

# ROUNDUP<sup>360</sup>

## Knee

### Demand for knee replacement continues to grow

■ One of the major challenges facing orthopaedic surgeons from the ageing population is the exploding need for joint replacement surgery, and the subsequent revision burden this brings. Ever more cost-effective surgery is going to be required in order to meet this healthcare need. Despite the significant burden this is likely to cause, current predictions of demand are woefully out of date. Surgeons in **Iowa City (USA)** have examined Medicare data to establish the current demand and trends over the past two decades. They aimed to establish changes in primary and revision total knee replacement (TKR), estimate per-capita utilisation, hospital length of stay, and adverse event rates over a 19-year period between 1991 and 2010. Their data covered 3.2 million primary TKRs and 320 000 revision procedures. Over the two decades of the study the demand for TKR rose 161% and the per-capita utilisation rose by a staggering 99.2%. These changes were reflected in revision rates but, to a lesser extent, with a rise in volume of 105% and per-capita by 60%. As the volume of surgery has increased, the length of stay has decreased from 7.9 days to 3.5 days. This has been achieved without a rise in adverse events, although readmission rates have risen from 4.2% to 5%. The same is not true with revision TKR, where readmission rates have risen from 6.1% to 8.9%, but this has been

accompanied by a rise in wound infection rates from 1.4% to 3.0%.<sup>1</sup> The demand for arthroplasty and other orthopaedic procedures continues to rise, and the orthopaedic community will be under increasing pressure to reduce length of stay and cost as this explosion is simply not sustainable. While there appears to be no cost for primary TKR in terms of complications, this does not appear to be true for revision procedures.

### A Japanese knee outcome score

■ Outcome scores are fickle things, many of the established scores have not gone through the appropriate rigorous validation and development necessary for validation. In addition, many outcome measures are only applicable to the populations for which they have been developed. Here at 360 we were delighted to see this report of validation of the Japanese-specific knee outcome score, and we hope it will be widely adopted and validated in other Pacific Rim countries. Researchers from **Osaka (Japan)** assessed the validity and reliability of the Japanese Orthopaedic Association score (JOA). The study team recruited 85 consecutive patients with primary knee osteoarthritis. All completed the JOA score as well as the SF-36, Japanese Knee Osteoarthritis Measure (JKOM) and the timed-up-and-go (TUG) test. The investigators looked for correlation between the JOA and the SF-36 and JKOM as a measure of concurrent validity whilst construct validity was measured with each domain of

the JOA score against the TUG test. A separate cohort of patients was used to establish the intra- and inter-observer reliability of the score. The investigators found the JOA to have both construct validity (they were measuring what they thought they were measuring) and concordant validity (whether the score agrees with other measures). Crucially, all the domains of the JOA had good correlation with the TUG. The reliability exercise the investigators performed demonstrated excellent intra- and inter-observer reliability and high internal consistency.<sup>2</sup> Here at 360 HQ we support the authors in their conclusion that the JOA is now a validated score, and as such should be considered a standard research tool in the Japanese population.

### Smoking and TKR do not mix

■ The health effects of smoking are probably only just behind those of diabetes and obesity in their current level of scrutiny by the world's scientific community. Therefore, it is amazing to 360 that this issue has not been resolved. Researchers from **Baltimore (USA)** have designed a comparative cohort study (Level III evidence) to establish whether there was a difference in clinical outcomes between smokers and non-smokers. The researchers examined the results of 621 serial TKRs performed in their centre over a four-year period. There were 131 smokers in the cohort and the mean follow-up was 47 months. The researchers noted a higher revision rate (10% *versus* 1%) in the smokers, although surgical

complications were not tangibly different between the two groups. As would be expected, the smoking group had a higher rate of medical complications.<sup>3</sup> There is certainly enough evidence in this paper to make us pause for thought at 360. If the revision rate in smokers is truly tenfold that of non-smokers, we should consider this when offering smokers a TKR. However, the boffins at 360 would add a slight note of caution. The event rates are relatively low for TKR revision in any series, and with only 19 revisions across over 600 patients, a shift of even one patient between groups would change the significance of the result. We would recommend a much larger study to corroborate these initial and interesting findings.

