



**Combined Services Orthopaedic Society
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Abstracts

1. THE CORNWALL EXPERIENCE OF THE AVON PATELLO-FEMORAL ARTHROPLASTY WITH FIVE-YEAR SURVIVORSHIP AND FUNCTIONAL RESULTS.

A.J.C. Vaughan, P.M. Guyver, M. Divekar, K. Farmer, A.S. Lee.
The Royal Cornwall Hospital, Truro.

This study aims to show that our series of Avon Patellofemoral Joint Replacements (APFJR) with over 5 year follow up, have comparable functional, radiological and revision rate results to other published reports.

Retrospective analysis occurred for all consecutive cases of APFJR from October 1999 and January 2010. All operations were performed by the senior author (AL). Each patient had both clinical and radiological follow up. Patient demographics, pre and post op Oxford Knee scores and complications were all recorded. An independent post operative radiological review took place to check for loosening and progression of disease. Revision to Total Knee Replacement was taken as the endpoint.

83 consecutive APFJR's were implanted in 56 patients for established isolated patellofemoral arthritis. The average age was 68.2(34-95) with 18 males and 38 females. The mean follow-up was 5.4 years (1.25 to 11). There were 5 revisions with the five-year survival rate being 95.2% (95% confidence interval 88.12% - 99.88%). The median Pre Op Oxford knee score was 17 of 48 points (interquartile range 11 to 21) showed significant improvement when compared to the median Post Op Oxford knee score of 35 (interquartile range 26 to 41). There was one superficial infection and no deep infections. There was also one transient sciatic nerve palsy. These results compare very closely to those in the designing surgeon's series (Ackroyd et al JBJS Br 2007).

These results reveal satisfactory survivorship and functional outcome results in the medium term leading to increased confidence in the use of patellofemoral arthroplasty.

2. THE OUTCOME OF TOTAL KNEE REPLACEMENTS IN YOUNG PATIENTS: A 10 YEAR MATCHED CASE CONTROL STUDY.

A.C.M Keenan, C.H.C Arthur, A.M. Wood, P.J. Jenkins, P.J. Walmsley, I.J. Brenkel.

Victoria Hospital, Kirkcaldy

The aim of this study was to compare the long-term outcome from total knee replacement (TKR) in young versus old patients in terms of pain and functional outcome.

We used our arthroplasty database which recorded prospectively pain and American Knee Society scores at regular intervals over ten years after TKR. The procedures used a modern, cemented resurfacing type cruciate retaining prosthesis. A cohort of young patients (≤ 55 years) were identified. A control group of patients ≥ 56 was identified, matching for ASA, body mass index and underlying condition. Change over time was analysed using a factorial repeated measures ANOVA test, which allowed for investigation of difference between groups. 40 Knees in 26 patients were identified. 2 patients died prior to follow up, 2 were revised within the study period. (1 for infection at 2 years and one for change of poly at 7 years) and a further 4 were lost to follow up. 7 knees could not be matched and were excluded. This left a study group of 24 young and 24 older knees. Pain scores ($p=0.025$) and American Knee Society "Knee" ($p<0.001$) and "Function" ($p<0.001$) scores changed significantly over time. There were however no statistical differences over the 10 year period in pain ($p=0.436$) and knee performance (0.618) but overall function was higher throughout the period in the younger group ($=0.004$).

We conclude that Knee replacement in younger patients produces similar outcomes in terms of pain and function compared with older patients and TKR should not be withheld purely on account of age.

3. 10 YEAR RESULTS FOR THE PRESS-FIT CONDYLAR SIGMA TOTAL KNEE ARTHROPLASTY

C.H.C. Arthur, A.M. Wood, A.C.M. Keenan, R.A.E. Clayton, P.J. Walmsley, I.J. Brenkel

Victoria Hospital, Kirckaldy.

The DePuy Sigma total knee arthroplasty (TKA) is a modification of the well established Press Fit Condylar (PFC) TKA and is used extensively in the UK and worldwide. It is the most commonly used TKA in England and Wales, where it accounts for 36% of all primary TKA.

This study reports the first 10-year clinical and radiological follow-up data for the Sigma PFC.

A total of 235 consecutive Sigma TKAs were performed in 203 patients between October 1998 and October 1999, in our unit. Patients were seen at a specialist nurse led clinic 7 to 10 days before admission and at 6 months, 18 months, 3 years, 5 years and 7-10 years after surgery. Data was recorded prospectively at each clinic visit. Radiographs were obtained at the 5 year and 8-10 year follow-up appointment.

Of 235 knees 171 (147 patients) were alive at 10 years. Twelve were lost to follow up. Eight knees (3.4%) were revised; four for infection and four underwent isolated change of polyethylene insert. Ten-year survival with and end point of revision for any reason was 95.9%, and with and endpoint of revision for aseptic failure was 98.7%. The mean American Knee Society score was 62 at 8-10 years compared with 31 out of 100 pre-operatively. Of 109 radiographs, 47 knees had radiolucent lines but none showed radiological evidence of loosening.

Our results show that the PFC Sigma knee arthroplasty performs well over the first 10 years post implantation.

4. USING A COMBINATION OF TRANEXAMIC ACID AND RIVAROXABAN IN TOTAL KNEE REPLACEMENTS REDUCES TRANSFUSION REQUIREMENTS: A prospective cohort study.

**A.M. Wood, R.J. Smith, A.C.M. Keenan, B.M. Sabnis, P. Walmsley, I. Brenkel.
Victoria Hospital, Kirkcaldy.**

The risk of venous thrombo-embolism (VTE) is high in orthopaedics. Oral direct factor Xa inhibitors have been introduced to help reduce the incidence of VTE. To reduce post-operative bleeding antifibrinolytics are used. We aimed to ascertain the effect of two drugs on post operative bleeding and transfusion requirements.

We prospectively recorded patient demographics, operative details, complications, transfusion incidence and VTE incidence in TKR patients. We also sent out a questionnaire to patients asking about wound bleeding and VTE. All patients were given 10mg Rivaroxaban 8 hours post operatively and then OD for 14 days. Patients given tranexamic acid were given 500mg IV, 5 minutes prior to wound closure at the discretion of the surgeon. VTE was confirmed by Doppler or CTPA as Deep Vein Thrombus or Pulmonary Embolism. Minor bleed was categorised as dressing soakage or reported wound leakage, major bleed as haematoma requiring revision within 30 days.

509 patients underwent TKR, 200(39%) only received Rivaroxaban (Group1). 296(58%) also received tranexamic acid (Group2). 13(3%) of patients had no data available. 5 patients had a VTE 4(2%) Group 1, 1(0.3%) Group 2 ($P<0.05$). 39 patients had a minor bleed: 17(8.5%) Group 1, 22(7.4%) Group 2 ($P=0.5$). 2 patients had major bleeds: 1(0.5%)Group1, 1(0.33%)Group2 $P=0.69$. Blood transfusions 21 (10.5%)Group 1, 9 (3%) Group 2 ($P<0.0001$).

We have demonstrated a reduced requirement for blood transfusions in the tranexamic acid group. However our results whilst they show a trend towards decrease bleeding rates in both the minor and major bleeds are not significant, requiring larger studies looking at wound bleeding and leakage.

5. A COMPARISON OF UNCEMENTED VERSUS CEMENTED OUTCOMES OF IMPACTION FEMORAL ALLOGRAFTING AT REVISION HIP ARTHROPLASTY

S. Masterson, S. Lidder, G. Scott

Royal London Hospital, London.

