treatment eligibility for patients with patellofemoral arthritis requiring arthroplasty in future.

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Foot & Ankle

X-ref *For other Roundups in this issue that cross-reference with Foot & Ankle see: Research Roundup 5.*

Haemoglobin A1c as a predictor of post-operative infection following elective forefoot surgery

It is well documented that diabetes is a significant risk factor for post-operative wound infection in foot and ankle surgery. The glycated haemoglobin (HbA1c) test is used as a marker of the long-term glycaemic status in diabetes, with an elevated level representing poor control. It is accepted that an elevated HbA1c is a risk factor for complications in diabetes, and there have been a number of studies examining the potential risk elevation for diabetic patients following surgery, based on their HbA1c levels. In this study from a group in **Charlottesville, Virginia (USA)**, the study team used insurance database records, which were analysed for patients with diabetes who underwent elective primary forefoot surgery.[1] Patients in whom a HbA1c test had been performed within three months of the date of their surgery were then selected. In those with multiple results, the result taken at the timepoint closest to the date of their surgery was included. In total, the records of 4630 patients were analysed to form the basis of this study. The patients were then grouped according to their recorded HbA1c result. Subgroup analysis was undertaken by stratifying patients into HbA1c increments of 0.5 mg/dl, commencing at a group with < 5.49 mg/dl up to a final group with > 11.5 mg/dl. Surgical site infection (SSI) data were extracted and analysed from the insurance database records, and patients were included who were at least one year post-surgery to ensure data capture was complete for all early and late infections. Data were then stratified into the groupings relative to HbA1c levels. The overall SSI rate was 3.73% in this study. The authors used a fairly thorough regression analysis to control for patient demographics and comorbidities. They established that patients with a HbA1c level of 7.5 mg/dl or higher had a significantly higher risk of subsequent SSI than those with a level that was below this threshold. Poor glycaemic control in the period surrounding forefoot surgery is a risk factor for SSI in this series, and this seems to fit with clinical observations. This study, through the size of the sample, enables us to advise our patients of the increased risk of SSI after forefoot surgery, and both provides a threshold for glycaemic control upon which a significantly increased risk can be advised, and underlines the importance of tight glycaemic control in patients with diabetes undergoing forefoot surgery.

Driving after hallux valgus surgery

"When is it safe to return to driving after hallux valgus surgery?" is a question commonly asked by our patients in clinic. It is a requirement that patients can demonstrate that they are in control of the vehicle at all times, and clearly ideal if they don't do any harm to their recently osteotomised first ray. A research group from **Philadelphia, Pennsylvania (USA)** carried out the now familiar post-operative driving study on patients following right-sided first metatarsal osteotomy.[2] Their aim was to establish at what stage in the post-operative phase the patients returned to a brake reaction time (BRT) comparable with that of a control group. In total, 60 patients were included in the study with a mean age of 52 years. Distal metatarsal osteotomy was performed in 24 patients and proximal osteotomy in 36 patients. At six weeks post-surgery, patients completed a driver readiness survey, along with a Visual Analogue Scale (VAS) for pain. They then also completed the BRT test using a reaction time tester. This is a validated commercial device consisting of an accelerator and brake pedal, a handheld control unit, and a red and green light system. The subject was instructed to press the accelerator pedal until the green light came on. They must then fully apply the brake pedal immediately upon seeing the light turn to red. A mean of three tests was taken as representing the BRT. The highest recorded time in the control group (0.85 seconds) was considered the minimum acceptable BRT by the investigators. Patients who failed to achieve a time below this were brought back each week for repeat testing until they achieved this time. At the first assessment, six weeks post-surgery, 85% of patients achieved a BRT below the minimum accepted time and were deemed safe to drive. There was no difference in the rates of pass *versus* fail at six weeks in the distal or proximal osteotomy groups. At six weeks, the driver readiness survey proved to be a reliable indicator of the ability to pass the BRT test. When asked, "Based on what I think my braking reaction time is, am I ready to drive?", all patients who answered "agree" or "strongly agree" went on to pass the test. Of the patients who failed their BRT, eight of nine returned for re-testing. Three patients returned one week later while five patients chose to return after two weeks. All patients passed the BRT on that visit. Based on this study, it seems reasonable to advise patients that a return to driving is safe at eight weeks following metatarsal osteotomy for hallux valgus correction. It also seems that patients themselves do know when it's safe for them to return to driving.

