recovery from ACL reconstruction, but its long-term benefit remains to be seen.

Failure of matrix-assisted autologous chondrocyte transplantation in osteoarthritic knees X-ref

■ The treatment of osteoarthritis in the young patient remains a considerable challenge for orthopaedic surgeons due to the high demand of these patients and the low functional capabilities of joint arthroplasties. Cartilage regeneration procedures hold considerable promise, but have, to date, not met these expectations. This paper from **Bologna (Italy)** analyzed the effectiveness of salvage for discrete chondral defects using matrix-assisted autologous chondrocyte transplantation (MACT) in the knees of 41 young patients.[4] All of these patients presented with cartilage lesions of 4 $cm^2 \pm 2$ cm^2 in size (Kellgren–Lawrence grades of 2 or 3) and had a mean age of just over 40 years old. The mean follow-up reported here was 15 years from the procedure. Results indicated an initial improvement in subjective knee scores (International Knee Documentation Committee (IKDC), EuroQol visual analogue scale (EQ-VAS), and Tegner scores) followed by progressive worsening of reported outcomes over time. IKDC and EQ-VAS improved up to two years and then significantly deteriorated by the final clinical evaluation, while Tegner scores improved at all follow-up points but did not reach preinjury levels. Patients undergoing MACT with another procedure did worse than those undergoing isolated MACT. Patients considered a failure of treatment or who converted to total knee arthroplasty made up almost 60% of the total cohort by 15 years of follow-up. The authors concluded that the use of MACT as a salvage procedure for young patients with cartilage defects led to a limited and minimal improvement, with the majority being considered failures or proceeded to knee arthroplasty at long-term follow-up. While there are limited options to treat young patients with knee osteoarthritis, total knee arthroplasty is not ideal due to the high demands these patients place on the prosthesis. This investigation presents a relatively small cohort with significant cartilage defects and underlying osteoarthritic changes, which is a particularly challenging scenario. Salvage cartilage restoration procedures may continue to hold some promise in those with an isolated lesion in the setting of intact cartilage, but it would seem that MACT is unable to meet the demands of this population when the lesion is present with considerable osteoarthritic degeneration, making these questionable indications for this procedure.

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Foot & Ankle

X-ref *For other Roundups in this issue that cross-reference with Foot & Ankle see: Wrist & Hand Roundup 6.*

Symptomatic venous thromboembolic events are low in total contact cast immobilization

■ Total contact cast (TCC) is widely applied for the management of diabetic foot complications, providing a low contact stress and thereby offloading the pressure areas. Although the lower limb is immobilized in a cast, there is a crucial difference in this group of patients compared with the usual patients immobilized in a lower limb cast: these patients are allowed to weightbear fully. There is now accumulating evidence and increasing concern that the incidence of venous thromboembolic events (VTEs) in patients immobilized in lower limb cast is not negligible, and that they require individualized risk-benefit assessment to determine the need for chemical thromboprophylaxis. However, the incidence of VTE in patients managed with TCC is unknown. In this retrospective cohort, researchers from **Wirral (UK)** investigated the overall incidence of VTE in patients treated with TCC.[1] Patients with a TCC were identified from the institution's plaster room records. A "casting episode" was defined as any length of time for which the patient was treated in a below-knee cast. If there was an interval of two weeks between the removal of one cast and the application of a further cast, this was considered as a new casting episode. Patients' electronic, case, and radiological records were reviewed. VTE episodes were identified by hospital records within a year of treatment with TCC. In what is a small series, 45/145 patients were excluded due to lack of notes. This left 100 patients (136 casting episodes) between 2006 and 2018 included in the study. Neuropathic ulcer was the most common indication for TCC application (n = 88) followed by Charcot ulcer (n = 40). The mean length of TCC treatment was 45 days. None of the patients were offered chemical prophylaxis. As expected, many patients had multiple medical comorbidities (59). Despite this, the VTE rate was low; only a single patient (0.7%) was known to have developed VTE nine days following removal of TCC. The authors proposed that this low incidence might be related to the fact that, although the limb was immobilized, patients were allowed to weightbear and therefore recruited their calf muscles to some extent, thus reducing the risk of venous stasis. Here at 360, we are not aware of any other evidence for the rate of VTE in patients managed with TCC and, therefore, despite the very low numbers of patients, this is worthy of note. Clearly, some large studies to investigate the risks of VTE in patients in lower limb casts are required and stratification by risk factors is clearly also going to be important.