An attempt to analyse whether impaction allografting without cement is more or less satisfactory than the technique with the addition of cement is compromised by conflicting reports of where the migration actually occurs. In some cemented series distal migration of the prosthesis within the cement mantle has been recorded as well as migration of the whole cement/prosthesis construct into the graft.

Two prospective consecutive series of revision hip arthroplasties by a single surgeon:- Group 1; Uncemented impaction grafting revision hip replacement in a series of 30 patients (33 hips). Group 2; Cemented impaction grafting revision hip replacement in a series of 30 patients (31 hips). Group demographics were similar. Each case used the same design of hip implant with the only difference in design being a proximal hydroxyapatite coating used on the uncemented implants.

Follow-up ranged from 2 to 17 years for the uncemented group and from 1 to 11 years for the cemented group. A validated hip scoring system was employed at regular follow up incorporating pain and functional assessment. Migration rates for the uncemented group were 0 to 15 mm for 30 hips; however 3 hips were revised early due to excessive migration. 3 hips sustained early complications (1 fracture, 1 dislocation, 1 varus malposition of stem). Migration rates for the cemented group were 0 to 9 mm for 29 hips, however the remaining 3 hips were revised due to excessive migration (up to 33mm). Although similar results were obtained in terms of success and also pain and function scores, marginal improvement in results did occur with the cemented series overall. Statistical significance was not reached however. More sinkage occurred in the uncemented group overall, the majority occurring in the first 6 post-operative months. Part of the improvement with the cemented series results may be explained by the improved techniques achieved whilst performing the uncemented series.

These results from a single surgeon demonstrate that the method is highly technique dependent and relies on adequate graft impaction. With sufficient graft and an appropriate prosthetic design, cement is not essential to the early success of this method. However, the extent of the initial migration did not accurately predict a successful outcome for the procedure. The absence of cement removes any confusion as to the location of any migration.

6. CELL COUNT AND DIFFERENTIAL OF ASPIRATED FLUID IN THE DIAGNOSIS OF LATE PROSTHETIC JOINT INFECTION

**Z.K.M. Beech, A. Dineen, N. Bradley, A. Guyot
Frimley Park Hospital, Frimley**

Although there is still no absolute diagnostic test for infection of the prosthetic joint, the synovial fluid leukocyte count and neutrophil percentage have been reported as having high sensitivity and specificity but to date the cut off values for these tests are not agreed upon.

In 39 patients who underwent revision arthroplasty the cell count and differential of joint aspirates were cross referenced with culture results and histology to confirm that these were valid tests and to determine cut off values. Cases were identified via the microbiology service of two district general hospitals: 17 patients in whom infection was identified via culture and/or histology results and 19 who were uninfected.

Receiver operator characteristic curves were used to determine the correlation between the results of the two tests and to identify a suitable threshold level. For absolute leukocyte count the area under the curve was 0.997 indicating excellent agreement between the tests. A cut off value of 2000 gave a sensitivity of 100% and a specificity of 94%. Differential count had an area under the curve of 0.94. A threshold of 50% had a sensitivity of 100% and a specificity of 77%.

Despite the low number of patients this study shows that the leukocyte count and differential of aspirated joint fluid are valuable tools in the diagnosis of suspected prosthetic joint infection.

7. EVOLVED FOR HIP ARTHRITIS?

A.P. Monk, G. Grammatopoulos, M. Chen, C.L.M. Gibbons, D. Beard, D.W. Murray, H.S. Gill
University of Oxford, Oxford.

INTRODUCTION

Osteoarthritis (OA) of the hip is an important cause of pain and morbidity. Hip OA is a complex disorder with multiple genetic, environmental and constitutional risk factors contributing to its development and phenotype. Although OA has marked familial predisposition, the mechanisms and pathogenesis of its development remain unknown. Minor acetabular dysplasia and subtle variations in proximal femoral morphology are increasingly being recognized as factors that potentially compromise the joint biomechanically and lead to OA¹. Cross-sectional case control studies have shown that risk of hip OA increased as the femoral head-to femoral neck ratio (HNR) decreased. Previous studies have described the evolutionary change in inferior femoral neck trabecular density and geometry associated with upright stance, but no study has highlighted the evolutionary change in HNR². The aim of this study was to establish whether there is any evolutionary evidence that adoption of the hominin, bipedal stance has led to alterations in HNR that might predispose humans to hip OA.

METHODS

A collaboration with The Natural History Museums of London, Oxford and the Department of Zoology, University of Oxford provided specimens from the Devonian, Triassic, Jurassic, Cretaceous, Miocene, Palaeolithic and Pleistocene periods to modern day, spanning 400 million years. Specimens included amphibious reptiles (eg. Hellbender), dinosaurs, shrews, tupaiae, lemurs, african ground apes, Lucy (A. Afarensis), Turkana Boy (H. Erectus) and H. Neanderthalis.

Species were grouped according to gait pattern; HAKF (Hip and knee flexed), Arboreal (mostly tree-dwelling mammals demonstrating ability to stand with hip and knee joints extended) and hominin/bi-pedal. Imaging of specimens was performed using a 64-slice CT scanner. Three-dimensional skeletal geometries were segmented using MIMICS software. Anatomical measurements from bony landmarks were performed to describe changes in HNR, in the coronal plane, of the different specimens over time.

Measurements of HNR from the specimens were compared with HNR measurements made from AP pelvic radiographs of 119 normal subjects and 210 patients with known hip OA listed for hip arthroplasty

RESULTS

Species from the HAKF group that ambulate via sprawling had the smallest HNR (1.10, SD: 0.09) ($p < 0.001$). Species of the arboreal group, that mainly ambulated by jumping in-between trees had the biggest HNR (1.63, SD: 0.15) ($p = 0.006$). The first bipedal (1.41, SD: 0.04) had significantly bigger HNR ($p = 0.04$) in comparison to the normal human subjects (1.33, SD: 0.08). The lowest HNR was observed in the OA group (1.3, SD: 0.09).

DISCUSSION

The adoption of an upright stance during evolution has created an associated change in the femoral neck bone stock to adapt to the altered loading environment. These data would suggest that the HNR peaked in the Miocene period (10-15 million years ago). The trade-off between mobility and the bony density required to support gait has led to a decreasing HNR throughout hominid evolution.

Evolutionary theory would suggest that modern environmental pressures might pre-dispose future hominid evolution to an increased risk of hip OA.

8. AN INVESTIGATION INTO RISK STRATIFICATION FOR PERI-PROSTHETIC FRACTURES OF PRIMARY HIP ARTHROPLASTY

**D.S. Edwards, J. Millington, D.J. Dunlop, D.R. Higgs, J.M. Latham
Southampton General Hospital, Southampton.**

Introduction: With an increasing ageing population and a rise in the number of primary hip arthroplasty, peri-prosthetic fracture (PPF) reconstructive surgery is becoming more commonplace. The Swedish National Hip Registry reported that, in 2002, 5.1% of primary total hip replacements required revision due to PPF. Laboratory studies have indicated that age, bone quality and BMI all contribute to an increased risk of PPF. Osteolysis and aseptic loosening contribute to the formation of loosening zones as described by Gruen, with subsequent increased risk of fracture. The aim of the study was to identify significant risk factors for PPF in patients who have undergone primary total hip replacement (THR).

