

Shoulder Instability and Magnetic Resonance Imaging in a Military population

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Shoulder Instability impacts on the ability of military personnel to fulfil their operational role and maintain sporting competence. Magnetic Resonance Imaging (MRI) and Arthrogram (MRA) are increasingly available as diagnostic adjuncts. We analysed MR reports from personnel undergoing stabilisation, correlating clinical diagnosis with operative findings and reviewed the literature in order to recommend improvements.

Methods

Retrospective, consecutive case note analysis of 106 personnel undergoing open anterior capsulolabral reconstruction (ACLR) by a single surgeon.

Results

70 patients had MR (48 MRA, 22 MRI). Commonly reported pathology included Hill Sachs Lesions (41%), Soft tissue (59%) and bony Bankart lesions (16%), capsular laxity (20 %), supraspinatus lesion (20%), ACJ disease (13%) and SLAP tear (12%). The sensitivity of MR for identification of labral lesions was 82% with a specificity of 86%. For bony glenoid lesions, sensitivity was 63% and specificity 94%. Disparity between report and operative findings occurred mainly in standard MRI. Patients with lesions unrelated to instability achieved a pain free functioning shoulder following stabilisation. 100% of patients referred for ACLR with clinical evidence of instability without MR had positive pre-operative and operative correlation with instability. In 5 cases, the original equivocal MRI was repeated by MRA due to clinical suspicion of instability. In all cases the repeat MRA correlated with pre-operative and operative findings of instability. In 5 cases with equivocal clinical findings, MRA provided confirmation of instability. Delay in referral due to scanning and follow up ranged from 0 – 15 weeks.

Conclusion

The diagnosis of those instigating referral is accurate. Reporting of MR is open to variation and has cost implications. MRA performed by a radiologist with a musculoskeletal specialist interest is recommended on an individual basis only and routine use of non-arthrographic studies should be discontinued. This will improve the efficiency of the fast track pathway.

The 'Surgilig' Synthetic Ligament in the Management of Chronic Acromioclavicular Joint Disruption

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Key Words: Surgilig; Acromioclavicular joint (ACJ) disruption.

Background

Chronic instability of the acromioclavicular joint is relatively common and normally occurs following a fall onto the point of the shoulder. Reconstruction of the joint (Weaver-Dunn procedure) is often required in service personnel, and numerous methods of fixation have been used, including vicryl tape, PDS loops and the use of a hook plate. Many of these operative methods require a second operation to remove the plates and/or screws, and are associated with a failure rate of up to 30%.

The 'Surgilig' was designed as a method of revision for failed Weaver-Dunn procedures. However this study evaluates its use in the primary operation.

Data Collection and Analysis

We prospectively followed up the Modified Weaver Dunn procedures using surgilig. The post-operative x-rays were reviewed at six weeks, 3 months and then 6 months when the patients were discharged to assess the radiological success of the procedure.

Results

We have performed this procedure in 11 patients. Of the eight patients that have reached the six month post-operative time so far, at which they would be discharged from clinic follow-up, none have had radiological failure of the fixation. One patient even had weight-bearing x-rays taken at 6 weeks, with no detrimental effect.

Conclusion

Even though a small study, the initial results for primary fixation of acromioclavicular joint disruption with surgilig are extremely encouraging. The study suggests that surgilig should continue to be used in its current role. As patient numbers increase, a follow-up study should be conducted to evaluate these preliminary findings.

The Ten Year Results of the Bayley-Walker Proximal Humeral Replacement in Tumour Salvage Surgery

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We retrospectively studied 67 patients who underwent proximal humeral replacement with the Bayley-Walker prosthesis, for tumour of the proximal humerus between 1997 and 2007. Of the 67 patients 10 were lost to follow up. Of the 41 surviving patients, function was assessed using the Musculoskeletal Tumour Society (MSTS) Score and the Toronto Extremity Salvage Score (TESS) questionnaire. 4 of the 41 patients received the new Bayley-Walker 'captured' proximal humeral replacement. The mean age was 46 years (7-87). The mean MSTS score at follow-up was 72.0 % and the mean TESS score was 77.2 %. The sub-group of 4 pts who received the new captured prosthesis had a mean MSTS score of 77.7 %. There was no mechanical failure of any prostheses in the follow up period.

Endoprosthetic replacement for tumour of the proximal humerus with the Bayley-Walker prosthesis, is a reliable operation yielding reasonable functional results and good long-term prosthesis survivorship. The performance of this prosthesis is expected to improve further with the new 'captured' prosthesis.

An Instructional Review of Military Hand Trauma: Learning from Past Experience and Embracing Emerging Concepts

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Aim:

To review the changing pattern of orthopaedic injury encountered by deployed troops with special regard to the importance of hand trauma sustained in conflict and non-war fighting activities.

Method:

Literature review relating to recent military operations (1990 – 2007) encompassing 100 conflicts worldwide. A subsequent search was performed to identify papers relating to hand injuries from 1914 to the present day. Papers were graded by Oxford Centre for Evidence-based Medicine Levels of Evidence.

Results:

Two hundred and ten published works were analysed. Review of the literature revealed a lack of statistical analysis and a tendency towards the anecdotal. These works were primarily level five evidence comprising reviews, correspondence, sub-unit experiences and individual nation database analyses.