Low incidence of adverse effects following intra-articular steroid injection of the ankle and the subtalar joint

■ Intra-articular steroid injection is a useful tool and a workhorse in the treatment of various foot and ankle conditions, but there is little data regarding its efficacy or side effects. Although complications are rare, they can happen, and there is not enough literature for an informed discussion with the patient. In this paper from **Boston, Massachusetts (USA)**, the authors set out to investigate the potential for adverse effects following intra-articular steroid injection of the ankle and

the subtalar joint.[2] In their retrospective cohort, the study team report on the outcomes of 1708 patients receiving foot and ankle injections with or without radiological guidance. Their primary outcome measure was any documented complication occurring within 90 days following the injection. In all, 99 patients (5.8%) had 104 adverse events. Postinjection flare was the most commonly reported complication (n = 78) and was defined as a significant increase in pain up to ten days following the injection. Skin reaction was the second most common (n = 10). There were no cases of infection. Patients receiving subtalar joint injection were significantly more likely to report complications. There was no relationship between joint injections performed under fluoroscopic guidance and experience of adverse events. The cohort only included first-time injections, so one cannot comment on the rate of adverse events after multiple injections. However, the cohort was superficially representative of usual foot and ankle practice, with proportionate representation of diabetics, smokers, and overweight patients providing generalizable results. Patients with rheumatoid arthritis are fairly common in practice, and it is not recorded whether these are included in this series. There remains a valid concern, especially in those with disease-modifying agents, that risk of infection is higher than in the average patient. The authors do not report the extent to which patients reported pain relief after the injections; they simply report the complication rates associated with the treatment. In the absence of a pain diary or face-to-face interview maintained prospectively by the patients, it is probable that flare rates are underreported. The events recorded are likely to be those where postinjection pain was severe enough for the patient to report this and worsening, but it is probable that manageable pain was not reported. Nevertheless, the results of this study would help the foot and ankle surgeon to quote benchmark figures while engaging the patient in discussions for an informed consent.

How common is neuropathic pain in patients with foot and ankle symptoms?

■ A proportion of foot and ankle patients will demonstrate chronic pain behaviour that proves resistant to treatment. Just how many of these patients have neuropathic pain (NP)? This useful question is addressed by this study from **Philadelphia, Pennsylvania (USA)**.[3] Establishing the aetiology of pain is important in initiating the appropriate treatment. In one of a few prospective studies on foot and ankle pain symptoms, the authors here set out to investigate the prevalence of NP in patients undergoing foot and ankle surgery. Patients were prospectively recruited at the preoperative visit. Patients with suspected obvious nerve-related pain (tarsal tunnel syndrome, Morton's neuroma) were excluded. The investigators used the English version of the painDETECT questionnaire to assess for the presence of NP. PainDETECT, a nine-question instrument with a possible score between 0 and 38, is a validated patient-reported questionnaire that was originally developed in Germany to screen for NP. It has since been translated into a number of languages and has been validated as a screening tool for NP. Higher scores are more suggestive of NP; in this study, the authors considered a score of 18 or greater to be suggestive of NP. They report a large cohort of 533 patients, of whom 66 (12.4%) satisfied the criteria for reporting NP. Current smokers were significantly more likely to report NP symptoms. The authors also found that obese patients and patients who had previous surgery were more likely to report NP symptoms. Diabetes was not found to be a risk factor. Multivariate logistic regression undertaken by the authors identified current smoking, previous foot surgery, and ankle-level pathology as factors more likely to be associated with NP symptoms. Reported current pain level, average pain, and the strongest level of pain were all significantly higher in patients with probable NP symptoms (pain score 0 to 10, with 10 being the highest level of pain). The pain score may have been a visual analogue scale, although this is not clarified. The authors found that a reported current pain level of 7 or greater was predictive of NP symptoms, with a sensitivity of 70.3% and a specificity of 75.1%. Chronic pain is a difficult subject to understand, and it may be useful to remind oneself that there is seldom a clear cut-off in real life. It is more likely that patients with chronic symptoms have an overlap of nociceptive and neuropathic type pain. The results of this study would suggest that around one in ten patients with foot and ankle pathology may have a component of NP. This is more likely in current smokers, those with previous foot surgery, and ankle pathology. Furthermore, patients who report more severe pain score may also have NP symptoms. This should prove useful when considering treatment options.

