A MOUNTAIN

COMBINED SERVICES ORTHOPAEDIC SOCIETY

Annual Conference 8th May 2015

201(Northern) Field Hospital

Fenham Barracks, Newcastle-upon-Tyne

&

Anzio House, Royal Marine Reserve Tyne

GIBRALTAR

PER MARE PER TERRAM

0910 Session 1: Lower Limb

Moderators: Prof H Simpson & Wg Cdr N Jacobs

Functional outcomes following medial patellofemoral ligament reconstruction for patellar instability

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Recurrent patellar instability is common in young and active patients. Medial patellofemoral ligament (MPFL) reconstruction with a single bundle hamstring graft is one method of surgical treatment for this problem.

This is a retrospective case series of patients who underwent MPFL reconstruction by a single specialist knee surgeon between January 2009 and July 2014. Data was collected prospectively for the purpose of service evaluation. Recorded data included gender, age, length of rehabilitation, complications, Knee Injury and Outcome Score (KOOS) and International Knee Documentation Score (IKDC).

108 knees (103 patients) were identified (56 female, 52 male) with a mean age of 24.5 years (range 12-58). Mean length of rehabilitation was 3.2 months (range 0-11 months). Three patients required further revision surgery for recurrent instability. KOOS and IKDC scores improved from 44 (SD 22.4) and 38 (SD 20.7), respectively before surgery, to 77 (SD 12.0) and 69 (SD 18.3) after rehabilitation.

MPFL reconstruction with a single bundle hamstring graft produces a marked improvement in knee function with a low recurrence of instability.

The Outcome of Outerbridge II Articular Cartilage Defects of the Knee: A Natural History

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Difficulties arise when counselling younger patients on the long-term sequelae of a minor knee chondral defect. This study assesses the natural history of patients with grade 2 Outerbridge chondral injuries of the medial femoral condyle at arthroscopy. We reviewed all arthroscopies performed by one surgeon over 12 years with Outerbridge grade 2 chondral defects. Patients aged 30 to 59 were included. Meniscal injuries found were treated with partial menisectomy. All patients had five-year follow up minimum. Primary outcome measure was further interventions of total or unicondylar arthroplasty or high tibial osteotomy. We analysed 3,344 arthroscopies. Average follow up was 10 years (Range 5-17 years). A total of 357 patients met inclusion criteria of which 86 had isolated medial femoral condyle disease. Average age was 50 at the time of arthroscopy. Average BMI at surgery was 31.7 and average chondral defect area was 450 mm^2. Isolated MFC chondral disease had a 10.5% intervention rate. Intervention occurred at a mean of 8.5 years post primary arthroscopy. In young patients Outerbridge II chondral injuries affecting ≥2 compartments have a high rate of further intervention within a decade. This information is crucial in counselling young patients on long-term sequelae of benign chondral lesions.

What is the relationship between knee biomechanical function and patient reported function before and after total knee replacement?

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Risk factors for poor outcomes after total knee replacement (TKR) have been identified, but the underlying causes are not fully understood. The aim of this work was to establish the relationship between measurable gait parameters and patients' subjective function, pre and post total knee replacement. 25 subjects underwent gait analysis, before and one year following total knee replacement. Patient reported function was investigated using the Activities of Daily Living Scale of the Knee Outcome Survey (KOS). Gait analysis was performed using infrared cameras and reflective marker clusters. Visual and principal component analysis allowed correlation of motion analysis data with patient reported function. Whilst multiple gait parameters correlated with KOS score preoperatively, there was no correlation after TKR. Three preoperative measurements correlated with the improvement in score a subject achieved following surgery: These were preoperative rate of extension in swing, total range of flexion from heel strike and time point of maximum stance extension. Our results suggest that whilst preoperatively there is a close relationship between knee biomechanical function and patient reported function, after TKR factors other than biomechanical function determine patient outcomes.