The importance of extremity trauma is clear. The combination of changing ballistics and increasing survivability off the battlefield leads to a previously under emphasised increase in complex hand trauma.

Hand trauma is also shown to occur in deployed troops during activities unrelated to war fighting.

Articles concerning military hand trauma management were mainly published prior to the conflicts of the last decade. Within these papers injury classification and treatment priorities are highlighted as core knowledge for trauma surgeons.

Conclusion:

This paper provides a review of conflict related injury patterns with special regard to hand trauma. The key learning points from historical literature are highlighted. Proposals for improving management of these injuries from battlefield to home nation are discussed with regard to training opportunities and dialogue to ensure past lessons are not forgotten.

Pressure in Finger Traps

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Introduction

It is common practice in wrist arthroscopy to suspend the patient's arm using Chinese finger traps and to distract the wrist joint by applying weight to the arm at the elbow. It is possible that this may cause significant pressure to be applied to the fingers, and potentially damage the digital nerves. We examined the pressure applied by finger traps and consider the risk this poses to the digital nerves.

Method

Standard finger traps were suspended from a spring balance and the author's fingers inserted along with a length of rubber tubing. The tubing was filled with saline and connected to a digital compartment pressure monitor. The hanging mass was gradually increased and the pressure in the rubber tubing noted. This pressure was taken as analogous to the pressure affecting the neurovascular bundle.

Results

Pressure increases linearly with increasing mass. A pressure of 500mmHg has been suggested as necessary to cause nerve injury¹. Using non-invasive technique it was not possible to accurately measure the absolute pressure acting on the digital nerves. However the increase in pressure was noted.

Conclusion

Using weight to distract the wrist during arthroscopy has potential to cause nerve injury. We suggest that pressure insufflation combined with Chinese finger traps with minimum weight traction provides a more than satisfactory view at wrist arthroscopy and can avoid potential digital nerve injury. However traction through finger traps for other purposes such as fracture reduction may be used with caution.

¹ Ochoa J, Fowler TJ, Gilliatt RW. Anatomical changes in peripheral nerves compressed by a pneumatic tourniquet. *J. Anat* 1972;113-3:433-455

Medium to Long Term Results of the Exeter Bipolar Hemiarthroplasty for Femoral Neck Fractures in Active, Independent Patients

5-13 year follow up

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Introduction

The management of displaced femoral neck fractures in independent, healthy patients remains controversial. Acetabular erosion is a time dependant phenomenon and our aim was to assess the long-term outcome of the Universal Head bipolar with an Exeter stem.

Method

49 consecutive cemented bipolar hemiarthroplasties were performed in 49 patients between 1992 and 2000. Mean age was 71.6 (range 54-91). There were 13 male and 36 female. 23 patients were alive at final follow up. 17 patients were assessed in outpatients with clinical and radiographic assessment. 2 patients had a telephone questionnaire and 4 patients were lost to follow up or were unable to attend clinic. Kaplan-Meier Survivorship analysis was performed.

Results

Median follow up was 7.1 years (range 5-13.3 years). 26 patients had died by the time of final follow up. 5/14 patients (36%) with an ASA score of 3 died within 30 days. There was one dislocation and one periprosthetic fracture. There were no deep infections. There were no revisions for aseptic loosening or acetabular erosion. 75.6% of surviving patients returned to their pre-injury mobility level at 1 year. 5 year cumulative survival was 60% (95% confidence interval 46-74%). There was a statistically significant reduction in cumulative survival for ASA grades 3 and 4 compared to 1 and 2 ($p=0.004$).

Discussion

Cemented bipolar hemiarthroplasty for femoral neck fractures is a good alternative to Total Hip Arthroplasty for independent, healthy patients. There is no evidence of acetabular erosion. Careful patient selection is necessary as patients with high ASA scores have greater mortality rates regardless of surgical prosthesis.

Preservation of Acetabular Bone Stock during Hip Arthroplasty – A Comparison of Total Hip Replacement with Two Generations of Resurfacing

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Resurfacing arthroplasty is advantageous over conventional total hip arthroplasty in that femoral bone stock is preserved. However, there has been controversy over the preservation of acetabular bone stock in resurfacing arthroplasty, with the concern that it may result in excess reaming compared with total hip replacement. This is of concern as the prosthesis is primarily advocated in the young patient, who is likely to face future revision surgery.

We prospectively identified a cohort of 68 patients with primary hip osteoarthritis undergoing conventional total hip arthroplasty. During surgery, the excised femoral head and neck diameter was measured, along with the diameter of the final acetabular reamer used to achieve a bed of bleeding cancellous bone. The measured neck diameter was then used to calculate the minimum possible resurfacing head and cup sizes, with corresponding final reamer sizes that could have been used in each patient without neck notching for both Birmingham Hip Resurfacing (BHR, Smith & Nephew, 3rd Generation) and Articular Surface replacement (ASR, De Puy, 4th Generation). Reaming diameter and volume was compared for all 3 groups.

