with a partial distal biceps rupture treated in their institution. Given the retrospective nature of the design, it is not surprising that the authors were only able to successfully contact 74 of these patients with an outcome survey. In this population, 56% of the contacted patients who tried an initial nonoperative course (34 of 61 patients) ultimately underwent surgery, meaning that 27 patients had completely nonoperative treatment, 34 patients failed nonoperative management and underwent delayed repair, and 13 patients underwent immediate surgery after their injury. There was no difference in satisfaction scores between patients who tried a nonoperative course before surgery and those who underwent immediate surgery. The only preoperative factor identified as being predictive of having a delayed repair was an MRI-diagnosed tear of greater than 50% of tendon width. Perhaps most importantly in this study, there were no differences in complication rates between those patients who underwent acute and delayed repairs. This study is useful for the initial counselling of these patients and they can be advised that, although there is a sizeable chance that they will fail nonoperative management, there is no lost opportunity and a delayed repair is not likely to incur a disadvantage. Higher-demand patients and those with a tear width over 50% should also be advised of their increased risk of need for delayed repair.

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Spine

X-ref ***For other Roundups in this issue that cross-reference with Spine see: Children's orthopaedics Roundups 2 & 8; Research Roundup 1.***

Bariatric prior to spinal surgery: as good as it sounds?

Obesity is an ever-increasing problem. Currently in the United States, 35% of the population is obese (defined as a body mass index (BMI) of 30kg/m² or higher), and these patients are more likely to present to spinal surgeons than those with a normal weight. Obese patients presenting for spinal surgery are, as with any systemic comorbidity, more likely to encounter complications during their care. One answer to this problem may be to undertake bariatric surgery in an effort to aid the patient in aggressive weight loss prior to treating the spinal pathology. Bariatric surgery has been shown to positively influence obesity-related health problems, and so a group from **San Francisco, California (USA)** have taken it upon themselves to see if the positive effects of this intervention extend into spinal surgery.[1] Retrospectively, a group of 180 425 adult patients who underwent posterior spinal fusion was gleaned from the State Inpatient Databases of New York, Florida, North Carolina, Nebraska, Utah, and California. There were 156 517 patients included in the analysis, who were divided into three groups: the first group of patients had bariatric surgery followed by fusion; the second group of patients were obese and underwent fusion without bariatric surgery; and the third group of patients were of normal weight and underwent fusion. There were 590 patients who had undergone prior bariatric surgery, 5791 who were severely obese, and 150 136 who were not obese. Patients undergoing revision or anterior surgery were excluded, as were those with bone malignancy or metastatic disease, infection, or trauma. Medical and surgical complications at 30 days and length of stay were assessed. Patients undergoing bariatric surgery prior to fusion were younger than the other groups and, when compared with obese patients without surgery, were found to have lower rates of respiratory failure, urinary tract infections, and acute renal failure. There was an overall reduction in medical complications (OR 0.59) and infection (OR 0.65). However, when comparing patients following bariatric surgery with non-obese patients, there were no significant differences in medical complications. When compared with patients with normal BMI, however, the bariatric surgery group maintained a higher rate of infection, revision surgery, and readmission. So, our obese patients do better following bariatric surgery, but not as well as those who have no history of obesity. The authors recommend a full nutritional workup of the patients prior to carrying out any procedure. As bariatric surgery has an association with poor bone quality, however, perhaps weight-loss procedures should be part of the larger treatment plan for this patient group.

A MAP to loss of intraoperative cord monitoring

Intraoperative cord monitoring is recommended by the Scoliosis Research Society to optimize outcomes in complex spinal procedures through the early identification of neurological dysfunction. However, intraoperative cord monitoring can be a volatile beast. Loss of signal can indicate a range of problems, which can be both patient-related or technical in nature, and which may not necessarily indicate damage to the spinal cord. Vitale suggested a checklist of steps that should be taken when changes occur in cord monitoring signal to exclude the causes of signal loss in a systematic way, one of which is to address the mean arterial pressure (MAP). A group from **Los Angeles,**