Method: Logbooks of three Consultant hip surgeons were filtered for patients who had THR-PPF fixation subsequent to trauma. Risk factors evaluated included sex, age, bone density (Singhs index), loosening zones, Vancouver classification, prosthesis stem angle relative to the axis of the femur, and length of time from THR to fracture. A control group of uncomplicated primary THR patients were also scrutinised.

Results: Forty-six PPF were identified representing 2.59% of THR workload. The male: female ratios in both groups were not significantly different (1:1.27 and 1:1.14 respectively). Average age of PPF was 72.1, which was significantly older than the control group (54.7, $p>0.05$). The commonest type of PPF was Vancouver type B. Whilst stem position in the AP plane was similar in both groups, in lateral views the PPF stem angle demonstrated significant antero-grade leg position compared to the non-PPF group ($p.0.05$). The PPF group demonstrated a greater number of loosening zones in pre-fracture radiographs compared to the control group (2.59 and 1.39 respectively, $p>0.05$)

Conclusion: Our workload from PPF reflects that seen in Europe. Age, stem position and the degree of stem loosening appear to contribute to the risk of a peri-prosthetic fracture.

9. TIP APEX DISTANCE – IS IT ENOUGH TO PREDICT IMPLANT FAILURE?

N. Agni, E.L. Sellers, R. Johnson, A.C. Gray

Royal Victoria Infirmary, Newcastle Upon Tyne, NE1 4LP

The aim of this study was to establish any association between implant cut-out and a Tip Apex Distance (TAD), $\geq 25\text{mm}$, in proximal femoral fractures reduced closed and stabilised with either a Dynamic Hip Screw (DHS) or Intramedullary Hip Screw (IMHS) device and whether any difference in cut-out rate may also be related to fracture configuration or implant type.

Radiographs of 65 consecutive patients with complete clinical details who underwent either DHS or IMHS fixation of proximal femoral fractures were reviewed retrospectively. The TAD was measured in the standard fashion using the combined measured AP and lateral radiograph distances. Fractures were classified according to the Muller AO classification.

35 patients underwent DHS fixation and 30 patients had IMHS fixation. 5 in each group had a $\text{TAD} \geq 25\text{mm}$. There were no cut-outs in the DHS group and 3 in the IMHS group. 2 of the cut-outs had a $\text{TAD} \geq 25\text{mm}$. The 3 cut-outs in the IMHS group had a fracture classification of 31-A2, 31-A3 and 32-A3.1 respectively. In addition, the fractures were inadequately reduced and noted as being fixed into a varus position.

A $\text{TAD} < 25\text{mm}$ would appear to be associated with a lower rate of cut-out. The cut-out rate in the IMHS group was higher than the DHS group. Contributing factors may have included an unstable fracture configuration and inadequate closed fracture reduction at the time of surgery.

10. TROPONIN - T IN HIP FRACTURE PATIENTS: PROGNOSTIC SIGNIFICANCE FOR MORTALITY AT ONE YEAR

**E.Spurrer, D. Wordsworth, R. Norris, S. Martin, M. Parker
Stamford.**

Hip fractures are common injuries in the elderly, with significant mortality and morbidity from several factors. Many of these patients have cardiac disease, and some develop cardiac complications, which may increase mortality.

Troponin T is a marker of myocardial injury but can be raised in other conditions. Patients over 60 years old admitted with hip fracture during the study period had their troponin T measured on admission and following surgery. Assay was performed after the patient had completed their treatment. We report the results of this study one year after the last patient was admitted.

108 patients were recruited. The average age was 84 years; 86% were female. This study found that 27% of hip fracture patients had some increase in the troponin T levels in the peri-operative period. This increase was not associated with an increase in early mortality, but there was an increase in one-year mortality for those with an increase in troponin T (45% versus 22%, $p=0.03$). These findings indicate that the routine measurement of troponin T after a hip fracture is unnecessary.

11. ARTHROSCOPIC CAPSULAR EXCISION IN THE TREATMENT OF ADHESIVE CAPSULITIS OF THE SHOULDER

C. R. Fetherston, D. W. Simon

North Hampshire Hospital, Basingstoke.

Adhesive capsulitis of the shoulder is a common debilitating condition with a prevalence in the order of 2 to 5%. Whilst it is usually a self-limiting condition, patients are typically not willing nor able to wait to the end of the recovery phase. A number of treatment strategies have been described. Manipulation under anaesthesia can significantly increase motion in all planes, but carries a significant risk of fracture. Capsular release also significantly improves motion with fewer potential side effects.

We hypothesise that performing an arthroscopic excision of the abnormal capsulitis tissue will give better results with least risk of recurrence. Data was collected both retrospectively and prospectively for patients undergoing this procedure. Range of motion and Oxford shoulder scores was documented pre-operatively and post-operatively, at 6 weeks, 3 months and 6 months. 41 patients were included. At 3 months mean flexion had increased from 101 to 152 degrees, abduction from 91 to 151 degrees, and external rotation from 18 to 44 degrees. Mean Oxford shoulder score had increased from 20.6 to 35.8 at 3 months.

The results support the use of this technique for treating adhesive capsulitis. Larger patient numbers and longer term follow up will help compare it against the other well established techniques.

12. 4-STRAND HAMSTRING RECONSTRUCTION USING BIO-INTRAFIX AND RIGIDFIX – A RETROSPECTIVE REVIEW

**A. Hamer, S. Roy, A. Metcalfe
Royal Glamorgan Hospital, Llantrisant.**

AIMS

To review the results of a single surgeon series using the above implants looking at functional outcome for the patient and implant survivorship.

BACKGROUND

The use of a quadrupled hamstring graft in ACL reconstruction is well established. There are many described techniques in securing graft fixation, the optimal method is not yet established.

METHODS

Patients were recruited for the study who had completed 8 months of post-op rehabilitation following primary ACL reconstruction and that had received the same surgical technique using the same implants from one surgical team. Patients undergoing a revision procedure were excluded. All patients received the same post-operative rehabilitation. Those who met the inclusion criteria were contacted via a postal survey using the Lysholm and Tegner questionnaires.

RESULTS

In total 77 patients were eligible for inclusion, consisting of 10 females and 67 males with a mean age of 31 (range 16-56). A 77% survey return rate was achieved with average follow up of 25 months (range 9-44). The mean Lysholm score was 82.1, with 59% ranking their knee as good or excellent. On average patients dropped 1.8 levels on the Tegner activity rating from a pre-injury average of 7.5 to post rehabilitation average of 5.7. There was a 100% survivorship of implants with no revisions undertaken due to implant failure.

DISCUSSION

The study has shown that this cohort of patients has produced self reported outcomes analogous to findings in the current literature. No obvious problem with implants was observed. It has highlighted the multiple factors associated with the outcome of ACL reconstruction and demonstrates that the quadrupled HT graft using Bio-Intrafix and Rigidfix implants produces short to mid-term functional and activity levels in keeping with the literature standard.

13. REDUCING THE COST OF LOWER LIMB TRAUMA: A PROSPECTIVE STUDY

A.C.M. Keenan, A.M. Wood, R. Maheshwari, R.A.E. Clayton

Queen Margaret Hospital, Dunfermline

Current health economics forces the clinician to consider the cost of treatment. Currently in Fife Hospitals, all lower limb injuries likely to require operative treatment are admitted from the Accident and Emergency department on the day of injury.

We prospectively recorded all patients admitted with lower limb trauma excluding neck of femur fractures, requiring operative treatment over an eleven-week period. The senior author reviewed all patients and a clinical judgment was made as to whether the patient could have been safely managed as an outpatient pre-operatively.

