in long bone fracture surgery. The advantages cited are the facility to maintain and hold an accurate reduction without increased periosteal stripping. While the premise is clear, there is little evidence other than a few small case series to establish what the biomechanical effects of these supplemental small plates are. We were delighted to see this published report of a very timely investigation undertaken by researchers in **San Francisco, California (USA)**.[6] The authors designed and reported a biomechanical study with the express intention of evaluating the influence of MFPs on the four-point bending and torsional stiffness of long bone transverse and simple wedge fracture fixation constructs. The study involved the use of a simple biomechanical model consisting of composite bone cylinders that were cut in a standardized fashion to produce transverse (AO-OTA classification 12-A3) and simple wedge (AO-OTA classification 12-B2) fracture models. These were then reconstructed using a standard locking compression plate (LCP) plate with or without an additional MFP. The MFPs were applied in three different potential orientations. MFPs significantly increased the bending stiffness for wedge fracture constructs when MFPs were positioned both orthogonal and opposite to the LC-DCP. The results of this study are not really that surprising and mimic earlier work looking at 90:90 plating and the use of cortical strut grafts in long bone fixation. However, they do serve as a timely reminder that the use of even MFPs can have a dramatic effect on the fixation of these plates.

A new approach to lateral clavicle fractures? X-ref

■ There are high rates of complications associated with lateral clavicle fixation. The injuries themselves are associated with a high rate of complications, such as nonunion when treated conservatively. The difficulty is that operative treatment is also associated with a significant complication rate. Use of plates on the lateral clavicle is associated with high pull-out rates without sling or suture reinforcements to the coracoid. Bridging options, such as the hook plate are associated with cuff pathology and erosion of the lateral acromion. Overall, there is no perfect treatment. In the specialist shoulder trauma world, a range of techniques involving a suspensory device with reconstruction of the coracoclavicular ligaments and then reinforcement of the lateral clavicle fracture are being used. This group, from **Edinburgh (UK),** have been proponents of their own particular technique, where open reduction and use of a tunnelled suspensory device (ORTSD) has been used.[7] The purpose of their current study was to evaluate the medium-term results of this approach in a larger series of patients treated using this technique. They reported 67 patients all treated with ORTSD for a lateral clavicle fracture in a single unit Outcomes were reported using the Disabilities of the Arm, Shoulder and Hand (DASH) score and Oxford Shoulder Score (OSS) at regular intervals to 12 months of follow-up. Complete follow-up data was available for 55 of the patients, with three deaths and the remainder lost to follow-up. Outcomes were overall good with a mean OSS of 46.4 points and DASH score of 2.4 points at 12 months. These were stable to final follow-up of 64 moths. There were two patients who developed a symptomatic nonunion requiring a reoperation, and two patients developed an asymptomatic fibrous union. The authors report an overall five-year survival using implant-related complications of 97.0%. This well-thought-out report demonstrates a low rate of complications and very satisfactory outcome measures at medium-term follow up.

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Oncology

X-ref ***For other Roundups in this issue that cross-reference with Oncology see: Children's orthopaedics Roundup 7.***

Proximal *versus* distal location in limb osteosarcomas

■ A group from **Oslo (Norway)** has conducted the first nationwide study of its kind, investigating a national cohort of all high-grade osteosarcomas (OS) in limb long bones.[1] Their study spanned all cases in Norway between 1982 and 2009 and is one of the most complete musculoskeletal tumour studies of its type. The authors aimed to establish the prognostic factors and outcomes of OS lesions located in proximal *versus* distal long bones. As a relatively rare diagnosis, this cohort consists of 221 patients, all with OS of the appendicular skeleton. Univariate analysis did not identify any significant differences in survival between patients with OS in the proximal long bones (101 cases) and patients with OS in the distal part of these bones (120 cases). As one might expect, proximal femoral and primary metastasis were both independent adverse prognostic factors for sarcoma-specific survival in multivariate analyses. In terms of other factors, the authors have established that elevated lactate dehydrogenase and secondary OS were poor prognostic factors and were associated with a lower rate of event-free survival. The team concluded that OS of the proximal femur had an unfavourable outcome in comparison with OS in other anatomical locations in limb long bones, unlike several prior studies that found poorer outcomes for proximal over than distal OS.