Five Year Outcomes of the PFC Sigma Colbalt Chrome Total Knee Arthroplasty

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The PFC Sigma Cobalt Chrome Sigma (PFCSCC) was introduced in 2006, an update of the PFC Sigma to reduce backside wear. To identify significant early failures following the introduction of PFCSCC, we prospectively identified all recipients over a one-year period. Clinical and demographic patient data, American Knee Society scores(AKSS), Oxford Knee scores, SF-12 scores and radiographic data were recorded pre-operatively and at 3,5 years. 233 patients underwent 249 primary knee arthroplasties with the PFCSCC. Seventeen patients (19 TKAs) died before last review, 29 patients (30 knees) were lost to follow up. Mean age 66.6 (34 - 80) with 47.6% male. Mean five year follow-up1836 days (1530-2307). Five knees (2.2%) revised for infection 3 revised for pain. 5-year survival 96.6% and 98.6% for aseptic failure. AKSS 32.6 (0 – 86.6) preoperatively, 80.7 (29 - 95) 5 years $P < 0.001$. OKS was 39.0 (22 - 53) preoperatively, 23.5 (4.7 – 42.3) 5 years $P < 0.001$. These results demonstrate a good early survivorship when compared to the old design PFC Sigma, however further follow-up to ten years is required.

Implant:Canal ratio to predict subsidence in Corail implants

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The Corail femoral implant has an ODEP rating of 10A and has been widely used in elective total hip replacements (THRs) and in hemi-arthroplasties following trauma. The aim of the study was to review the incidence of subsidence.

Post-operative radiographs of trauma (n=39) and elective (n=45) patients with Corail femoral implant were reviewed. Using the standard marker, the femoral canal size and implant size were measured at the 50% and the 70% level of the Corail implant on antero-posterior view of the radiograph. The implant-to-canal (I:C) ratios were calculated. Follow up radiographs were reviewed to identify subsidence.

The average age of patients was 80.3 years (range 66-93 years) in hemi-arthroplasties and 61 years (range 18-88) in elective THRs. The implant to canal (I:C) ratio at the 50% and 70% levels in trauma patients were 0.77 (range 0.54 – 0.97) and 0.81 (range 0.59 – 0.94) respectively. In THRs, the ratios were 0.77 (range 0.57 – 0.98) and 0.81 (0.56 – 0.95). One case of subsidence was seen in a THR with a collarless implant with a reduced I:C ratio.

A novel ratio is proposed, with potential value in predicting the incidence of subsidence and a larger study will validate the 'implant:canal' ratio.

Re-operation rates in arthroplasty for intra-capsular neck of femur fractures

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A retrospective review was conducted of patients undergoing either total hip replacement or hemiarthroplasty for intra capsular neck of femur fractures between April 2013 and April 2014 in a university hospital; identified from the hospital hip fracture database. PACS and the electronic database including operation notes and discharge summaries were reviewed.

309 patients were identified, 3 of whom fractured both hips during the study period giving a total of 312 operations. 59 cemented bipolar hemiarthroplasties, 143 cemented unipolar hemiarthroplasties, 2 uncemented hemiarthroplasties and 108 total hip replacements were performed.

11 patients required further intervention. There have been 5 dislocations: 2 required MUA alone, 2 treated by excision arthroplasty and 1 converted to THR. 2 patients developed haematomas requiring intervention,1 receiving formal wound washout and there were 4 wound infections - 1 treated by a washout, 2 by excision arthroplasty, one patient has undergone first stage revision; with an overall reoperation rate of 3.5% comparing well with data published elsewhere.

5-Year experience of "modern" distal femoral locking plates at a UK Major Trauma Centre

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Management of distal femoral fractures has traditionally been associated with high rates of reoperation. We hypothesised that recent advances in locking plate design and material in combination with appropriate application of biomechanical principles should improve outcome. There being no large series evaluating modern locking plates we have conducted a retrospective evaluation.

127 consecutive distal femoral fractures in 124 adult patients were fixed with "modern" locking plates. Electronic medical records, operation notes and radiographs were reviewed to classify fractures, record mode of fixation and subsequent union/failure.

The majority were elderly, infirm, females patients. Fracture were AO types 32 and 33, over half involved a prosthesis. Average plate length was 14 holes. 12 patients required reoperation. 41 patients were followed to radiological union at an average of 6.5 months. 26 patients died. 48 patients were not followed to radiological union but have not represented.

Our series shows a comparatively low re-operation rate. We intend to recall those patients in whom outcome is unknown for follow-up radiographs. Those who died were elderly patients with fragility fractures and significant co-morbid medical conditions. In the UK, great energy is dedicated to proximal femoral fractures; priority should also be given to this equally vulnerable patient group.

74 not followed up

12/41 → Rest.

