series is certainly helpful.

Aspirin and thromboprophylaxis X-ref

Authors from **Brighton (UK)** have turned the evidence-based spotlight on the venerable old aspirin as a thromboprophylactic agent.[7] Recommended by national guidance in some healthcare systems but not in others, aspirin is widely seen by the surgical fraternity as providing a potential balance between the risks of thromboprophylaxis and the risks of thrombosis. The study team identified 13 studies presenting data eligible for inclusion, the bottom line being that the only trial of high-quality evidence within the systematic review demonstrated aspirin to be equivalent to other forms of chemical thromboprophylaxis. This finding, of course, is in line with the registry study data. The authors comment that while other included studies show a mixture of superiority or inferiority, there are methodological problems with all of these studies, rendering their results low-quality evidence with a severe risk of bias. We would agree with the authors' conclusion that further studies are definitely required to establish the safety and effectiveness of aspirin – perhaps a topic for a future large-scale randomised controlled trial.

Lower birth rate in patients with total hip arthroplasty

As patients with arthroplasties are becoming somewhat younger and parents are becoming somewhat older, a question that John Charnley would perhaps not have foreseen is answered by researchers in **Tampere (Finland)**: does having a total hip arthroplasty (THA) have an effect on birth rate?[8] Using the Finnish national registry, the investigators compared the birth rates of 5863 patients who had undergone THA while of child-bearing age (between 15 and 45 years for women and 15 and 50 years for men) with a matched cohort on a 3:1 matching basis. Though a simple study, the authors reveal an interesting finding – the birth rate following THA was between approximately 20% and 60% lower in the male and female patient groups. Once adjusted for potential confounders, there was still a significant reduction in birth rate (male HR 0.80, female HR 0.56).

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Knee

***X-ref** For other Roundups in this issue that cross-reference with Knee see: Hip Roundups 2, 3, 5, 6, 7; Trauma Roundup 1; Research Roundups 1, 2, 3, 5, 7, 8.*

Early discharge not associated with complications X-ref

With improved anaesthesia and pain control modalities after total joint arthroplasty, hospital length of stay has decreased over time. This has become a focus of healthcare funders and patient groups alike, with shorter lengths of stay purportedly associated with reduced costs and increasing satisfaction. However, opponents to shorter hospital length of stay argue that the benefits may be lost with patients being discharged too soon hiding a burden of later re-admission, complications and poorer outcomes due to a failure to recognise early complications. Researchers in **Montreal, Québec (Canada)** have reported their large database study which was designed to answer some of these questions.[1] Their study was undertaken using the National Surgical Quality Improvement Program (NSQIP) database with the aim of establishing the effects of a reduced length of stay on total joint arthroplasties. They report the outcomes of 31 044 total knee arthroplasty (TKA) patients and 19 909 total hip arthroplasty (THA) patients. Outcomes reported included length of stay, re-admission and incidence of major complications. The study team divided the cohort into non-admission to two-day admissions, and two or more day admissions, with a multivariable model being used to assess the effect of length of primary stay on these outcomes. The authors demonstrated fairly conclusively that, based on the NSQIP dataset, hospital discharge at less than two days for TKA was not harmful, and that in terms of complications and re-admissions it was actually protective in THA patients. This adds to the body of evidence that discharge within two days does not increase complication or re-admission rates, and that in the USA Medicare should consider revisiting their three-day hospital stay rule.

