



Combined Services Orthopaedic Society  
Friday 13<sup>th</sup> May  
Council House, Birmingham



## **Non-penetrating ballistic chest trauma – an experimental study of the influence of chest wall biomechanics.**

Hinsley D, Tam W, Evison D.

**Objectives:** Behind armour blunt trauma (BABT) to the thorax results from motion of the body wall arising from the defeat of high-energy projectiles by body armour. NATO predicts that BABT will increase in future conflicts. This study aims to define biomechanical tolerance levels for BABT to the lateral thorax.

**Methods:** Terminally anaesthetised pigs (n=19) were subjected to 4 levels of severity of BABT (Table). Two types of armour plates were used. Group 1 were subjected to a 7.62mm round (INIBA armour) whilst group 2 was subjected to a 12.7mm round (EBA armour) the latter group being further subdivided by the presence or absence of two thicknesses of trauma attenuating backing (TAB). Accelerometers were attached to the pleural aspect of ribs 7, 8 and 9 mid-way between the spine and the sternum.

**Results:** Outcome was assessed by classifying severity of injury, in terms of mortality, into 3 groups – survivors (animals surviving to 6 h post-impact), early (0-30min) and late deaths (>30min-6h). The peak acceleration values were obtained from the accelerometer closest to the point of impact. Mean peak acceleration was significantly higher in the early death group ( $1070\text{km/s}^2$ ) compared to survivors ( $591\text{km/s}^2$ ) ( $p<0.05$ ).

There were 6 early deaths, 5 late deaths and 8 survivors. In terms of outcome Group 1 represented the lowest threat with 5 survivors and 1 late death. The animals in Group 2 with no TAB fared worst with 2 early deaths, one late death and no survivors. Deaths were due to respiratory failure/apnoea (n=4), pneumothorax (n=2), haemothorax (n=1), respiratory failure/pulmonary contusion (n=3) and ventricular fibrillation (n=1).

**Conclusions:** Peak acceleration of the body wall may be used to rank the outcome following BABT. There is a significant difference in peak acceleration at the extremes of the injury scale.



## **ABSTRACT**

### **ORTHOPAEDIC ADMISSIONS TO MND (SE) FIELD HOSPITAL DURING JANUARY – MARCH 2005**

Capt Anna Crawford, Lt Col Prakesh

#### **INTRODUCTION**

The Role 4 facilities available for those troops serving in Iraq, as well as Civilians contracted by the Ministry of Defence, to support the Iraqi Security Forces, are distributed into four quadrants. The 120 bed Field Hospital at Shaibah Log Base receives patients through A&E, a Primary Health Care facility and direct referrals to the SHO from the Role 1 & 2 facilities within the South East quadrant.

This study was a retrospective evaluation of the orthopaedic attendances via A&E, as well as direct referrals (but did not include PHC attendances) during a three month period; January through March of this year.

#### **AIM**

The aim of this study was to assess the percentage of orthopaedic attendances, and of these:

- the number admitted
- the (average) length of inpatient stay
- the management of each condition (surgical/conservative/active rehabilitation)
- the outcome ie. Repatriation (via Aeromedical Evacuation) or Return to Unit

#### **CONCLUSIONS**

The deductions drawn from this (short) study are aimed to explain the rationale behind the Repatriation process for prognostic purposes, to introduce the logical reasoning of requiring internal fixation capability in Operational Theatre, to introduce a concept of need for a Rehabilitation Facility/Inpatient Rehabilitation Ward and to discuss the unsuitability and inappropriateness of referring chronic orthopaedic conditions to the Orthopaedic Team within Theatre.

# **Aeromedical Evacuation from OP TELIC – Comparison of Evacuation before, during and after the conflict phase.**

**Eardley WGP, Pathak G.** *Bolton*

## **Introduction**

A retrospective analysis of aeromedical evacuation of casualties from OP TELIC contrasting the demand for evacuation and nature of injury during both war fighting and peace enforcement missions. The study was performed to address a perception of clinicians working within the operational theatre that service personnel outside of times of conflict were being evacuated with increasingly trivial or chronic injuries compared with those evacuated when war fighting was occurring.

## **Methods**

A comprehensive record of patients evacuated was retrospectively studied. Consecutive cases were classified by diagnosis. The period of study was 1<sup>st</sup> March 2003 to 30<sup>th</sup> June 2004.