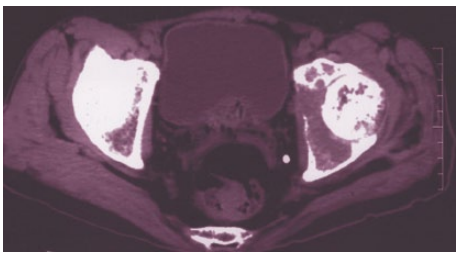
Osteosarcoma around the knee and limb salvage surgery

■ This interesting study from **Shanghai (China)** looked at how treatment-related factors influenced prognosis in 182 patients being treated for osteosarcoma around the knee with limb salvage surgery between 2004 and 2013.[2] The tricky question remains of how best to undertake limb salvage for patients with lesions in the proximity of the knee where amputation is likely to be above the knee.

In this series, the authors reported that 63 patients had died by the end of the 73-month follow-up. The overall survival rate was 68.6% and 59.4% at five and ten years, respectively. The authors' subsequent analysis of the data showed that the prognostic factors for overall survival were symptom intervals over 60 days, biopsy and subsequent resection performed by different surgical units, medical comorbidities, incomplete preoperative chemotherapy, incomplete implementation of planned neoadjuvant chemotherapy, and delaying postoperative chemotherapy for longer than three weeks. The data reinforce that chemotherapy timing and appropriate referral to an experienced centre capable of performing both biopsy and resection should be prioritized, in order to reduce the chance of developing local recurrence. Despite the improvements in survival for many tumour diagnoses, it is clear that there are a number of diagnoses where the outcome is still somewhat bleak, and simple measures to improve prognosis are very much welcomed.

Outcomes for chondroblastic osteosarcoma of the limbs and pelvis

■ Continuing on the theme of outcomes following an osteosarcoma diagnosis, this group from **Birmingham (UK)** have conducted a retrospective review of their series at a regional tumour centre.[3] This report investigates the outcomes of 256 patients diagnosed between 1979 and 2015 with chondroblastic osteosarcomas (COS) of the limbs and pelvis, in order to explore the factors that influence their overall outcomes. Using a retrospective review of prospective data, the group showed that, overall, 82% of patients had a poor response to chemotherapy, and that this poor response was associated with the presence of a predominantly chondroblastic tumour. The incidence of local recurrence overall was 15%. Synchronous or metachronous metastasis was diagnosed in 60% of patients. Overall survival was 51% and 42% after five and ten years, respectively, which is in line with other published series but still very low for this tumour. Conventional chemotherapy regimens used for osteosarcoma do not seem as effective in COS, with less than one-fifth of patients in this study demonstrating a good histological response, which explains the overall results report here. This response to chemotherapy, and the subsequent ongoing development of metastases, is significantly lower than that reported in the literature for conventional high-grade osteoblastic OS. The inferior response seen in tumours with a predominantly chondroblastic component indicates that the osteoblastic component of the tumour is more susceptible, which is in line with the known resistance of malignant cartilage tumours to chemotherapy. Furthermore, in contrast to what is known for conventional OS, the authors have here demonstrated that the response to chemotherapy was not a significant predictor of local control or survival. The authors conclude that despite the comparable epidemiological factors of COS and conventional high-grade OS, the former have a unique biological behaviour characterized by poor response to standard chemotherapy and a very high rate of metastases.



Is there a role for chemotherapy after local relapse in high-grade osteosarcoma?