Posterior malleolar ankle fractures: is open fixation the way forward? X-ref

■ Posterior malleolar (PM) fractures have traditionally been the poor cousin of ankle fracture management, having been relegated to the confines of conservative management for any fracture of less than a reported one-third size of the plafond. Recent evidence has challenged this received notion, and there has been a trend towards promoting open reduction and internal fixation (ORIF) for most PM fractures. Surgeons at Aintree Hospital in **Liverpool (UK)** have been at the forefront of this approach, and have also proposed a new classification scheme for PM fractures.[4] The Lyndon–Mason classification is not an isolated anatomical classification, but also considers the pathoanatomy of the ankle injury as a whole, and therefore suggests indicative treatment preferences according to the PM fragment size. This paper follows on from their previous work and attempts to validate the suggested treatment protocol. In this paper, the authors reported the functional outcome following operative management of PM fracture in line with their proposed classification scheme. The authors advise ORIF of the PM fragment in IIA injury (a Volkman's fragment) and ORIF of the posteromedial fragment first before fixation of the Volkman's fragment in IIB fractures (a Volkman's fragment with extension into the posteromedial tibia) to achieve anatomical reduction. Syndesmotic disruption was rare in type III (comminuted length unstable posterior column) injuries. All patients had CT scans to assess the type of PM fracture. Surgery was undertaken through a combination of posterolateral, posteromedial, or medial posteromedial approaches. This was a retrospective review and only included adult patients, who were followed up by postal questionnaire. Outcomes were assessed using the Euro-Qol five-dimensional (EQ-5D) questionnaire for overall health status and Olerud–Molander (OM) ankle score to assess ankle-specific performance. The authors reported 61 patients who were eligible for the study; however, only 50 patients completed the outcome score. There were 17 type I fractures, 12 type IIA, ten type IIB, and 11 type III fractures with an overall OM score of 74.1. The authors report that this is a significant improvement compared with a historical cohort from the same centre, where patients with PM fracture were mostly treated conservatively. They also suggest a trend of lower ankle score with higher fracture classification. Overall, the EQ-5D index at a year was 0.88, with a visual analogue scale health score of 77.5 points. The authors here limited themselves to reporting the outcome scores only; surgical complications, reoperation, morbidity, and radiological outcomes were not reported. These would have been useful in establishing the utility of ORIF for PM fractures, as posterior approach to the ankle is not without complications and is not yet the preserve of the general orthopaedic surgeon. Although the important role of PM fracture fixation is now well understood, whether all PM fractures require ORIF is still a matter of debate. Therefore,

here at *360*, we believe that the authors could have been more ambitious in their remit in reporting surgical complications as an integral component of patient outcomes.

Should we routinely investigate vitamin D level in elective foot and ankle patients?

■ Vitamin D has an important role in calcium homeostasis and healthy bone preservation, and there has been an increasing focus on its deficiency as a cause for a wide variety of musculoskeletal symptoms. The Chief Medical Officer of England recommended nearly a decade back that regular vitamin D supplements should be taken by at-risk groups. Patients undergoing elective foot and ankle surgery may often require osteotomy and/or a fusion procedure, and there is therefore a growing and potentially valid concern that these patients, if deficient in vitamin D, may demonstrate a suboptimal outcome. Researchers from **Northampton** and **Leicester (UK)** undertook a prospective observational study to ascertain vitamin D levels in patients undergoing routine elective foot and ankle surgery.[5] Overall, 577 consecutive adults presenting for elective foot and ankle surgery between October 2014 and March 2017 were included. The authors measured serum vitamin D at preadmission assessment. In terms of demographics, this was a representative foot and ankle population with a male:female ratio of 219:358, a mean age of 52 years, and an overwhelming majority of Caucasian patients (n = 541). The patient population were most commonly undergoing a fusion (n = 202) or osteotomy (n = 95). In terms of the focus of the study, this population had a mean vitamin D level of 52.3 nmol/l. As only 17.5% were within the normal range of vitamin D level, this paper makes for concerning reading. The rest of the population are deficient to a variable degree and 20% were significantly deficient. The authors attempted to identify the role of suspected risk factors and found that ethnicity, seasonal variation, and geographic location affected serum vitamin D level, but that age, sex, and procedure type did not. Unfortunately, although the study was conducted concurrently in two different centres, the laboratory indices were not standardized and the Northampton patients were recruited from private practice, whereas the Leicester patients were recruited from NHS practice. This variation could well explain the difference in geographical location. The authors did not record a number of factors that might have affected vitamin D level, such as obesity, medical comorbidities, and medications taken. All these factors are known to affect vitamin D bioavailability and ideally should have been recorded. The authors did not report incidences of delayed union and/or nonunion in the cohort and the clinical significance of deficient vitamin D in this cohort therefore remains unknown. Preoperative assessment is an integral part of our practice to optimize patient health and outcome. This study, despite its limitations, highlights the need to investigate vitamin D level as an indicator of bone health, especially in ethnic minorities in winter months, to optimize patient outcome.