## **Results**

In the sixteen month period a total of one thousand nine hundred and twenty four patients were evacuated by air to the United Kingdom. In the first three months (immediately before, during and post conflict) eight hundred and thirty patients were evacuated, an average of 280 per month. Of these, 2.8% were as a result of battle. During the conflict phase, an average of 60 patients a month were evacuated due to a chronic orthopaedic condition. This is in contrast to an average of 10 a month in the post conflict phase. In the three months following the conflict (incorporating the Iraqi summer) four hundred and seventy one troops were evacuated - an average of 157 per month. Of these, heat illness accounted for 28%. In the following ten months 621 troops were evacuated, averaging 62 per month. During the post conflict period, Battle injuries accounted for 5.6% of those evacuated, which is double that seen during conflict. Chronic general surgery maintained a similar percentage of total sent home throughout both phases. Other specialities were more sporadic with no particular pattern other than a decrease in raw figures compared to the war fighting phase.

## **Conclusion**

This pattern of aeromedical evacuation in a modern major deployment illustrates the paucity of battle injury at the time of fighting in relation to non battle injury. It also highlights the impact of chronic injury on a deployed force, especially injury related to back pain. The study has shown that contrary to perception by the clinicians in theatre, there was no obvious increase in evacuation of troops as a result of chronic or minor injuries in the post conflict period. Heat illness clearly places an important predictable strain on this method of evacuation.

## **Correspondence**

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# Injuries of the Hand in a British Field Hospital in Iraq

*Wille*  
Eardley WGP, Pathak G & Stewart M

## Introduction

A prospective study of consecutive hand injuries treated at a British Field Hospital revealed a distinctive pattern of injury. This is a unique review of hand injuries in a recent military deployment.

## Method

Patients presenting to the field hospital with hand injuries over a two-month period were entered into a database.

The parameters studied included mechanism of injury, timing and nature of treatment and ultimate disposal. An anatomical comparison of pattern of injury with six months retrospective data and a literature search was performed.

## Results

Of nine hundred and thirty one patients attending the hospital in this period, fifty-three had injuries to the hand.

Only seven cases resulted from battle injuries. Of the remainder, thirty-three were work related and the 13 were due to sport.

Twenty-eight of the patients required a surgical procedure; the mean time to surgery was 1.7 hours.

Twelve patients were subsequently aero medically evacuated.

*What procedure*  
*& scaphoid*

## Conclusion

Wounds of conflict account for a small proportion of hand injuries seen in the operational environment. The injury pattern seen reflects Daily Non-Battle Injury (DNBI) – the hazards encountered by deployed troops on a daily basis.

## Correspondence

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**The War in Iraq 2003 – OP TELIC, Role 4 – UK**  
O'Meara M, Taylor T, Porter K

*perspective*



## **Ballistic fractures of the limbs during Op Telic 1**

Hinsley D, Phillips S, Clasper J

**Background:** Ballistic fractures produce a significant burden on medical facilities in war. Workload from the recent conflict was documented in order to guide future medical needs.

**Method:** All data on ballistic fractures was collected prospectively. Wounds were scored using the Red Cross Wound Classification and the Red Cross Fracture Classification.

**Results:** During the first two weeks of the conflict, 202 Field Hospital was the sole British hospital in the region. Thereafter, until the end of the conflict, it became the tertiary referral hospital for cases requiring orthopaedic and plastic surgery opinions. Thirty-nine patients, with 50 ballistic fractures, had their initial surgery performed by British military surgeons. Fifty-two percent (26/50) were caused by bullets. Seventeen upper limb fractures and 33 lower limb fractures were sustained. Four children sustained five fractures. Thirty per cent of wounds became infected. Thirteen limbs were amputated; seven were traumatic amputations. The relationship between those fractures with adverse outcomes and their fracture and wound scores will be discussed.

**Conclusion:** War is changing; modern conflicts appear likely to be fought in urban or remote environments, producing different wounding patterns and placing civilians in the line of fire. Military medical skills training and available resources must reflect these fundamental changes in order to properly prepare for future conflicts.

# Why do cannulated screws fail?

## Author

**Major Michael McErlain**

## Abstract

Intra-capsular fracture neck of femur in a young patient is a surgical emergency. Results of internal fixation with cannulated screws to date show high rates of non-union and of avascular necrosis. This leading to a high rate of re-operation with cannulated screws. A tendency therefore is to lean toward total arthroplasty of the hip in the instance of displaced fracture of the neck of femur.