■ This study, carried out in **Bologna (Italy)**, sought to identify if there are any patterns in the unfortunately common local recurrences (LRs) that occur in patients with high-grade osteosarcoma, and to investigate the overall factors that influence survival.[4] The authors included patients who experienced LR as the first event of recurrence after treatment for localized high-grade osteosarcoma, and excluded those who presented with metastatic disease. From a series of 869 patients with nonmetastatic osteosarcoma treated between 1995 and 2015, 70 patients (8%) had an LR as the first pattern of recurrence. Of these patients, 62 were included in the present analysis, with LR only seen in 58% and LR in combination with distant metastases seen in 42%. Over the course of the study, 49 patients (79%) were known to have relapsed within the first two years. The latest recurrence occurred after nine years and six months of follow-up. Surgical removal of the LR was performed in 53 patients (85%); chemotherapy treatment after LR was administered to 34 patients. After a median follow-up of 43 months, 39 patients (63%) died of disease, 22 (35.5%) were alive and free of disease, and one (1.5%) was alive with disease. Patients with LR without evidence of systemic disease had a survival rate of 60% at five years, compared with 11% in the case of distant metastasis. The five-year LR survival rate was reported as 31% in patients with an LR-free interval of two years or shorter, increasing to 61.5% with a LR-free interval of longer than two years. Patients with early LR more frequently presented with distant metastasis. This study suggests that generalized use of second-line chemotherapy in LR osteosarcoma cannot yet be supported.

Wound complications in sarcoma

■ As a result of improvements in radiological and therapeutic techniques, limb soft-tissue sarcomas are increasingly managed with wide local excision. This study from **Toronto (Canada)** carried out a systematic review of studies investigating the outcomes of surgery for limb soft-tissue sarcomas identified from the usual databases.[5] The majority of contemporary literature focuses on event-free survivals, overall survival, and local and distant recurrence rates to evaluate the success or otherwise of surgery. However, this only tells part of the story, with high rates of complications including wound breakdown and infection that are not captured by purely reporting oncological outcomes. The authors of this meta-analysis have focused on the local complication and revision rates, and have gone on to identify factors associated with subsequent wound complications. Overall, there were 21 studies that fulfilled the inclusion criteria and were included in the analysis; these studies reported the outcomes of 5628 patients. The overall wound complication rate was as high as one might expect at 30.2%, and the authors report a reoperation rate of 13.37%. The risk factors identified included age, obesity, smoking, tumour size, diabetes mellitus, tumour site, and preoperative radiotherapy. These factors were found to be associated with poorer outcomes and wound complications. The authors note that there was wide heterogeneity between the studies, which were in most instances not designed primarily for this purpose. There was, therefore, a limited amount of analysis that could be carried out. This article highlights the high incidence of wound complications following soft-tissue sarcoma surgery and acts as useful information to communicate to patients.

Baseline erythrocyte sedimentation rate and outcomes in sarcoma

■ Systemic inflammation plays a role in the progression of cancer and in a range of outcomes, including survival, following treatment for a number of diagnoses. This is an area that we are only just really starting to take note of in orthopaedics, although it has been highlighted for many years as part of the enhanced recovery after surgery (ERAS) protocols widely used in other areas of surgery. This report from

a team based in **Seoul (South Korea)** investigated the contribution of C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) as biomarkers for predicting overall survival in patients treated with surgery and postoperative radiotherapy for soft-tissue sarcoma.[6] The team analyzed preoperative data from 99 patients presenting with limb soft-tissue sarcoma. Raised CRP was seen in 33 patients and raised ESR was seen in 44 patients; both were associated with subsequently reduced overall survival, disease-free survival, and distant-metastasis-free survival. Further analysis showed that elevated ESR is an independent prognostic factor for overall survival and distant-metastasis-free survival after controlling for other known factors. The authors undertook a receiver-operating characteristic curve analysis and established that a threshold of 0.14 mg/dl for CRP, 15 mm/h for ESR, and >1.95 for neutrophil:lymphocyte ratio were predictive of a poor outcome. This study lends weight to the established hypothesis that global inflammation plays a role in outcomes, and perhaps suggests a potential therapeutic target in the future, as well as helping to identify which patients are most likely to suffer from complications.