Mean reaming diameters for the THR, ASR and BHR groups were 51, 52 and 56mm respectively. Mean reaming volumes were 39, 40 and 47cc. There was a statistically significant difference between the THR and BHR groups for both reamed diameter and volume ($p < 0.001$). There was also a significant difference between the ASR and BHR groups for both reamed diameter and volume ($p < 0.001$). This difference was more pronounced with larger neck diameters.

Our data shows that the BHR results in more acetabular bone loss compared to total hip replacement. An implant with a lower profile acetabular cup and a larger variety of sizes such as the ASR may allow better preservation of acetabular bone stock.

PSEUDOTUMOURS AFTER HIP RESURFACING

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Introduction

We report on a group of 20 metal-on-metal resurfaced hips (17 patients) presenting with a soft tissue mass associated with various symptoms. We describe these masses as pseudotumours. All patients underwent plain radiography and fuller investigation with CT, MRI and ultrasound. Where samples were available, histology was performed.

Methods

All patients in this series were female. Presentation was variable; the most common symptom was pain or discomfort in the hip region. Other symptoms included spontaneous dislocation, nerve palsy, an enlarging mass or a rash. The common histological features were extensive necrosis and lymphocytic infiltration. Fourteen of the 20 cases (70%) have so far required revision to a conventional hip replacement and their symptoms have either settled completely or improved substantially since the revision surgery. Two of the three bilateral cases have asymptomatic pseudotumours on the opposite side.

Conclusions

We estimate that about 1% of patients develop a pseudotumour in the first five postoperative years after a hip resurfacing. The cause of these pseudotumours is unknown and is probably multi-factorial, further work is required to define this; they may be manifestations of a metal sensitivity response. We are concerned that with time the incidence of these pseudotumours will increase.

Is there any point in classifying Subtrochanteric Fractures? – The Reproducibility of Four Classification Systems

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Introduction: Classification systems are used for communication, deciding/planning treatment options, predicting outcome and research purposes. The vast majority of subtrochanteric fractures are now treated with intramedullary nails, which questions the need for classification.

Objectives: To assess the intra- and inter-observer reliability of the Seinsheimer, AO and Russell-Taylor (RT) classification systems and assess a new simple system (KMG).

Methods: The KMG system was developed to alert the surgeon to potential hazards: Type 1 - subtrochanteric fracture (ST#) with intact trochanters. Type 2 ST# involving greater trochanter (entry point for nailing difficulty). Type 3 –ST# involving lesser trochanter (most unstable).

Thirty two AP and lateral radiographs of subtrochanteric fractures were classified independently by 4 observers twice with a 6-week interval (2 Consultants and 2 Registrars). The observers were asked to rank the systems based on how descriptive they thought they were, whether they felt they influenced treatment plan and whether they would predict outcome.

Results: The intra- and inter-observer variation was poor in all systems. KMG gave the best inter-observer reproducibility (Kappa 0.3 to 0.6) followed by AO and RT, and then Seinsheimer. The observers felt that Seinsheimer and KMG were the most descriptive and would influence the treatment plan, and Russell-Taylor would perform worst at predicting outcomes. All of the fractures in this series united

Conclusions: The classification systems analysed in this study have poor reproducibility and seem to be of little value in predicting outcome of intramedullary nailing. The KMG system may be of some use in alerting the surgeon to potential problems.

Accurate Scaling of Pelvic Digital X-rays without a “Calibration Object”

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Most hospitals have introduced digital radiography (PACS) systems. Accurate pre-operative templating prior to hip arthroplasty requires precise information on the magnification of the digital image. Without this information the benefits of expensive digital templating programs (Orthoview-£10000) cannot be realised.

To determine the magnification of a digital image involves the placement of a “calibration object” at the level of the hip joint. This is unpopular with patients and radiographers alike. We describe a method that requires a single measurement to be made from the greater trochanter to the digital film.

An AP pelvis x-ray was taken of 50 patients with hip replacements. The “predicted” magnification was calculated using the new method. As the size of the head of the prosthesis was known the “actual” magnification could be calculated also. There was no significant difference at $p < 0.05$, Wilcoxon T, 2-tail test.

Conventional radiography, which assumes a magnification of 20%, results in errors up to 11%. Templating may therefore predict an incorrectly sized prosthesis. Our method is as accurate as methods using a calibration object whilst being acceptable to patients and staff. Its use should lead to more accurate pre-operative templating prior to total hip arthroplasty.

Wounding Patterns from Roadside Improvised Explosive Devices in Iraq

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Background: Following the invasion of Iraq in April 2003, Coalition forces have been conducting counter-insurgency operations in a bid to maintain security within the country. The improvised explosive device (IED) has become the weapon of choice of the terrorist and is the leading cause of death and injury amongst Coalition troops in the region.

Method: From Jan 2006, data was collected on 100 consecutive casualties who were either injured or killed during hostile action. Mechanism of injury, new Injury Severity Score (NISS), ICD-9 diagnosis and anatomical pattern of wounding was recorded in a trauma registry.