We discuss both the biomechanical and biological reasons for failure of internal fixation of displaced fractures of the neck of femur with cannulated screws, and criteria required to provide adequate fixation of these fractures to allow union and avoid osteonecrosis.

We consider other methods of fixation of displaced intracapsular fractures and analyse illustrative cases demonstrating these methods.

In view of the precarious biological milieu of displaced intracapsular fractures of the neck of femur, we feel that the use of cannulated screws is a poor fixation method. Therefore the option of internal fixation should not be abandoned in favour of arthroplasty because of poor results from this one biologically and biomechanically inadequate operation.

2 hole DHS  
+ derotation.

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○ established OA  
○ → THIR  
○



## **Quadriceps sparing approach in Total Knee Replacements – a path to faster mobilisation**

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**Royal Hospital Haslar**

**Keywords: Total Knee Replacements, time to discharge**

### **Abstract**

The drive in contemporary medicine is improved utilisation of scarce resources and a faster turn around of patients, with patients seeking faster recovery from surgery. Delaying factors in discharge from hospital following total knee replacement surgery include the time taken to get active extension and a straight leg raise following surgery. A retrospective case matched study of 20 patients shows that reducing the length of incision into the quadriceps tendon, therefore sparing the quadriceps mechanism speeds the post operative recovery significantly. Reducing the average time to discharge from 9.6 days in the control group to 3.2 days in the quadriceps-sparing group. All but one patient had an ASA grade of 2 with no significant co-morbidity in either group. No patient in either group suffered a post-operative medical event precipitating a delayed discharge. The criteria for discharge were the same in both groups.

**Day Case Arthroscopic, Anterior Cruciate Ligament Reconstruction: A Tourniquet-less Technique using a Pressure Controlled Saline Epinephrine Irrigation System.**

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Guarantor.

71 min (4.2L) 1 in 1000  
20ml  
No TQ.  
Several in 30 series

**ABSTRACT**

This is a report of 30 patients who underwent arthroscopic, Anterior Cruciate Ligament (ACL) reconstruction without the use of a tourniquet, but using saline and epinephrine, pump regulated, irrigation. Each case was performed as a day case by the same surgeon for the period May 2003 to December 2004. 5 patients had their tendons reconstructed with the use of patellar tendon grafts, the remainder, 25 patients, had hamstring tendon grafts. The study included 4 women and 26 men. This prospective study assessed cost effectiveness, clinical efficacy by measuring post-operative pain and post-operative results and finally whether this procedure remained the "patient choice". The mean age was 30.6 years, (range 17 – 46). In addition to assessing level of immediate post operative pain the patients were also assessed at two weeks and six weeks for pain, range of movement, swelling and for the occurrence of any early post-operative complications. We were able to show that there was a significant cost benefit, approximately one third to a half in comparison to other local surgeons; that the study was clinically effective and that there were no reported early complications; and that all 30 patients would choose to have the surgery again as a day case procedure with this technique. We would like to present day case ACL reconstruction as a safe option for the carefully selected patient and as a procedure that could perhaps be included in the orthopaedic basket for day case surgery in the UK.



# Audit of the accuracy of the PACS system for pre operative templating

Queen Alexandra Hospital, Portsmouth.

Pickard R.J. Higgs D. Ward N.