### Coronal alignment determines outcome in TKR

■ The debate is starting to die down about the benefits, or otherwise, of computer guidance in TKR, however, the benefits of correct alignment in improving longevity of arthroplasty are universally accepted. Surgeons from **Victoria (Australia)** have revisited a randomised controlled trial (Level I evidence), designed initially to compare computer-assisted and conventional TKR. The investigators examined their initial cohort of patients at five years to establish whether the functional benefit of correct alignment was sustained at mid-term follow-up. In their initial report the investigators noted that superior functional and quality of life scores

(International Knee Society and SF-12 scores) were seen in patients with coronal alignment within 3° of neutral. They also reported a higher accuracy of alignment following the computer-guided method. The benefit they initially noted in those individuals with accurate coronal alignment was sustained to five years. The investigators were able to review 90 of the 111 participants of the study at five years' follow-up, and there remained a functional and quality-of-life benefit associated with improved coronal alignment.<sup>4</sup> We were delighted to read this long-term follow-up of a randomised controlled trial. Whatever your personal views on navigated knee surgery, it seems to us here at 360 that the authors have eloquently demonstrated that well performed surgery with accurate coronal alignment leads to a better functional result.

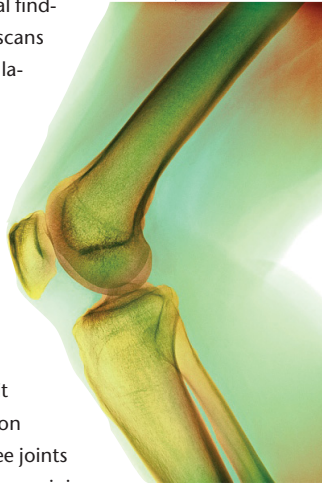
#### Fixed flexion not as bad as we thought

■ Researchers from **Nottingham (UK)** have turned their attention to fixed flexion deformity (FFD) which is commonly believed to have a detrimental effect on long-term outcomes following TKR. The research group set out to examine the natural history of the condition which was previously poorly understood. They performed a prospective cohort study (Level III evidence) to establish the cause, effect and natural history of patients following primary TKR. The researchers undertook a prospective review of 1626 patients at four years' follow-up. The study team defined FFD as either less, or more, than 15°. Within their cohort, 170 patients (10.5%) presented with a FFD; 124 with ≤ 15° and 12 with > 15°. The researchers noted that FFD improved significantly from a mean of 8.8° to 0.4° over the course of nearly a year. This was equivalent to FFD almost completely resolving in 94% of patients. In the remaining 6% of patients, FFD improved from almost 17° to 7° by final follow-up. The study team noted that the natural history of fixed flexion deformity is a gradual

improvement over a period of up to two years. Even patients with quite significant deformity of > 15° on average made a 10° improvement over the follow-up period of the study. A gradual improvement in the FFD can be expected up to two years and the authors comment that a small residual flexion contracture does not cause functional deficit.<sup>5</sup>

#### MRI detected knee lesions are more common than thought

■ Much has been made of the rate of incidental findings on spinal MRI scans in the normal population, or rather the high false positive rate. As more and more patients are receiving health care from providers (either in the community or hospital setting) with access to MRI it has become common practice to scan knee joints with pain of unknown origin. What is not known is the false positive rate. Researchers from the Framingham osteoarthritis study group, **Framingham (USA)**, published their results from a population cohort observational study. Their cohort consisted of 710 participants with no radiological evidence of osteoarthritis. All patients underwent an MRI scan, pain and WOMAC knee score. The MRI scans were reported by a radiologist paying particular attention to the MRI signs of osteoarthritis or degenerative joint disease (osteophytes, marrow oedema, subchondral cysts, meniscal lesions, synovitis and ligament lesions). Patients were stratified by age, gender, BMI, and presence or absence of knee pain to account for some confounding variables. The study population was predominantly caucasian (93%), female (55%) and had a mean BMI of 27.9. Only 206 patients (29%) reported knee pain within the last month. The research team identified abnormalities in 89% of patients