Ultrasound in acute ankle sprains X-ref

■ Given that ankle sprains are one of the most common musculoskeletal injuries, it is surprising how little is known about treatment options or likely patient outcomes. Often, the diagnostic process is as simple as establishing that there is not a fracture visible on radiographs, with patients then treated as having an ankle sprain. There may be little further diagnostic effort applied to grading severity or to the specific ligaments involved, with patients then usually going down a rehabilitative pathway with or without splintage or support, depending on clinician preferences. This study from a team based in **Suwon (South Korea)** set out to evaluate if there is any utility in grading injury severity using ultrasonography, a practice that is becoming increasingly common.[6] The authors undertook a prognostic study using patients presenting with acute ankle sprains, and also recorded other potential prognostic factors such as age, sex, body mass index (BMI), current job, and sports activity. Somewhat disappointingly, there were only 28 patients available for review in this study. All had an acute ankle sprain and received a standardized clinical examination, radiographs, and ultrasound. The study team placed emphasis on reaching a specific ligament injury diagnosis, and they identified the nature of the ankle sprain prior to the patients undergoing a standardized conservative management pathway. At their final follow-up, which was a year after injury, clinical outcomes (as measured by the Foot and Ankle Outcome Score (FAOS)) were reported to differ significantly for injury severity, age, and BMI. The authors also reported that there were no significant differences in sex, job activity, and exercise levels. While this study is interesting in itself and understanding the injury that is being treated must be a positive move, here at *360*, we cannot help thinking that these results can be little more than hypothesis-generating. With just 28 patients in the group, trying to break the results down by any more than the simple observation that more severe grades of injury yield poorer clinical results is unlikely to be a valid observation.

Osteochondral transplantation to the talus under the spotlight

■ A reliable treatment for osteochondral defects of the talus– either traumatic or otherwise – is autologous osteochondral transplantation. The major disadvantage of osteochondral grafts, however, is the risk of donor-site morbidity. There are few studies quantifying the potential problems at the knee, so we were delighted, here at *360*, to come across this study from **Kyoto (Japan)**, which quantifies the occurrence of knee donor-site morbidity using a meta-analysis of published studies.[7] The authors undertook a form of sensitivity analysis in parallel with their meta-analysis, in order to establish the potential variation in estimates of risk of donor-site morbidity. The initial meta-analysis examined the proportion of patients experiencing donor-site morbidity in the best-case scenario (i.e. no patients lost to follow-up experienced problems), while a second analysis assumed the worst-case scenario (i.e. that all patients lost to follow-up had donor-site morbidity). In addition to these two meta-analyses, the authors also undertook an analysis of the characteristics of the included studies. The authors included papers reporting knee donor-site morbidity in patients treated for osteochondral lesions of the talus with osteochondral transplantation from the knee. Overall, 26 studies were reported in this meta-analysis, around half of which were of small cohorts. Disappointingly, 12 of the studies did not report loss to follow-up. The authors estimated that

there was a 6.7% incidence of knee donor-site morbidity at a mean follow-up of around two years. This estimate rises to 10.8% if all patients lost to follow-up experienced donor-site morbidity. There was an overall negative association between study sample size and proportion of donor-site morbidity. In the larger studies, around 2.8% experienced donor-site morbidity, rising to 5.0% when assuming that all patients lost to follow-up experienced donor-site morbidity. This is the most accurate estimate of donor-site morbidity in this diagnosis and serves to highlight not only the rates of donor-site morbidity, but also the poor rates of overall patient follow-up and unclear quantification of complications in this condition. More work is required here.