~30%

Atypical Femoral Fractures – A Major Trauma Centre 5-Year Retrospective Database Analysis

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Over the last 10 years atypical femoral fractures (AFFs) have become recognised as a complication of standard-dose bisphosphonate use. In 2014 the American Society for Bone and Mineral Research published updated diagnostic criteria for AFF. We undertook a 5-year retrospective analysis of the trauma admission database at a major trauma centre to establish the incidence of this problem in our patient population. Initial screening was performed using keyword-matching methodology to produce a shortlist of patients with low-energy femoral fractures. These patients' case notes, radiographs, and electronic discharge summaries were reviewed to discriminate AFF from typical femoral fractures. Initial filtering identified a total of 112 low energy femoral fractures. Of these, 12 were confirmed as AFFs. 58% (7/12) of the AFF group were on bisphosphonates compared to 15% (15/100) of the typical femoral fracture group. This finding was statistically significant ($p = 0.0004$). These data show that there is a link between bisphosphonate use and AFF. However, a causal relationship cannot be inferred. The incidence of AFF in our study is broadly in line with the published data.

The epidemiology and changing face of Tibial Plateau Fractures and other intra-articular proximal tibial fractures: The Edinburgh Experience

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Epidemiological data about tibial plateau and associated intra-articular proximal tibial fractures, provides clinicians with an understanding of the range, variety, and patterns of injury. There are relatively few studies examining this injury group as a whole. We prospectively recorded all tibial plateau and intra-articular proximal tibial fractures occurring in our regional population of 545,000 adults (aged 15 years or older) in 2007-2008. We then compared our results with previous research from our institution in 2000. There were 173 fractures around the knee, 65 of these involved the tibial plateau. Median age was 59 years (IQR, 36.5-77.5 yrs). Tibial plateau fractures were more common in women (58.5%vs 41.5%). The median age of men was 37 years (IQr, 29-52 yrs) compared to women, 73 years (IQR, 57-82 yrs). Tibial plateau fractures accounted for 0.9% overall and 2.5% of lower limb fractures. Incidence was 1.2/10,000/yr (95% CI, 0.9-1.5). We have prospectively identified and described the epidemiological characteristics of tibial plateau fractures in adults from our region. We have identified a change to the epidemiology of these fractures over a relatively short time frame as the patients at risk age.

1110 Session 2: Military Session A

Moderator: Mr J Getty & Lt Col Dylan Griffiths

The Blast Pelvis: Mechanism of Fracture and The Potential for Mitigation Techniques

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The Improvised Explosive Device (IED) was the predominant mechanism of injury in recent conflicts in Afghanistan, and explosive devices are likely to feature in future conflicts. A blast from below has been described as the signature injury causing lower limb tissue damage and when pelvic fracture present, higher mortality. Pelvic fracture patterns are very different from civilian trauma, and the patients typically die early of exsanguination from great vessels. Of 364 blast pelvic fractures, 179 sustained a primary lower extremity injury with the remainder sustaining a pelvic fracture in addition to a primary injury elsewhere (head, neck or thorax). Of those with primary lower extremity trauma, there were 111 survivors and 68 deaths. Deaths were almost exclusively due to exsanguination from great vessels, with variation in fracture patterns, but most often considerable separation of the pelvic bones, gross widening of the symphysis and sacroiliac joints. It is currently unknown whether direct impact from blast or leg flail is most responsible for causing this fracture pattern. However, this patient group could benefit from preventative measures in equipment or body positioning in vehicle in order to prevent pelvic separation, or leg flail, to achieve a constant pelvic volume.

Bayesian scoring systems for military pelvic and perineal blast injuries: Time for a new approach?

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Various injury severity scores exist for trauma; it is known that they do not correlate accurately to military injuries. A promising anatomical scoring system for blast pelvic and perineal injury led to the development of an improved scoring system using machine-learning techniques.

An unbiased genetic algorithm selected optimal anatomical and physiological parameters from 118 military cases. A Naïve Bayesian (NB) model was built using the proposed parameters to predict the probability of survival. Ten-fold cross validation was employed to evaluate its performance.

Our model significantly out-performed Injury Severity Score (ISS), Trauma ISS, New ISS and the Revised Trauma Score in virtually all areas; Positive Predictive Value 0.8941, Specificity 0.9027, Accuracy 0.9056 and Area Under Curve 0.9059. A two-sample t-test showed that the predictive performance of the proposed scoring system was significantly better than the other systems ($p<0.001$).

