

ROUNDUP³⁶⁰

Knee

For other Roundups in this issue that cross-reference with Knee see: [Hip & Pelvis Roundup 2](#); and [Oncology Roundup 2](#).

Microfracture equivalent to OATS

■ Osteochondral defects are a difficult condition to treat, with patients presenting with debilitating symptoms and longer-term comparative outcomes not clear between the various treatment options. Investigators from **Lørenskog (Norway)** have reported their study which aimed to determine the longer-term outcomes of microfracture *versus* the osteochondral autologous transplantation (OATS) mosaicplasty procedure.¹ The researchers report a randomised control trial establishing the long-term functional and radiological outcomes of 25 patients, randomised to one treatment or another at a mean follow-up of nearly ten years. All patients were recruited with full-thickness chondral lesions of the femur and treated with either microfracture (n = 11) or OATS (n = 14). Patients were followed-up using the Lysholm and Knee Injury and Osteoarthritis Outcome Score as the measures of clinical outcome. A more objective assessment of quadriceps and hamstrings strength was also recorded as a secondary outcome measure. The clinical outcomes were no different between the groups at long-term follow-up, with mean Lysholm scores of 69.7 and 62.6 in the OATS and MF groups, respectively. Despite being a long-term outcome study of two different randomised interventions, this

study does not really shed any light on which intervention is better. There is, however, no evidence presented here to favour one intervention over the other.

Examination better than MRI in predicting hamstring re-injury

■ A heart sink presentation for the sports medicine consult is that of the hamstring injury. Patients present with a common injury whose outcome and prognosis is hard to predict. It is not clear if there is a reasonable established correlation between clinical findings and the occurrence of hamstring re-injury. Investigators in **Doha (Qatar)** set out to investigate what the association was, if any, between clinical and MRI findings and the eventual outcome in athletes sustaining an acute hamstring injury.² The authors conducted standardised clinical tests and examinations all performed within five days of the initial presentation. Outcomes were determined as re-injuries and further clinical examination was undertaken within seven days of return to play. The data were analysed using a multivariate model to assess the association between the possible predictive variables and outcomes. The study population consisted of 80 enrolled patients and 64 who completed the second examination after return to play. There was a re-injury rate of around a quarter (27%, n = 17). A number of factors were associated

on both univariate and multivariate analysis, with likelihood for re-injury where no MRI-related factors were predictive. Patients who had a higher number of previous injuries (OR 1.33), those with a higher extension deficit (OR 1.13), isometric flexion force deficit (OR 1.04) and the presence of localised hamstring discomfort on palpation (OR 3.95) were all significant independent predictors of re-injury. The authors have essentially done what it says on the tin. In a nicely conducted prospective study they have established that clinical findings are more important in the prediction of further hamstring injury than MRI findings, and that the most predictive factor for a poor prognosis is simply the presence of pain on local palpation which was associated with a nearly fourfold increase in risk of re-injury.

A second view on return to play with hamstring injuries

■ In the second of a pair of papers published in the *British Journal of Sports Medicine* this month, researchers from **Amsterdam (The Netherlands)** set out to look at prognostication for time to return to play (rather than success of return to play) following a hamstring injury.³ The research team used a similar methodology to the previous paper, using both MRI scan and clinical examination findings in an attempt to establish which parameters were best at predicting time to return to play. In this case, the study population consisted

of 80 non-professional athletes in whom 28 clinical and MRI parameters were investigated as potential prognosticators. The study team undertook a relatively sophisticated multivariate analysis to correct for interacting effects. All patients were treated in an identical manner with a standardised rehabilitation regime and outcomes were assessed as the time to return to play. Of the initially screened 28 variables, only nine were suitable for inclusion in the multivariate model. Amazingly, of all these variables tested, only self-predicted time to return to play and ability to passively straight leg raise were significantly predictive of return to play. All the other factors tested, including type of sport (intensity and level played), along with examination findings (length of palpation discomfort, pain and strength on isometric knee flexion) and all MRI appearances were not significant. As with the previous paper, these authors identified that clinical parameters were much more predictive of return to play than imaging findings, or indeed the sport played. Perhaps, if these authors are to be believed, the best thing to do is just ask the patients what they think.