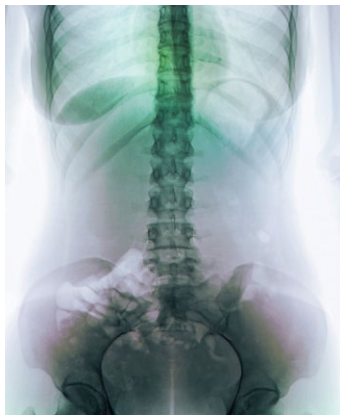
California (USA) have sought to identify how useful this step is in restoring signal as part of a wider study into validating Vitale's checklist.[2] The authors took a prospective group of 452 patients aged between one and 19 years undergoing surgery for scoliosis, kyphosis, or hyperlordosis, excluding any with a pre-existing neurological deficit, across three spinal surgical centres. They found that 7% of patients showed signal loss during their procedure, as documented by the operating surgeon; 20% of these patients had a return of signal with elevating the MAP by a mean of 18 mmHg alone, 67% of which had a return of signal within 10 minutes. Of the 7% of patients who showed signal loss during their procedure, a further 60% had a return of signal after elevation of MAP with an additional intervention; the remaining 20% had a return of signal with a different intervention altogether (including removal of distraction or compression, loosening screws, or changing the rod shape). Where multiple signal losses were encountered, the second signal loss took 2.6 times as long to return. In this series of 452 patients, all but two patients had normal neurology at the end of the procedure: one with a root injury and one with a costal nerve injury leading to reduced sensation. The authors note that, in general, a loss of signal amplitude of between 50% and 80%, or an increase in latency of 10% or more, is consistent with signal change. They suggest that the first step should be to elevate the MAP to 85 mmHg or above, which should be joined with a second intervention if it fails to correct signal amplitude. Of course, if there is an obvious cause for signal loss, such as a misplaced pedicle screw, this should be reversed first. This is a useful study that starts to create some practical, evidence-based guidelines for managing signal loss during challenging cases. The evidence base is thin in this area, and this study lays out a template with which other interventions can be evaluated within the limits of a surgeon-reported study.

Visual disturbance in spinal surgery

The loss of vision after a spinal procedure is a risk described in the consent process that can be particularly concerning for patients. It is rare, however, with only 0.2% of patients said to suffer from this worrisome complication. We are fortunate to now have the benefit of additional data to better describe this risk to our patients, in the form of a study from **New York, New York (USA)**, where a group has used data from the 782 members of the Scoliosis Research Society who recorded their procedures and outcomes with the organization between 2009 and 2012.[3] The authors sought to identify the frequency and risk factors for anterior and posterior optic neuropathy, cerebral blindness, and central retinal artery occlusion. A total of 167 972 patients were included in the analysis, which showed 21 incidences of visual problems, a rate of 12.5/100 000. Of the 21, ten were being treated for scoliosis, eight for kyphosis, and three for spondylolisthesis. On average, patients had between eight and nine levels fused. When further analysis was undertaken, there was a significantly higher risk of visual problems following kyphosis surgery (0.049%) over scoliosis (0.010%) and spondylolisthesis correction (0.005%). Furthermore, of the 21 affected, 20 were operated on prone for a mean of 264 minutes and lost up to 1.4 l of blood. Five patients had complete bilateral visual loss and four had partial bilateral loss, with over 50% of symptoms emerging within the first day postoperatively. Every patient who was positioned with a commercial head holder or tongs made a full recovery or notable improvement. Positioning the patient flat appeared to be an additional risk factor. The authors note that anaemia, blood loss, and intraoperative hypotension are all recognized risk factors for visual loss; however, this study suggests that it is even less common than first thought, and that through careful positioning the risk can be minimized. There is also valuable information here to aid with patient counselling; those at high risk of complications can be identified and can have the risk more fully explained to them.

Online rating of surgeons: a necessary evil?