61 patients met the inclusion criteria. Average age 41.8 (Range 8-66) The three most common fractures 23(38%) ankle, 15(25%) tibial, 8(13%) femoral. Shaft.

28(46%.) fractures were deemed safe to have been managed preoperatively on an outpatient basis. 14/23(61%) ankle fractures were deemed safe to be discharged home. Average pre-operative stay 1.38 nights (Range 1-4 nights).

By initiating a simple policy of allowing uncomplicated ankle fracture patients to wait at home and return on the morning of surgery it is possible to reduce inpatient occupancy by 64 nights per year in our department. At a cost of £518 per patient per night, this could result in a saving of around £33,000 in unnecessary overnight inpatient stays. In order to achieve this clear clinical guidance for admitting doctors is necessary and further prospective research should be conducted into the risk/benefit of implementing this policy.

14. ARE CLINICAL OUTCOMES WORSE POST ELECTIVE FOOT AND ANKLE SURGERY IN OBESE PATIENTS?

L.B. Cannon and L. McMenemy

Queen Alexandra Hospital, Portsmouth.

Primary Care Trusts across the country are being encouraged to ration service provision due to austerity measures. Obesity has been suggested as a rationing tool with poor clinical outcomes sited as justification. There is however, a lack of evidence in the literature pertaining to clinical outcomes post elective foot and ankle surgery in patients with an increased Body Mass Index (BMI).

All patients undergoing elective foot and ankle surgery at Queen Alexandra Hospital, Portsmouth are entered into a prospective database which includes their BMI at time of assessment in clinic. From this we analysed the notes of all patients with a BMI ≥ 30 , excluding any not operated on between July 2007 and August 2009 or with a BMI of < 30 at time of surgery, to determine whether there was an increased incidence of peri or post operative complications.

Included in the study were 109 patients with a mean age of 54 (range 21 - 79). Female patients accounted for 63% of those notes reviewed and the mean BMI was 34 (range 30 - 50). A mixture of hind foot and forefoot procedures were carried out (20 different procedures).

Median length of stay was 0 nights (range 0 – 15 days). The causes for excessive length of stays (> 4 nights) included a pre operative Lower Respiratory Tract Infection missed prior to intubation and the initiation of CPAP post operatively in a patient with known Obstructive Sleep Apnoea. We found 3 cases of post operative Venous Thrombo-embolism within 3 months of surgery and 1 proven wound infection in a non-insulin dependent diabetic patient. Also noted were 3 non-unions, all requiring further surgery.

Based on our historical evidence of infective and thrombo-embolic complications in patients with a BMI < 30 , we conclude that peri and post operative complications in obese patients occur no more frequently than in a patient population with a BMI < 30 .

15. THE MODERN DECK-SLAP INJURIES: 3-YEAR OUTCOMES OF CALCANEAL BLAST FRACTURES

A. Ramasamy, A.M. Hill, R. Phillip, A.M.J. Bull, J.C. Clasper

Imperial Blast Biomechanics and Biophysics Group, Imperial College London.

Anti-vehicle mines (AV) and Improvised Explosive Devices (IEDs) remain the most prevalent threat to Coalition troops operating in Iraq and Afghanistan. Detonation of these devices results in rapid deflection of the vehicle floor resulting in severe injuries to calcaneus. Anecdotally referred to as a 'deck-slap' injury, there have been no studies evaluating the pattern of injury or the effect of these potentially devastating injuries since World War II. Therefore the aim of this study is to determine the pattern of injury, medical management and functional outcome of UK Service Personnel sustaining calcaneal injuries from under-vehicle explosions.

From Jan 2006 – Dec 2008, utilising a prospectively collected trauma registry (Joint Theatre Trauma Registry, JTTR), the records of all UK Service Personnel sustaining a fractured calcaneus from a vehicle explosion were identified for in depth review. For each patient, demographic data, New Injury Severity Score (NISS), and associated injuries were recorded. In addition, the pattern of calcaneal fracture, the method of stabilisation, local complications and need for amputation was noted. Functional recovery was related to the ability of the casualty to return to military duties.

Forty calcaneal fractures (30 patients) were identified in this study. Mean follow-up was 33.2 months. The median NISS was 17, with the lower extremity the most severely injured body region in 90% of cases. Nine (30%) had an associated spinal injury. The overall amputation rate was 45% (18/40); 11 limbs (28%) were amputated primarily, with a further 3 amputated on return to the UK. Four (10%) casualties required a delayed amputation for chronic pain (mean 19.5 months). Of the 29 calcaneal fractures salvaged at the field hospital, wound infection developed in 11 (38%). At final follow-up, only 2 (6%) were able to return to full military duty with 23 (76%) only fit for sedentary work or unfit any military duty.

Calcaneal injuries following under-vehicle explosions are commonly associated with significant polytrauma, of which the lower limb injury is the most severe. Spinal injuries were frequently associated with this injury pattern and it is recommended that radiological evaluation of the spine is performed on all patients presenting with calcaneal injuries from this injury mechanism.

The severity of the hindfoot injury witnessed is reflected by the high infection rate and amputation rate seen in this cohort of patients. Given the high physical demands of a young, active military population, only a small proportion of casualties were able to return to pre-injury duties. We believe that the key to the reduction in the injury burden to the soldier lies in the primary prevention of this injury. Work is currently on going to develop experimental and numerical models of this injury in order to drive future mitigation strategies.

16. THE UNHAPPY TRIAD OF ANKLE INJURY

C. Arthur, J. Dabis, A.J.C. Mountain

University Hospital Birmingham Foundation Trust & Royal Centre for Defence Medicine, Birmingham.

Since 2008 the improvised explosive device has been responsible for a significant proportion of injuries sustained whilst on operational duty in Afghanistan. Vehicles have been developed and adapted to offer maximal protection to service personnel. As a direct result of this success, there has been an increase in the severity of injuries to the lower limb.

Hind-foot injuries are a difficult cohort of injuries to treat successfully. Those that are amenable to reconstruction carry a significant co-morbidity and risk of amputation whether it is early or delayed.

There has been a new fracture pattern of injury to the lower limb that has not been described in medical literature. This pattern consists of a distal third tibial fracture, calcaneal fracture and mid-foot injury within the same limb. The management of these injuries are even more challenging due to the extent of associated soft-tissue injury.

We believe the combination of the three injuries form the “unhappy triad of the ankle”. Each of the injuries is individually potentially reconstructable but in the combination of all three, primary amputation should be considered as part of the surgical options.

17. TIBIO-TALO-CALCANEAL ARTHRODESIS WITH A COMPRESSIVE RETROGRADE INTRAMEDULLARY NAIL: THE EXETER EXPERIENCE OF 55 CONSECUTIVE NAILS.

**P.M. Guyver, J.M. Taylor, R.E. Knox, M. Czipri, N.J. Talbot, I.T. Sharpe.
Royal Devon and Exeter Foundation Trust, Exeter.**

Tibiototalcalcaneal arthrodesis is an important salvage method for patients with complex hindfoot problems including combined arthritis of the ankle and subtalar joints, complex hindfoot deformities and failed total ankle arthroplasty. The aim of this study was to report the elective results of combined subtalar and ankle arthrodesis using one design of dynamic retrograde intramedullary compression nail-the T2 Ankle Arthrodesis Nail(Stryker)

Retrospective review identified 53 consecutive patients who had 55 tibiototalcalcaneal arthrodesis procedures by two surgeons(ITS and NJT) using T2 Ankle nail fixation. 3 patients died of unrelated causes before follow up was complete which left 50 patients(52 nails); the largest consecutive series in the use of this device. Mean follow up was 23.5(3-72) months with the average age of patients being 61(range 22-89) years. An 84% response was achieved to a function and patient satisfaction questionnaire. Main indications for treatment were combined ankle and subtalar arthritis(63%-33/52) or complex hindfoot deformities(23%-12/52). Outcome was assessed by a combination of Clinical notes review, clinical examination, and telephone questionnaire.