Results: During the study period, 53 casualties were injured by IEDs in 23 incidents (mean 2.3 casualties per incident). Twelve (22.6%) were killed or died of wounds. Mean NISS score of survivors was 5.4 (Range 1-50). There was no significant difference in NISS scores of survivors from fatal and non-fatal incidents. A mean 2.61 body regions were injured per casualty. Limb injuries were present in 45 (84.9%) of casualties, but primary blast injuries were seen in only 9 (14%). Twenty (48.7%) of survivors underwent surgery by British surgeons in the field hospital. Sixteen (39%) were deemed fit to return to duty after injury.

Conclusions: IEDs used in Iraq do not follow the traditional pattern of injuries seen with conventional high explosives. Primary blast injuries were uncommon despite all casualties being in close proximity to the explosion. When the IED is detonated, an Explosive Formed Projectile (EFP) is formed which results in catastrophic injuries to casualties caught in its path, but causes relatively minor injuries to personnel sited adjacent to its trajectory. Enhanced vehicle protection may prevent the EFP from entering the passenger compartments and thereby reduce fatalities.

Complications Of Ballistic Injuries to the Extremities

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Background: Extremity injuries on the battlefield are commonly secondary to high energy mechanisms. These cause significant injury to soft tissue and bone and are contaminated. Evacuation to medical care can be difficult in the operational environment and may delay the time to initial surgery. There is already substantial literature on the complications of such injuries but this is the first report from UK forces. Our aim was to assess the complications, but specifically infections, in relation to delay in surgery and also the method of fracture stabilisation.

Methods: Military patients who had ballistic mangled extremity injuries were identified from the database (courtesy of ADMEM). Using both the trauma audit and the hospital notes, demographics were assessed. The injuries sustained (including the fractured bones), time to theatre, associated injuries, method of stabilisation at Role 3, definitive fixation and complications were noted.

Results: 81 patients were identified with 95 limbs injured (68 lower limb, 27 upper limb). The most commonly fractured bones were the tibia, radius/ulna, femur and humerus. Primary stabilisation was either ExFix (53%) or plaster (44%). Of those stabilised by ExFix, the definitive stabilisation was mainly by either a nail (44%) or plate (17%). Those stabilised by plaster mainly stayed in plaster. 72% of patients developed at least one complication, the most common of which was superficial infections. Other complications were deep infections, delayed union, haematomas, neuropathic pain and flap failures. The main organisms involved were *Acinetobacter*, *Bacillus* and *Pseudomonas*. There was no association between delay to theatre and decision to amputate. There was an association between the use of plaster for definitive stabilisation and superficial infection and plates for definitive stabilisation and deep infections. There was no association between time delay to theatre and infections.

Conclusions: This provides the first report of complications from extremity injuries secondary to ballistic missile devices in UK forces. It allows for comparison with reports from other sources on similar injuries and helps to guide further management of patients. In particular it agrees with recent civilian data that initial surgery does not have to be carried out as soon as possible, which has implications for military planning.

Predicting the Need for Early Amputation in Ballistic Mangled Extremity Injuries

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Background: Despite modern advances, amputation is still a commonly performed operation in war. It is often difficult to decide whether to amputate following high-energy trauma to the lower extremity. To help guide this assessment, scoring systems have been developed with amputation threshold values. These studies were all conducted on a civilian population, encompassing a wide range of ages and methods of injury. The evidence for their sensitivity and specificity is inconclusive. The purpose of this study was to assess the validity of Mangled Extremity Severity Score (MESS), the only verified score, in a population of military patients with ballistic mangled extremity injuries.

Methods: Fifty two military patients with 58 limbs who had ballistic mangled extremity injuries were identified, 13 of whom required amputation. Using both the trauma audit and the hospital notes, demographics were assessed. Patients were retrospectively evaluated with the MESS system for lower extremity trauma.

Results: The MESS would not help in the decision-making. However, we were able to develop an algorithm for management, in particular the need for early amputation.

Conclusions: The management of ballistic extremity injuries in military patients should be considered separate to that of civilians with high-energy trauma extremity injuries. The authors have developed an algorithm to provide guidelines for management.

Surgical Workload During Operation Herrick

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Background

British military forces are heavily committed in Iraq and Afghanistan. Operation HERRICK, currently supported by a Role 2(Enhanced) medical facility at Camp Bastion, is predicted to continue for the next 10 years.

There has been no large published series on surgical workload on Operation HERRICK. The aim of this study is to determine and plan future medical needs.

Methods

A retrospective analysis of operating theatre records between 10th October 2006 and 31st Oct 2007 was performed. Data was collated on a monthly basis, to assess seasonal variation, and included patient demographics, operation type and time of operation.

Results

During the study period 968 cases required 1262 procedures. Thirty-four per cent were ISAF, 27% were Afghan soldiers, police or enemy forces and 39% were civilians, of which, 43% were children. Ninety-one per cent were secondary to battle injury and 50% were emergencies. The breakdown of procedures, by specialty, was 67% (841) were orthopaedic, 16% (199) general surgery, 8% (96) head and neck, 5% (55) burns surgery and a further 4% (50) were non-battle, non-emergency procedures. During the second half of the study period 655 cases were operated on compared to 313 in the preceding half ($p < 0.05$). Twenty-eight per cent of cases were performed between 6pm and 8am.

Discussion

Surgical workload remains consistently high throughout the study period, however there was significant seasonal variation with casualty rates being greater in the summer months, this may have bearing on the decision to deploy additional surgeons and trainees in the future.

