neither a viable, nor desirable, option. This group from **Fuzhou (China)** aimed to clarify, in one of the only series big enough to do so, the predictive features for development of avascular necrosis in paediatric patients with a fracture of the femoral neck.[7] The authors retrospectively reviewed 239 children undergoing surgical treatment for a femoral neck fracture. In this prospective series, the children had a mean age of ten years, and the development of AVN was assessed on plain film radiographs. Risk factors, including age, sex, mechanism of injury, initial displacement, time type of fracture, time to reduction, and the method and quality of reduction were recorded. Logistic regression analysis was used to evaluate independent risk factors. None of this study's findings are particularly surprising, with the degree of initial displacement of the fracture, as well as age, being significant, independent risk factors for AVN. With a receiver operating characteristic analysis, the authors established a cut-off age of 12 years as the critical point for increasing the incidence of AVN. If the subject was over the age of 12 years, severe initial displacement of the fracture and poor quality of reduction significantly increased the rate of AVN. However, for those under the age of 12 years, these factors were not significantly predictive, with only initial displacement reaching statistical significance. Interestingly, in those patients treated with open reduction, the authors reported a significantly reduced secondary AVN rate when a plate and screw fixation was used, compared to cannulated screw or Kirschner wire fixation. In patients treated with closed reduction, a poor quality of reduction significantly increased the rate of AVN. While we should be relatively unsurprised by some of these results, the finding that plate and screws is superior in open reduction is an interesting one. This warrants further investigation, as this is certainly a more invasive procedure.

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Research

X-ref ***For other Roundups in this issue that cross-reference with Research see: Sports Roundup 3; Foot & Ankle Roundup 5; Wrist & Hand Roundup 4; Spine Roundup 1.***

Long-term impacts of brace treatment for adolescent idiopathic scoliosis on body composition, paraspinal muscle morphology, and bone mineral density

X-ref

■ In the past, some studies have claimed that brace treatment affects the mobility of the spine in later life, as well as negatively influencing bone mineral content and muscle strength. It is known that immobility, bed rest, and even surgery itself has a profound effect on body composition including dry muscle mass, myosteotosis, and sarcopenia. The mechanisms behind this are not entirely known; however, there is some evidence that this affects outcomes and wellbeing. There is, however, very little evidence as to the effects of functional bracing, such as that used in scoliosis, when used for a period of time. In this interesting study from **Niigata (Japan)**, a team has investigated the effects of brace treatment on body composition in patients with adolescent idiopathic scoliosis (AIS) in an effort to evaluate any changes in bones or muscles.[1] In this study, the authors used bioelectrical impedance analysis to estimate body composition and MRI to measure cross-sectional area and fatty degeneration of paraspinal muscles in patients treated nonoperatively for AIS. Bone mineral density was also measured at the lumbar spine and left hip. The authors had a population of 319 patients treated nonoperatively for their AIS. Among the 80 patients who enrolled in the study, 44 comprised the full-time brace group (more than 13 hours per day), and 36 made up the non-full-time brace group (observation, dropouts from brace wear, or part-time brace users). No significant differences were found in any of the body composition parameters between groups. Further analysis showed that full-time brace wearers were significantly more active. The conclusions drawn from this study can be included in the information given to patients and parents, in order to alleviate their concerns about some of the negative effects of bracing for scoliosis. This study has some wider implications for researchers and clinicians interested in body composition. The implication that functional bracing does not have profound effects on body composition is important and supports other work suggesting that exercise and activity, even in shorter timeframes (such as high-intensity interval training), can offset any losses from immobility.

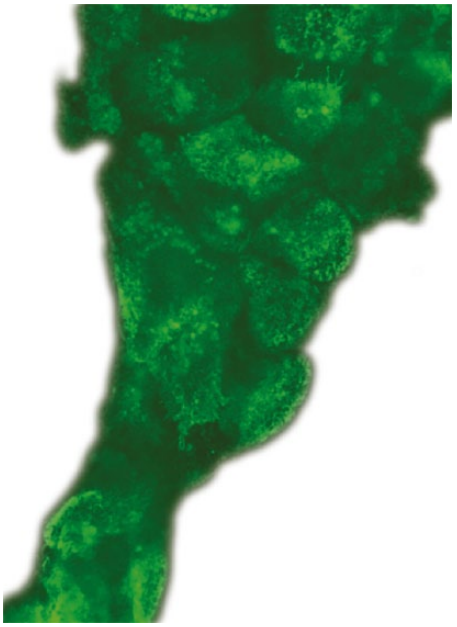
Single vendor arthroplasty: is there a benefit?