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Wrist & Hand

Bilateral scapholunate widening: is it important?

Both the aetiology and natural history of scapholunate (SL) interval widening are poorly understood, as is the risk of progression into carpal instability and scapholunate advanced collapse (SLAC wrist), with its classic pattern of arthritic change. When a patient with a painful wrist presents after trauma with a widened scapholunate interval, the natural assumption is that this represents an acute rupture; however, this may not be the case. It is widely recognized that the contralateral wrist can have the same abnormality. While the causes for this are unclear, other conditions such as ligamentous laxity and degenerative change are thought usually to be responsible. This study from **Ghent (Belgium)** sought to examine the prevalence of bilateral widened SL intervals in the absence of trauma, and to investigate if atraumatic SL interval widening would lead to instability and degenerative change.[1] The authors identified and reviewed 1000 radiographs of patients who attended clinic or were hospitalized for a hand or wrist problem over a four-year period. These patients all had bilateral radiographs, as the author's routine practice is to also image the contralateral hand simultaneously. Indication for radiographs, sex, age, and the presence of osteoarthritic change were recorded. A widened SL interval, defined as ⩾ 3 mm, occurred in 12% of wrists and bilaterally in 6.7%. Those patients with a widened interval also had measurements taken for carpal instability, defined as a radiolunate angle of greater than 90° or a scapholunate angle greater than 60°. In this cohort, 36% of patients with radiological signs of SL dissociation had a reported trauma, indicating that acute trauma in this study was not the main cause of dissociation. Where bilateral SL interval widening was identified, only 55% of these wrists had radiological evidence of instability, and the absence of instability was much greater in younger patients. The author, therefore, concludes that as younger patients with SL widening have instability and no arthritis, while older patients with SL widening generally have SLAC wrists, there is a firm causal progression from one to the other. Here at *360*, we would note that it is not possible to draw this conclusion from the evidence presented. In an ideal world, a huge longitudinal study could look at the development of SLAC more closely, but such research is unlikely to ever be performed. This paper does remind us, however, that a widened scapholunate interval may be bilateral and/or non-traumatic in aetiology, and should be interpreted with caution.

Immediate MRI in the management of patients with scaphoid fracture: is it worth it?

Scaphoid fractures are a notorious area for litigation. If the injury is not identified and the wrist is not immobilized, the patient may develop a nonunion that requires surgical intervention. The patient may then litigate for both the longer period of discomfort and the need for surgery. For most scaphoid fractures – and especially instances in which they are missed – the presentation is usually relatively subtle, and the radiological interpretation of undisplaced fractures is difficult. Indeed, it might be cheaper, once the litigation cost is accounted for, to place any wrist with a history of trauma straight into an MRI scanner. Many authors have questioned this approach, however, as incidental pathologies may be diagnosed. This could lead to unnecessary overtreatment and, sometimes, perhaps we must accept that some fractures will be missed. In this study from **London (UK)**, the authors investigate this problem with an emphasis on cost analysis.[2] The authors ask which approach results in reduced costs to both the patient and the treating department. Patients with a suspected fracture who had initially normal radiographs were randomized to either immediate MRI or standard immobilization, with clinical follow-up and the potential for imaging at a later stage. The mean patient age was 37 years and the primary outcome was total cost impact at three months following enrolment. Diagnostic accuracy, patient satisfaction, and total cost impact were also assessed at six months. At three months, the difference in costs was neutral; however, they were significantly different by six months in favour of the early MRI arm, with better quality of care through earlier diagnosis. Interestingly, there was no significant difference in days off work between the two groups, as the increased number of other injuries picked up by the MRI led to immobilization for other causes. The act of studying scaphoid fractures in a department may well increase overall awareness and introduce a bias away from normal practice, in which case we will never know if any scaphoid fractures were missed by the hospital during this period. Overall, this is an excellent paper demonstrating improved satisfaction, care, and reduced cost with immediate MRI scans. This will surely be a good lever to change and a step towards the standardization of practice elsewhere.