adult patients treated in a single centre who had operatively treated tibial (not pilon) fractures and, as such, could be potentially treated with plates, nails, or frames. The authors did not just consider plain film radiology; all patients also underwent axial CT scanning. This was used to confirm or refute the presence of a posterior malleolar fracture. Of the original cohort, 26 had distal third spiral fractures, and ipsilateral posterior malleolar fractures were seen in 24 cases. In this series, the authors sensibly undertook supplemental fixation of the posterior malleolus to prevent unwanted secondary displacement. It would certainly seem, based on this series, that all spiral distal tibial fractures should be investigated with a CT scan to ensure that there is no posterior malleolar fracture (displaced or not) visible on the CT that cannot be easily visualized on the plain films, as this may change management.

How oblique can screws be in a locking plate?

■ As the osteoporotic population continues to age with their hip and knee joints *in situ*, there is a wave of periprosthetic fractures starting to emerge. In many patients these are treated by fixation, and, essentially by definition, the screws need to be oblique to the cortex due to the presence of the implant stem in the canal. There are a few studies looking at this, but usually with non-locking screws. There are some clear clinically relevant messages from this biomechanical study performed in **Galveston, Texas (USA)** which sets out to establish what the impact of the type and orientation of peripheral screw placement has on locked plate constructs in a composite osteoporotic humeral model.[6] The authors investigated the structural and mechanical properties of the construct in order to establish what the effects were, if any, when centrally or eccentrically placed locking and non-locking screws were placed in the most proximal hole. The constructs were tested in torsion to failure. The most stable constructs were the centrally placed plates with a non-locking screw in the most proximal hole. The non-centrally placed non-locking screw construct failed at a significantly lower peak torque (51 Nm *vs* 39 Nm). The locking eccentric screws and non-orthogonal eccentric standard screw groups exhibited the lowest peak torques to failure with little to choose between the two (35 Nm and 32 Nm). Total energy expended to cause a periprosthetic fracture reflected the peak torques to failure.

Does intertrochanteric collapse affect shortening? X-ref

■ It is accepted widely in hip surgery that the restoration of femoral offset is one of the keys to successful hip arthroplasty. This impacts both the tension of the abductors and their lever arm, and functions to add stability to the hip joint, to reduce the muscle work required to walk by optimizing the abductor mechanical advantage, and to have a positive effect on hip stability. While this is not a surprise to any reader, there is a counterpoint in trauma surgery for intertrochanteric fractures. The controlled collapse is gospel, with fractures being encouraged to dynamize into a stable position with either a hip screw construct or a proximal femoral nail. These two aims are somewhat at odds in patient populations that are not that dissimilar, and there has been some contemporary thought that, while controlled collapse and compression improves healing rates, too much collapse may inhibit function. However, these authors from **New York, New York (USA)** set out to establish if there were any association between proximal femoral shortening and function in intertrochanteric hip fractures using the trochanteric fixation nail (TFN) and helical blade.[7] This study is based around the outcomes of 72 serial patients with intertrochanteric hip fractures all treated with the TFN cephalomedullary nail. At follow-up the authors undertook a gait analysis and radiographs in combination with a range of patient-reported outcome measures (Harris Hip Score, visual analogue scale for pain, Short Form-36 Physical Component Score, and Short Form-36 Mental Component Score). The follow-up period was, on average, a little under nine months and the average patient shortened by 4.7 mm; with 15 patients more than 8 mm. From a functional perspective, the patients with excess shortening had a poorer gait, with increased shortening resulting in decreased cadence, step length, and gait asymmetry. Despite these visible differences on gait analysis, none of the patient-reported outcome scores suggested a significant difference.

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Oncology

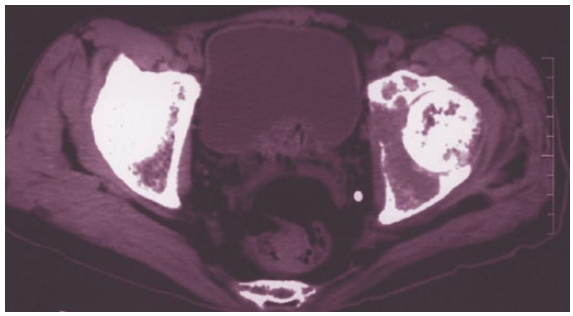
The significance of a 'close' margin in extremity sarcoma: a systematic review

