

average, 12 and a half years. In what is often a complication-ridden procedure, the team reports favourable results for primary bone sarcomas treated with surgical resection and intercalary (14), osteoarticular (3), and fusion (1) operations with vascularised fibular autograft augmented with a massive allograft in seven cases. Graft union and hypertrophy were seen in 17 out of 18 patients at 12 months. Four complications were seen: nonunion, infection, implant failure and skin necrosis.<sup>7</sup> While we are always naturally cautious, here at 360, when we see stand-out results that are significantly better than those previously reported (especially in small heterogeneous series such as these), we are interested in these results. Given the differing biology of the growing patient, it is certainly more than possible that results of biological reconstructions could well be better in the growing child than in the adult.

### The paediatric hip fracture x-ref Trauma, Hip

■ Few injuries have such significant long-term disability potential as a subcapital hip fracture within a growing hip. Due to the rarity of the condition, little is known in detail about the longer-term prognosis, and specifically the effects on the vascularity of the head. This interesting (although low patient-volume study) brings into question whether prognostication based on the results of bone scintigraphy following trauma to the hip joint in children is valuable. In a study in **Lund (Sweden)**, bone scintigraphy was performed post-operatively in eight patients with femoral neck fractures to establish if there was any measurable femoral head vascularity. Two patients who had normal scans post-operatively had femoral heads of normal appearance on radiographs in follow-up. In two patients who had complete femoral head avascularity,

one had radiographic findings of subchondral sclerosis and flattening, one had normal radiographs, and in those who had partial femoral head perfusion, three out of four had normal radiographs in follow-up.<sup>8</sup> Perhaps advances with perfusion MRI may give more information from which to prognosticate and possibly intervene in this population, however, its use will be limited by metallic fixation devices causing artifact around the area of interest. All that can really be drawn from this paper is that normal femoral head perfusion appears to be reassuring!

#### REFERENCES

1. Sarkissian EJ, Sankar WN, Zhu X, Wu CH, Flynn JM. Radiographic follow-up of DDH in infants: are X-rays necessary after a normalized ultrasound? *J Pediatr Orthop* 2015;35:551-555.
2. Valencia M, Moraleda L, Díez-Sebastián J. Long-term functional results of neurological complications of pediatric humeral supracondylar fractures. *J Pediatr Orthop* 2015;35:606-610.

3. Schuett DJ, Bomar JD, Pennock AT. Pelvic apophyseal avulsion fractures: a retrospective review of 228 cases. *J Pediatr Orthop* 2015;35:617-623.
4. Sevensan A, Aygün Ü, Inan U, Ömeroğlu H. Pulled elbow in children: a case series including 66 patients. *J Pediatr Orthop B* 2015;24:385-388.
5. Erol B, Topkar MO, Caliskan E, Erbolukbas R. Surgical treatment of active or aggressive aneurysmal bone cysts in children. *J Pediatr Orthop B* 2015;24:461-468.
6. Chen TL, He CQ, Zheng TQ, et al. Stiffness of various pin configurations for pediatric supracondylar humeral fracture: a systematic review on biomechanical studies. *J Pediatr Orthop B* 2015;24:389-399.
7. Erol B, Basci O, Topkar MO, et al. Mid-term radiological and functional results of biological reconstructions of extremity-located bone sarcomas in children and young adults. *J Pediatr Orthop B* 2015;24:469-478.
8. Juréus J, Geijer M, Tiderius CJ, Tägil M. Vascular evaluation after cervical hip fractures in children: a case series of eight children examined by scintigraphy after surgery for cervical hip fracture and evaluated for development of secondary radiological changes. *J Pediatr Orthop B* 2015;(Epub ahead of print) PMID:26288375.