Dislocation risks in the Oxford unicompartmental knee

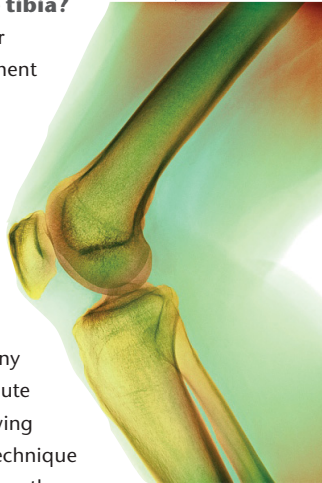
■ Unicompartmental knee replacement is an attractive option for many patients, potentially simplifying revision options, and increasing satisfaction levels in the large number of patients with isolated

medial compartment knee OA. The mobile-bearing Oxford medial unicompartmental knee replacement (UKR) is the most successful of these and has increased in popularity due to its good long-term results. Mobile-bearing unicompartmental knees, however, introduce their own unique complication, that of bearing dislocation which is the most common reason for revision. Over time, the implant design has progressed from Phase I to Phase III, but there is no consensus as to whether or not the dislocation rate has decreased with the new implant design as many of the changes have been made to the method of instrumentation rather than to the prosthesis. Several recent studies have in fact reported an increase in dislocation rates with the more modern implant design, especially in Asian populations. The orthopaedic research group in **Seoul (South Korea)** have reported the first study to look at risk factors for dislocation of the bearing after an Oxford UKR.⁴ They used a matched cohort method and designed their study to evaluate alignment as a risk factor for dislocation using post-operative radiological measurements. A group of 391 patients (480 knees) who underwent a medial UKR using an Oxford Phase III at a single institution were retrospectively included in the study at a minimum of 24 months of follow-up. The overall incidence of dislocation was 3.5% (n = 17 patients) and to identify any radiological risk factors for bearing dislocation, these 17 patients were matched to a control group who did not dislocate (n = 51) by age, gender, BMI, and type of meniscal bearing. In the dislocation cohort, there were 11 anterior and six posterior dislocations, and four patients experienced multiple dislocations. The authors identified that a post-operative posterior tibial slope < 8.5° and a difference between pre-operative and post-operative posterior tibial slope of > 2.19° was associated with a significantly increased risk of bearing dislocation.⁴

This study suggests that a post-operative decrease in posterior tibial slope is a significant determinant of dislocation of the bearing after medial Oxford UKR, which makes intuitive sense. Individual and ethnic differences need to be considered as this might be a risk factor that would not warrant the standard posterior tibial slope of 7°. Perhaps (as in the hip) many dislocations can be avoided with careful attention to alignment.

What about the tibia?

■ The demand for total knee replacement (TKR) continues to rise, and implant design has continued to evolve to increase implant longevity, outcomes and reproducibility. While there are many factors that contribute to outcomes following TKR such as BMI, technique and patient selection, the implant design – and more specifically the tibial component – is considered by most surgeons to be an important factor in determining implant longevity. Currently, there are over 100 tibial implants available in the US and more in the rest of the world. The current literature is mostly based on data from national joint registries worldwide, and due to the nature of registry studies it is often the case that because of differing surgical techniques, individual implant designs and manufacturers cannot be directly compared. This is particularly true in the knee where the prosthesis as a whole has to be evaluated, not the specific designs of each component as, unlike in the hip, different combinations are not implantable. Over a 21-year time period, researchers at the Mayo Clinic, **Rochester (USA)** collated prospective data on 11 992 adult patients (16 584 primary TKRs), all implanted at a single institution and consisting of a mix of 22 different



tibial component designs.⁵ In this cohort, there were 4592 patients who had information for bilateral TKRs (2277 were one-stage bilateral and 2315 were staged bilateral procedures). At an average follow-up of 9.4 years, there were a total of 1180 revisions, of which 374 were tibial revisions (309 coincidental femoral revisions). Of these, there were 275 revisions for loosening, wear, and/or osteolysis. The overall survival rate at ten years was 94%, and 88% at 15 years for the prosthesis as a whole. The tibial components did better than the whole joint, with a survival rate of 98% at ten years and 96% at 15 years. Increased BMI, younger age and male gender had a significantly higher risk for revision (p < 0.01), and patients

with inflammatory arthritis had a decreased risk of revision compared with patients with degenerative arthritis. In this cohort, the cruciate-retaining knees had better outcomes than the posterior-stabilised knees, but this result was based on a single metal-backed modular PFC design. Excluding the PFC design, there was no difference in survivorship between posterior-stabilised and cruciate-retaining knees. Many studies have reported functional outcomes and survivorship of various implants, but there is no determined methodology to help differentiate clinically when a modular metal-backed or an all-polyethylene tibial component should be used. Based on this single-institution registry study, all-polyethylene tibial components do significantly better than metal-backed modular designs, irrespective of age and gender. This is not a unique finding, and perhaps the knee community

should re-evaluate its use of modular components. The revision rate for tibial components in this series was, however, low. With survival rates of 96% at 15 years, there is a good counter argument that with such good survivals, the ability to change the polyethylene liner is an attractive one.