Everything now is assessed and rated online, from restaurants, hotels, and airlines, to countless other products or services. Perhaps, then, it is to be expected that surgeons are similarly reviewed, with the results posted online for all to see. This study from **New York, New York (USA)** analyzed the ratings of spine surgeons who are members of the Cervical Spine Research Society (CSRS) on five physician review websites (PRW): healthgrade.com, vitals.com, ratemd.com, webmd.com, and yelp.com.[4] They standardized the scores given to surgeons on a 1 to 100 scale. Out of 209 spine surgeons, 208 had been assessed at least once on one of these five websites. The mean number of ratings per surgeon was 2.96. The key finding was that most surgeons were positively reviewed (mean score, 80/100). However, surgeons in an academic centre had significantly higher scores, as did younger surgeons, defined as those in clinical practice for less than twenty years. While surgical outcomes are now routinely recorded and analyzed by funders of health care, patients, who are the direct healthcare consumer, are increasingly using physician reviews to select their surgeon. The authors suggest that younger surgeons may be more internet-savvy and attuned to the importance of online marketing. Several of these PRWs are unregulated and ratings are vulnerable to being skewed by a single disgruntled patient. The authors discuss strategies such as having a staff member who monitors and responds to poor online ratings, but who also ensures that satisfied patients also complete an online assessment. PRW ratings



will become an integral part of the surgeon's portfolio and a poor review will become hard to ignore if it jeopardizes future referrals. Perhaps the most sensible option is for the institutions themselves to arrange for viewable online feedback of patient experience, ensuring a comprehensive coverage of both satisfied and dissatisfied patients.

Supine radiographs for determining in-brace of adolescent idiopathic scoliosis

Scoliosis is commonly treated with surgery when curves are either progressive, neuromuscular, or unsightly. Although surgery often seems an attractive 'instant fix' from the patient's perspective, surgeons are always aware and mindful of the life-changing complications that can on occasion arise from scoliosis corrections. Bracing can also be an effective way of treating adolescent idiopathic scoliosis in skeletally immature patients with progressive curves; however, this requires adherence to bracing protocols, and can be cumbersome for patients. Consensus opinion suggests that the in-brace Cobb angle correction should be around 50% for the brace to be effective. But how do spine surgeons judge curve flexibility and thus predict which curves will correct in a brace? The standard techniques include obtaining lateral bending, traction, or fulcrum radiographs, but these techniques can be prone to variability. Investigators from **Hong**

Kong have assessed whether the Cobb angle from supine radiographs correlate with final in-brace standing radiographs.[5] Their study results were derived from a series of 105 patients with a mean age of 12.2 years; the patients were Risser stage 0 to 3, and presented with curves of between 25° and 40°. Univariate analysis showed that supine radiograph Cobb angle did indeed correlate with the in-brace Cobb angle. Other factors such as age, weight, date of menarche, Risser stage, or pre-brace standing Cobb angle showed no significant relationship. From their study sample, the authors then went on to perform regression analysis to produce a predictive formula: in-brace Cobb angle = 0.809 × supine Cobb angle. Essentially, this means that, in a brace, the final correction should be approximately 80% of the supine Cobb angle. This is a useful guide for the clinician and demonstrates that it is the flexibility of the curve rather than the size of the curve that determines the effectiveness of the brace.

Posterolateral discectomies in paediatric spinal deformities

X-ref

■ The correction of significant scoliotic deformity can only really be achieved using a combination of release, instrumented correction, and fusion. Historically, when required, surgical correction of idiopathic scoliosis entails an anterior release, which involves excising the anterior longitudinal ligament, disc, and adjoining rib heads, with the opportunity to graft the intervertebral space, and then undertaking a posterior instrumented fusion. However, with the advent of pedicle screw systems and the powerful correction they offer, the need for an anterior release has decreased significantly. The majority of anterior releases now are undertaken for large rigid curves, shorter focal curves with severe rotation, and also large curves in patients with an open triradiate cartilage. However, anterior release, when performed, has an associated morbidity for the patient. Anterior approach in the thoracic spine involves a significant transthoracic dissection and therefore a chest drain is required. In addition, there is a reported reduction in pulmonary function and the potential for damage to vessels and viscera. Modern spine surgeons may also be less familiar with the approach. Surgeons from **Baltimore, Maryland (USA)** have set out to compare an all-posterior procedure, which involved a posterolateral discectomy to release the intervertebral disc space and subsequent posterior instrumentation (PLDF), with a 'traditional' anteroposterior spinal fusion (APSF).[6] Their posterolateral discectomy technique consisted of a wide facetectomy at the apex of the deformity, excision of the rib head, and posterolateral discectomy to 'shorten' the convex side of the curve. The authors reported the outcomes of 56 children who underwent PLDF and 21 who underwent APSF in a comparative case series; both groups had similar diagnoses (adolescent idiopathic, neuromuscular, and syndromic scoliosis) and curve characteristics. Their study showed that the PLDF group achieved an eventual greater curve correction (86% *vs* 57%), less blood transfusion (mean 2.5 (SD 2.6) *vs* 4.0 (SD 3.3)), and, as would be expected, a significantly lower incidence of staged surgery (1.8% *vs* 86%). Although this study consists of small patient numbers in a single centre, this technique appears to be a reasonable alternative to the morbidity of a two-stage front-back procedure.