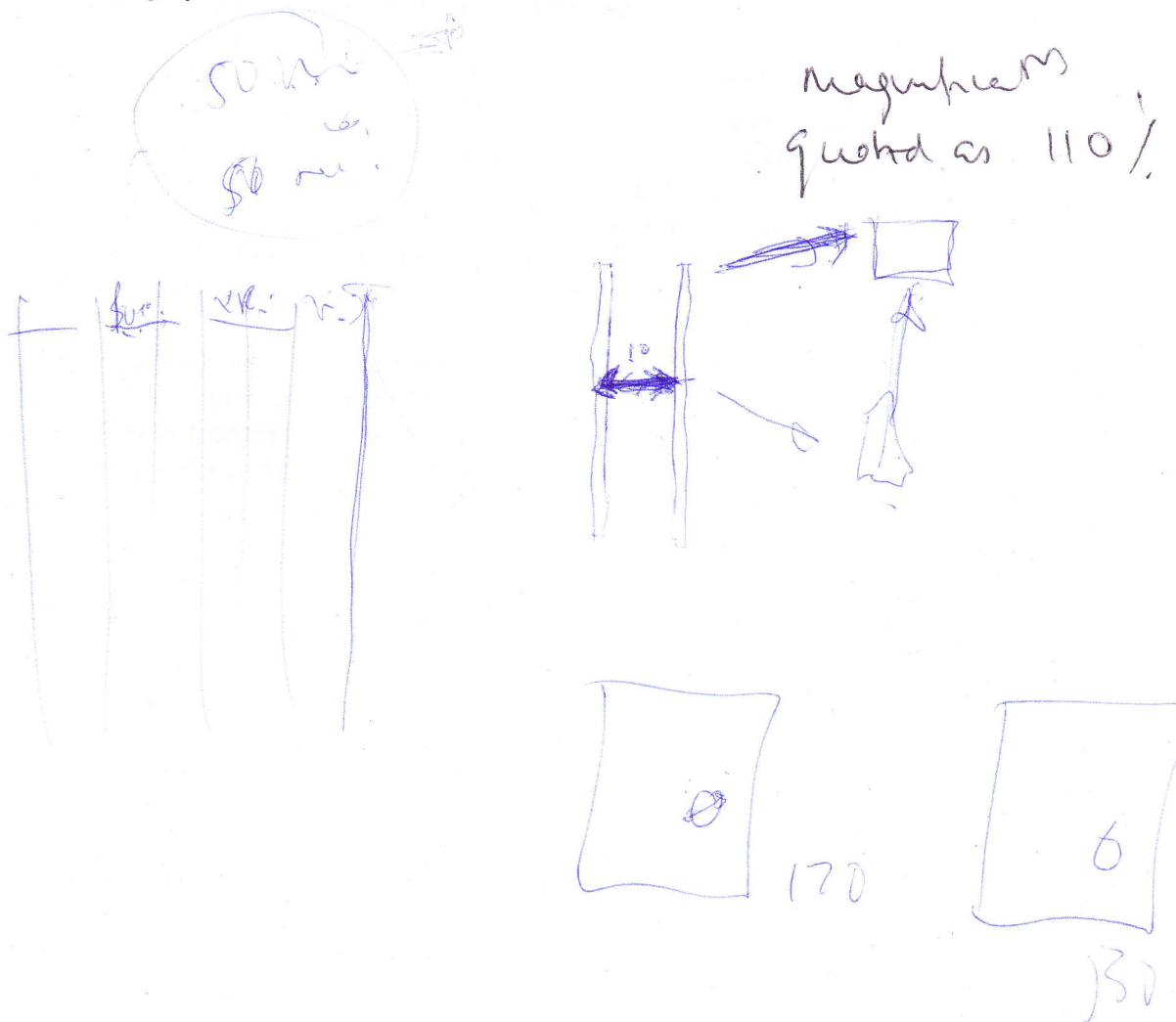
*Richard*

Increasingly hospitals are moving away from traditional hard copy xrays to digital films. These offer a clear advantages in terms of cost but concerns have been raised about the accuracy of these images for preoperative templating.

We reviewed the pre and post operative films in 20 patients with subcapital fractured necks of femur. Each film was reviewed by 3 different observers and the sizes of the femoral head and the hemiarthroplasty measured using the PACS digital system. These were then compared with the known size of the implant.

A total of <sup>360</sup>120 measurements were taken. The average magnification was found to be 120.1% with a range of 109.3% to 128.2%. Observer error and intra observer error in measurement were both found to be very low.

We conclude that the PACS system at present, without further methods for standardising image size is unreliable for preoperative templating, as the image magnification is highly variable.



## **The use of the Stoppa Approach in the operative treatment of pelvic and Acetabular trauma.**

Authors: M McErlain, O Khan, A Ward, T Chesser,

The Stoppa approach was originally conceived to deal with difficult abdominal hernia surgery. Its use has been modified to deal with Acetabular and Pelvic surgery. We report on our use of the Stoppa approach in 26 cases from 1998-2003 to fix Pelvic, Acetabular, and combined Pelvic/Acetabular fractures.

The Stoppa approach was used in combination with other approaches to afford the best access for fixation. 11 of the cases were Acetabular fractures with no pelvic ring disruption (42.3%), 4 cases (15.3%) were pelvic ring disruptions without an Acetabular component. The other 11 cases (42.3%) were combined Pelvic and Acetabular fractures where this approach came into its own. In particular it is to be noted that the Corona Mortis was easily identifiable in 5 (19.2%) of the cases to allow its safe ligation.