Getting on top of lateral facet pain post total knee replacement

■ While total knee replacement (TKR) is a common procedure and for the most part highly successful, there is a clearly defined and relatively large subset of patients that have low satisfaction and are not happy with their post-operative pain and functional outcomes. This can be a challenging issue for both the surgeon and the patient. Amongst patients who are unhappy with their knee replacements, anterior knee pain is the most frequent cause for unhappiness, followed by continued pain and decreased post-operative functional outcome. Views on the aetiology of the symptoms and consensus of best treatment for anterior knee pain could, at best, be said to be disparate. Partial lateral patellar facetectomy (LPF) has been shown to increase functional outcome in patients with patellofemoral arthritis. However, there are no reports of LPF being used as a treatment strategy for patients with anterior knee pain following TKR.⁶ Researchers from **Basel (Switzerland)** designed this prospective study to establish the role (or otherwise) of LPF in patients with anterior knee pain following TKR. The research team included 34 patients in their study who underwent isolated partial LPF with medial reefing. The results were reported and matched to a cohort of 34 patients who underwent a patellar resurfacing without lateral facetectomy. The cohorts were of a similar age, gender, BMI and ASA status. While both groups experienced significant pain relief and increased range of movement (ROM), patients who had a LPF had significantly

higher knee ROM and KSS scores. Radiologically, patients who had LPF experienced a significant improvement in lateral patellar tilt compared with no change in the resurfacing group. This study presents an important finding in that it is the first study to report results of LPF in patients with patellar-retaining TKR with persistent pain due to lateral patellar facet syndrome. While the study reports good results for LPF in patients with a patellar-retaining TKR, the authors suggest that LPF and medial reefing is an option for patients with isolated lateral patellar facet syndrome. However, in patients with advanced grade 3 to 4 degenerative changes, LPF should be performed concomitantly with secondary patellar resurfacing.

Re-admission in knee replacement

x-ref Hip

■ As total healthcare costs continue to rise, insurance companies, state-sponsored healthcare systems, national policy makers and providers are trying to help curb the increased cost. One of the most consistent ways to do this (and hence the focus of two articles reviewed in this month's 360 – see also Hip abstract 2) is to reduce re-admission rates, which cause total healthcare costs to rise and are a marker of poor discharge planning and complications. TKR, is expected to rise to over three million procedures per year by 2030, and as such, its provision plays a significant role in the total healthcare cost of developed nations. Some providers in the US and Europe are either withholding reimbursements and/or instituting penalties for re-admissions that occur within 30 days for certain conditions and hospital-caused diseases. As the major US insurers begin to expand on these policies, there is a need to help identify risk factors associated with re-admission rates and decrease the financial burden. These authors from **Philadelphia (USA)** carried out a retrospective review of 3218 primary TKRs performed over a two-year

period at a single urban academic hospital.⁷ The study team used clinical and administrative data to identify risk factors for 30-day unplanned re-admission across the cohort and compared this with those patients not having an unplanned re-admission. Factors considered included age, gender, race, BMI, LOS, MS-DRG and whether the TKR was part of a staged bilateral surgery. The overall 30-day re-admission rate was 5.53% with the underlying cause for re-admission being surgical in 53.9% of re-admissions and medical in 46.1%. Increased risk of 30-day re-admission was associated with extended LOS ($p < 0.001$), but it was not associated with age, BMI, gender, race and staged bilateral procedures. The most common causes associated with re-admission were post-operative infection (22.5%), haematoma (10.1%), pulmonary embolus (7.9%), DVT (5.6%), and uncontrolled pain (5.6%). This study suggests that patients who have an extended length of stay, elevated infection risk and low socioeconomic status have an increased risk for re-admission within 30 days following a TKR. The authors suggest that hospitals should identify patients early in their patient population that have these risk factors and initiate programmes to help decrease their effect on re-admission rate – extremely sensible, we feel, here at 360. Tailoring health care to an individual's needs is one of the potential ways to improve efficiency and cut costs.