■ Tumour surgery relies on accurate local staging to aid in the diagnosis and assess the efficacy of treatment. A critical part of this equation is the surgical tumour margin. However, how tumour margins are defined and reported is controversial. One group from **Iowa City, Iowa (USA)** has sought to use a comprehensive literature search and review to question if defining a margin as close, rather than positive or negative, is sufficient for clinical use.[1] The authors searched published literature for reports of studies that reported the treatment of at least ten patients presenting

with a primary sarcoma of a limb where patients received limb salvage or amputation surgery, and where the surgical margin of the excised pathology is reported alongside the histological grade. Studies were included if local recurrence after two years or more was reported. The literature search and article exclusion process resulted in 22 articles that reported the results of 498 patients for final data analysis. The authors found that the Enneking classification system, which distinguishes between intralesional, marginal, and wide or radical margins, was able to give more information on local recurrence compared with a simple dichotomous system, and therefore may be considered a more successful predictor of treatment outcomes. A close margin in this series behaves more like a positive margin than a negative margin. When all patients were analyzed, a marginal margin gave a recurrence rate of 50.48% compared with an intralesional margin recurrence rate of 75.76% and a wide/radical margin of 7.22%. A marginal margin was therefore shown to provide more information as a predictor of local recurrence compared with a positive or negative margin alone. The authors also went on to look at adjuvant therapies and, although radiation did slightly diminish local recurrence rates in high-grade soft-tissue sarcomas, there was still a substantial local recurrence rate, even with radiation therapy (30% in those who received radiation therapy, 31% in those who did not). In osteosarcoma patients, however, chemotherapy was associated with considerably reduced rates of local recurrence and positive margins. The need for a universal margin classification system remains and will undoubtedly be the focus of future studies. Yet, this simple paper gives a clear point.

Synovial sarcoma: do children do better? X-ref

Synovial sarcoma is an uncommon condition, and one that typically affects younger patients. With an often-delayed presentation and a varied clinical picture, it is commonly found as a delayed diagnosis. The current accepted thinking is that children presenting with soft-tissue sarcomas, such as synovial sarcoma, have a superior prognosis when compared with adults, and this has already been reported in some series in the literature. This study from **Birmingham (UK)** sought to investigate the factors responsible for the differences in cancer-specific survivals (CSS) in patients presenting with synovial sarcomas.[2] The authors examined the reported outcomes of 248 patients treated between 1982 and 2014 at one regional centre. The mean age of patients was 37 years, with 43 patients presenting at an age of less than 16 years. There were no differences in presentations between children and adults regarding tumour size, site, grade, and superficial/deep location. In patients treated with curative intent, five-year CSS rates were 75.5% for adults and 89.0% for children, with ten-year CSS rates of 56.1% and 82.2%. In a multivariate analysis, large tumour size and patient age were associated with poorer CSS, irrespective of tumour location and site. This study shows that the clinical presentation of synovial sarcoma is similar, regardless of age, and that small tumour size and a younger age at presentation is prognostic of an improved outcome.



Repeat surgical treatment of a local recurrence in soft-tissue sarcomas?

It is relatively well known that positive margins following the excision of a soft-tissue sarcoma are related directly to local recurrence, but the relationship between surgical margin and survival remains controversial. In the second noteworthy paper to cross the editorial desks at *360* this month concerning surgical margins in sarcoma, a group from **Scottsdale, Arizona (USA)** examined the clinical outcomes and factors associated with survival and local re-recurrence in patients after initial surgical treatment of soft-tissue sarcomas who underwent another resection with a goal of negative margins.[3] The case series reported here covers over 20 years (1992 to 2013) and the group treated 530 patients with soft-tissue sarcoma without metastasis in this time frame. Of those, 26 (5%) were lost before three years of follow-up. Of the remainder, 59 had a local recurrence. Of those with a local recurrence, 34 (58%) were treated with wide resection and 30 of these (88%) were available for follow-up. Overall five- and ten-year survival rates after resection were 70% and 44%, respectively, and 12 patients (40%) developed distant metastases after the second operation. Ten patients (33%) had additional local recurrences, and overall five- and ten-year local re-recurrence-free rates were 66% and 50%, respectively. A positive margin in this series – like many others – was associated with further recurrence and with poorer survival. The survival rate was lower in patients with recurrence developing within two years. The authors postulate that, based on their presented results, surgical margins may have shown a correlation with survival because other adjuvant treatments, such as chemotherapy, were not routinely used; only one-third of the patients here received adjuvant therapy. Although the authors could not show that the use of adjuvants (chemotherapy or radiation) had an effect on local re-recurrence or survival, their study was not designed to assess that.

The MDT and Ewing's sarcoma

Despite the perceived importance of the multidisciplinary team (MDT) in successfully managing orthopaedic malignancies, their value, in terms of benefit for patients and the health care system in general, is not well documented and is consequently the subject of controversial discussions. The direct healthcare costs of a multidisciplinary meeting are, of course, much easier to assess than the health economic benefits of any improved survival they bring. A group from **Essen (Germany)** sought to address this deficit through demonstrating the value of their interdisciplinary tumour board (ITB), which is akin to the MDT seen in other systems.[4] Their paper analyzed data from a series of 481 patients who had been enrolled into the European Ewing Tumor Working Initiative of National Groups (EURO E.W.I.N.G.-99) clinical trial via the Cooperative Ewing Sarcoma Study Group (CESS) collaborative between 2006 and 2009. Patients were assessed for their overall survival at the end of treatment. The reported cohort included 331 patients presenting with localized disease and another 150 individuals with metastases at diagnosis. Furthermore, the authors achieved a mean follow-up of 3.2 years. Patients in this study who received recommendations from the ITB were more likely to receive combined local therapy (surgery with radiation) than patients who had not received a recommendation. Patients with metastatic disease who had not received a recommendation were more likely to forgo local therapy entirely. Improved overall survival was observed for patients

with metastases who had received recommendations from the ITB compared with those who had not received any input. In patients with localized disease, a recommendation from the ITB had no influence on overall survival. Patients in developing countries or from rural regions are often faced with problematic access to medical facilities and a lack of specialized medical care. This problem can be addressed through the use of technology, which can facilitate interactions with the regional, national, or international tumour board, allowing patients the benefit of expert recommendations. An international reference centre for such a rare disease has the potential to influence treatment strategy by offering expert opinions and comprehensive treatment plans to these patients, regardless of their location.