Infection following spinal instrumentation: what are the risks?

■ One of the worst nightmares for both the spinal surgeon and the spinal patient is the development of a postoperative infection. In addition to the usual problems of wound breakdown, poorer outcomes, and extended antibiotics with additional surgical procedures, there is the difficulty that patients suffering spinal infection cannot often have their metalwork removed to aid treatment, due to the inherent risk of spinal instability. The development of infection within the cord carries with it significant complications and risks. While there has been much work undertaken on the risk factors for surgical site infection (SSI) in spinal surgery, perhaps not every stone remains unturned. Investigators from **Niigata (Japan)** have set out to establish if there are any unrecognized factors that contribute to the higher-than-average rate of surgical site infection in instrumented spinal surgery compared with other clean orthopaedic procedures.[7] The authors utilized the records of 431 patients who underwent surgery over a three-year period with at least three months of reported follow-up. The authors then went on to establish what factors (if any) were associated with SSI, including a range of operative and perioperative factors. Perhaps one of the main weaknesses of this study is its reliance on a small number of events, with just 15 patients in the series developing a deep or superficial infection. The initial screening univariate analysis yielded an association with diabetes mellitus (OR 4.7) and serum albumin (OR 3.35). In addition, the authors venture that polypharmacy has a role to play in infection, with significantly more regular medicines in the infection group than in the control group. A secondary multivariate analysis revealed that taking seven or more regular medications was an independent risk factor significantly associated with SSIs (OR 7.3). This report is the first to suggest that the number of drugs prescribed is related to the postoperative infection rate of spinal surgery. This effect is clearly not just due to medications; polypharmacy is indicative of increased numbers of comorbidities. However, whatever the cause, and despite the weakness of the evidence due to the low number of events observed, the finding that seven medications can act as a marker of higher risk of complications is a useful one.

Lumbar spinal stenosis surgery or not?

■ Patients with lumbar spinal stenosis may result in natural remission, with reduction in symptoms and no need for surgery. For this reason, surgical indications need to be considered very carefully; an operation that carries significant risks should not be undertaken in a patient who is likely to get better anyway. In this study from **Wakayama (Japan)**, the authors undertake surgery only in patients where symptomatic improvement in lumbar spinal stenotic symptoms is not obtained after an initial course of six weeks of physiotherapy. The cohort consisted of patients presenting with spinal claudication and CT-proven lumbar spinal stenosis with symptoms affecting both legs. Initially, the whole cohort of 38 patients was treated with a physiotherapy regime consisting of manual therapy, stretching and strengthening exercises, and bodyweight-supported treadmill walking for six weeks. The outcomes were assessed using the Zurich Claudication Questionnaire (ZCQ), visual analogue scale for pain, Japanese Orthopedic Association Back Pain Evaluation Questionnaire, and 36-Item Short-Form Health Survey (SF-36). Follow-up was to two years. Between these two groups of patients, there were no significant differences in clinical outcomes at baseline, although, unsurprisingly, the group that was responsive to physiotherapy had superior scores six weeks after physiotherapy in the ZCQ, and in physical functioning and bodily pain on the SF-36 subscales. These were maintained and did not differ significantly between groups at final two-year follow-up. This seems to suggest that in the medium term, at least, there is little need for surgery for lumbar spinal canal stenosis cases where symptomatic improvement was observed within physical therapy for six weeks.