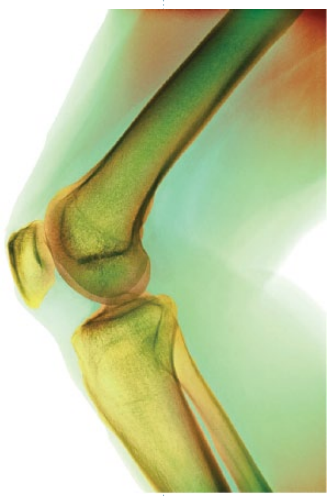
Complex primary total knee arthroplasty

Every primary total knee arthroplasty (TKA) patient is different and, perhaps more so than in any other joint arthroplasty, primary knee replacement can require significant reconstruction of bone defects and some use of 'revision' implants. In some of these more complex cases there are times when increased constraint is necessary to achieve stability in a TKA. Little is really known about these complex primary joint arthroplasties where increasing constraint is used 'from the off'. Using their own arthroplasty register, surgeons from The Mayo Clinic, **Rochester, Minnesota (USA)** describe the outcomes of their 'constrained primary' knee arthroplasties.[2] From a population of 28 667 undertaken over a 44-year period, just 427 patients received a constrained primary knee arthroplasty while 246 were given a rotating-hinge arthroplasty. Their analysis of survival took into account age, sex and BMI, and outcomes were reported by cause of re-operation or revision. There was (as would be expected) a reduction in all-cause survival at ten and 20 years associated with increasing constraint. There was an increased hazard ratio of revision for both the constrained group (1.74) and rotating-hinge group (2.07). This picture was slightly different in patients when component revision was taken as an endpoint with the rotating hinge performing better

than the constrained implants. Although apparently contrary findings, one has to wonder if part of this is selection bias – after all, revision of a rotating-hinge component is a significant undertaking. This paper illustrates nicely that patients who require primary constraint in TKA may not be fully comparable with those who do not need primary constraint. The key message for us here at *360* is that if constraint is not needed in a primary TKA case, it should be avoided, especially given the higher re-operation and revision rates. Using constraint in primary TKA is not benign and should certainly be carefully considered before implementing it in primary TKA.

Patient-specific cutting guides make no difference in total knee arthroplasty X-ref

■ Patient-specific guides, also referred to as patient-matched positioning guides (PMPGs), were introduced to total knee arthroplasty (TKA) with the intention of improving pain relief and function. The logic goes that conventional or guidance-based arthroplasty still leaves a number of patients with symptomatic knees and this may be due to subtle component malposition following surgery. A number of studies have attempted to describe the clinical outcomes and adverse events related to these patient-specific guides, however, there are no reports of randomised studies or long-term follow-up. In this randomised controlled multicentre trial co-ordinated in **Sittard-Geleen (The Netherlands)**, 180 patients undergoing unilateral primary TKA for primary osteoarthritis of the knee were randomised to either receive standard care or patient-specific instrumentation.[3] Surgery was otherwise identical and a standard medial parapatellar approach was used by three surgeons, who used either PMPGs created from pre-operative MRI scans or standard intramedullary instrumentation. Outcomes were assessed using a variety of outcome measures including Knee Society Scores, Oxford Knee Scores, Western Ontario and McMaster osteoarthritis indexes and the VAS pain scale. By the final 44-month follow-up, 17 (9.4%) patients were lost to follow-up and there were no differences in any outcome measure between the PMPG or conventional groups pre-operatively, or at three-months, one-year, or two-year follow-up. From a safety perspective, the total number of complications following primary TKA did not differ between groups, suggesting that there was no added benefit to these patient-specific guides. It is somewhat curious to a non-medical outsider to suppose that the use of more accurate instrumentation would not make a difference. The temptation as surgeons and patients is to suggest that the quality of the surgery (in this case accuracy of component placement) has a profound effect on outcomes. However, this and similar papers continue to underline to us here at *360* that surgery is only one part of a bigger picture and, certainly for component placement, perhaps we are flogging a dead horse. Modern surgical technique is likely to be able to position implants accurately enough that there are so few outliers and the impact on outcome scores is minimal.



The best outcome: a 'forgotten joint' X-ref

■ The forgotten joint score has recently been developed in **St. Gallen (Switzerland)** and follows the premise that the best possible outcome following a joint arthroplasty is the 'forgetting' of the joint.[4] Based on previous literature, up to 20% of patients are unhappy after total knee arthroplasty (TKA), and remain so, limited in one way or another by their joint replacement. The goal of surgery for patients is to restore function and decrease pain and, arguing that perhaps the forgotten joint score (FJS) might be the best way to assess success following a TKA, the authors set out to establish how good the FJS was at assessment of clinical outcomes. Their study centres around the outcomes of 540 patients, all having undergone a TKA. Each patient had an objective assessment (range of motion, stability and alignment) and in addition they underwent an assessment of complications and the FJS patient-reported outcome measures were administered. The authors analysed the spread of results based on the FJS score, age and post-operative range of motion, undertaking a cluster analysis. The authors identified three discrete clusters and analysed their characteristics in terms of predictors of outcome. These authors ably demonstrated that when assessed using the FJS, males in their 60s with a lower body mass index (BMI) are more likely to have better outcomes compared with women, older or younger patients, and patients with a higher BMI. This is useful for patient selection and for setting patient expectations, so that going into surgery, patients understand that they may not 'forget' their joint despite a well-conducted surgery.