## Research

For other Roundups in this issue that cross-reference with *Children's orthopaedics* see: **Hip Roundup 7, 8, 9; Knee Roundup 5, 7; Wrist & Hand Roundup 5; Shoulder & Elbow Roundup 1, 2; Trauma Roundup 1, 9.**

### Wasted implants

x-ref Hip, Knee, Shoulder

■ In a brief report from **Akron (USA)**, the management of a surgeon-owned hospital tried a novel method for reducing wasted implants. The study team identified that a 1.5% implant wastage rate was occurring in their institution during arthroplasty surgery. The (arguably slightly aggressive) response was the publication of an open 'league table' of surgeons' implant wastage rates. Roll on one year, and the authors repeated their audit with, it appears, little effect. A statistically insignificant improvement in implant 1.1% was seen.<sup>1</sup> It does beg the question as to

whether, with apparent 'mistake' rates of over 1% in implant selection in theatre, the labelling is good enough on implant boxes. Surely with the public naming and shaming approach taken by these authors, surgeons will have done their utmost to reduce implant wastage?

### Biofilms revisited

x-ref Hip, Knee, Shoulder, Ankle, Trauma

■ One explanation for the difficulties facing revision surgeons in eradicating infection is the persistence of biofilms. Bacteria arranged in a semi-dormant state under a protective layer of glycocalyx on the surface of an implant are often surprisingly resistant to antibiotics, lavage and even aggressive debridement. A pair of papers shed some light on potential, more direct physical attacks during revision surgery to address this problem. Researchers in

**Surrey (UK)**<sup>2</sup> (and we admit, here at 360, that we are likening the biofilm effect to that seen commonly in dental plaque) have used an experimental model to test the value of sodium bicarbonate (thought in dentistry to be effective) on disrupting biofilms. Their model consisted of some fermenter-grown human dental biofilms. Each was subjected to a different concentration of sodium bicarbonate and the efficacy assessed using colony viability counts on microscopy. In short, these investigative dentists established that sodium bicarbonate is most effective in older, more established biofilm models. In a similarly experimental paper, researchers in **Copenhagen (Denmark)** evaluated the potential for acetic acid (vinegar) to effectively disrupt biofilm-established bacteria. These authors present a comprehensive look at the potential for acetic

acid to be used as an anti-biofilm agent. Their rather general article covers both gram-positive and gram-negative bacteria, along with some anecdotal clinical evidence.<sup>3</sup> While we are not supposing for a minute that either of these two articles holds the key to dealing with infected biofilm-colonised joints, it is clear that new and inventive approaches are required, and examining the mechanism of action of topical non-toxic agents may yield some novel treatments in the future.

### Peri-operative anticoagulation not required in atrial fibrillation

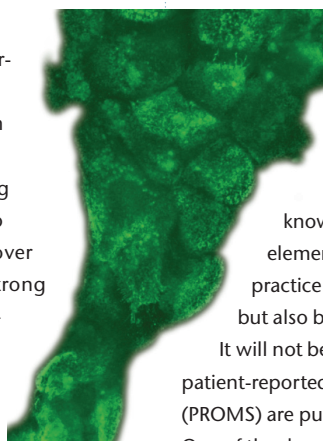
x-ref Hip, Knee, Foot, Hand, Shoulder, Spine, Trauma, Oncology, Paeds, Research

■ In a game-changing paper for peri-operative management, researchers in **Copenhagen (Denmark)** have debunked

another myth surrounding low molecular weight heparins (LMWH). Common practice the world over has been to place patients on warfarin on a 'bridging' anticoagulation with LMWH. This has been for two reasons: to protect them in the peri-operative period, and also to cover the re-warfarinisation period which is associated with a

transient hypercoagulant state as warfarin preferentially inhibits anti-protein C and anti-protein S over other clotting factors. The need to provide bridging cover in patients with a strong history of thrombosis (e.g. major PE, proximal DVT or arterial embolus) seems sensible, but what about

the relative indications such as providing cover for patients on warfarin for atrial fibrillation (AF)? The research team conducted an impressive randomised controlled trial involving 1884 patients, half randomised to LMWH cover for the peri-operative period and the other half randomised to placebo. Outcomes were assessed within 30 days of the procedure and primarily thromboembolic events (stroke, SVTE, TIA) were taken as end points. The incidence of adverse thromboembolic events was 0.3% in the bridging group and 0.4% in the non-bridging group. With a study like this powered for non-inferiority, this result suggests that the use of bridging anticoagulation was not required in patients with AF and on warfarin.<sup>4</sup> Although many clinicians do not use VTE prophylaxis in this group, this is nevertheless a landmark paper demonstrating once and for all that it is an unnecessary health economic burden, not to mention the inconvenience caused to patients and clinicians.



