of public transport, driving remains an important mode of mobility for the vast majority of patients, be that for commuting to work, going shopping, or social activities. Therefore, patients will always want to know how soon they can return to driving safely following surgery. Some patients are so dependent on driving that they would even contemplate driving with the left foot if surgery is performed on the right foot. Left-footed driving appears unsafe on the surface, but is that really the case? Authors from **Birmingham, Alabama (USA)** have now come up with an answer.[4] The study consisted of two components. Firstly, the authors identified 588 patients in their institutional database who had undergone foot and ankle surgery in 2015. These patients were contacted and invited to complete a questionnaire on their postoperative driving habits. Secondly, the authors recruited 20 volunteer subjects between 18 and 85 years of age who were active drivers, had been driving in the three months prior to recruitment, did not report any medical contraindication to driving, and were not known to have had recent foot and ankle surgery or lower limb trauma. Of those contacted, 96 eligible patients completed the driving survey. Perhaps surprisingly, 38% (36/96) reported attempting left-footed driving. Most of these patients (58%, 21/36) had been instructed to remain non-weight-bearing for more than six weeks and represent a cohort of patients mostly including a large joint fusion. Two thirds of patients reported that they had attempted left-footed driving after the period of their recommended immobilization (22/36), but others attempted this during the prescribed immobilization period, when left-footed driving was performed at least once a week (n = 18) or even on a daily basis (n = 13). Driving episodes lasted more than 30 minutes for a sizable portion of this group (13/36). There were two patients (6%) who were involved in traffic accidents. The volunteer drivers participated in a simulated driving test. The arrangements were quite elaborate and designed to mimic normal driving as much as possible. Participants were able to view the full dashboard, operated the simulator using a steering wheel, and had to respond to driving hazards and street signs. The volunteers performed an initial test drive designed to eliminate the bias of unfamiliarity with the equipment. The test drive lasted for four miles. One week later, the participants repeated the simulated driving with the left foot while wearing a boot on the right foot. Interestingly, vehicular collision, as well as exceeding the speed limit, was more common while driving with the right foot than with the left foot. It is probable that the participants were more careful while driving with the left foot in the simulated environment. Driving reaction time to a stop signal was the same for left-footed and right-footed driving. However, both throttle release and time to full braking was more prolonged in response to a vehicular hazard while driving with the left foot. As the authors themselves point out, the study was probably underpowered and some of the other parameters that were found not to be significantly different might have been significant with a larger sample size. Only a small portion of the eligible patients responded to the survey, so the real-life driving behaviour may not have been reflected well. Attempted left-footed driving has not been investigated before and, if the results are replicated elsewhere, it may be more common than believed. Needless to say, anyone attempting left-footed driving while recuperating from surgery would not be covered by insurance in the event of an accident. However, this study also gives some objective data of the safety and feasibility of left-footed driving.

### Vitamin C for postoperative pain relief in foot and ankle surgery X-ref

Vitamin C is a water-soluble antioxidant that plays an important role in the synthesis of collagen. Scurvy due to vitamin C deficiency was a problem for centuries, until vitamin C started to be added to a range of food stuffs. Popular medicine holds that vitamin C is a treatment for almost anything, including the common cold. However, given this vitamin's ubiquitous presence in the human body, could it conceivably have any role in pain management? Investigators from **Delhi (India)** conducted a randomized placebo-controlled trial to assess analgesic requirements in patients having foot and ankle trauma surgery, and the role of vitamin C in reducing postoperative pain.[5] Healthy adults between 18 and 60 years of age presenting with isolated foot and ankle trauma were recruited. The reported elaborate exclusion criteria appear appropriate. Patients, surgeons, and researchers were blinded to the allocation received, and surgery was performed under spinal anaesthesia. Postoperatively, patients either received 1 g of vitamin C or identically shaped placebo for six weeks.