46 patients(83.6%) achieved union at a mean time of 3.7 months. 8 patients required an allograft(femoral head) bone block procedure. 4 patients(10%) subjectively thought that the procedure was of no benefit or had a poor result whilst 35(83%) had a good or excellent result. The mean visual analog scale(VAS) score for preoperative functional pain was 7.1 compared to the mean post operative(VAS) score of 1.9($p < 0.001$). Complications consisted of 2 amputations, 2 deep infections and 5 removals of broken or painful screws. The use of preoperative functional aids and orthotics dropped from 32% to 18% and 22% to 18% respectively.

This device and technique is a safe and effective treatment of hindfoot arthrosis and deformity giving reliable compression and subsequent fusion with excellent results in terms of patient satisfaction and pain relief.

18. ANKLE / HINDFOOT SALVAGE ARTHRODESIS USING EXTERNAL FIXATION

S. Ramakrishna, P. Moras, A.J.L. Jowett, S.L. Hodkinson, I.F.N. Lasrado, C.J. Hand.

Queen Alexandra Hospital, Portsmouth.

We report on the clinical, radiographic and functional outcomes after salvage arthrodesis for complex ankle and hind-foot problems - the Portsmouth experience with the Ilizarov ring fixator.

Methods and results: We report on 11 patients who underwent ankle and hind-foot (tibio-calcaneal) arthrodeses using an Ilizarov ring fixator between 2006 and 2010. The indications included failed fusion after primary arthrodesis, sepsis complicating internal fixation of fractures, talar avascular necrosis and failed total ankle arthroplasty (TAR).

All patients had undergone multiple previous surgeries, which had failed. There were 8 males and 3 females in this group. Average age of the patients was 58 (43 years – 77 years) Mean follow up was 36 months (7 – 60 months). Mean frame time was 24 weeks (15 – 36 weeks). BMP 2 (Inductos) was used in three cases. The procedure was combined with a proximal corticotomy and lengthening in 2 patients who had undergone a talectomy and tibio-calcaneal fusion. There were no major complications apart from minor pin site infections requiring oral antibiotics. There were no deep infections, thrombo-embolic issues, CRPS, or functional problems on account of limb shortening.

Patients were assessed clinically, radiologically and using functional outcome scores - EQ50 and AOFAS.

Solid arthrodesis was achieved in all but one patient who was subsequently revised with a hind-foot nail.

All patients were satisfied with their overall improvement in pain and function.

Conclusion: We conclude that this is an effective salvage technique for complex ankle and hind-foot problems in patients with impaired healing potential, insufficient bone stock and progressive deformity.

19. CHANGES IN SURGICAL WORKLOAD AT THE JF MED GP ROLE 3
HOSPITAL, CAMP BASTION, AFGHANISTAN: 01 NOV 2008 - 01 NOV 2010
N, Jacobs, D.M. Taylor, P.J. Parker
Salisbury District Hospital, Salisbury

The operative workload at the surgical facility in Camp Bastion, Afghanistan, has previously been reported for the two-year period 1 May 2006 to 1 May 2008. The nature of the Afghanistan conflict has changed considerably since 2007, and wounds from improvised explosive devices (IEDs) have replaced those of small arms fire as the signature injury of the insurgency. The severity of injury from IEDs has increased such that casualties routinely present with high bilateral traumatic lower limb amputations and associated pelvic, perineal, upper limb and facial wounds. These complex injuries affecting multiple anatomical zones necessitate a multi-surgeon team approach in their management. We present recent data for the surgical activity at the JF Med Gp Role 3 Hospital, Camp Bastion, for the two-year period 1 November 2008 to 1 November 2010.

During the study period, a total of 4276 cases required 5737 surgical procedures, representing a 2.6-fold increase in activity compared with the previously reported 2-year period. Of these cases, 42% were coalition troops (ISAF) and 6% children. Wound debridement (44%) and relook/ delayed primary closure of wounds (10%) remain the most commonly performed procedures. There has been a marked increase in the rates of amputation (8% of procedures, 48% being above-knee), laparotomy (9%), application of external fixation (4.5%), and fasciotomies (3%). Scrotal exploration accounted for 1.9% of procedures, resulting in 17 orchidectomies. During the 2-year study period, we have also observed a considerable increase in the incidence of cases requiring 5 or more surgeons operating simultaneously.

20. THE CAMP BASTION EXPERIENCE OF TRAUMATIC LIMB AMPUTATION
K. Rourke, A. Hicks, PA. Templeton
Royal Liverpool Hospital, Liverpool.

UK personnel have been deployed in Afghanistan since 2001 and over this time a wealth of experience in contemporary war surgery has been developed. Of particular note in the latter Herrick operations the injury pattern suffered by personnel is largely blast wounds, primarily from improvised explosive devices. With the development of improved body armour previously unsurvivable blasts now result in a large number of traumatic amputations, predominantly affecting the lower limb.

Faced with this, deployed medical personnel in the Role 3 facility, Camp Bastion, have developed, by a process of evolution, a standard process for timely management of these injuries.

We present a documented schema and photographic record of the 'Bastion' process of management of traumatic amputation through the resuscitation department, radiology, theatres and post-operatively. In resuscitation the priority is control of catastrophic haemorrhage with exchange of CAT tourniquets to Pneumatic tourniquets. While undergoing a CT, time can be used to complete documentation. In theatre a process of social debridement & wash then sterile prep followed by formal debridement allows rapid management of the amputated limbs.

This work provides a record of current best practice that generates maximum efficiency of personnel and time developed over a large number of procedures. This allows reflection both now in relation to continuing Herrick operations and when military medical services are faced with a future conflict and an inevitable change in injury patterns.

21. IED RELATED PERINEAL TRAUMA: EVIDENCE BASE, ANATOMICAL INJURIES AND SURGICAL MANAGEMENT

S. Mossadegh, M. Midwinter, P. Parker

Royal Centre for Defence Medicine, Birmingham.

This study defines the patterns of perineal injury due to blast currently seen on operations. It refines our team-based surgical strategies of surgical resuscitation provides an evidence base for a perineal debridement - colonic diversion didactic on the Military Operational Surgical Training (MOST) course.

The Joint Theatre Trauma Registry (JTTR) held at RCDM was examined from 1 January 2003 to 31 December 2010. Data abstracted included patient demographics, mechanism of injury, injury severity score (ISS), treatment, management, length of stay (LOS) and outcomes.

Of 4807 military trauma patients, 118 (2.5%) had a recorded perineal injury, 56 died (48% all IED). Pelvic fractures were identified in 63 (53%) of which 17 (27%) survived. Mortality rates were significantly different between the combined perineal & pelvic fracture group compared to pelvic fracture & perineal injuries alone (41% & 18% respectively, $p = 0.0001$). Mean ISS for all patients was 41.03. Those with a pelvic fracture had a significantly higher ISS than those with perineal injuries alone (29.53 vs. 51.06, $p = 0.0001$). Recorded early antibiotic use was significantly more frequent in survivors ($p = 0.0119$). A literature review demonstrated the benefits of early feeding, emergent diversion, antibiotics, daily washouts and radical early debridement.