Union after first metatarsophalangeal joint arthrodesis

Fusion of the first metatarsophalangeal joint (MTPJ) is well established and is the benchmark operation for patients with hallux rigidus. It is also a treatment option of other pathologies, such as severe hallux valgus and inflammatory arthritis affecting the forefoot. Although surgery is usually successful and high union rates of > 90% are often quoted, there is a variety of slightly different techniques, and, in those patients who go on to develop a nonunion, a poor outcome can be expected. Although there is a wide range of both surgical techniques and outcome series reported, we haven't seen a recent systematic review rounding up what is known on this topic. In a systematic review of the literature, a team from **Leicester (UK)** present an excellent summary of the state of play with fusion rates for first MTPJ arthrodesis as their endpoint.[3] The authors examine the effect of joint pathology, surface preparation, and fixation methods on eventual successful fusion. Their aim is to provide an overall rate of union, as well as to identify any factors in either pathology or surgical technique that may affect the overall fusion rate. The review team undertook a thorough literature review and identified all of the relevant human studies from 1990 onwards that reported on first MTPJ arthrodesis in the English literature. A total of 26 studies met the criteria, which reported the outcomes in a total of 2059 feet. The overall reported union rate was high at 93.5%. The union frequency was significantly higher when low-velocity joint preparation was used (hand tools, curettes, rongeurs) compared with power tools such as saws, burrs, and ball-and-socket reamers. Union frequency was also significantly higher when the primary pathology was hallux rigidus. There were similarly high union rates when fixation was performed with crossed screws, locking plates, and non-locking plates. It appears that high rates of union are to be expected in first MTPJ fusion. They are especially high when low-velocity joint preparation is used in patients with hallux rigidus.

The impact of ankle arthrodesis on returning to sports

Ankle arthrodesis remains a popular option with patients and surgeons alike in the treatment of ankle arthritis. The advantages of a reliable lifelong solution to a painful and debilitating condition are attractive to patients. For some, however, there are concerns about the achievable functional level with a stiff ankle, which is potentially a major draw of ankle arthroplasty. Although it is widely known that a well-performed arthrodesis furnishes a functional result that is entirely satisfactory for day-to-day life, what isn't quite so clear is what impact arthrodesis has on slightly higher-demand patients, and in particular those who want to return to sports. Investigators in **Nijmegen (The Netherlands)** have questioned the implications for patients of returning to sports following ankle arthrodesis.[4] They report the functional outcomes of 185 patients who were retrospectively assessed with the Foot Function Index (FFI), Visual Analogue Scale (VAS) for pain, and the Foot and Ankle Ability Measure (FAAM). In addition, the authors collated data surrounding sports participation and complications. The patients were followed up to a mean of eight years following their arthrodesis. As would be expected, the clinical scores (FFI, VAS, and FAAM) all significantly improved following surgery. What was perhaps somewhat unexpected was the high level of sports participation achieved by the patients, with 80% undertaking sporting activities of some form prior to the onset of arthritis, and a surprising 69% returning to sports post-operatively. In terms of activity levels, 73% were able to hike, a small proportion were able to sprint (14%), and 17% could run a distance of around 60 metres. We were surprised by the excellent results these patients achieved in terms of sports and activity levels following surgery, with the majority able to undertake light exercise for a moderate distance. However, very few patients achieved any high-intensity exercise following their surgery, and no patients could run farther than 1 km.

Ankle arthroplasty in the stiff ankle?

One of the great unanswered questions in ankle arthritis is "What are the indications of ankle arthroplasty in patients with a stiff ankle?". The Foot & Ankle Group in **Dallas, Texas (USA)** turned their attention to this difficult problem.[5] The authors note that the two competing approaches (arthroplasty and fusion) have very different effects on the biomechanics of the foot and ankle. Traditionally, ankle arthroplasty has been thought of as a motion-sparing rather than a motion-producing procedure and, as such, has not really been considered an option in ankles that are already stiff. There are obvious potential advantages of ankle arthroplasty over fusion, including sparing of the subtalar joint from arthrosis, and maintenance of more normal gait biomechanics over fusion. However, these benefits are debatable in their magnitude, and should be offset against the downsides of long-term longevity and difficulty of revision. The current study investigates the hypothesis that there would be improvements in parameters of gait with ankle arthroplasty, even in patients with a low degree of pre-operative total sagittal range of motion. The authors conducted a retrospective review of 67 patients who underwent total ankle arthroplasty for end-stage ankle arthritis and in whom over a year's worth of follow-up data was available. The authors recorded a variety of demographic, surgical, and gait analysis

data, with the aim of establishing the determinants of a more normal gait using multivariate analysis. As perhaps would be expected, a greater degree of pre-operative sagittal range of motion was predictive of greater post-operative sagittal range of motion. What is most surprising, however, is that patients with limited pre-operative range of motion experienced a greater overall improvement in range of motion, as well as clinically meaningful absolute improvements in range of motion, and other parameters of gait. The authors conclude that "On one hand, a low preoperative range of motion resulted in a lower absolute postoperative function. On the other hand, patients with stiff ankles preoperatively had a statistically and clinically greater improvement in function as measured by multiple parameters of gait." It certainly seems to us here at *360* that, based on these results, we may need to think again about the supposition that pre-operative stiffness precludes ankle arthroplasty, as here there are marked benefits to report.