Small soft-tissue lesions: is primary excision biopsy a suitable option?

■ Small, suspicious soft-tissue lesions are common, and when they present they are usually investigated through conventional radiography, MRI, and biopsy. However, the small size of many lesions means that percutaneous core biopsy may be difficult or impossible to achieve, and these lesions may be more amenable to excision biopsy. With the caveat of being performed within a specialist centre, this group from **Stanmore (UK)** seeks to show that primary excision biopsy is a suitable and safe procedure to carry out in small indeterminate superficial lesions.[5] The authors present 58 patients referred over a 12-month period to the sarcoma service all with a small (<3 cm), indeterminate, superficial soft-tissue mass according to MRI criteria, or a small lesion of the foot or of the hand that was thought to be unsuitable or unsafe for percutaneous biopsy. All of these patients were managed with primary excision biopsy to confirm the diagnosis. Of the initial 58 patients, 42 (72.4%) showed benign neoplastic pathology, four (6.9%) had eventual diagnoses of malignant tumours, and two (3.4%) an intermediate grade lesion, while ten out of 58 (17.2%) were non-neoplastic. All four malignant lesions were completely excised at the time of excision biopsy. The authors concluded that primary excision biopsy of small, indeterminate soft-tissue masses, within the setting of a specialist sarcoma service, is a suitable management option. Only a small proportion of small superficial soft-tissue lesions with indeterminate MRI features are malignant tumours.

Tumour thrombus seen in large veins with pelvic osteosarcoma

■ Malignant lesions show a wide range of systemic effects, and symptoms and signs of the disease can be found throughout a patient's physiology. One area that has a well-recognized vulnerability to the systemic effects of malignancy is the vasculature (hence its representation in the ubiquitous venous thromboembolism (VTE) prophylaxis protocol). In this interesting study from **Houston, Texas (USA)**, the authors sought to investigate the frequency of direct tumour thrombus presence within the large veins draining a primary pelvic osteosarcoma presenting to their unit between 2000 and 2014, and its effects on outcome.[6] The group identified 39 patients, all of whom were aged 45 years or less and presenting to their own centre with complete appropriate imaging and follow-up, from their own database for inclusion in the study. The authors reviewed case notes and cross-sectional imaging from all of these patients which was then examined by four senior radiologists, and correlated with intraoperative findings and pathology records to make a retrospective diagnosis of malignancy related tumour thrombus. The authors demonstrated that in their series, 45% of patients who underwent tumour resection showed tumour thrombus within the large draining veins, with an equivalent figure of 59% in those who did not undergo tumour excision. In those who did have tumour excision, the presence of tumour thrombus was closely and significantly associated with a poorer outcome. So, tumour thrombus is present in the majority of patients with primary pelvic osteosarcoma and, when it is present, a poorer outcome should be expected. The causality of this can, of course, not be proven, but any information is useful in this difficult-to-treat condition.

Sacrococcygeal chordoma: a systematic review and meta-analysis

■ Sacrococcygeal chordoma is rare and, although it is the most common primary sacral tumour, very little is known about its treatment or outcomes. Presentation is often delayed, and different treatment modalities are available including resection, radiotherapy, or chemotherapy. The relative effect of two of these treatments on mortality and disease-free survival has been compared in a very valuable paper, for anyone treating these patients, by a combined group from **Minnesota (USA)** and **Egypt** using a systematic review and meta-analysis of observational studies.[7] The usual databases were searched for papers reported up to 2015 reporting observational studies that included patients with sacrococcygeal chordoma treated with surgery, radiotherapy, or both. Each study was evaluated by two separate reviewers for eligibility for inclusion. The same reviewers considered the risk of bias within each study and extracted the data relevant to all-cause mortality, progression-free survival, and the occurrence of metastases. A further sub-analysis was made correlating outcomes with resection margins. All outcomes were assessed at least five years following treatment. The review included 33 non-comparative studies that reported on 501 patients. Overall mortality was 16% following surgery, with higher rates after radiotherapy or surgery with adjuvant radiotherapy, though these did not reach statistical significance. Wide surgical resection was associated with a higher rate of all-cause mortality when compared with marginal excision. Progression-free survival rates were significantly higher following surgical resection with adjuvant radiotherapy in comparison with surgery and radiotherapy. However, disease-free progression was higher at 60 months with surgery with adjuvant radiotherapy and with wide surgical margins. In an interesting paper, the authors were able to conclude that sacrococcygeal tumours are rare and tricky to treat. They further explain that, until comparative studies are conducted, multidisciplinary management with wide surgical excision will remain the gold standard.

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