

X-ref For other Roundups in this issue that cross-reference with *Knee* see: *Children's orthopaedics Roundup 1*; *Research Roundups 1, 5 and 6*.

Dexamethasone and knee arthroplasty

■ One thing that most patients have in common when they undergo a total knee arthroplasty (TKA) is that they suffer from acute surgical pain in the post-operative period. The mainstay of pharmacological relief is opioids, however, the side effects of nausea, vomiting, sedation and constipation, as well as ineffective pain relief, have led to the use of a multimodal approach in the majority of centres to relieve pain following a TKA. The inability to control post-operative pain is not only distressing for the patient but can affect the patient's surgical outcome, increase the patient's hospital stay and may affect their ability to complete their post-operative rehabilitation. Dexamethasone is a long-acting glucocorticoid that has an anti-inflammatory effect by inhibiting peripheral phospholipase which reduces the pain-aggravating products from the cyclooxygenase and lipoxygenase pathways. They also inhibit cytokine gene expression and other pain mediators, thereby reducing pain secondary to inflammation. With a half-life ensuring efficacy for 48 hours, dexamethasone potentially has a lot to recommend it as a peri-operative analgesic adjunct. On the flip side of the coin are concerns about steroid use and stress ulcers in the peri-operative period, combined with concerns about immunosuppression in the knee potentially leading to higher infection rates. Previous research reports the effectiveness of dexamethasone in reducing pain following a number of general surgical procedures. Previous studies in TKA have involved multiple doses

of dexamethasone being administered peri-operatively whereas these authors from **Flint, Michigan (USA)** set out to establish the effect of their protocol in the context of a single 8 mg dose of dexamethasone.¹ This retrospective comparative cohort study reports the outcomes of a 55-patient treatment group (who received dexamethasone) and a 47-patient standard care group. There were no differences in anaesthetic type between the two groups, and the primary outcome measure was oral opioid use within three days of operation. The dexamethasone treatment group required a significantly smaller quantity of oral opioids throughout the three-day period and reported lower pain scores at 24 hours. This is the first study to focus on the use of a single pre-operative dose of dexamethasone, however, in common with many other studies in orthopaedic surgery, it is let down by its methodology. It was a retrospective non-randomised study. There are now a number of studies suggesting the potential of dexamethasone to reduce pain following a TKA, and a proper randomised study is certainly warranted before this technique becomes more widespread, especially given the potential for adverse effects.

Patient-specific instruments in TKA: a systematic review and meta-analysis

■ TKA satisfaction scores are good but are consistently eclipsed by those of hip arthroplasty. For the patient and surgeon alike, it is disappointing when expectations are not met, not to mention the socioeconomic impact that this may have. Dissatisfaction is a complex multifactorial problem, however, there has been some focus on component alignment as a potential cause. Patient-specific instrumentation (PSI) is said to allow more accurate component

alignment, coupled with reduced operating time and facilitating work flow in the operating theatre. Cross-sectional MRI or CT imaging is used to develop a 3D model of the patient's anatomy and produce disposable pinning or cutting blocks which are used intra-operatively to align the components correctly. While meta-analyses have been published before on the subject, they did not include more recent studies, and the authors were keen to include those in order to obtain a more representative impression of how successful PSI has been in improving TKA outcome. A review team in **Brussels (Belgium)** and **Männedorf (Switzerland)** undertook the mammoth task of reviewing the literature for PSI.² They identified a total of 44 studies reporting 2866 TKAs that used PSI and 2956 that used standard instrumentation. Interestingly, there was a significantly higher probability of malalignment with the use of PSI for the tibial component in the sagittal plane but a lower probability of femoral component malalignment in the coronal plane with PSI, which translated into an important 30% greater chance of tibial component malalignment with PSI compared with standard instrumentation. This meta-analysis revealed a slight advantage regarding blood loss (perhaps due to the lack of intramedullary instrumentation) and operative time. There were six studies that reported enough data for meta-analysis of the post-operative Knee Society Score, demonstrating a significant, although marginal, improvement in the functional component of the score in the PSI group. Similar to previous meta-analyses, this study struggled with the heterogeneity of the data and a possible publication bias, however, it is the largest study of its type to date. It did show that PSI is associated with

an increased risk of tibial component malalignment and, similar to previous studies, there was no evidence that PSI is associated with an improved clinical outcome. There is therefore little evidence to support the routine use of PSI in standard primary TKA, however, it does have its uses. For patients with previous femoral shaft fracture or severely abnormal femoral geometry, PSI may have a role.

Robotic-assisted medial unicompartmental knee arthroplasty

■ In the never-ending quest to improve surgical outcomes through improved accuracy of component position, there has been a push from implant companies to develop technology to improve accuracy of component positioning. Three technologies continue to be developed and pushed hard, namely computer navigation, patient-specific instrumentation and, on the even more expensive end, robotic-assisted surgery. Arguing that a key determinant in outcome for unicompartmental knee arthroplasty is the accuracy of surgical approach, authors in **New York, New York (USA)** have published their multicentre study reviewing the outcomes of 1135 patients who underwent robotic-assisted TKA.³ There were outcome data available for 909 knees at an average of around 30 months of follow-up. Of those available for review, there were 11 known knees reported as revised (98.8% survival). In the worst-case scenario, where all 35 who declined participation had failed, the survival would be 96%. These results in the best case are better than the vast majority of published series and, especially given the size of this cohort, it does give one pause for thought. Although robotic-assisted surgery



has never been seen to have much of an advantage here at 360, given that we now know unicompartmental knee arthroplasty perhaps isn't an operation where the implant tolerances are particularly lax, this paper certainly gives some pause for thought.