Orthopaedic Training in a Military Environment – The First Trainee Deployment on Operation Herrick

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Background

British military forces remain heavily committed in both Iraq and Afghanistan. A recent workload analysis from Op HERRICK identified a high surgical workload, particularly orthopaedic, under the care of a sole consultant orthopaedic surgeon. There are no orthopaedic training posts in UK that consistently provide training in ballistic trauma. In order to prepare Military orthopaedic trainees for future deployment, a new orthopaedic registrar post, on Op HERRICK, was created.

Method

Prospective analysis of trainee and trainer operative logbooks, between Jan 27th and March 24th 2008, was performed. Records were kept of orthopaedic and post-graduate teaching schedules, audit and research projects and all OCAP training assessments.

Results

One hundred and fifty-seven cases and 272 procedures were performed during the study period. Sixty-two per cent of cases were orthopaedic. Fourteen major amputations were performed and 7 external fixators applied. Five fasciotomies, 9 skeletal traction pins were inserted and 7 skin grafting procedures were performed. Limb debridement was the most common procedure (n=59). Eleven per cent of cases were children and 50 per cent of cases were emergencies. Thirty-eight per cent of cases were performed out of hours (18-00-08.00 hrs). Mean operating hours per week was 35 hrs. Four Procedure Based Assessments were performed and 16 hours of postgraduate education was conducted during the deployment. Two major audits were initiated and five publications were prepared, one has already been accepted for publication.

Discussion

Trainee exposure to high-energy transfer trauma is high when compared to that seen in the NHS. The numbers of certain index procedures, such as external fixation, is similar to those achieved by an average orthopaedic trainee in six years of higher surgical training. The opportunity for one-on-one training exceeds that available in the NHS and learning and academic opportunities are maximised due to the close working environment.

Medial Opening Wedge High Tibial Osteotomy, a Clinical and Radiographic Review

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Aim:

To review the short-term clinical results of a single-institution cohort undergoing opening wedge high tibial osteotomy (HTO).

Method:

We undertook a prospective clinical and radiographic review of our cohort of patients who had undergone opening wedge HTO for varus malalignment. The Cincinnati scoring system was used for objective assessment. Pre- and post-operative radiographs were evaluated and Blackburne-Peel (BP) and Insall-Salvati (IS) ratios recorded, as well as integrity of the lateral hinge.

Results:

We reviewed 55 knees (51 patients: 34 men and 17 women; mean age, 44.2years; range 34-58years) followed up for a minimum 12 months (range, 12-62months). All patients had relief of pain, but six met our criteria of failed treatment where either revision fixation was required or proceeded to total knee arthroplasty for persisting symptoms. Cincinnati scores were 94.5% excellent (52/55) and 5.5% good (3/55) at 1 year, whilst at last follow-up they were 87.2% excellent (48/55), 9.1% good (5/55) and 3.6% fair (2/55). There was a significant improvement in mean American Knee Society score at 1 year and maintained at last follow-up ($p < 0.05$). Radiographically the lateral hinge was noted to be breached in 9.1% (5/55), but no incidence of non-union was identified. There was no significant change in IS index, however BP index diminished by a mean 15.3% (range, 7.4-28.2%).

Discussion:

Opening wedge HTO provides a means of relieving stress distribution through the medial tibio-femoral compartment and results in effective relief of symptoms with improvement in functional outcome and quality of life.

Influence of Patellar Height on Outcome after Medial Opening Wedge High Tibial Osteotomy

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Discussion:

Medial opening wedge tibial osteotomy results in patellar infera, but successful clinical and functional outcomes have been demonstrated. The fact there is inconsistency between the two indices assessing patellar height ratio we believe reflects the inherent variability in the techniques employed. Distalisation of the tibial tubercle will mean the IS ratio remains unaffected, whilst the BP index more accurately demonstrates the lowering of patella relative to the joint line. However there may be other factors which are not immediately appreciated, such as changes in the tibial inclination or antero-posterior translation.

Reconstruction of the Medial Patellofemoral Ligament – a Review of Twenty-Five Cases

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Purpose:

Patellar instability is a common clinical problem affecting a young, active population. A large number of procedures have been described to treat patellar instability. We present the clinical results in a case series of 25 medial patellofemoral ligament reconstructions in 21 patients with up to 30 months follow-up (mean 7.3 months).

Methods:

Reconstruction was performed using either the gracilis tendon (6 cases) or semitendinosus tendon (19 cases) autograft. At follow-up the Tegner activity scores, objective knee function, complications and reoperations were assessed. **RESULTS:** No patella re-dislocations were observed. Five patients (20%) required a manipulation under anaesthetic but subsequently regained a satisfactory range of motion. Two patients (8%) had post operative complications. One patient developed a post operative infection which required a washout and one patient developed a neuroma related to the hamstring harvest site which was excised. Both subsequently returned to work with a full range of motion.

Conclusions:

Medial patellofemoral reconstruction with both gracilis and semitendinosus tendon graft provided good postoperative patellar stability restoring the primary soft tissue restraint to pathological lateral patellar displacement. **LEVEL OF EVIDENCE** Level IV, therapeutic case series.