The anatomy of the approach and the access afforded are considered, along with the plating techniques that can be achieved because of its use.

Patients were followed up for an average of 17.39 months with one lost to follow up. Clinical results were excellent in 20 cases, good in 2, fair in 2, and poor in 1. Complications were lateral femoral cutaneous nerve palsy in 11 patients, 1 bladder rupture, 2 superficial wound infections, one lateral incisional hernia related to an ilioinguinal approach, and 1 deep vein thrombosis. Heterotopic Ossification occurred in 3 patients in whom the Kocher-Langenbeck approach was used. One revision for screw proximity to the joint was undertaken.

The Stoppa approach allows safe access and ease of reduction and fixation in these complex fractures, in combination with other approaches, particularly in combined pelvic and Acetabular fractures. We outline our recommendations for its use in this paper and outline a series of fracture patterns where it is most helpful.

# Radiological predictive factors in the healing of displaced intracapsular hip fractures. A clinical study of 404 cases

*Jan*  
Kendrew J, Gurusuamy K, Parker M J

## Abstract

1961 JBJS

The admission radiographs for 404 patients with a displaced intracapsular hip fracture treated by reduction and internal fixation were classified using five different variables. These were the Garden grade, a modified Garden grading, a ratio of fracture displacement, direct measurement of fracture shortening and trochanteric shortening. Inter-observer reliability of the various classifications was also studied. Only trochanteric shortening had an acceptable degree of inter-observer variation. For the Garden grading equal numbers of grade III and IV fracture healed. For the modified Garden grading 36% of Grade III fractures developed non-union against 48% of grade IV fractures (p value =0.02). The ratio method and fracture shortening were related to fracture healing complications, but trochanteric shortening was predictive of fracture healing (15.2mms versus 11.0mm), although the usefulness of this measure in clinical practice has to be questioned.



## **Physiotherapist Led Military Orthopaedic Screening Clinics – The Way Forward?**

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Satisfactory military orthopaedic service provision in the UK suffers significantly from a lack of basic resources, notably overall consultant numbers and host trust support. The waiting time to see an appropriate consultant (uniformed or contracted) can be as long as nine months. Many of these referrals from the primary care sector do not, in fact, need to see a consultant. Appropriately trained individuals such as; GP's with special interests, Nurse Practitioners and Extended Scope Practitioners may all have a role to play in patient management. Military Physiotherapists are uniquely qualified to deal with these referrals. They can provide military input, advice on grading, order appropriate investigations (including MRI scans and X-rays) and give guidance on further management and arrange follow-on treatment. Although popular in spinal assessment clinics, we are unaware of this facility being formally used in a general military orthopaedic setting. We have now reviewed the results of our first 100 patients. The average waiting time to first appointment was 2 weeks. 75 patients were dealt with solely by the screening clinic. 21 MRI scans, were ordered. Only 25 patients required review by the orthopaedic team. 7 patients required surgery. Our conclusion is that such clinics represent a clinically beneficial and cost-effective screening tool at the primary/secondary care interface. A high patient satisfaction at the short waiting times and outcomes was also noted.

**DEFENCE REHABILITATION AND THE ROLE OF SPECIALIST  
PHYSIOTHERAPISTS IN ORTHOPAEDIC SPINAL TRIAGE: THE  
MILITARY SPINAL TRIAGE CLINIC AT THE ROYAL HOSPITAL  
HASLAR, GOSPORT**

Heywood J

**BACKGROUND**

Changes in professional boundaries have allowed many of the tasks traditionally undertaken by doctors to be delegated to Nurses and Allied Health professionals. The employment of an appropriately experienced specialist physiotherapist in orthopaedic clinics in the NHS to triage patients is well established. This paper examines the background, establishment and outcomes of the use of a Physiotherapist Extended Scope Practitioner (ESP) in the Orthopaedic Department at the Royal Hospital Haslar, Gosport.

**METHOD**

The post at RH Haslar has evolved in the five years since its implementation. All military patients referred to RH Haslar Orthopaedic Department with spinal, predominantly low back, pain are assessed in the Military Spinal Triage Clinic. The Physiotherapist ESP case-manages patients with access to radiological and haematological investigations and onward referral to other specialities as appropriate.