C-reactive protein as an independent prognostic indicator for disease-specific survival in patients with soft-tissue sarcoma

■ This study from **Wuhan (China)** again looks at the value of systemic inflammatory markers in prognostication for soft-tissue sarcoma.[7] These authors, however, present an evidence synthesis investigating the role of C-reactive protein (CRP) as a prognostic indicator for disease-free survival in the same condition. A systematic literature search was carried out for studies that investigated the correlation between CRP, disease-free survival, recurrence, and clinical characteristics. The team found nine eligible articles reporting a total of 1655 patients, and carried out a random-effects analysis to show that raised CRP correlates to both poor disease-specific survival and poor disease-free survival. The authors excluded a single heterogenous study and used a fixed-effects model to show that elevated CRP level was firmly correlated with poorer disease-specific survival (hazard ratio (HR) 2.36) and disease-free survival (HR 1.78). This is a useful study that helps to paint a picture of the factors influencing survival in this challenging condition.

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Children's orthopaedics

The value of the 'clicky hip' in selective screening for developmental dysplasia of the hip X-ref

■ There is some controversy and difference in opinion in the literature regarding the value of the 'clicky hip' when considering screening and investigation for developmental dysplasia of the hip (DDH). It is well recognized that DDH is a spectrum of pathology ranging from subtle dysplasia in a stable hip through to those that are dislocated. Early diagnosis is associated with improved outcomes, and missed dislocations have catastrophic consequences. While all children receive a hip examination as part of their baby checks in the United Kingdom, a selective screening programme is standard for access to ultrasound imaging. Patients with a history or examination of 'clicky hip' are not a universally accepted criterion for referral for paediatric screening. This excellent paper from **Nottingham (UK)** sought to use their large prospectively collected database to assess how many patients with a presentation of a 'clicky hip' and no further risk factors actually had a dysplastic hip on their initial ultrasound scan, and also what proportion of the children treated for DDH were initially referred as a 'clicky hip'.[1] This was a single-centre study in a large teaching hospital including all referrals to the paediatric hip clinic over a four-year period; all patients received an ultrasound scan and were clinically examined by a consultant surgeon. Over that period, 5716 children were referred and 1754 (30%) had a 'clicky hip' but lacked additional risk factors for DDH. Overall, 7% of children with a 'clicky hip' had an abnormal ultrasound scan, including 1% or 16 children with Graf 2b, 2c, 3, or 4 dysplasia. When reviewing the 141 patients treated in a Pavlik harness during the study period, 16% had been referred with a 'clicky hip' in the absence of abnormal clinical examination or any other additional risk factor. Worryingly, this group included Graf 3 or 4 hips in six children. Given the terrible consequences of missed diagnoses and the relative difficulty in providing late treatment, here at *360*, we would agree with the authors conclusion that this is an important indication for referral that should not be removed from the screening pathway. The authors also make an important observation on how such pathways are applied and, with a diverse group of clinicians performing baby checks, any manoeuvre reducing the sensitivity of the pathway to detect pathology does seem unwise.

Conscious sedation and fracture reduction X-ref

■ In many emergency departments there can be a strong reluctance to perform conscious sedation on paediatric patients who require manipulation of a displaced fracture. This is often due to an inability to provide the sedation safely, but there is also an argument that a further procedure is almost always required, leading to the reluctance to introduce what is seen as an unnecessary step. However, with inpatient beds and access to emergency operating space at a premium in many centres, any opportunity to safely and effectively intervene early would be welcome. This paper from **Boston, Massachusetts (USA)** examines the case mixture and outcomes in the children's emergency department