Should Extended Scope Physiotherapists Place Patients Directly on Arthroscopy Lists?

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Aim

To determine if extended scope physiotherapists perform to the same standards as their orthopaedic colleagues with regards to diagnosing knee pathology and making appropriate referrals for arthroscopy.

Method

Data was collected prospectively from Aug 2005. Patients were seen in a consultant led orthopaedic clinic by an Extended Scope Physiotherapist (ESP), a registrar or the consultant. All patients placed onto the waiting list for knee arthroscopy were considered for the study. The outpatient diagnosis and demographic data were recorded and compared against the arthroscopy findings. A single consultant surgeon performed the arthroscopies.

Results

Three hundred patients were included in the study (100 in each group). Each group was similar in terms of presenting complaint and demographics. There was no significant difference between the ESPs and registrars in their ability to diagnose intraarticular pathology (CHI squared test: $X^2 2.031$, $df 1$, $p=0.15$). When only cruciate and meniscal pathology were considered there was also no significant difference between the ESPs and the registrars (Fishers test $p=0.12$ and $p=0.22$ respectively, 2-tail test). The ESPs performed particularly well in their ability to diagnose cruciate injuries (sensitivity 100%, specificity 100% and PPV 100%). Both ESPs and registrars had high sensitivity but low specificity with regards to diagnosing meniscal pathology suggesting a low threshold for a positive diagnosis and a poor ability to correctly diagnose those patients who did not have a meniscal injury. Of the 300 patients only 9 unnecessary arthroscopies were requested. None were requested by the ESPs.

Conclusions

Extended scope physiotherapists perform a useful role in orthopaedic outpatients. They perform as well as orthopaedic registrars with regards to making the correct diagnosis and the selection of patients for arthroscopy.

Comparison of Peri- and Intraarticular Multimodal Drug Injection with Femoral and Sciatic Nerve Block after Total Knee Replacement

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Good perioperative analgesia following Total Knee Replacement facilitates rehabilitation and may reduce hospital stay. A multimodal drug injection has been shown to provide excellent pain control and functional recovery, and was introduced into the operating practice of one Arthroplasty surgeon during his Total Knee Replacements.

We compared the rehabilitation of 27 consecutive patients (group 1) following their Total Knee Replacement under spinal anaesthesia receiving the periarticular infiltration mixture, consisting of levobupivacaine, ketorolac and adrenaline at the end of surgery. Their rehabilitation was compared to group 2, a historical group operated on by the same surgeon before the introduction of the multimodal drug injection. These patients were age and sex matched and had received a Femoral and Sciatic block at the time of their operation.

Patients in group 1 had lower analgesic and antiemetic requirements than group 2. Group 1 also had a shorter time to Straight Leg raise.

Periarticular multimodal drug injection can improve perioperative analgesia and mobilisation following Total Knee Replacement as well as reducing opioid side effects.

Intervertebral Disc Degeneration: The Role of Degraded Elastin Peptides

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Intervertebral discs (IVDs) are fibrocartilagenous ovoids located between the vertebral bodies of the spine that provide the sole source of flexibility in that structure. IVDs are clinically very important as degeneration has been shown to be strongly associated with lower back pain, sciatica, and disc herniation: potentially disabling conditions that affect a very large section of the UK population.

The aetiology of disc degeneration is poorly understood although upregulation of matrix metalloproteinase (MMP) activity is thought to be involved. Degradation products of the extra-cellular matrix are known to increase MMP production and activity in other tissues. This project concentrated on examining the effects of degradation products of elastin. Elastin fragments (κ -elastin peptides) have been shown to upregulate mRNA levels and increase expression of pro-MMP-1 in human skin fibroblasts, cells that are thought to be similar to those residing in the annulus fibrosus of intervertebral discs. This study examined their effect on disc cells and on skin fibroblasts.

Total MMP-2 and -7 activity produced by cells extracted from the annulus fibrosus of bovine intervertebral disc cells and cultured for 24 hours with 0-300 μ g/ml κ -elastin was determined using fluorimetric and zymographic analyses. κ -elastin was prepared from bovine ligamentum nuchae or bovine intervertebral discs.

Culture with κ -elastin prepared from bovine ligamentum nuchae caused skin and disc cell potential pro-MMP-2 activity to increase in a dose-dependent manner; the potential pro-MMP-2 activity of both cell types is more than doubled when cultured with 300 μ g/ml κ -elastin.

These findings suggest that in the bovine disc, matrix breakdown may cause a feedback loop with degraded elastin stimulating disc cells to increase production of pro-MMP-2, with the possibility of further degrading elastin and other proteins and contributing to IVD breakdown.

Management of Non-Union – The MOD Hospital Unit Frimley Park Experience with Bone Morphogenic Protein

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Failure of fracture healing is a significant problem, resulting in considerable morbidity and financial costs to the NHS. It is also a major complication of ballistic injuries.