They were also prescribed diclofenac sodium and asked to record analgesics consumed for up to six weeks postoperatively. Follow-up was complete and there were no complications. All fractures healed. There were 30 patients in each group, most of whom sustained ankle fractures. There was no difference in demographic variables or injury pattern between the two groups. However, the group taking vitamin C reported significantly better pain relief (in terms of visual analogue scale score at one, two, and six weeks), despite having consumed fewer analgesics. This group also reported better functional outcome, assessed via the Foot and Ankle Outcome Score at three months. It is not clear if both groups were identical. Importantly, there is no information on smoking status or alcohol consumption, both of which might be confounding factors. It is also not clear if patients self-medicated with additional analgesics that may not have been recorded. The sample size was small and the follow-up was also short. Adequate pain relief in the postoperative period is essential for successful rehabilitation. The results of this trial would suggest that up to 1 g of vitamin C taken in the early postoperative period following foot and ankle trauma surgery may reduce regular analgesic requirements and may also lead to better functional outcome. The authors are to be congratulated for conducting a randomized controlled trial that appears methodologically sound. Previous studies have indicated that vitamin C may have a role in prevention of chronic regional pain syndrome, especially after distal radial fractures. Taking into account the role of vitamin C in collagen synthesis, it may well be that this vitamin has an adjunctive part to play in rehabilitation following musculoskeletal injuries that warrants further investigation. There is, however, a further consideration here in that this study was conducted in Delhi, where malnutrition is more common than in Europe or North America. It is conceivable that the patients were deficient in vitamin C prior to enrolment in the study, which in itself gives a reason for efficacy that may not be relevant in other populations.

### How common is gastrocnemius tightness in an asymptomatic population?

■ Gastrocnemius tightness (GT) has been implicated as part of the underlying pathophysiology in many foot and ankle conditions. However, the measure of GT or the prevalence in the general population is not well known. Authors from **Stanmore (UK)** conducted a population-based observational study to establish some normative criteria for GT.[6] For the purposes of this report, the authors included only healthy adults who were recruited between February 2016 and January 2017. Patients were excluded if they had known foot and ankle pathology, previous surgery, systemic musculoskeletal disorder, knee stiffness, or pregnancy. Although the Silfverskiöld test is widely used in clinical practice to assess for GT, the authors chose to use a lunge test. The purported advantage of the lunge test is that it is a weight-bearing test and therefore is more relevant to clinical practice. Further, the test has a reported high inter- and intrarater reliability. An a priori required sample size was calculated and 400 participants recruited for the study. Ankle foot dorsiflexion was measured, both with the knee extended and 20° flexed, using a digital inclinometer placed around the lateral ankle with the participants lunging against a wall. The authors initially assessed the inter- and intrarater reliability of the test by conducting multiple measurements on the first 20 participants. Having confirmed excellent reliability, the authors conducted the rest of the tests using a single measurement. The difference in ankle foot dorsiflexion between the fully extended and the flexed knee was calculated as the ankle-foot dorsiflexion index (ADI). Mean age of the recruited participants was 40.2 years (SD 13.1). The mean patient height was 1.68 m (SD 0.10) and the mean body mass index (BMI) was 25.4 kg/m² (SD 4.55). Different ethnic groups and occupations were appropriately represented. Ankle foot dorsiflexion varied from 8° to 52°. The distribution of the measured angles in both fully extended and the flexed knee followed a normal distribution. Mean ADI was 6.04° (SD 3.49°). Sex, BMI, and height did not affect ADI. However, mean ADI was found to significantly increase with age, and to decrease with participant-reported level of physical activity. This is certainly a useful large study and the results are of clinical relevance, inferring a wide variation in normal range of ankle foot dorsiflexion. The study also confirms the clinical assumption that both age and physical activity affect the values. However, the finding of reduced ADI with increasing physical activity is somewhat surprising. The authors did not offer a clear answer to this result, and it may well require further validation.

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# Wrist & Hand

### The outcome of bone graft surgery for nonunion of fractures of the scaphoid X-ref

■ Collaborative research has significant benefits, particularly when considering the results of less common pathologies. Therefore, we at *360* were interested to see this work from authors representing the British Society for Surgery of the Hand (BSSH) scaphoid nonunion group in **Nottingham (UK)**, who have compiled a large series of scaphoid nonunions in a multicentre service review.[1] Trainee representatives from 19 centres across the UK were tasked to contribute retrospective data on at least 30 scaphoid nonunions from their units. Eligible cases were defined as adults who presented with a scaphoid nonunion not associated with a perilunate dislocation, and in whom treatment was surgical for their nonunion, with greater than 12 weeks' postoperative radiological follow-up available. Overall, 806 cases were collated and submitted; however, 344 were excluded for failing to meet the above criteria, or for having incomplete data concerning the fracture pattern or type of surgery performed. This left 462 cases of scaphoid fracture