**RESULTS**

In eighteen months 235 new patients have been assessed. Only 25 patients required review by the consultant spinal surgeon, while 5 were referred to non-spinal orthopaedic consultants with shoulder/hip pathology. A total of 18 patients were referred to Pain Clinic and 3 patients to rheumatology. The results indicate that nearly 90% (n=210) of patients who would previously been reviewed by a consultant spinal surgeon could be managed by a Physiotherapist ESP. The waiting time to spinal surgery has reduced from approximately 8 months to between 6 and 16 weeks.

**CONCLUSIONS**

It is concluded that an appropriately trained specialist physiotherapist is clinically and economically appropriate to manage patients in an Orthopaedic Department. This has important implications for optimising patient management and additionally supports the wider clinical employment of senior military physiotherapists.

Key words: *Physiotherapists, orthopaedics, triage, rehabilitation; extended scope practitioner*

**Percutaneous or Open Lumbar Discectomy –  
Can MRI Accurately Diagnose the Extruded Disc Prolapse?**

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**Keywords:** Correlation of surgical findings with Magnetic Resonance Imaging, lumbar disc protrusion, herniated nucleus pulposus.

**Study design:** A prospective comparison of MRI findings with surgical findings in patients presenting to our spinal triage service with a prospective diagnosis of a lumbar disc herniation.

**Objective:** To investigate consistency between Radiologists' interpretation of MRI scans, and comparison between MRI and surgical findings, in an attempt to identify those patients suitable for percutaneous treatment.

**Background:** MRI has assumed a pre-eminent position in the diagnosis of lumbar disc prolapse.

**Methods:** 87 consecutive patients presenting with signs and symptoms suggestive of a lumbar disc prolapse that underwent an MRI and based on that a discectomy.

**Results:** Reliability tests show only fair agreement ( $k=0.36$ ) between the Radiologists and at best only moderate agreement ( $=0.41$ ) between the Radiologists and surgical findings.

**Conclusion:** MRI is an excellent tool for diagnosis of a disc prolapse. MRI is poor at defining the character of a disc prolapse, and does not appear to help in classifying discs suitable for percutaneous treatment.



# A review of referrals to the Defence Medical Services Telemedicine Unit

April 2003-March 2005

Authors: **Surg.Lt. C Arthur RN**, Lt.Col. DMStandley RAMC,  
GpCapt J Kilbey RAF, Surg.Cdr P Buxton RN

Abstract: The Defence Medical Services (DMS) Telemedicine Unit won awards for innovation from the British Computer Society in 1998 and the current version of the software went live on 7<sup>th</sup> April 2003. We present a review of the referrals made to the Unit from April 2003 to March 2005. Over this two-year period the Unit received 110 referrals from areas such as Falkland Islands, Bosnia, Ghana, HMS Ocean and Belize. We consider the referral patterns; reporting times; ease of use; and clinical consequences of the system.

## Acute Distal Biceps Tendon Rupture – A new surgical technique using a de-tensioning suture to brachialis.

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**Introduction.** Acute distal biceps rupture can be a devastating injury and surgical repair offers the only real chance of full recovery. We report on a new surgical technique in which the use of suture anchors and a modified de-tensioning suture was employed to protect the repair in the early post operative recovery period and aid early rehabilitation and return to full pre-injury activity.

**Materials & Methods.** Using the standard anterior incision the distal biceps tendon was approximated to the radial tuberosity using two Mitek sutures and a sliding stitch. Using 2-0 Vicryl, de-tensioning sutures were used to attach the medial and lateral sides of the tendon to the underlying brachialis muscle. Post-operative recovery encouraged isometric contractions as early as 24 hours and after 2 weeks allowed flexion and extension with gravity eliminated. Six weeks onwards full active movement commenced with gradual increase in stretching and strengthening exercise.

**Results.** 14 patients underwent this procedure and all returned to pre-injury activity levels within 9 months. Follow up (6-14 months) demonstrated all had regained pre-injury levels of strength in flexion and supination.

**Discussion.** Using two suture anchors, it is suggested that load bearing strength is greater than the trans-osseous method, providing even tension is applied to both anchors. This can be achieved using a sliding stitch. De-tensioning sutures restore the isometric pull on biceps in the early phase and protects the repair.