■ The purchase of orthopaedic implants constitutes a significant proportion of the costs associated with arthroplasty. The choice of implants is influenced by many factors, including surgeon choice and the purchaser's relationship with vendors. In the past, manufacturers would set the price of the implants and hospitals would pay for them. As these relationships have developed, many hospitals moved to setting prices and ensuring that vendors provide their implants under that price. The newest iteration of cost savings is to move large systems into a single vendor (or a 'preferred vendor'), with the potential to dramatically reduce implant prices by guaranteeing large volume. In this study from **New York, New York (USA)** a team has compared the overall implant costs and readmissions, length of stay, and surgical site infections (SSIs) before and after the introduction of a preferred vendor programme.[2] Nearly 8,000 cases were included in the study, evenly split between the year before and the year after the programme was introduced. The team found that the use of implants supplied by the preferred vendor rose from 50% to 69%, with low-volume surgeons showing the largest increase. The mean cost per case was

reduced by 23% and the length of stay reduced significantly; however, no changes in readmission or SSI were found. When these cost savings return directly to the department/surgeons, this change to a single provider is incentivized, without affecting 30-day readmission, SSI risk, or length of stay. As healthcare provision continues to evolve and cost pressures are further felt, the concept of block contract purchasing is likely to become even more commonplace. This article nicely picks out the potential benefits and serves to allay concerns from surgeons and healthcare providers about the risks to such a system.

Peritoneal dialysis does not carry the same risk as haemodialysis in patients undergoing hip or knee arthroplasty X-ref

■ As our patients live longer and become both frail and comorbid, more patients will inevitably present for elective and emergency orthopaedic care, with kidney failure leading to dialysis. Unfortunately, traditional haemodialysis is associated with an increased rate of complication following lower limb arthroplasty that is well described in the literature. Thus, in many cases patients are encouraged to undergo renal transplant prior to joint arthroplasty. With this understandably not always being possible, interest has piqued regarding which mode of dialysis might be likely to reduce the incidence of complications. In this study from **Charlottesville, Virginia (USA)**, a team has compared the differences in the incidence of postoperative complications after total hip or knee arthroplasty between patients on peritoneal dialysis and patients on haemodialysis.[3] Using Medicare records, over 1,000 patients undergoing arthroplasty with peritoneal dialysis were matched with either those receiving haemodialysis or those receiving neither form of dialysis. The group showed that infection rates at one year were significantly lower in the peritoneal dialysis group than in the haemodialysis group. Furthermore, peritoneal dialysis appeared to show a similar infection rate with the control group. Readmission, mortality, and emergency department visits were similar between the two dialysis groups, but both were higher than in the control group. The findings from this study clearly suggest that encouraging the use of peritoneal dialysis instead of haemodialysis is to be welcomed in patients requiring arthroplasties. In the long term, these results may alter our options as to optimizing these vulnerable patients prior to elective lower limb arthroplasty.



Implantation in knee focal cartilage defects X-ref

■ The problem with articular cartilage is its limited ability to heal. Over the last 20 years, cell therapies have significantly progressed, especially with the advent of autologous chondrocyte implantation (ACI). Unfortunately, this procedure requires a two-stage operation and a significant number of the transplanted chondrocytes either die or dedifferentiate to a fibroblastic phenotype. As a result of these real and as yet insurmountable limitations, there has been considerable recent focus on the potential use of mesenchymal stem cells (MSCs) for these lesions. Previous studies have utilized bone-marrow-derived MSCs with potentially encouraging results, but recently new MSC sources have been utilized such as those from adipose tissue, with the advantage that extracting these cells is less invasive. This study from two European centres in **Brussels (Belgium)** and **Thessaloníki (Greece)** is the first to review the mid-term outcomes following a single-staged matrix-induced, culture-expanded autologous adipose-derived mesenchymal stem cell (AD-MSC) graft to a focal symptomatic chondral defect.[4] A total of 25 patients were treated with culture-expanded AD-MSCs, which were embedded within a biodegradeable scaffold and inserted into each full-thickness cartilage defect. Patients were followed up over a 36-month period for the purpose of the study. The procedure was found to be safe with a significant improvement in the patient's clinical, functional, and radiological scores based on MRI. Two patients required subsequent arthroscopies for other reasons and had a biopsy that showed 'hyaline-like' cartilage tissue within the defect. Previous studies have utilized a technique where AD-MSCs were injected into the knee; however, this study had an advantage in that the cells were first located onto a scaffold, which might be considered a more logical technique for encouraging stem cells to fill a chondral defect. Previous studies have also shown that this technique results in cells with a stable phenotype, unlike alternative cell therapies. However, it remains that these techniques result in 'hyaline-like' grafts and not hyaline cartilage. Until a chondral repair can be obtained that is reliably hyaline cartilage, there will always be a question as to whether the repair will be durable. The majority of cell-based therapies can result in a graft with chondrocytes enveloped within a lacuna surrounded by an extracellular matrix containing type II collagen. Does that make it hyaline cartilage? The collagen fibres in these repairs are arranged haphazardly and are not arranged in zones, nor do they reproduce the Benninghoff arcades seen in native articular cartilage. As a result, there is always the question as to whether these particular cell-based techniques are any better than the repair obtained following simple microfracture.