Modality of peri-operative analgesia perhaps not so important?

■ Pain management during total knee arthroplasty (TKA) is a critical component in the overall rehabilitation and is perceived to be central to the success of the procedure. Regional analgesia is a common peri-operative option for pain control, however, rare but serious complications such as spinal haematoma and more common problems such as prolonged motor blockade have resulted in many centres looking for alternative approaches. The authors of this study aimed to compare the effect of patient-controlled epidural analgesia (PCEA) and local infiltration analgesia (LIA) during TKA within an established enhanced recovery programme, to evaluate the impact of administration technique on rehabilitation and outcomes at six weeks and one year post-operatively. In this randomised controlled trial from **Glasgow (UK)**, 242 patients all undergoing primary unilateral TKA were recruited to the study and randomised to receive either PCEA or LIA. Twenty patients were excluded due to failure of the spinal anaesthesia, leaving 109 patients in the PCEA group and 113 in the LIA group.[5] Outcomes were primarily assessed using the Oxford Knee Score (OKS), along with maximum flexion and adverse events during the hospital stay. Patient evaluations were at both six weeks and one year post-operatively. There were no real differences with the discharge rates, with 77% of PCEA patients discharged by day four following surgery compared with 82% of LIA patients. There were also no differences in time to achieve discharge criteria, length of hospital stay, verbal pain rating scores immediately after surgery, amount of rescue analgesia, incidence of nausea or vomiting, or post-operative complications. OKS and maximum flexion were similar at both the six-week and one-year follow-up. Based on these findings it would appear that both PCEA and LIA techniques provide adequate pain control and enable a suitable proportion of patients to achieve early mobilisation. It seems that either option is a perfectly suitable regime for post-operative analgesia with little to choose between them.

Predicting extensive medial releases following knee arthroplasty

Coronal plane soft-tissue balancing during total knee arthroplasty (TKA) is recognised as being probably the key factor in the correction of a severe varus deformity. A wide range of soft-tissue balancing techniques are described including various soft-tissue ligament releases and medial tibial reduction osteotomy (MTRO). In the current study, authors from **Denver, Colorado (USA)** retrospectively compare patients who underwent extensive medial releases with those who did not during the primary TKA, to determine which pre-operative radiographic parameters are associated with the need for a more extended medial release.[6] Sixty-seven patients requiring a MTRO to correct a varus deformity during primary TKA between 2009 and 2010 were retrospectively identified from a single institution and matched by BMI, age, follow-up duration, and sex to 67 patients who did not require a MTRO to achieve coronal balance. Standard anteroposterior (AP) pre-operative radiographs were used to measure femoral and tibial articular surface angles, tibiofemoral angle, presence of osteophytes, medial joint space narrowing and three novel measurements including tibial offset, medial tibial articular surface angle and lateral joint space widening. Post-operative weight-bearing AP radiographs were then reviewed to allow measurement of femoral and tibial articular surface angles, tibiofemoral angle, and tibiofemoral angle correction. Tibiofemoral angle, tibial angle, medial tibial slope and medial joint space were significantly reduced in the MTRO group compared with the control, while the tibial offset and lateral joint space measurements were increased in the MTRO group compared with the control. In a multiple linear regression, only medial tibial slope and lateral joint space widening were independently associated with the need for an extensive medial release. Though significance was reached in both of these comparisons, the differences were often very small and may be within the margin of error for the measurement technique. Based on these findings, the authors recommend screening the pre-operative radiographs to determine lateral joint space opening and medial tibial offset, which may act as surrogate measurements for lateral collateral ligament lengthening, and in turn indicate increased risk of the requirement for an extensive medial release. Although a relatively 'dry' paper, these sorts of radiographic findings are important if the pre-operative radiographs can be used to identify those patients who are likely to require peri-operative release.