With limited resources and the simplest of Bayesian methodologies we have demonstrated that the Naïve Bayesian model performed significantly better in virtually all areas assessed by current scoring systems used for trauma. This is encouraging and highlights that more can be done to improve trauma systems not only for the military, but also in civilian trauma.

40 Years of Terrorist Bombings – A Meta-Analysis of 167 Incidents

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The explosive device has successfully been used by terrorists globally, with their effects extending beyond the resulting injuries. Suicide bombings, in particular, are being increasingly deployed due to the devastating effect of a combination of, high lethality and target accuracy. This aim of this study was to analyse the demographics and casualty figures of terrorist bombings worldwide.

Analysis of the Global Terrorism Database and a PubMed search (keywords "terrorist", and/or "suicide", and/or "bombing") from 1970 to date was performed.

Of 58,095 reported terrorist explosions worldwide, 5.08% were suicide bombings. Incidents per year is increasing ($P<0.01$). PubMed identified 41 publications reporting 167 incidents. Mean casualty statistics per incidents was 1.14 deaths and 3.45 wounded from non-suicide incidents, and 10.16 and 24.16 from suicide bombings ($p<0.05$). The Middle East witnessed the most incidents (26.9%), with Europe ranked 4th in the number of terrorist related explosion (13.2%). Differing injury patterns were seen in open, confined and building collapse incidents.

Terrorist bombings continue to be a threat and are increasing in the Middle East and Europe. Suicide bombings are becoming an increased threat with greater casualty figures per incident seen. This data assists in the planning of security, logistics, casualty evacuation and care.

Refining the Trauma and Injury Severity Score (TRISS) to measure the performance of the UK combat casualty care system.

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The TRISS methodology is used in by both the UK and US military trauma registries and relies on dividing casualties according to mechanism: penetrating or blunt. The UK and US military trauma registries use the original coefficients devised in 1987 and it is not clear how either registry analyses explosive casualties according to the TRISS methodology.

This study aims to use the UK military trauma registry (JTTR) to calculate new TRISS coefficients for contemporary battlefield casualties injured by either gunshot or explosive mechanisms.

The JTTR was searched for all UK Casualties injured or killed between 2003 and 2014. A logistic regression analysis was performed to devise new TRISS coefficients, these were then used to re-examine survival over the 12 years of the study.

Comparing the predictions from the GSW TRISS model to the observed outcomes, it demonstrates a sensitivity of 98.1% and a specificity of 96.8% and an overall accuracy 97.8%. With respect to the explosive TRISS model, there is a sensitivity of 98.6%, a specificity of 97.4% and an overall accuracy of 98.4%. When this improved TRISS methodology was used to measure changes in survival, there was a sustained improvement over the 12-year study period.

Upper limb vascular injuries from austere military operations: management and outcomes

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Major upper limb arterial injuries sustained in combat are associated with significant trauma. We analysed the survival and complication rates following upper limb vascular injury in Iraq and Afghanistan (2004-2014).

Fifty-two soldiers sustained 59 major arterial injuries in 54 limbs. Axillary artery injuries were more likely to be caused by gunshot wounds (79%), whilst brachial and ulnar artery injuries were primarily associated with blasts (75% and 94% respectively); no such correlation was identified with radial artery injuries.

Apart from three temporary shunts, all vascular injuries were treated definitively in the local field hospital before repatriation. Proximal injuries were predominantly treated with long saphenous vein grafts and distal injuries with ligation. One soldier required an immediate amputation following failed LSV grafting, however no amputations followed repatriation.

There were five identified graft failures (28%), although these were not associated with subsequent perfusion issues. There were no graft failures following temporary shunting. Associated nerve injuries often required operative intervention and have a guarded outcome. 100% of radial fractures went onto non-union if combined with a radial artery injury.

Successful immediate re-perfusion of a vascular compromised upper limb correlates with excellent long-term limb survival, despite a significant number of grafts developing secondary failure.

Scapula injuries sustained by UK military personnel on operations: a 10 year review

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Scapula fractures mostly occur following high energy trauma, however the demographics are unknown in deployed soldiers. We analysed the incidence, aetiology, associated injuries, treatment and complications of these fractures in military personnel from Afghanistan and Iraq (2004-2014).