Open or arthroscopic in acute septic arthritis

■ Septic arthritis of the native knee joint is a relatively common condition which is difficult to treat. The extensive synovial folds of the knee provide plenty of space for the bacteria to adhere, and the relative avascularity of the meniscus and chondral cartilage often does not lend itself to successful treatment with systemic antibiotics. The debate surrounding aspiration, arthroscopic washout and open washout has yet to be settled, with many papers being clouded by selection biases, difficulties with sample size and confounders such as numbers and type of bacteria. Although also confounded by potential selection biases, this paper from **Newcastle (Australia)** definitely significantly adds to what we already know.⁴ The authors report the outcomes of patients with acute native knee septic arthritis (166 knees treated). The series consisted of 123 knees which were treated arthroscopically initially, and 43 with open debridement in a single institution. There were important differences between the groups in terms of success

rates, with 50% of the arthroscopic debridements requiring a second operation as compared with 71% of the open debridements. Clearly, there is potential for significant selection bias here, and the cynical among our readers will be decrying the results as surely only the most badly infected, or the most delayed presentations, would have a primary open washout in the first instance? There isn't really enough detail as to how the patients were assigned to one group or another to be certain. Nonetheless, there is an important message in the regular need for second or even third washouts to clear established infection. This is an important reminder to surgeons to keep looking at the patient even after they've had a washout as often another is required. The authors did attempt to allow for any potential confounders and the superiority of an arthroscopic procedure persisted even after adjustment for potential confounders by multivariable analysis, with an odds ratio of 2.56.

Predicting dissatisfaction following TKA in the young

■ We have already touched briefly this month on the difficulty of the dissatisfied TKA patient, with strategies for improvement in other papers focusing on accurate component position. In an excellent paper from **Edinburgh (UK)**, the authors focus instead on the age-old practice of 'picking winners'.⁵ We all know it when we see one, that patient who will do incredibly well, just as we know the patients protesting a 'high pain threshold' have anything but. This paper focuses on the assessment of 177 serial TKAs undertaken in 157 consecutive patients under the age of 55 years. The core of this study is the collation of demographic information (age, gender, body mass index (BMI), social deprivation), diagnostic information (indication, range of movement, Kellgren-Lawrence grade) and surgical details (prior knee surgery, implant), as well as attempting to predict the likely functional outcome (as measured by

the Oxford Knee Score and SF-12). Pre- and post-operative scores, along with one-year outcome scores, were available. There was a range of factors that appeared to predict dissatisfaction following surgery, including low Kellgren-Lawrence grade, low pre-operative Oxford Knee Score, previous surgeries, high BMI and post-traumatic arthritis. Although the authors included a multivariable model for outcomes, this was of little use to the study question as they included change in pre- and post-operative functional scores which remained independently predictive of dissatisfaction. However, clearly this is not a co-variate as the improvements in self-reported functional scores and satisfaction are likely to be dependent. Perhaps the most helpful message here is to avoid offering TKA to patients with Kellgren-Lawrence grade I or II osteoarthritis, as the dissatisfaction rates are around 60%.

Six-week return to full weight bearing after MACI X-ref

■ Surgeons in **Crawley (Australia)** have taken a second look at the rehabilitation protocol following matrix-induced autologous chondrocyte implantation (MACI).⁶ The current best practice in the majority of units throughout the world is very much on the conservative side. The study team established that the current 'best practice' available in the literature was eight weeks to return to full weight bearing. Reasoning that a more aggressive protocol of six weeks may not confer any disadvantages in terms of graft complications but could benefit patients in terms of a more rapid return to weight bearing, the authors chose to compare the two rehabilitation protocols. Although this paper is presented as a 'Level 1' randomised controlled trial, the surgical team were only able to allocate 35 patients to either their accelerated six-week protocol or eight weeks. The conservative group (n = 19 knees) were compared with the accelerated group (n = 18). Outcomes were assessed at regular

intervals, up to two years following surgery, using functional scoring (Knee Injury and Osteoarthritis Outcome Score), quality-of-life scores (SF-36), a VAS pain score and functional testing (six-minute walk test, range of motion and isokinetic dynamometry). In addition, MRI scanning was undertaken and a composite score produced. Overall, the patients reported improved outcomes in the functional scores and objective functional testing, with both groups ending up significantly better than their pre-operative scores. Although the authors do attempt to suggest some advantages of the early motion group, given the number of outcome measures they have, and the small numbers of patients, this should be viewed with some suspicion. On balance, this paper suggests that there are no significant problems if you allow early weight bearing. Although presented as an RCT, given the low power it really cannot be considered a definitive study, but is rather more a pilot.