Tranexamic acid and rivaroxaban: a match made in heaven? X-ref

Minimally invasive techniques for total knee arthroplasty (TKA) have grown in popularity over the past decade due to the proposed advantages of decreased wound pain, faster rehabilitation, shorter hospital stay and possibly reduced blood loss. Both tranexamic acid (TXA), a synthetic amino acid derivative, and rivaroxaban, an oral factor Xa inhibitor for thromboprophylaxis, are options to control blood loss, reduce the risk of thrombosis and reduce the need for transfusion during TKA procedures. However, whether there is a blood conservation effect by TXA combined with an oral anticoagulant during a minimally invasive TKA procedure remains unclear, considering the high rate of bleeding complications associated with rivaroxaban when used on its own. The primary aim of this study was to evaluate the blood conservation effect of TXA and wound haematoma related to post-operative blood loss when rivaroxaban is used for thromboprophylaxis in minimally-invasive TKA patients. In this prospective, double-blind randomised control trial originating in **Kaohsiung (Taiwan),**[7] 198 patients were identified based on the authors' inclusion criteria. The intervention group (100 patients) received 1 g TXA intra-operatively during the primary TKA, and the 98 control patients received the placebo saline injection. All patients received rivaroxaban as the thromboprophylaxis agent of choice (10 mg each day for 14 post-operative doses). Outcomes in terms of total blood loss, maximum haemoglobin drop, transfusion requirement, wound complications and deep-vein thrombosis incidence at day 15 post-operatively were collected for all patients. Total recorded operative blood loss was reduced in the combined TXA and rivaroxaban group compared with the placebo group (1202 ± 327 *vs* 1020 ± 301; $p < 0.01$). Transfusion was required in only 1% of the intervention group - a significantly lower proportion than the 8% of placebo patients requiring transfusion. Post-operative wound haematoma and ecchymosis were again reported to be of a significantly higher incidence in the placebo than the study group. Symptomatic deep vein thrombosis or pulmonary embolism did not occur in either group, which is to be expected given the sample sizes; no conclusions can really be drawn from this. Based on these findings, the authors conclude that systematic administration of TXA in conjunction with rivaroxaban for thromboprophylaxis is effective in reducing blood loss, need for transfusion, and wound haematoma in minimally invasive TKA. It would seem to us here at *360* that given the recognised higher incidence of bleeding complications from rivaroxaban, if it is to be used as thromboprophylaxis, a combination with tranexamic acid would seem to be sensible.

Fluoroscopy better in monitoring for osteolysis about the knee

Aseptic loosening is the most common indication for revision surgery following total knee arthroplasty (TKA), however, there is no universally accepted system or methodology for the diagnosis of aseptic loosening, nor any widely accepted indications for revision surgery. Patient clinical history and sequential plain radiographs are typically accepted as the standard of follow-up; a combination of clinical assessment and radiographic review for evidence of aseptic loosening is the standard of care in many institutions. The problem with this approach is that, though widely accepted, there is significant variation between institutions and individual radiographers to introduce enough error to limit the reliability of this technique. It has been suggested that fluoroscopically-guided radiographs may improve the detection of radiolucent lines at the bone implant interface, and previous work from the Oxford group on follow-up of unicompartmental knees has shown this to improve follow-up consistency. However, the evidence supporting this in TKA is limited. The authors of the current study from **Rochester, Minnesota (USA)** aim to analyse the clinical utility of fluoroscopically-assisted radiographs in comparison with standard anteroposterior (AP) radiographs in the detection of loose tibial and femoral TKA components.[8] The study retrospectively identified 60 patients with standard AP, standard lateral, and fluoroscopically guided radiographs for inclusion in the study. Half (30 patients) of the TKAs included were revised for true aseptic loosening, as determined intra-operatively. The remaining 30 were revised for other indications, most commonly for instability. Four independent reviewers determined tibial and femoral component stability based on standard and fluoroscopically-guided radiographs. Tibial component loosening was more often correctly identified using fluoroscopically-guided radiographs, however, sensitivity in detecting femoral component loosening was the same between the imaging methods. There were no differences in the calculated specificity in terms of detecting well-fixed tibial and femoral components. The findings of this study would suggest that there is a role for fluoroscopically-guided

radiographs, particularly for the determination of tibial component loosening. However, further work is clearly necessary to validate these results. If the radiographs suddenly become more sensitive, it may be that the presence of a radiolucent line is no longer as important as we all thought it was.