## Determinants in outcome following orthopaedic surgery

**x-ref Hip, Knee, Foot, Hand, Shoulder, Spine, Trauma, Oncology, Paeds, Research**

■ Orthopaedic surgeons, especially arthroplasty surgeons, are being monitored extensively on their outcomes. Publicly available data in

many healthcare economies now not only list 'hard' end points like death, infection and revision surgery (which we all

know have a significant element of selection and practice bias) by hospital, but also by surgeon.

It will not be long before patient-reported outcome measures (PROMS) are publically available.

One of the dangers of this kind of data transparency is that outcome measures may not always be reporting what we believe them to be. The more generalisable, self-administered and subjective a measure (such as the EQ5D, DASH, etc), the less it is potentially subject to administrator bias, but the more it is subject to patient bias. Consciously or not, the majority of these scores likely also measure patient experience.

Researchers in **Durham (USA)** have set out to quantify the effect of some 'non-modifiable' risk factors on patient satisfaction scores. The research team used a previously collected large sample of 12 177 outpatient clinical encounters at a teaching hospital in an effort to partly unpick what is to a certain extent a Gordian knot. The study team used this sample of pre-collected data and divided the patients into 'generally satisfied' and 'unsatisfied' subgroups. A number of potential non-modifiable confounders were also evaluated including age, sex, employment, health insurance, zip code and subspecialty. Although a more complex multivariate analysis model may have been

more appropriate, the authors used a perfectly acceptable statistical model looking for predictors of satisfaction and dissatisfaction. Their analysis suggested that increasing age was strongly associated with satisfaction (younger patients being less satisfied) and patients who have travelled further, curiously, were more satisfied with their care.<sup>5</sup> The authors of this interesting study make a good point, and one that will not be news to any practising orthopaedic surgeon. Patient-reported outcomes are as much about the patient and the environment as they are about the surgery. This of course doesn't make them an invalid outcome tool – assuming, that is, that everyone has the same patient mix.

## Patient 'activation' and outcomes

■ Patient 'activation' is a bit of a buzz word on the other side of the pond, but we are sure it is a concept with which we are going to become familiar the world over. There are patients who do well and patients who do not – this is a truism in all types of medicine and surgery. The more experienced clinician will always talk about 'picking a winner', but how do we know or quantify who are going to be winners. Patient activation goes some way towards explaining this. It is the concept that a patient's ability to engage with adaptive health behaviours might be as important in achieving a good result as many other factors. In one of the first papers studying the effects of activation, researchers in **Salt Lake City (USA)** have explored the relationship between patient activation and joint arthroplasty outcome scores. The study is a simply designed, prospective case series of 134 patients undergoing hip or knee arthroplasty at one of two centres. Data were collected pre-operatively including the patient activation measure (PAM), Hip Disability and Osteoarthritis Outcome Score (HDOS) and Knee Injury and Osteoarthritis Outcome Score (KOOS). Patients' activity and quality

of life measures were quantified using the UCLA and SF-12 scores.<sup>6</sup> The results themselves are both intuitive and fascinating. Patients with higher PAM scores experienced improved outcomes as measured by the KOOS and HDOS scores. Perhaps unsurprisingly, a higher PAM score was also associated with improvement in post-operative satisfaction and physical health scores.