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Trauma

X-ref ***For other Roundups in this issue that cross-reference with Trauma see: Foot & Ankle Roundups 3 & 6; Wrist & Hand Roundups 1 & 2; Shoulder & Elbow Roundup 7; Children's orthopaedics Roundup 1; Research Roundups 1 & 4.***

Antibiotic prophylaxis and removal of metalwork X-ref

■ Seldom, here at *360*, do we see a randomized trial about a topic that we weren't expecting but nevertheless wanted to read. This randomized trial from **Amsterdam (The Netherlands)** was designed to answer the question, are antibiotics required for removal of fracture metalwork?[1] The investigators performed a multicentre, double-blinded, randomized clinical trial designed to determine whether antibiotics affect the incidence of infection following removal of metalwork. Patients recruited to the trial were randomized to either a single preoperative intravenous dose of 1000 mg of cefazolin or 0.9% sodium chloride. The authors report the outcomes of 500 patients recruited to the trial, 228 in the cefazolin group, and 242 in the saline group. They designed the study to report the primary outcome of surgical site infection within 30 days, as measured by the criteria from the US Centers for Disease Control and Prevention. The study followed up the patients to six months for final follow-up, and excluded patients with any of the following: active infection or fistula, antibiotic treatment, reimplantation of osteosynthesis material in the same session, allergy to cephalosporins, known kidney disease, immunosuppressant use, or pregnancy. Overall, 66 patients developed a surgical-site infection (14.0%): 30 patients (13.2%) in the cefazolin group *versus* 36 in the saline group (14.9%) (absolute risk difference was -1.7, which was not significant). This study showed that, in patients undergoing surgery for removal of orthopaedic implants used for treatment of fractures below the knee, a single preoperative dose of intravenous cefazolin does not reduce the risk of surgical-site infection within 30 days of implant removal.

Locking plate fixation *versus* intramedullary nail fixation: the UK FixDT randomized clinical trial

■ In what has been a bumper month for clinically relevant randomized trials, a multicentre team of investigators led by **Coventry (United Kingdom)** report the UK Fixation of Distal Tibia Fractures (UK FixDT) randomized trial, for which 321 patients with a closed, displaced, extra-articular fracture of the distal tibia were recruited.[2] Patients were randomly allocated to be treated with either an intramedullary nailing (n=161 patients) or a locking plate (n=160 patients). The study was designed to assess the impact of fixation type on patient disability and also to undertake a cost-effectiveness analysis at a six-month final follow-up. The overall primary outcome measure was the Disability Rating Index (DRI) at six months. The exclusion criteria for this study included open fractures, fractures involving the ankle joint, contraindication to nailing, or inability to complete questionnaires. The authors established no statistically significant difference in the DRI score between groups at six months (mean score, 29.8 in the nail group *vs* 33.8 in the plate group; adjusted difference, 4.0). However, there was a statistically significant difference in the DRI score at three months in favour of nail fixation (44.2 in the nail group *vs* 52.6 in the plate group). There were no statistically significant differences in complications, not even in the number of postoperative infections (9% in the nail group *vs* 13% in the plate group). Further surgery was more common in the plate group at 12 months (8% in nail group *vs* 12% in plate group). The investigators concluded that neither nail fixation nor locking-plate fixation resulted in superior disability status at six months. The results of this study are similar to those reported by Vallier et al in 2011.[3] They randomized 104 extra-articular distal tibial shaft fractures to intramedullary nailing or medial plate fixation. Their main outcome measures were malunion, nonunion, infection, and secondary operations. They found that the rates of infection, nonunion, and secondary procedures were similar between the two treatment groups.

Staged prone/supine fixation of tibial plateau fractures X-ref

■ High-energy tibial plateau fractures have been much in focus in recent years. The popularization of the posteromedial approach to the knee and plating from the back has allowed fixation of posterior plateau fractures that were previously considered 'unfixable'. While, in isolation, these posterior sheer fractures are nearly always fixed with the patient prone, there is still some debate surrounding the indications for a 'front and back' fixation, and the results are far from clear. In a timely multicentre retrospective study, these authors from **New York, New York (USA)** described a staged surgical protocol for treatment of patients presenting with high-energy multicolumnar tibial plateau fractures with significant posterior articular surface involvement.[4] The authors describe their staged approach for these fractures and support it with some clinical data. Their surgical tactic is to start with the patient prone, allowing