Asking the right questions in outcome measures

It has been our view, here at *360*, that too much time and effort cannot be spent in ensuring that the outcome measures we have come to rely on are sensitive enough, specific enough, and consistent enough to measure adequately the interventions we wish to compare. As a profession, we are at risk of hiding

the benefits of our surgical interventions in ceiling effects, or scores that are not responsive enough to distinguish between treatments. As healthcare funders and patients are becoming 'outcome-score savvy', so we need to ensure these scores are fit for purpose. We were delighted to see this study from **Vancouver (Canada)** that set out to examine the Ankle Osteoarthritis Scale (AOS) from a psychometric perspective and then revise the questions to optimise the effectiveness of the score by removing redundancies.[6] The authors used a split sample approach, with 380 patients treated with total ankle arthroplasty or arthrodesis to evaluate the AOS and propose a refined instrument. The authors established, using correlation analysis, that a number of questions on the AOS were highly correlated with other similar questions, were frequently incomplete, or showed little variation between respondents. Eight of the original AOS questions were utilised in the newly proposed Ankle Arthritis Score (AAS). These were three from the AOS pain subscale and five from the disability subscale. These authors conclude that their newly proposed AAS is both shorter than the AOS and has improved psychometric properties. The problem, of course, is that this remains a 'proposed' score and further investigation is required to determine the potential for clinical utility.

Responsiveness in patient-reported outcome measure scores

■ Sticking with the topic of outcome measures, a second worthwhile paper caught our attention here at *360*. This time, investigators in **Malmö (Sweden)** have conducted an analysis to establish the responsiveness and minimally clinically important change (MCIC).[7] The MCIC is a crucial piece of information to establish with any patient-reported outcome measure (PROM), and all too often we don't know it. The MCIC establishes the threshold at which a change in value of a particular score, for a particular diagnosis, is perceived to be clinically relevant by patients. This particular study involves the Self-reported Foot and Ankle Score (SEFAS) which is the PROM used in the Swedish National Registries. The authors included patients with both forefoot (n = 83) and hindfoot or ankle pathology (n = 80). Scores were collected pre-operatively and at six months following surgery, along with a patient global assessment (PGA) scale (used to establish the MCIC). The authors then used a dual method to establish the MCIC, investigating the median change scores in improved patients on the PGA scale and using receiver operating characteristic (ROC) curve analysis to establish the 'best cut-off point'. Both forefoot and hindfoot cohorts had the same change in overall score (of nine points) between pre- and post-operative scores. Both methodologies for calculating the MCIC yielded a value of five points, and the measurement error calculations undertaken by the study team established that this was well above the measurement error of 2.4 points. In what is a very thorough investigation, the study team have established that an MCIC of at least five points is required in order to consider any change significant.

Swedish total ankle arthroplasty registry outcomes

■ The Scandinavians have long led the field in total ankle arthroplasty (TAA), with the Scandinavian Total Ankle Replacement (STAR) a well-established prosthesis. However, although ankle arthroplasty continues to gain traction, albeit slowly, in the treatment of end-stage arthritis of the ankle joint, there are few large-scale studies to support its use. We were delighted to see this report from **Malmö (Sweden)** that reports the outcomes of the Swedish Ankle Registry, a registry that includes patient-centred outcomes in the form of the EuroQol-5D (EQ-5D), Short Form 36 Health Survey (SF-36), and Self-Reported Foot and Ankle Score (SEFAS).[8] The Swedish registry recorded 241 ankle arthroplasties in an eight-year period, which is just 30 per year nationally. However, on the whole, this does represent a large series of arthroplasties. Outcomes were assessed pre-operation, post-operatively, and at two years of follow-up. Satisfaction levels were mostly high (71%) although some patients were dissatisfied (12%). Overall, SEFAS and other measures improved significantly from the pre-operative point to two years post-operatively. There were some obvious correlations between functional scores and age/satisfaction scores but no apparent differences between prosthesis design, diagnosis, or functional scores. This is one of the first large-scale reports of ankle arthroplasty. As the other major joint registries start to report long- and mid-term outcomes of ankle arthroplasties, it is certain that we will learn more about how these prostheses perform in the medium and longer term.

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Wrist & Hand

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

Radiotherapy in Dupuytren's disease: a systematic review of the evidence

■ Although much is known about Dupuytren's disease from the interesting epidemiological aetiology (genetically propagated across Northern Europe by the Vikings), we understand a limited amount about the matrix biology that drives the process. We also know that patients do not need treatment if they have no symptoms, yet a proportion will progress and then develop symptoms. The ideal treatment is one that