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Foot & Ankle

X-ref ***For other Roundups in this issue that cross-reference with Foot & Ankle see:*** *Trauma Roundup 2; Research Roundup 3.*

Calcaneal fracture fixation: should we consider a less invasive approach? X-ref

The treatment of calcaneal fractures continues to be a controversial issue in both trauma, and foot and ankle, surgical fields. The controversy stretches from initial indications through to the operative technique and post-operative care. Most, however, would agree that wound breakdown and infection are among the most devastating of complications following calcaneal fracture fixation surgery, and that patients with even the most severe injuries do poorest with surgery if complications arise. In an attempt to minimise these risks, many trauma surgeons now utilise limited incision approaches and arthroscopic-assisted methods to fix certain subtypes of calcaneal fractures. A pair of interesting papers shed some more light on this technique. In a retrospective case series of 39 displaced calcaneal fractures, a group from **Winston-Salem, North Carolina (USA)** reported their experience of a consecutive retrospective series of patients treated using a limited sinus tarsi incision with subsequent plate fixation.[1] Outcomes were assessed in terms of complication incidence, visual analogue pain scores and joint reduction (assessed using pre- and post-surgical CT scanning). Data for the study were obtained through retrospective chart and radiographic review. Post-operative CT scanning demonstrated that the articular reduction of the subtalar joint was impressively within 2 mm of anatomic in 91% of cases. However, even this limited approach was not without its complications, with two cases of superficial wound dehiscence, and deep infection requiring subsequent surgery seen in one case, giving around an 8% infection rate. The authors themselves conclude that surgery using this approach results in acceptable fracture reduction with low rates of complications. Whether restoration of anatomy using this technique confers a clinical advantage in the longer term remains unanswered. In a much smaller but comparative series from **Kangar (Malaysia)** and **Vancouver, British Columbia (Canada)**, the authors report a comparison of open reduction and internal fixation with plates (n = 12) with an arthroscopic-assisted method of percutaneous screw fixation (n = 15).[2] The authors report their outcomes at a minimum one-year follow-up using the American Orthopaedic Foot and Ankle Society (AOFAS) Hindfoot and SF-36 scores. In addition, a range of secondary outcome measures are reported including radiographic data. At final follow-up, both groups had strikingly similar outcome scores, and radiographic parameters were also no different. Interestingly, the percutaneous screw fixation patients had a significantly shorter delay to surgery, shorter hospital stay and faster return to work than the open reduction internal fixation patients. This potentially offers a health economic advantage, although clearly a much larger randomised study would be needed to establish this. Given the continued interest in this topic, the debate on the best management of calcaneal fractures will most probably continue long into the future.

Synchronous osteochondral defect and ankle fractures: a common phenomenon? X-ref

Fractures around the ankle are one of the most common injuries seen in the fracture clinic. Osteochondral defects are rarely diagnosed, although occult lesions are probably more common than widely thought. A previous systematic review has shown that up to 20% of patients do not achieve a good functional result after surgical treatment, and one potential explanation for this is the presence of treated or untreated osteochondral defects. In this prospective study from **Amsterdam (The Netherlands)**, the team set out to assess the value of CT scans to detect these otherwise occult osteochondral lesions.[3] They designed their study as a prospective cohort series, and hypothesise that the presence of an osteochondral defect occurring at the time of injury may be a cause for unsatisfactory long-term outcome in some patients. The authors report the results of CT scans obtained on 100 fractured ankles, all performed post-operatively. The chief message of this simple paper is to describe the incidence of osteochondral lesions in their cohort, which is 10% in this series. They have also attempted to investigate an association with ankle fracture type and propose that clinical outcome at one year may be prejudiced by the presence of such a lesion. Although the authors were able to establish that all of these lesions were talar in nature and associated with pronation injuries, that is about as far as they reached. Although 100 fractured ankles is a fair number, there are just ten osteochondral defects in a range of injury patterns, making any form of further analysis difficult. The authors accept that there are a number of methodological limitations in this paper,