Combined perineal injuries & pelvic fractures have the highest rate of mortality. Early aggressive management is essential to survival in this cohort. Our recommendations are immediate faecal diversion, aggressive initial debridement & early enteral feeding (in the deployed ITU after first surgery). These findings will enable the rapid provision of an evidence based training schedule to be incorporated into our pre-deployment surgical training program (MOST) to improve surgical team preparation and patient outcomes.

22. A STUDY OF THE ASSOCIATED INCIDENCE AND PATTERN OF UPPER LIMB TRAUMA IN BILATERAL LOWER LIMB AMPUTATIONS ON OP HERRICK – AN ANALYSIS OF 221 CONSECUTIVE CASES

**A. Pandya, A. Hicks, P. Coates, N. Jacobs, J. Hawker
Mountbatten Department of Plastic Surgery, MDHU Portsmouth.**

Introduction :

During two sequential deployments to Afghanistan, it was noticed that an inordinately high number of patients with bilateral lower limb injuries that resulted in amputations at Camp Bastion itself, had associated upper limb injuries.

It was decided to study the incidence and distribution of the same.

Methods:

This was both a retrospective as well as a prospective study. Of the 221 cases, sixty eight were recorded and data collected prospectively whereas the data for the rest was gathered using the patients' scanned records from Camp Bastion, their radiology reports and clinical photographs. Permission to gather and access this data was through the access of the Joint Theatre Trauma Registry provided by the Deputy Director of the Joint Combat Casualty Research Team (JC2RT) in Afghanistan and was also relayed to the US Army Institute for Surgical Research, Fort Sam Houston, Texas. Permission was granted to conduct this study as it would throw a light on the pattern of injuries and allow a further study of the impact of this on rehabilitation (this is an ongoing concurrent study)

Results:

A total of 221 patients were studied as described above. They included UK, NATO, US, ANA, ANP, EF and Afghan civilians. The cases occurred between June 2009 till January 2011.

There were 59 fatalities from these 221 cases. That data pertaining to these cases was discarded.

Data: Of the surviving 162 cases, 31 cases had no upper limb involvement. A number of these individuals were subjected to an IED attack when mounted, although dismounted injuries still accounted for the vast majority.

131 individuals had upper limb involvement of some sort or the other. The injuries were classified into anatomical distribution as well and the type of trauma (amputations, composite soft tissue, fractures, vascular, nerves etc). The predominance of the injuries was on the distal portion of the upper limb (i.e involving the digits, hands and forearm (digits and hands – 66 patients, wrist and forearm in 69 patients, elbow and arm in 42 patients). The most common form of involvement was a composite tissue injury (involving skin, muscle and vessels/nerves) in 85 patients. 27 patients ended up as triple amputees by the time they left the Camp Bastion Role 3 Hospital.

Discussion.

From the pattern and severity of injuries it is obvious that dismounted individuals presented with a very severe spectrum of injuries. The predominance of the left upper limb being involved is in keeping with a dismounted right handed soldier out on patrol with the left upper limb extended along the barrel of the rifle or his weapon.

Using various cases (clinical photographs as well as radiographs) the spectrum of injuries is explained and a case is made for truly differentiating the debridement and radical treatment of upper limb versus lower limb trauma during initial surgery.

23. THE EFFICACY OF ANTIMICROBIAL WOUND DRESSINGS USED IN THE MANAGEMENT OF COMPLEX EXTREMITY INJURY: A PRE-CLINICAL RANDOMISED CONTROLLED TRIAL

W.G.P. Eardley, K.R. Martin, E. Kirkman, J.C. Clasper, S.A. Watts.
Academic Department of Military Surgery and Trauma, Royal Centre for Defence Medicine, Birmingham.

Extremity injury and complications such as wound infection remain a significant problem for the military. This study investigates the anti-microbial efficacy of four dressings used in militarily relevant complex extremity injury.

Under general anaesthesia, the flexor carpi ulnaris of 24 New Zealand White rabbits was exposed to a high-energy impact and then inoculated with 10^6 colony forming units of *Staphylococcus aureus*. Dressings: gauze soaked in saline, Chlorhexidine, Betadine or Acticoat®, were randomised and applied 3 hours post injury, to replicate casualty evacuation. Once recovered, animals were checked at least twice daily and body temperature recorded. Analgesia was administered once a day. At 48hrs animals were culled, the muscle harvested and analyzed by a blinded investigator. Group sizes of 6 were required to detect a statistically significant effect of a mean one log reduction in bacterial counts at 48 hours.

No dressing gave a significant reduction in bacterial counts at 48 hours. A paired t-test of contamination versus recovered dose gave p values of 0.903, 0.648, 0.396 and 0.336 for saline, Acticoat®, chlorhexidine and iodine respectively. Contamination dose between groups compared using ANOVA showed no significant difference ($p=0.566$). Recovered bacterial loads between groups revealed no significant difference ($p=0.280$).

This study indicates that over a 48 hour period, dressings with reported anti-bacterial properties offer no advantage over saline soaked gauze in reducing the bacterial burden in a contaminated soft tissue injury. Future work will extend the study temporally and introduce multiple contaminants.

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24. EARLY INITIAL ANTIBIOTICS AND DEBRIDEMENT INDEPENDANTLY REDUCE INFECTION IN AN OPEN FRACTURE MODEL

J.G. Penn-Barwell, C.K. Murray, J.C. Wenke

Academic Department of Military Surgery and Trauma, Royal Centre for Defense Medicine, Birmingham.

Introduction

Open fractures are common, and infection a frequent complication. There is still uncertainty regarding the urgency of initial treatment. The majority of animal studies indicate that early irrigation and debridement reduces infection; unfortunately, these studies often do not involve antibiotics. Clinical studies indicate that the timing of initial debridement does not affect the infection rate. These studies are observational and fraught with confounding variables. The purpose of this study was to control for these variables using an animal model incorporating both systemic antibiotics and surgical treatment.

Method

This study used a segmental defect rat femur model contaminated with *Staphylococcus aureus* and treated with a 3 day course of systemic cefazolin (5 mg/Kg 12 hourly) and surgical treatments, both of which were initiated independently at 2, 6 and 24 hour time points. After 14 days bone and hardware was harvested for separate microbiological analysis.

Results

These results show that the earlier systemic antibiotic treatment or surgery is initiated. When antibiotics are started at 2 hours, delaying surgical treatment from 2 to 6 hours significantly increases infection ($p=0.047$). However, delaying surgery to 24 hours increases infection, but not significantly ($p=0.054$). The timing of antibiotics had a more significant effect on the proportion of positive samples than earlier surgery. At the 2 and 6 hour treatments, the p value was 0.004 and for the 6 and 24 timings it was 0.003.

Conclusion

Surgery and antibiotics at 2 hours completely eradicates the bacteria, but surgical delay for 6 hours appears to allow the bacteria to form non-susceptible colonies. Delaying antibiotics to 6 or 24 hours had a profound detrimental effect on the infection rate regardless of timing of surgery. These findings are consistent with the concept that bacteria progress from a vulnerable planktonic form to a treatment-resistant biofilm.