We reviewed our experience in the management of non-union by revision of fracture fixation and use of Bone Morphogenic Protein at Ministry of Defence Hospital Unit Frimley Park. Bone Morphogenic Proteins have been identified as promoting osteogenesis and have been used to stimulate bone growth in fracture revision surgery and spinal surgery. BMP's are a subgroup of the TGF- β family and consist of at least 20 different subtypes of which BMP 2¹ and BMP 7² are commercially available. Current preparations include a solution for application to a gel matrix and as a powder for reconstitution to a paste for implantation to the fracture site. Costs per graft are in the region of £2,000.

BMPs have been used at Frimley Park since 2005 in the management of 12 patients with established non-union. These included fractures of 4 femurs, 5 humerii, 2 clavicles and 1 metatarsal. Early results are encouraging and support continued use of BMP's in fracture revision surgery for established non-union.

However, non-union remains a difficult problem and even with this treatment there was a significant failure rate, often associated with failure of fixation.

¹ InductOs, Wyeth

² Osigraft, Stryker

Vascularised Periosteal Transfer – a Surgical Technique to Achieve New Bone Formation in Trauma

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Introduction:

It has long been recognised that the periosteal membrane has osteogenic capability and experimental studies have concluded that periosteum transplanted to a distant site could also be osteogenic. This ability of periosteum to generate new bone at distant sites may have clinical application. In the laboratory setting however periosteal flaps in animals have demonstrated variable results. Little clinical work using the technique of periosteal transfer has been reported, with only individual case reports in the literature.

Methods:

A clinical review of a series of three fracture patients in whom vascularised periosteal transfer has been used is presented. Cases involved a primary bony defect at the fracture site (first metatarsal), established non-union (tibia) or post-traumatic AVN (talar dome). The technique is described and clinical follow-up of the patients is presented.

Results:

In each instance evidence of lasting new bone formation was demonstrated clinically and radiologically.

Conclusion:

The efficacy of this technique in forming new bone is demonstrated. The technique may have utility alongside other techniques in cases where new bone is required.

Arthroscopic Ankle Fusion: Technique and the Learning Curve

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The outcome of arthroscopic ankle fusion has been favourably reported in the literature. The technique allows for early weight-bearing and results in fusion earlier than that of open techniques. All authors state that it is a demanding procedure that has a significant learning curve. The purpose of this presentation is to report on that learning curve by analysing the first two years experience of one surgeon. Technical details, difficulties encountered and outcomes are described.

We analysed the results of arthroscopic ankle fusion in 14 consecutive ankles in 13 patients over a two-year period. Average age at fusion was 59 years. There were 12 male patients and one female. Indication for surgery was osteoarthritis in all patients. All were non-smokers at the time of surgery. Anti-inflammatory drugs were not prescribed on discharge. All patients underwent pre-operative sciatic nerve block using a nerve stimulator. Fixation of the fusion was performed with two screws in 13 ankles and a single screw in one. Mean tourniquet time was 117 minutes (first 4 cases averaged 124 minutes; last 4 averaged 105 minutes). Mean hospital stay was a single night. All patients were treated post-operatively with plaster cast immobilisation for two weeks (non-weight bearing). Subsequently, they were instructed to fully weight bearing as tolerated in a removable walking boot.

Radiological union was achieved in 11 ankles within 3 months. One ankle fused at between 9-12 months post-operatively. One ankle failed to unite due to inadequate joint access and preparation and underwent later open revision with bone grafting. One case of superficial portal wound infection treated successfully with antibiotics. No thrombo-embolic events. All patients had excellent or good clinical results at last follow up.

Patient selection issues and intra-operative learning points are discussed. With adequate training, arthroscopic ankle fusion is a safe and reliable technique.

Technology or Training: Which Matters More in Surgery Today?

Professor J Cobb

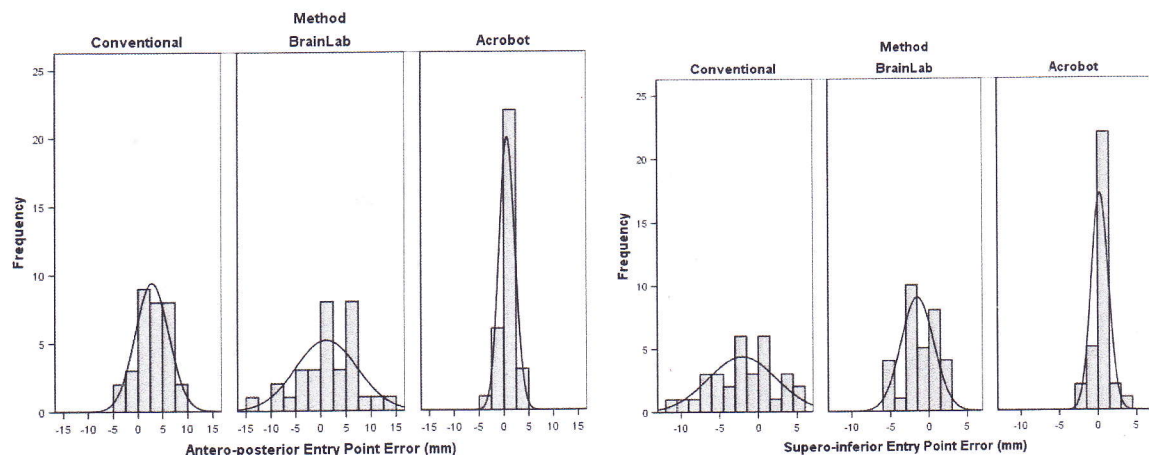
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The level of accuracy and precision required for consistently good surgical results will vary depending upon the characteristics of surgical task being undertaken. Training surgeons to achieve these results rapidly and effectively is a continuing challenge. Resurfacing arthroplasty for cam type deformity (a common cause of early osteoarthritis) is a technically demanding operation. We considered it desirable that the operation should be performed within $\pm 10^\circ$ of the desired angular orientation, and ± 6 mm of entry point translation in 95% of cases. To achieve that level of accuracy, without learning slowly on real patients, technological aids are now available. Using 3 models of varying severity of cam, we assessed the efficacy of 3 systems of instrumentation in delivering the level of accuracy and precision that is needed to ensure the excellent results that this surgeon and patient group expects.