Forty-four scapula fractures from 572 upper limb fractures (7.7%) were sustained. 85% were caused by blast or gunshot wounds and 54% were open blast fractures. Multiple injuries were noted including lung, head, vascular and nerve injuries. Injury Severity Scores were almost double compared to the average upper limb injury without a scapula fracture (21 vs. 11). Brachial plexus injuries (17%) have a favourable outcome following GSW compared to blast injuries. Glenoid fractures or floating shoulders were internally fixed (10%) and resulted from high velocity gunshot wounds or mounted blast ejections. There were no cases of deep soft tissue infection or osteomyelitis and all scapula fractures united.

Scapula fractures have a 20 times higher incidence in military personnel compared to the civilian population. These fractures are often associated with multiple injuries, including brachial plexus injuries, where those sustained from blast have less favourable outcome. High rates of union following fixation and low rates of infection are expected despite significant contamination and soft tissue loss.

Gun-shot injuries in UK military casualties

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ID Sargeant

On behalf of the Severe Lower Extremity Combat Trauma (SeLECT) Study Group: Surg Lt Cdr JG Penn-Barwell, Surg Lt PM Bennett, Surg Lt Cdr CA Fries, Wg Cdr JM Kendrew, Surg Capt M Midwinter, Dr J Bishop, Surg Capt RF Rickard, Gp Capt ID Sargeant OBE, Prof Sir K Porter KBE, Lt Col T Rowlands, Lt Col A Mountain, Col A Kay, Dr D Mortiboy, Surg Capt SA Stapley Surg Lt RM Myatt RCDM/Queen Elizabeth's Hospital, Birmingham, UK

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High-energy firearms do not necessarily produce 'high-energy' Gun Shot Wounds (GSWs). The aim of this study was to characterise the gun shot injuries sustained by UK forces, and secondly test the hypothesis that the likely severity of GSWs can be predicted by features of the wound.

The UK Military trauma registry was searched for cases injured by GSW in the five years between 01 Jan 2009 and 31 Dec 2013: only UK personnel were included.

There were 450 cases who met the inclusion criteria. 96 (21%) were fatally injured, with 354 (79%) surviving their injuries. Of the 325 survivors with full records, 236 had GSWs to the limbs and pelvis. 'Through and through' wounds were strongly associated with less requirement for debridement ($p<0.0001$). Fractures were associated with a requirement for a greater number of wound debridements ($p=0.00022$) GSW with intact, retained bullets and those involving bullet fragmentation, required similar numbers of wound debridements ($p=0.53744$).

This study characterises the GSWs sustained by UK Military personnel over 5-years of warfare. More complex wounds as indicated by the requirement for repeated debridements are associated with injuries where the bullet does not pass straight through the body, or where a bone is fractured.

1400 Session 3-Military Session B
Moderator: Prof C Howie & Lt Col W Eardley

Spinal injury patterns in UK victims of IED attacks on vehicles

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The improvised explosive device (IED) has been a feature of recent insurgent and asymmetric conflicts with frequent attacks on vehicles. Identifying the patters of injury in UK victims of IED strikes against vehicles will allow the most common and preventable injury patterns to be identified, contributing to mitigation strategies.

A Joint Theatre Trauma Registry search identified UK victims of mounted IED strike. Each victim had his initial trauma CT reviewed to identify and classify spinal fractures using standard anatomical and mechanistic systems.

78 patients were identified, of whom 53 were survivors. There were a total of 284 fractured vertebrae, including 101 thoracolumbar vertebral body fractures, 169 thoracolumbar spinous and transverse process fractures and 39 cervical spine fractures. The most common thoracolumbar body fracture pattern was wedge compression (35), followed by unstable (32) and stable burst (16). Most cervical spine fractures were compression-extension injuries.

The most common thoracic and lumbar body fractures in this group suggest a flexed posture at the time of injury. Most cervical spine fractures were in extension. Identifying the posture that lead to these injuries might allow improved vehicle designs to reduce the risk in future incidents.

? MRI - muscle/ligament #

The effect of whole-body vibration and mechanical stress on the lumbar spine of military personnel operating on small marine craft

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Military personnel operating on high speed marine craft are exposed to Whole-Body Vibration (WBV). Additionally planing craft operate at speeds with minimal contact of the hull with water making the crew vulnerable to mechanical shock. An association between Low Back Pain (LBP) and exposure to WBV has been extensively reported in civilian literature. LBP is reported by military personnel operating on planing craft leading to downgrades and potential discharge. There is a clear need to understand the impact prolonged exposure has on our population operating these craft.