Patient-specific instrumentation: fashion or substance?

x-ref Research

■ Patient-specific instrumentation (PSI) for arthroplasty is a recent innovation and has been designed to improve alignment in TKR in an effort to improve clinical outcomes and decrease revision rates. PSI requires additional cross-sectional imaging so that manufacturers can accurately design 3D models of the patient's anatomy to create disposable instruments that the surgeon

can use during surgery. There are a number of studies published on this technique, but no clear consensus as to the benefits of this enticing technology. A review team in **Brussels (Belgium)** designed a meta-analysis to evaluate the benefits. Their review was based on eight RCTs and eight cohort studies to examine the effect of PSI on radiological outcomes after TKR.⁸ The meta-analysis includes results of 1755 patients: 901 had a TKR with PSI and 854 underwent conventional TKR surgery. Radiological outcomes were used as markers of surgical quality, including mechanical axis alignment and malalignment of the femoral and tibial components in the coronal, sagittal, and axial planes (at a threshold of $> 3^\circ$ from neutral). The authors found that across these patients, there was no significant difference in the degree of mechanical axis alignment with PSI TKR *versus* conventional TKR. While the axial and sagittal planes did not show a significant difference, in terms of the coronal plane on the femoral side, the PSI TKR showed a significant advantage compared with conventional TKR. For the tibia, the pooled estimate showed that conventional TKR was better than PSI TKR. While this meta-analysis lacked a large number of randomised controlled trials (as with many in orthopaedics), with many including only small numbers, the authors concluded that overall PSI does not improve component alignment in TKR compared with conventional instrumentation. While the theoretical advantages of PSI are enticing on the surface, the authors of this study recommend that although PSI showed a significant advantage over conventional TKR on the femoral side, the alignment for the tibial component was significantly worse using PSI. PSI, therefore, does not improve the overall accuracy of alignment of the components in TKR compared with conventional instrumentation. Given the inherent disadvantages

of increased cost and the need for cross-sectional imaging, it would seem that at the moment, at least, there is little room for PSI in TKR.

Treating infrapatellar saphenous neuralgia

■ Amongst the many causes of unhappiness following total knee replacement (TKR) is infrapatellar neuroma. Although uncommon, it is known to be a cause of persistent pain.⁹ A less common, but similarly presenting cause of chronic medial knee pain is injury to the infrapatellar branch of the saphenous nerve (IPSN). During a TKR, the position of the medial retractor can put the IPSN at risk of iatrogenic damage. In this clinical series from **Jacksonville (USA)**, the authors report the clinical presentation, treatment and outcomes of 16 patients who had persistent medial knee pain after a primary or revision TKR without any other aetiology to explain their pain.⁹ In all these cases, patients underwent ultrasound-guided imaging to identify the IPSN and hydrodissection of the nerve from the adjacent interfascial planes followed by administration of a local corticosteroid injection. The clinical results reported improvement in pain levels in 12 patients, while two had no improvement and two underwent subsequent radiofrequency ablation of the IPSN with pain resolution in one patient. The results of this study would suggest that the IPSN is an underappreciated cause of medial pain following a TKR. Patients with persistent medial pain following a TKR without a known aetiology are a real diagnostic and therapeutic challenge. The authors found that hydrodissection of fascial planes adjacent to the IPSN with a corticosteroid injection under ultrasound injection can be effective in some patients with persistent medial pain following TKR. The treatment protocol, as presented, could be considered and expected to yield similar results. However, based on the

limited experience and the likely sizeable placebo effect, conclusive conclusions really cannot be drawn and future studies, preferably randomised placebo-controlled trials, are necessary.

Arthroscopy OK in the middle-aged

■ There has been much debate surrounding the value of arthroscopic knee surgery for almost every clinical indication. Clinical trialists in Scandinavian countries have been making themselves unpopular the world over by casting doubt on the benefit of arthroscopic surgery in conditions ranging from ACL tears to degenerate knees. In a further randomised study, researchers from **Linköping (Sweden)** examined the potential efficacy of arthroscopic debridement in middle-aged patients with meniscal symptoms when compared with other treatments.¹⁰ Their study evaluated middle-aged patients

(aged 45 to 65 years) and compared arthroscopic debridement with a structured exercise programme to an exercise programme alone. All 150 patients included in the study had completed a previous course of physiotherapy, had meniscal symptoms and no signs of arthritis on their radiographs. Outcomes were assessed as a change in pain at 12 months, assessed with the Knee Injury and Osteoarthritis Outcome Score. Using an intention-to-treat analysis methodology, pain at 12 months was lower in the arthroscopy group (10.6 vs 17.7) *versus* the exercise alone cohort. These results add significantly to what is already known on this topic. Patients with meniscal symptoms and no arthritis in their middle age benefit from arthroscopy over exercise therapy alone.

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