## Neuroplasticity and nerve repair

**x-ref Hand; Shoulder**

■ In one of the most interesting papers to cross the 360 editors' desk in some time, researchers in **Malmö (Sweden)** ask this fascinating question in their small-scale randomised controlled trial: can neuroplasticity improve outcomes in nerve repair? Their study concerns the outcomes of 39 patients, all with median or ulnar nerve injuries who underwent primary repairs in the forearm. Participants were randomised to start sensory and motor relearning either within a week of the injury - well before any regeneration - or only once there were clinical signs of regeneration.<sup>7</sup> The sensory outcomes in the early intervention group were significantly better (as measured by the texture and shape discrimination domains of the Rosen score), with improved shape discrimination. Although a small-scale study, this should be a game changer in the field of peripheral nerve repair. There are few drawbacks to starting rehabilitation early and clearly encouraging early plasticity pays dividends later.

## KOOS score in predicting injury?

**x-ref Knee**

■ It has been known for some time that there are significant gender differences in both the propensity to injure the knee and the injury patterns that occur. There is some suggestion that self-reporting of previous knee injury and lower Knee Injury and Osteoarthritis Outcome Scores (KOOS) may have a predictive value

in anticipating future injuries in other areas of sports. However, curiously there have been no studies to date in female footballers, one of the highest risk groups for knee injuries.<sup>8</sup> A research team in **Amager-Hvidovre (Denmark)** undertook a simple epidemiology study of 326 adolescent female football players without injury, as a baseline cohort. They recorded the players' self-reported previous knee injuries and administered a KOOS score. Rather innovatively, the research team utilised text message technology to undertake weekly surveys of participants' time lost

from play. Risk factor analysis was undertaken and established that previous self-reported knee injuries (relative risk 3.65) and all KOOS subscores were also predictive of future time lost from play due to injury when less than 80 points. Female soft-tissue knee injuries are one of the areas where 'prehab' with appropriate proprioceptive and muscle-strengthening exercise has been demonstrated to reduce the rate of future injury. Perhaps targeting this intervention at young female players with these risk factors could reduce injury rates even further.

#### REFERENCES

1. **Pfefferle KJ, Dilisio MF, Patti B, Fening SD, Junko JT.** Transparency to reduce surgical implant waste. *Clin Orthop Surg* 2015;7:207-210.
2. **Pratten J, Wiecek J, Mordan N, et al.** Physical disruption of oral biofilms by sodium bicarbonate: an in vitro study. *Int J Dent Hyg* 2015;(Epub ahead of print) PMID: 26198308.
3. **Bjarnsholt T, Alhede M, Jensen PØ, et al.** Antibiofilm properties of acetic acid. *Adv Wound Care (New Rochelle)* 2015;4:363-372.
4. **Douketis JD, Spyropoulos AC, Kaatz S, et al.** Perioperative bridging anticoagulation in patients with atrial fibrillation. *N Engl J Med* 2015;(Epub ahead of print) PMID: 26095867.
5. **Abtahi AM, Presson AP, Zhang C, Saltzman CL, Tyser AR.** Association between orthopaedic

outpatient satisfaction and non-modifiable patient factors. *J Bone Joint Surg [Am]* 2015;97-A:1041-1048.

6. **Andrawis J, Akhavan S, Chan V, et al.** Higher preoperative patient activation associated with better patient-reported outcomes after total joint arthroplasty. *Clin Orthop Relat Res* 2015;473:2688-2697.
7. **Rosén B, Vikström P, Turner S, et al.** Enhanced early sensory outcome after nerve repair as a result of immediate post-operative re-learning: a randomized controlled trial. *J Hand Surg Eur Vol* 2015;40:598-606.
8. **Clausen MB, Tang L, Zebis MK, et al.** Self-reported previous knee injury and low knee function increase knee injury risk in adolescent female football. *Scand J Med Sci Sports* 2015;(Epub ahead of print) PMID: 26179111.

© 2015 The British Editorial Society of Bone & Joint Surgery. DOI: 10.1302/2048-0105.42.360386

# Stay up-to-date with orthopaedic research anywhere

Download the free Bone & Joint journals app



full-text articles available with your subscription

[www.bjj.boneandjoint.org.uk](http://www.bjj.boneandjoint.org.uk)