We performed a bibliographical search of the PubMed database for records using a combination of keywords. Abstracts were screened for relevance to the topic and references cited in retrieved papers reviewed.

There is no consensus on the potentially pivotal pathological process behind the association. Evidence from professional driving suggests current safe operating exposure levels require review to protect against long-term damage however with little evidence concerning the unique environment in which boats crews operate, the parity of these environments require investigation to allow direct comparison.

Due to the prevalence of LBP in this population a need exists to establish the pathological process and add to the evidence base driving safe operating exposure levels.

Risk Stratification for Heterotopic Ossification in Residual Limbs of Blast Related Amputations

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Previous reports of the prevalence of Heterotopic Ossification (HO) in limbs from UK blast-related amputees from Afghanistan, is demonstrated to be 57.1%. With the end of UK military operations in Afghanistan in 2014 the aim of this study is establish the rate of HO, assess causality demographics and ascertain risk factors for the formation of HO during the entire period of operations in Afghanistan.

Military databases, case notes and radiographs were scrutinised to quantify and qualify the prevalence and risk factors for the formation of HO.

256 servicemen sustained 398 military trauma related amputations. The overall prevalence of HO was 65.9%. Significant ($p<0.05$) risks identified for the formation of HO included a blast mechanism of injury, a zone of injury the same as the subsequent amputation, and an increased number of debridements prior to closure. Positive correlation existed between the number of amputations and the presence and grade of HO ($p=0.04$).

HO presents clinical problems to military blast injury patient populations. This study demonstrates that both a blast mechanism of injury and an increased injury load are key factors in the increased prevalence of HO seen in military trauma.

Heterotopic Ossification: A Novel Approach to Prevention and Treatment – Preliminary Results

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Heterotopic ossification (HO) is the formation of bone in extraskeletal sites. It is a major problem for combat-related casualties with 64% of such patients showing radiological evidence of the disease. Of these, 19% require surgical excision. Current prophylaxis is problematic due to poor efficacy and unsuitability in a military setting. Our novel anti-HO strategy is to use an inorganic reagent to inhibit the deposition of HA and disperse any pre-formed mineral. Literature review identified several potentially effective agents. These were tested for their ability to disperse solid monoliths of HA. In addition, a standard HA synthetic reaction was performed in the presence of each agent to establish their inhibiting activity. One reagent (a condensed phosphate) dispersed a solid monolith of HA by 38% (mass loss) over 30 days. This reagent was also shown to inhibit HA crystal synthesis yield by 28%. Early work on a hydrogel delivery system has produced favourable results. These preliminary data demonstrate proof of concept that HA may be dispersed and its formation inhibited by a non-toxic polyphosphate. This work will form the justification for development into in vitro osteogenic cell culture models and animal HO models.

Quantitative and Qualitative Characterisation of the Organic and Non-organic Components of Heterotopic Ossification from Blast Related Amputees

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Heterotopic ossification (HO) is the formation of lamellar bone in extra-skeletal soft tissues. Its exact pathogenic mechanism remains elusive. Previous studies demonstrate observation only of HO at the microscopic scale. This study uses scanning electron microscopy (SEM), Back-scatter electron (BSE) imaging and mechanical testing to detail the organic and non-organic elements of HO, compared to normal bone, to guide stem cell and bio-modelling research into HO.

Samples analysed were 5 military blast related HO patients, 5 control cadaveric samples (age and sex matched). Samples were imaged using SEM, BSE and the I13 beam Synchrotron x-ray diffraction scanner using validated quantitative and qualitative techniques of measurement.

Appearances seen in HO compared to normal bone were characterised by the presence of a hyper-vascular network and high lacunae (osteocyte) counts, two distinct zones of bone mineral density distribution, with a tendency for hypermineralisation with kurtosis of the grey scale plots (mineral content as a weight percentage of Ca2+ was calibrated to atomic weight of C, Al and HA). Direction of dependence and collagen orientation in HO suggest isotropic properties.

This research demonstrates that HO is bone, however its characteristics suggest a high metabolic turnover and disorganised ultra-structure consistent with an inflammatory origin

1600 Session 4-Miscellaneous

Moderator: Mr D Large and Surg Cdr C Hand

Is there variation in Orthopaedic operative training experience between Deaneries?