**Conclusion.** All cases operated on in this way have made excellent recoveries and have returned to full pre-injury levels of activity. We therefore recommend this technique as a way of enhancing rehabilitation in what can be a devastating injury for the active sporting individual

# **Scaphoid Non-Union – Results of Pedicled Vascularised Bone Graft Based on the 1, 2 Intercompartmental Supraretinacular Branch of the Radial Artery**

**Rowlands TK, Pathak G**

## **Abstract**

### **Background**

Scaphoid non-union remains a difficult problem to treat effectively. Screw fixation and standard bone grafting techniques are good options with union reported in approximately 90% of cases. Studies of the vascular supply to the distal radius have revealed a consistent vascular bone graft source from the dorsal radius. This allows for a pedicled vascularised bone graft to be fashioned, further enhancing the local blood supply to the fracture site.

### **Methods**

14 male patients with a mean age of 30 years (21 to 51 years) and a mean duration of injury of 57 months (15 – 348 months) underwent vascularised bone grafting of established non-union of the scaphoid. The graft was vascularised with a pedicle based on the 1, 2 intercompartmental supraretinacular branch of the radial artery. In addition the long standing deformity resulting from the non-union was corrected by a tri-cortical iliac crest bone graft. (The results were assessed with regard to evidence of union at the fracture site and resolution of pain with return of function). Some of the cases had previous operations with conventional bone graft and failed.

### **Results**

Fracture healing was demonstrated radiologically in 9 of 14 cases (64%). 12 of 14 cases (86 %) showed resolution of pain and improvement in function.

### **Conclusion**

This technique shows promising results for treating established non-union of the scaphoid, even after long intervals between initial injury and the grafting procedure.



## **Hand Injuries at a British Military Hospital on Operations**

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It has been shown that extremity injuries form a large proportion of the operative surgical workload in conflict situations. Injuries to the hands are an important subgroup and hand surgery has a long association with military surgery. While most hand injuries do not require surgical intervention, those that do, require that military surgeons should be well versed in the principles of hand surgery. The concepts of staging and/or damage control surgery are well applied to this region.

The nature of military medical support necessarily changes in the transition from war fighting to a post-conflict phase. We examine the activity in the sole British Military Hospital serving a multi-national divisional area in Iraq over 2004. During this post conflict phase, the spectrum of hand trauma is characterised.

The overwhelming majority of hand trauma resulted in soft tissue injury. There was a clear predisposition to hand trauma for males, manual workers, combat soldiers and engineers/mechanics. X-ray imaging is heavily used in this environment. Even where soldiers are returned to duty they are often restricted in the duties that they can perform.

The results of this study reinforce the relevance of basic principles of hand trauma management, particularly in challenging environments. These knowledge and skill requirements should be emphasised for the war surgeon and the emergency physician. Hand surgery is an evolving speciality that continues to find clear and direct applications for the military surgeon.

## **POST-TRAUMATIC FLEXION CONTRACTURE OF THE ELBOW: OPERATIVE TREATMENT WITH ANTERIOR CAPSULAR RELEASE.**

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We present a single-surgeon series of surgical release of post-traumatic flexion contracture of the elbow performed via a limited lateral approach.

We undertook a retrospective review of patients having surgery for established post-traumatic flexion deformity of the elbow. All patients underwent anterior capsulectomy via a limited lateral approach. Patients with an intrinsic contracture also had the intra-articular lesion addressed at the time of surgery. Short-term follow-up was available from clinical review until discharge. Medium-to-longterm follow-up was conducted by telephone interview supplemented by clinical review in selected cases.

Between 1998 and 2004, 23 patients were treated surgically for established flexion contracture of the elbow. There were 15 males and 8 females with a median age of 35yrs (range 16-52yrs). In sixteen patients the contracture was not associated with damage to the joint surface (extrinsic) and in seven it was (intrinsic). The mean pre-operative deformity was 55 degrees (95%CI 49 – 61) which was corrected at the time of surgery to 18 degrees (95%CI 12 – 23). The mean residual deformity was 25 degrees (95%CI 20 – 31). The difference between the pre-operative and discharge deformities was significant (Wilcoxon test  $p < 0.001$ ). In the extrinsic group the mean deformity at discharge was 21 degrees (95%CI 17 – 25) compared to 34 degrees (95%CI 19 – 49) in the intrinsic group – this difference was significant (Mann-Whitney U test  $p < 0.01$ ). In those patients with an extrinsic contracture all elbows had a return of functional extension. One patient suffered a post-operative complication with transient dysaesthesia in the distribution of the ulnar nerve which resolved after six weeks.