Thirty two students of surgical technology were instructed in hip resurfacing, and shown detailed plans of the desired operative outcome for the 3 cam type hips. They then used conventional instruments, image-free navigation (brainlab) and image based navigation (Acrobot).

Only image based navigation performed well enough at navigating these difficult cam type hips with novice surgeons. Conventional instruments were not sufficient, with a tendency for the novice to put the hip in varus and translated low on the femoral neck. Image free navigation was more accurate than conventional instruments, avoiding the serious complication of notching but the range of error was 18mm and 10° .

Image based navigation appears to be fit for purpose in delivering both the accuracy and the precision needed by the novice surgeon in the skills laboratory who needs timely feedback so his clinical experience may start substantially further along the learning curve of this or any other technically demanding operation.



Oral Midazolam for Removal of K-Wires in the Children's Orthopaedic Outpatient Department: a Randomised Controlled Trial

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Purpose - To determine if oral midazolam reduces the anxiety of children undergoing removal of percutaneous Kirschner wires (K-wires) from the distal humerus in the Orthopaedic Outpatient Department.

Methods – This was a prospective double blind, randomised controlled trial. 46 children aged between 3 and 12 years who had supracondylar fractures of the distal humerus internally fixed with K-wires were randomised into 2 groups. 0.2mg/kg oral midazolam (active group) or the same volume of an oral placebo (control group) was administered 30 minutes prior to removal of K-wires.

Venham Situational Anxiety Score was performed before and immediately after removal of K-wires. University College London Hospital sedation score was recorded every 20 minutes.

Results – 42 children with an average age of 7.1 years (range 3.6-12.3 years) had complete documentation for analysis. The two groups had similar demographics. All wires were removed in the clinic with or without midazolam.

There was no significant difference in anxiety scores between the groups either before or after wire removal. The change in scores was not significantly different between the 2 groups. However, 45% of children in the active group had reduced anxiety levels in the active group compared to 18% of children given placebo but this difference was not significant ($p=0.102$). No child was excessively sedated but one in the active group became agitated and restless.

Conclusions – The anxiety scores before and after wire removal in the active group were not significantly different from the placebo group scores. We do not recommend the routine administration of midazolam (0.2 mg/kg) to all children requiring k-wire removal in the outpatient department.

The Epidemiology of Fractures Related to Participating in Football

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Objective: To illustrate the incidence and epidemiology of fractures due to football.

Design: All inpatient and outpatient fractures from a prospectively collected database for a defined population in 2000 were retrospectively analysed.

Results: There were 396 football fractures, 96% male. Football caused 39% of the 1022 sports fractures in 2000. This represented 5% of the 8151 fractures in total. The incidence was $61/10^5$ in males and $5/10^5$ in females. The average age was 22.9 years; 22.8 in males and 26.6 in females. 77% of fractures were treated as outpatients. The top five fractures representing 84% of the injuries were Radius+Ulna 30%, Phalanx 19%, Tibial+Fibula 18%, Metacarpal 11% and Clavicle 5%. 71% were upper-limb fractures. The busiest two months were October and May 17% and 14% respectively. The quietest two months were February and December at 5%.

Discussion: Although the epidemiology of football injuries will vary amongst different populations, these results can be generalized to similar population bases. Results will be valuable to medical professionals supporting football teams, enabling them to focus their attention on treating the most common injuries, the majority being treated as outpatients.

Conclusion: Football is the most common cause of fractures in sport. As participation increases, the incidence of fractures is likely to reflect this. Upper limb fractures account for over 2/3rd of fractures with radius+ulna fractures accounting for up to a 1/3rd of fractures; the majority can be treated as an outpatient. Therefore medical teams should be familiar with standard treatment regimes, possible impact on players' futures and time out of sport.

ANZAC DAY – Lest We Forget

It was Plato who said that only the dead have seen the last of war and many philosophers and teachers since have stated that war is a great training ground for surgeons. In war though, not only do men and women become injured, many die. These are they whom we must never forget.

This paper looks at some aspects of Military Medicine in the context of the Australian experiences on the Gallipoli Peninsula following the landings on 25 April 1915 and traces the celebration of that event through to the present day. It looks at the developments of Military Surgery over the past 90+ years, from 1916 through to the Vietnam War then draws on the author's experience of celebrating ANZAC day on deployment.

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