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In June 2012 the Orthopaedic Speciality Advisory of the Joint Committee on Surgical Training defined 'minimum indicative numbers' that trainees would have to meet before completion of specialist training. It has been speculated that regions have varied in their ability to provide operative opportunities to their trainees. This study aims to test the hypothesis that there are regional differences in operative training experience. The eLogbook database was interrogated for cases over a 12 month period from 7 August 2013 to 5 August 2015. Within each region, the mean of the cases registered by orthopaedic trainees in each year of training during the study period was calculated and summed to give a representative surgical experience for the years ST3-8. First surgeon only cases were analysed for 11 index procedures in 30 T&O rotations. Considerable variation in training existed across rotations. In three index procedures, including DHS, no rotation achieved the minimum indicative number required. All rotations achieved the minimum indicative number of external fixator applications. This study proves the extent of the significant regional variation in surgical training in Trauma and Orthopaedics in the UK and raises concerns regarding the volume of operative training currently achieved.

Under anaesthetic - "Ensuring your moulding holds"

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Paediatric wrist fractures are routinely managed with closed reduction and a molded cast. Gap(GI) and Cast indices(CI) are useful in predicting re-displacement following application of cast.

Over 6 months we audited the efficacy of molded cast application following closed reduction of distal radial fractures in paediatric patients. The standard was that proposed by Malviya *et al.* where GI >0.15 and CI >0.8 indicate an increased risk of re-displacement. Age, date and time of operation and surgeon's grade were collected. Pre-op displacement, post-reduction GI and CI and subsequent re-displacement were measured using imaging. Post audit intended changes to practice were presented to all surgeons, a "one-pager" was placed above scrub sinks. Re-audit was conducted at 1 year.

The audit and re-audit included 28 and 24 patients respectively. Cast molding (CI) improved minimally following intervention (32% to 29%). Cast padding (GI) improved significantly (82% to 63%). Loss of reduction decreased slightly (14% to 12%), this was not accurately predicted by GI and CI in the re-audit.

Audit demonstrated that casts were loose, over-padded and did not hold reduction adequately. Re-audit demonstrated that tighter, less padded but still inadequately molded casts were being applied with minimal change in loss of reduction.

Ankle Arthroscopy in a Cohort of Military Patients: A Retrospective Review

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This was a retrospective review of 57 military patients who underwent ankle surgery between 1999 and 2011. Their medical records were reviewed for data pertaining to their role in the armed forces, type of ankle injury sustained, mechanism, presenting symptoms and their duration. Operative findings at arthroscopy were compared to the findings on plain radiographs and MRI scans.
At first presentation, 23 patients had features of arthritis on plain radiographs. 16 of the patients had evidence of osteochondral injury. We found that MRI was both highly sensitive (98%) and specific (93%) in detecting osteochondral defects (OCD). All OCDs detected by MRI were confirmed at arthroscopy.

Ankle injury is not a benign injury in military personnel, as over half of these young patients had radiological features of osteoarthritis at presentation. We found that MRI is an effective tool for identifying occult injuries not picked up on plain radiographs. Lateral ligament injury and gutter scarring or synovitis can be treated with arthroscopic debridement. This suggests pseudo-instability rather than a true mechanical instability as the main cause for patient's symptoms in this cohort.

? what was the sensitivity of MRI for AFI

? what was outcome measured ~~assessment~~.
- Return to theatre (P2)
MD.

Introducing the Golden Patient at a Major Trauma Centre

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The "Golden Patient" is suitability worked up to be the first theatre case of the day; the aim being to improve theatre efficiency. A previous audit of theatre activity demonstrated that the average knife to skin time being achieved across 3 daily trauma lists was 10.12.

Over 2-months we introduced a Golden Patient Pathway and completed the audit cycle. The pathway involved a checklist to ensure the completion of essential clinical tasks for each designated golden patient. Activities from 74 trauma theatre cases were reviewed. 47 golden patients remained first whilst 27 were deferred for reasons including non-suitability for golden patient status and emergent cases given clinical priority.

The average theatre call time was 24 minutes earlier and the average knife-to-skin time was 15 minutes earlier than non-golden patients during the re-audit. However, when compared to the initial audit the knife-to-skin time had only improved by 3 minutes.

Reasons effecting theatre efficiency are multifactorial and other organisational changes had occurred between the audits. This study demonstrates that while the Golden Patient Pathway can improve theatre start times it is not the whole solution; communication, anaesthetic job plans, portering arrangements, equipment storage and theatre staffing also need to be reviewed.