A kinematic explanation for post ACL rupture arthrosis

■ There are some interesting theories as to why anterior cruciate ligament (ACL) injury results in early arthrosis of the knee. The fact that it does so is widely accepted. However, ACL reconstruction has never been shown to reduce the longer-term incidence of arthritis in injured knees, and it is far from clear what the causes of this arthrosis are. This engaging paper, which crossed the editorial desks here at 360 HQ, set out to establish what the ins and outs are of the kinematics of an ACL injured knee, and whether this alone could result in early arthrosis. The investigators from **Stanford, California (USA)** have published the results of their investigation aimed at establishing the centre of rotation in the knee following ACL injury and reconstruction using the uninjured knee as a control.⁷ The study team were able to recruit 26 patients, all of whom underwent

gait analysis and completed a Knee Injury and Osteoarthritis Outcome Score (KOOS) at both two and four years following unilateral ACL reconstruction. The gait analysis was used to establish the knee centre of rotation. There were (as perhaps might be expected) marked differences between the two knees. The reconstructed knees demonstrated greater medial compartment motion and pivot, in addition to having a more lateral centre of rotation. The centre of rotation was more anterior in the reconstructed knees, although this did start to normalise with time, moving more towards normal by the four-year follow-up in the coronal plane. However, the sagittal centre of rotation worsened over time in 38% of patients, and the increasing anterior position of the centre of rotation demonstrated a negative correlation with KOOS scores, i.e. the more anterior the centre of rotation, the poorer the functional scoring. This is an extremely thought-provoking paper that attempts to quantify what surgeons have accepted innately: that, even with reconstruction, knees following ACL injuries do not have normal function and this likely leads to early-onset osteoarthritis.

However, they have done an excellent job of looking at the science of why post ACL injury patients get post-traumatic OA and what exactly are the abnormal kinematics.

Arthroscopy in the year prior to TKA?

■ The future is not exactly bright for arthroscopy in the older patient group. The latest randomised controlled trials do not appear to favour arthroscopy for the ‘tidy up’ that used to be so commonplace in eking out a patient’s life before TKA. However, many surgeons still offer the option, and with randomised studies suggesting no benefit, this series from **Preston (United Kingdom)** adds some valuable information to what is already known.⁸ The authors ask: does knee arthroscopy within the year of surgery do any harm to outcomes following TKA? These authors undertook a retrospective review of 186 patients, all of whom underwent TKA within a year of arthroscopy, over a four-year period. The Oxford Knee Scores in this cohort were then compared with a reference cohort of 1708 patients who had undergone TKA in the same department in a similar time period. The take home message from this paper is that the arthroscopy

group had a significantly lower Oxford Knee Score than the non-arthroscopy cohort (32.8 vs 36.3), and a high re-operation rate at 14%. This seemed to translate also into a higher revision rate, with an early revision rate of 3.8% versus 1.6% in the arthroscopy group. This effect was not seen in patients who had arthroscopy six months, or more, prior to the TKA. Although there is no causal link established in papers like this and the comparator group is, by definition, a different group (as the treating surgeons did not think arthroscopy was indicated for the year preceding surgery), it does raise a big question. Given that when randomised trials such as this do not suggest any improvement in mid-term outcomes from arthroscopic debridement of the degenerate knee, we do have to ask whether patients who are likely to need a knee arthroplasty should undergo arthroscopy at all. Furthermore, perhaps they should not be offered knee replacements within six months of a previous arthroscopy.

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Foot & Ankle

X-ref For other Roundups in this issue that cross-reference with *Foot & Ankle* see: **Trauma Roundup 6; Research Roundup 5.**

Mid-term results of the “Cartiva” first MTPJ hemiarthroplasty

■ Advanced arthritis of the first metatarsophalangeal joint (MTPJ) continues to provide us with a treatment challenge, and the traditional “gold standard” remains, for many an arthrodesis of the first MTPJ, a reliable operation with a known

complication rate which has served well for many years. The inevitable sacrifice of joint motion associated with fusion, however, is not appealing to all patients, and, as such, surgeons and device manufacturers continue to search for reliable options offering a better functional result. Although the first MTPJ replacements have not had a terribly successful history, there are advances in technology which, combined with a greater understanding of the pathophysiology of the first MTPJ,

have resulted in some newer and more innovative solutions. One of these is the Cartiva implant. The Cartiva synthetic cartilage implant (Cartiva, Inc., Alpharetta, Georgia) is a hydrogel implant, engineered to closely replicate the tensile and compressive properties of human articular cartilage. It is implanted into the first metatarsal head with the aim of being a joint-preserving procedure for treatment of advanced arthritis of the first MTPJ. In 2016, a prospective multicentre randomised clinical

trial published evidence of equivalent results when compared with arthrodesis of the first MTPJ in terms of pain relief and functional outcome at two years’ follow-up, and was reported in 360. The Canadian centres led by **Vancouver (Canada)** that formed part of that initial trial have presented the mid-term five-year results of the Cartiva cohort of patients.¹ As this was an early reported study of the 68 patients who originally received the implant, 29 had reached five-year follow-up.