Surgical release of post-traumatic flexion contracture of the elbow via a limited lateral approach is a safe, reliable technique with the best results achieved in patients with an isolated extrinsic contracture.



# **Magnetic Resonance Imaging Study on Relationship of Brachial Plexus to Coracoid in various Shoulder Positions**

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M Firth FRCR Consultant Radiologist

G Pathak FRCS(Tr & Ortho) Consultant Orthopaedic Surgeon

**Scientific Background** The Coracoid process of scapula is a principal landmark in shoulder surgery. Brachial plexus is at risk of injury during surgery around the coracoid, e.g. Weaver-Dunn procedure. Magnetic resonance imaging is the method of choice for evaluating the anatomy and pathology of the brachial plexus and has good resolution compared to Computed tomography or Ultrasound (Ref: 1).

## **Aim**

The aim was to study the proximity of brachial plexus to coracoid process in various Shoulder positions. The objective was to define the position of safety for operating around the coracoid.

## **Methods**

With Ethics Committee approval, twelve healthy volunteers (men with average age of thirty-five years) were recruited. Exclusion criteria included previous shoulder injury or operations, known contraindication for MRI examination and children. An open Magnetic Resonance Scanner (1.5 Teslar) was used to facilitate shoulder positioning. Consent was obtained prior to scanning after information was given to subjects. They were placed under the scanner and images were obtained in axial, coronal and sagittal plane with shoulder in neutral, 45 degrees and 90 degrees of abduction. The images taken are T1, T2 axial spin-echo sequences with 2-mm cuts and coronal echo of a T1-3D gradient with 2 mm cuts, together with a T1 coronal spin-echo, with cuts 2 mm in width. Distance from coracoid process to the Brachial plexus bundle is measured in millimetre on the PACS system which has software to eliminate magnification.

## **Results**

The brachial plexus consistently moved away medially from the coracoid in all the subjects at 45 degrees abduction of the shoulder. It returned to the closer position to coracoid in 90Degree abduction. The statistical analysis showed that on an average the distance the brachial plexus moved away towards medial side by 4.37 mm with Standard deviation 3.57 ( $p= 0.014$ ).

## **Conclusion**

The brachial plexus move medially away from coracoid process at 45 degrees shoulder abduction. This position reduces the risk of injury to the brachial plexus during surgery around the coracoid process.

## **Reference**

1 MR imaging of the brachial plexus: Posniak HV, Olson MC, Dudiak CM, Wisniewski R, O'Malley C: AJR Am J Roentgenol. 1993 Aug;161(2):373-9.



## Incidence of SLAP Lesions in a Military Population

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### Abstract

#### Introduction

SLAP (superior labrum anterior and posterior) lesions are a recognised cause of shoulder pain and instability. They can occur following a direct blow, (biceps) traction and compression injuries, and are commonly seen in overhead athletes. Military personnel are physically active and often subjected to trauma. We assessed the incidence of SLAP lesions within a military population presenting with shoulder symptoms.

#### Methods

A retrospective review, of all shoulder arthroscopies performed by a single surgeon between June 2003 and December 2004 at a district general hospital serving both a military and civilian population, was undertaken. The presentation and incidence of SLAP lesions were recorded for both military and civilian patients.

#### Results

178 arthroscopies were performed on 70 (39.3%) military and 108 (60.7%) civilian patients. The average age was 42.3 (range 17-75), 50 females and 128 males were included. Indications for arthroscopy included pain (75.3%), instability (15.7%), pain and instability (7.9%), or "other symptoms" (1.1%). 39 SLAP lesions (22%) were found and grouped according to the Snyder classification – 20.5% type 1, 69.3% type 2, 5.1% type 3, 5.1% type 4. Patients with a history of trauma or symptoms of instability were more likely to have a SLAP lesion ( $p < 0.05$ ). The incidence of SLAP lesions in the military patients was 38.6% compared to 11.1% in civilian patients ( $p < 0.05$ ). After allowing for the increased incidence of trauma and instability in the military, SLAP lesions were still more common in the military patients ( $p < 0.05$ ).

#### Conclusions

There is a higher than average incidence of SLAP lesions in military patients compared to civilian patients. They tend to present with a history of trauma, as well as symptoms of pain and instability. Given the high incidence in military personnel, this diagnosis should be considered in military patients presenting with shoulder symptoms, and there should be a low threshold for shoulder arthroscopy.