25. OUTCOMES FROM COMBAT PERIPHERAL NERVE INJURY - A PROSPECTIVE STUDY OF 261 NERVE INJURIES.

A. Ramasamy, W.G. Eardley, K.V. Brown, R. Dunn, P. Anand, J. Etherington, J.C. Clasper, M.P.M Stewart, R. Birch
Academic Department of Military Surgery and Trauma, Birmingham.

Peripheral nerve injuries (PNI) occur in 10% of combat casualties. In the immediate field-hospital setting, an insensate limb can affect the surgeon's assessment of limb viability and in the long-term PNI remain a source of considerable morbidity. Therefore the aims of this study are to document the recovery of combat PNI, as well as report on the effect of current medical management in improving functional outcome. In this study, we present the largest series of combat related PNI in Coalition troops since World War II.

From May 2007 – May 2010, 100 consecutive patients (261 nerve injuries) were prospectively reviewed in a specialist PNI clinic. The functional recovery of each PNI was determined using the MRC grading classification (good, fair and poor). In addition, the incidence of neuropathic pain, the results of nerve grafting procedures, the return of plantar sensation, and the patients' current military occupational grading was recorded.

At mean follow up 26.7 months, 175(65%) of nerve injuries had a good recovery, 57(21%) had a fair recovery and 39(14%) had a poor functional recovery. Neuropathic pain was noted in 33 patients, with Causalgia present in 5 cases. In 27(83%) patients, pain was resolved by medication, neurolysis or nerve grafting. In 35 cases, nerve repair was attempted at median 6 days from injury. Of these 62%(22) gained a good or fair recovery with 37%(13) having a poor functional result. Forty-two patients (47 limbs) initially presented with an insensate foot. At final follow up (mean 25.4 months), 89%(42 limbs) had a return of protective plantar sensation. Overall, 9 patients were able to return to full military duty (P2), with 45 deemed unfit for military service (P0 or P8).

This study demonstrates that the majority of combat PNI will show some functional recovery. Adherence to the principles of war surgery to ensure that the wound is clear of infection and associated vascular and skeletal injuries are promptly treated will provide the optimal environment for nerve recovery. Although neuropathic pain affects a significant proportion of casualties, pharmacological and surgical intervention can alleviate the majority of symptoms. Finally, the presence of an insensate limb at initial surgery, should not be used as a marker of limb viability. The key to recovery of the PNI patient lies in a multi-disciplinary approach. Essential to this is regular surgical review to assess progress and to initiate prompt surgical intervention when needed. This approach allows early determination of prognosis, which is of huge value to the rehabilitating patient psychologically, and to the whole rehabilitation team.

**26. THE EARLY MANAGEMENT OF UNSTABLE PELVIC RING FRACTURES:
STABLISHING THE EFFECT OF CIRCUMFERENTIAL BINDER POSITION ON
DIASTASIS REDUCTION.**

T.J. Bonner, W.E. Eardley, N. Newell, S. Masouros, I. Gibb, J. Matthews and J.C. Clasper

Academic Department of Military Surgery and Trauma, Birmingham.

Circumferential pelvic binders have been developed to allow rapid closure of the pelvic ring in unstable fracture patterns. Despite evidence to support the use of pelvic binders, there is a paucity of data regarding both the efficacy of their application and the incidence of fracture malreduction associated with their use.

All patients presenting to the UK's military hospital in Afghanistan who survived and underwent pelvic radiography were included. Cases were identified by retrospective review of all digital plain pelvic radiographs performed between January 2008 and July 2010. All radiographs and CT images were assessed to identify the presence of any pelvic fracture. Patients were grouped into three categories according to the vertical level of the buckle: superior to the trochanters (level A), inferior to the trochanters (level C) and at the level of the trochanters (level B). Diastasis reduction was measured in patients with Anterior-Posterior Compression (APC) grades II and III, or Combined Mechanical Injuries (CMI). Comparison of diastasis reduction between groups B and C was assessed by an independent samples student's t-test.

We identified 172 radiographs where the metallic coils in the buckle of a SAM Pelvic Sling™ were clearly visible. The binders were positioned at level B in 50% of radiographs. In the patients with fractures, the mean pelvic diastasis gap was 22 mm less when the pelvic binder was positioned at level B compared to level A ($p < 0.01$).

This report is the first to highlight and quantify a problem with accurate positioning of circumferential binders for unstable pelvic fractures. Checking the binder position against easily identifiable anatomical landmarks and appropriate training in the application technique will help to ensure appropriate early management of these life threatening injuries.

SAP 4. - SW Thomas

27. THE DISTAL RADIUS SKYLINE VIEW: A SIMPLE AND ACCURATE METHOD FOR DETERMINING DORSAL CORTEX SCREW PENETRATION IN LOCKED VOLAR PLATING OF THE DISTAL RADIUS

J. Granville-Chapman, A.G. Hacker, A. Keightley, T. Sarkhel, J.P. Monk, R.R. Gupta

Ashford and St Peters NHS Foundation Trust, Chertsey.

Volar locking plate fixation of distal radius fractures is becoming increasingly popular, but is not without complications. These include extensor tendon rupture. Extensor tendon ruptures occur in up to 8.8% of patients. Rupture has been attributed both to the drill bit and long screws breaching the extensor compartments.

Using conventional radiological views, the dihedral shape of the dorsal surface of the distal radius impedes accurate intra-operative screw length assessment.

We present a simple new radiological view that is: sensitive (100%); accurate (98%), and reproducible (97% inter and intra-observer variability $p=0.005$). It clearly demonstrates all screw tips and is superior to radiological views currently in use (69% sensitive and 42% accurate, 69% sensitive) for determining correct screw length.

Introduction of this novel radiological view should reduce the incidence of extensor tendon rupture following distal radius volar plate fixation. We recommend it is used routinely during wrist fracture volar plate surgery.

How do you do the skyline view.

Surgeon Lt Col Sandy Wood

28. EPIDEMIOLOGY OF MUSKULOSKELETAL INJURIES DURING COLD WEATHER WARFARE TRAINING.

J.T. Evans, R.J. Howes, S.J. Droog, I. M. Wood, A.M. Wood

Rate 5/5

The Royal Marines regularly deploy to Norway to conduct Cold Weather, Arctic and Mountain Warfare training. A total of 1200 personnel deployed to Norway in 2010 over a 14-week period. Patients whose injuries prevented them from continuing training, were returned to the UK via AEROMED.

1200

All data on personnel returned to the UK was prospectively collected and basic epidemiology recorded.

53 patients (incidence 44/1,000 personnel) were returned to the UK via AEROMED. 20/53 (38%) of cases were musculoskeletal injuries (incidence 17/1000 personnel).

15/20 musculoskeletal injuries were sustained while conducting ski training (incidence 13/1,000), 4/20 were non-alcohol related injuries 1/20 was related to alcohol consumption off duty.

Injuries sustained whilst skiing: 5/15 sustained anterior shoulders dislocation, 5/15 Grade 1-3 MCL/LCL tears, 2/15 sustained ACJ injuries, 1/15 crush fracture T11/T12, 1/15 tibial plateau fracture and 1/15 significant ankle sprain. Non-Training injuries: 1 anterior shoulder dislocation, 1 distal radial fracture, 1 olecranon fracture, 1 Scaphoid Fracture and one 5th metatarsal fracture. 60% of injuries were upper limb injuries. The most common injury was anterior shoulder dislocation 6/20 (Incidence 5/1000)

Our results suggest that cold weather warfare training has a high injury rate requiring evacuation, 4% of all people deployed will require AEROMED evacuation, and 2% have musculoskeletal injuries. Ski training causes the majority of injuries, possibly due to the rapid transition from non-skier to skiing with a bergen and weapon. Military Orthopaedic and rehabilitation units supporting the Royal Marines, should expect sudden increases in referrals when large scale cold weather warfare training is being conducted. Further research is required to see if musculoskeletal injury rates can be decreased in cold weather warfare training.