with the most common abnormalities being osteophytes (74%), cartilage lesions (69%), and bone marrow lesions (52%), and there was a clear preponderance of abnormal findings in the older patients. There were no significant differences between prevalence of abnormalities in patients with high BMI or painful knees.<sup>6</sup> The authors have conclusively established that there is a high prevalence of MRI proven pathology in patients with and without painful

knees in middle and old age. This paper demonstrates a high false positive rate for MRI proven abnormalities, and illustrates the point ably being made by professional bodies in developed countries across the world: a family doctor consultation and MRI scan is not a substitute for a thorough evaluation by an orthopaedic specialist.

#### How many bundles is enough?

■ The debate continues as to how many 'bundles' in a cruciate ligament repair is required to be effective. We have even seen a few reports recently of triple-bundle repairs. The majority of ACL reconstructions are, however, still performed using the tried and tested single-bundle technique, mostly due to a lack of convincing evidence that anything else is clinically superior. A team from **Znojmo (Czech Republic)** have decided to address this gap with a prospective randomised cohort study (Level II evidence). They recruited 60 patients (39 male) with the aim of evaluating the function of the anteromedial (AM), posterolateral (PL) and single bundles in controlling rotation and translational movements of the knee. The investigators used

computer navigation for their ligament placement and randomised the double-bundle group to tensioning of either the AM or PL bundle first. Knee laxity was objectively measured intra-operatively at each stage of reconstruction. Stability of the knee was objectively measured using a KT-1000 arthrometer and a rolimeter used to apply constant rotational forces. The study team noted that the AM bundle controlled rotation as effectively as a single-bundle repair, with a lesser contribution from the PL bundle. The most marked differences in stability were noted in internal rotation where the single-bundle technique did not perform as effectively as the double-bundle group.<sup>7</sup> The investigators have adequately demonstrated the different stability control achievable from the single- and double-bundle techniques. We hope the investigators are planning a further study to establish if their elegantly demonstrated, increased stability with a double bundle is reflected in improved clinical results.

#### Lateral domed Oxford unicompartmental knee replacements.

■ Mobile bearing lateral knee replacements do not have a blemish-free reputation in the literature. The Oxford group developed the domed lateral component to reduce the rate of meniscal bearing dislocation associated with their initial design. However, there have been no independent results of this controversial operation. Researchers in **Heidelberg (Germany)** designed a prospective cohort series to examine the survivorship and outcomes of the domed lateral tibial component of the Oxford unicompartmental knee replacement. The team used Kaplan-Meier survival curves as their primary outcome measure for revision and dislocation. Additionally, they collected prospective clinical outcome data and radiological measures of their outcomes. The researchers report outcomes of 50 prospective serial patients with isolated lateral compartment osteoarthritis

who had the arthroplasty performed at the authors' centre. A single patient died, but none were lost to follow-up after three years. The incidence of dislocation was 6.2% and cumulative survival was 94% (95% CI 82 to 98) at three years, and 96% (95% CI 85 to 99) for aseptic loosening. The patients had significant improvements in their pain and other outcome measures compared with pre-operative scores. Post-operatively, the Oxford knee score was 43 and American Knee Society score 91. Patients had a mean flexion of 127°, and the authors identified that a raised lateral joint line was associated

with dislocation in the majority of cases.<sup>8</sup> Independent series are an important verification of originator series, and this case demonstrates a reliable result at early follow-up. We applaud the authors for identifying that the increased risk of dislocation has not been completely abolished, but is reduced with accurate restoration of the joint line to an anatomical position.

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