Intrawound vancomycin powder reduces surgical site infection in rib-based distraction surgery X-ref

■ Infection poses a serious problem in rib-based distraction surgery for children with early-onset scoliosis (EOS), with recent papers reporting rates of between 6% and 32%. The use of vancomycin powder in the wound is widely used in spine surgery, and its effectiveness has been corroborated by a number of studies. The authors of this study, reporting from **Salt Lake City, Utah (USA)**, describe the use of local vancomycin powder in this unique situation.[5] A total of 76 patients (representing 1,035 procedures) were retrospectively identified in a non-vancomycin group and compared with 104 patients (252 procedures) in the vancomycin group. The group without intrawound vancomycin showed an infection rate of 5.3%, while the rate of infection in those with vancomycin applied was 1.2% ($p = 0.008$). These results, taken in conjunction with those of the VANCO study that trialled local vancomycin power in orthopaedic trauma fixation and contained a substudy to assess the safety and systemic side effects, conclude that localized vancomycin administration is safe from a renal and systemic perspective. The authors went on to note that no side effects following the application of vancomycin were identified.

As a result of these findings, the authors state that intrawound vancomycin is now the standard of care in their institution.

Does femoral head orientation affect acetabular development? X-ref

Acetabular dysplasia is a quintessential orthopaedic pathology, with a broad range of surgical options that can influence the disease at every stage of skeletal maturity and degeneration. Unfortunately, there is little in the way of high-quality experimental research that identifies which of the plethora of suitable potential risk factors and developmental factors are truly at play. It is known that in the clinical setting and early in skeletal growth, surgery can tackle either side of the hip, with both acetabular and proximal femoral osteotomies playing a role in improving not only the function of the joint, but also its development. In this study, a group from **Bolivia**, **Spain**, and **Ecuador** have investigated the mechanism of changes in acetabular growth following proximal femoral osteotomy using a lamb model.[6] In one of the most complete investigations into the pathogenesis of developmental dysplasia of the hip (DDH), the set of animal studies were set up using a standardized lamb model of dysplasia to establish what the effect of femoral head orientation is on acetabular development. The team performed various osteotomies in 21 lambs aged three months, and then fixed them with a plate and screw construct. At three months, the shape of the acetabula were compared with a control group of five animals. The group found that changes in neck shaft angle or femoral version had no impact on acetabular depth, anteroposterior diameter, or inferosuperior diameter. Acetabular volume correlated only with a lower neck shaft angle. Overall, this study shows that proximal femoral osteotomy does influence primary acetabular development. Femoral derotation osteotomy, although undoubtably therapeutic in the correct clinical circumstances, does not appear to exert a measurable influence on acetabular morphology in terms of development. The caveat to studies like this, of course, is that the hips were essentially normal at the time the initial osteotomy was performed, not dysplastic, and as such the soft-tissue envelope had developed appropriately.

Real-time assessment of femoroacetabular motion using radial gradient echo magnetic resonance arthrography

Magnetic resonance arthrogram (MRA) is at present the most common radiological study used to evaluate hips for femoroacetabular impingement (FAI). In a new development in the ever-expanding library of MR protocols available to the orthopaedic surgeon, this group from **New York, New York (USA)** have compared the addition of real-time radial gradient echo images with the usual images in assessing the hips of patients with or without symptoms of FAI.[7] A total of 22 patients were included in the study, with patients only excluded if they could not move through the required range of motion during their scan or if they showed signs of hip dysplasia. The images and real-time video were assessed by two musculoskeletal radiologists in order to identify the joint space through the range of motion and the static measurements at rest. A total of 12 patients in the cohort had clinical findings consistent with FAI prior to scan. The additional images required a further three to six minutes of scanning time. Patients with positive clinical findings were found to have significantly lower anterior femoral acetabular cortical space (FACS) ratios compared with those without clinical findings. Similarly, a reduced anterior FACS ratio was correlated to an increased alpha angle, but not to centre-edge angle or cartilage loss. This article is interesting in that it describes a technique of real-time assessment of femoroacetabular motion to aid in investigating the aetiology of FAI. The additional ability to study femoroacetabular motion via real-time MRA in a routine clinical practice may well improve the ability to diagnose the syndrome and plan appropriate management.

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