5) Shoulder disloc → first time dislocators
→ recurrent dislocators

Surgeon Lt Col

29. ACL RUPTURES IN ROYAL MARINE BASIC TRAINING: REHABILITATION TIMES AND RATE OF COMPLETION OF TRAINING.

A.M. WOOD, R.J. HALES, J. BAKKER-DYOS, M. CHAPMAN, A. KEENAN
Institute of Naval Medicine, Gosport.

Previous Anterior Cruciate Ligament (ACL) reconstruction is currently a bar from entry to the Royal Marines and Royal Navy, whilst the British Army allows recruits to join if asymptomatic 18 months post ACL reconstruction. However current Royal Marines policy is to rehabilitate recruits who sustain an ACL disruption in training. We retrospectively analysed the rehabilitation times and pass out rate of Royal Marines who had an ACL disruption during recruit training over an 8 year period.

12 recruits sustained an ACL disruption during recruit training in the study period giving an incidence of around 1.5/1000 recruits. 9 Patients underwent ACL repairs in training, with 1 patient leaving and rejoining post repair and later successfully passed out. 2 patients were treated conservatively. Of the 12 ACL sustained in training 8/12 (67%) passed out. None of the patients treated conservatively passed out. The mean time out of training for successful recruits was 51.6 weeks (95% CI 13.1) mean rehabilitation time post ACL reconstruction for successful recruits was 36.7 weeks (95% CI 12.5). Mean time to discharge for unsuccessful recruits 63.2 weeks (95% CI 42.4). In the operative group 1/10 left due to failure to return to training and 1/10 left through unrelated reasons. Current costing for recruit training is £1800 per week per recruit.

ACL injuries are not common in Royal Marine Training, and reconstruction is not a bar to completing Royal Marine basic training. We estimate that it costs around £100,000 per-injured recruit, to maintain a policy of rehabilitating ACL injured recruits in Royal Marines training. Further research into the long term employability of Royal Marines sustaining an ACL injury in training is required

Sandy

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30. PATIENT REPORTED OUTCOME MEASURES (PROMS) IN MILITARY PATIENTS WITH SHOULDER INSTABILITY

S. Middleton, P. Guyver, M. Boyd, T. Anderson, M. Brinsden
MDHU Plymouth.

Military patients have high functional requirements of the upper limb and may have lower pre-operative PROM scores than civilian patients i.e. their function is high when benchmarked, but still insufficient to perform their military role thereby mandating surgery.

Our aim was to compare the pre-operative Oxford Shoulder Instability Scores in military and civilian patients undergoing shoulder stabilisation surgery.

We undertook a prospective, blinded cohort-controlled study (OCEBM Level 3b). The null hypothesis was that there was no difference in the Oxford Shoulder Instability Scores between military and civilian groups. A power calculation showed that 40 patients were required in each group to give 95% power with 5% significance. A clinical database (iParrot, ByResults Ltd., Oxford, UK) was interrogated for consecutive patients undergoing shoulder stabilisation surgery at a single centre. The senior author - blinded to the outcome score - matched patients according to age, gender and diagnosis. Statistical analysis showed the data to be normally distributed so a paired samples t-test was used to compare the two groups.

110 patients were required to provide a matched cohort of 80 patients. There were 70 males and 10 females. Age at the time of surgery was 16-19yrs (n=6); 20-24yrs (n=28); 25-29 (n=16); 30-34(n=12); 35-39(n=12); 40-44(n=6). 72 patients (90%) had polar group one and 8 patients (10%) had polar group two instability. The mean Oxford Shoulder Instability Score in the civilian group was 17 and the in military group was 18. There was no statistical difference between the two groups (p=0.395).

This study supports the use the Oxford Shoulder Instability Score to assess military patients with shoulder instability.

4 Col

Specialist Physio
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31. ATTITUDES AND BELIEFS OF MILITARY PHYSIOTHERAPISTS AND THEIR INFLUENCE ON THE MANAGEMENT OF CHRONIC LOW BACK PAIN- A QUALITATIVE INVESTIGATION

J.W. Heywood and I. Ryder

Defence Medical Rehabilitation Centre, Headley Court, Epsom.

The study used a qualitative methodology to explore the attitudes and beliefs of military physiotherapists and how these influenced the management of military patients presenting with chronic low back pain. Semi-structured interviews were undertaken with a sample of 16 military physiotherapists; the transcripts were analysed using a method of thematic content analysis.

Analysis of semi-structured interviews undertaken resulted in the identification of six themes, these were; military culture, occupational issues, continuing professional development, clinical reasoning, need for cure and labelling the patient. The importance of understanding the occupational demands on their patients was considered highly significant by all of the military physiotherapists interviewed. However, there appeared generally poor knowledge of the biopsychosocial model in the management of low back pain and over reliance on the medical model. Three-quarters of the military physiotherapists interviewed expressed frustration in their management of patients with low back pain. Similarly, the military physiotherapists displayed a poor awareness of current evidence-based clinical guidelines for the management of low back pain.

The themes military culture and occupational issues were significant in influencing the military physiotherapist's clinical management. The highly physical and arduous nature of military occupations resulted in investigative procedures being requested at an earlier stage than is recommended in the current evidence-based guidelines. Justification for early investigations was provided on the basis of the unique occupational factors combined with requirement to optimise the number of military personnel able to deploy operationally.

It was concluded that the management of low back pain in military personnel could be improved by increasing awareness of the current evidence-based guidelines. This would benefit both patients and the Armed Services, by reducing the disability caused by low back pain and increasing the number of operationally deployable service personnel.

Fys
Research

Caplan
CT + SWest Derriford.

32. ARTHROSCOPY SIMULATION IN SURGICAL TRAINING

M. Boyd, T. Anderson, S. Middleton, M. Brinsden

Derriford Hospital, Plymouth.

Skills simulation is increasingly used as a training tool in postgraduate surgical training. Trainee's perception of the value of this experience has not previously been investigated.

To investigate the value of surgical simulation training delivered by an arthroscopy skills course.

We constructed a subject-specific, self-assessment questionnaire based around the ISCP Peer Assessment Tool. The questionnaire was administered to candidates before and after attending the Plymouth Arthroscopy Skills Course. Participant demographic data was recorded. Questionnaire data was interrogated to give an overview of the course, as well as the benefit of site-specific skills stations. Statistical analysis showed the data to be normally distributed. The paired T-test was used to compare mean values.

Twelve surgical trainees attended the course – CT2 trainees (n=4); ST3 trainees (n=7); ST4 trainee (n=1). 11 candidates completed both administered questionnaires giving a 92% response rate. The global mean score at the beginning of the course was 2.39. The global mean score at the end of the course was 3.90. The mean improvement was 1.51 ($p < 0.01$; 95% CI= 0.96-2.07). Skill station specific scores all showed improvement with the greatest effect in wrist arthroscopy. CT trainees had a lower mean score compared to ST trainees. Both groups completed the course with similar mean scores.

This study shows that arthroscopy simulation improves trainee-reported ratings of surgical skill. It also shows that less experienced candidates derived the greatest benefit from the training. Further research is required to compare self-assessed performance against objective benchmarks using validated assessment tools.