

BSSH

The British Society for
Surgery of the Hand



BSSH/BAHT COMBINED AUTUMN SCIENTIFIC MEETING

17-18 OCTOBER 2013
THE ROYAL COLLEGE OF
SURGEONS OF ENGLAND

CONTENTS

President's Foreword	1
Outline Programme	2
Guest Speakers.....	3
Thursday 17 October	9
Friday 18 October.....	23
Posters	39
Meeting information	61
Medical and technical exhibition	64

BSSH OFFICERS 2013

President S L Knight	Chair J Chalmer
Immediate Past President I A Trail	Vice-Chair M Hayden
Vice President R H Milner	Secretary R Box
Honorary Secretary D Warwick	Treasurer P Smith
Honorary Treasurer R Savage	Vice-Treasurer M Ryan
Editor in Chief G E B Giddins	Membership N Allen
Council Members S M Fullilove I Grant C Heras-Palou M Hobson S P Hodgson R L Lester D P Newington G D Smith	Website and Media K Mitchell Advertising B Jha

BAHT EXECUTIVE COMMITTEE

COVER IMAGES

© Donald Sammut 2013
www.donaldsammut.com

PRESIDENT'S FOREWORD



Simon L Knight, FRCS
President, BSSH



Joelle Chalmer
Chair, BAHT

Dear Members and Guests

Welcome to the combined BSSH and BAHT Autumn Meeting at the Royal College of Surgeons in London.

The scientific programme includes free papers covering the breadth of hand surgery and hand therapy. The programme also explores the themes of extensor tendon injury and tendon transfer: there is a mini symposium on extensor tendon injuries, a round table discussion on common extensor problems, a guest lecture on the biomechanics of tendon transfer and live demonstrations of commonly performed tendon transfers.

We have a number of guest speakers delivering keynote lectures: Caroline Leclercq on the treatment of hand problems in cerebral palsy, Wim Brandsma on the biomechanics of tendon transfer, Gus McGrouther on the anatomy of the fascia of the hand and Maggie Bellew on the psychology of recovery from hand injury.

This is an exciting programme which I hope that you will enjoy. I look forward to seeing you at the meeting.

OUTLINE PROGRAMME

THURSDAY 17 OCTOBER		FRIDAY 18 OCTOBER	
All sessions in Lecture Theatre 1 unless otherwise stated		All sessions in Lecture Theatre 1 unless otherwise stated	
08:00	Registration	08:30	Registration
08:55	Welcome by the President and announcements	09:00	Keynote: Biomechanics of tendon transfer Dr W Brandsma
09:00	Extensor tendon injuries	09:30	Surgical Dissection: Live demonstration of commonly used tendon transfers
09:45	Free papers	10:30	Refreshments and trade exhibitions
10:30	Refreshments and trade exhibitions	11:00	Parallel sessions Lecture Theatre 1 Lecture Theatre 2
11:00	Free papers	11:00	Free papers 11:00 Rehabilitation after tendon transfers
12:00	Keynote: Psychology of recovery from hand injury Dr M Bellew	12:00	Overseas Aid Programme
12:30	Distal Radius Acute Fracture Fixation Trial (DRAFT) Professor J J Dias/Professor M Costa.	12:30	Keynote Anatomy: The fascia of the hand
13:00	Lunch and trade exhibitions	13:00	Lunch and trade exhibitions
14:00	Parallel sessions Lecture Theatre 1 Lecture Theatre 2	13:55	Presidential handover
	14:00 Free papers 14:00 BAHT Presidential	14:00	Keynote: Treatment of hand problems in cerebral palsy Caroline Leclercq
	15:00 BSSH Surgical Outcomes Audit Lecture: Move a hand with fractures, don't stiffen it with a splint Mr A Chojnowski	14:30	Parallel sessions Lecture Theatre 1 Lecture Theatre 2
	15:20 Instructional Courses in Hand Surgery 14:30 Hand Therapy Practice: Thinking about the future	14:30	Free papers 14:30 Keynote: Know your hands Dr W Brandsma
15:30	Refreshments and trade exhibitions	15:30	Refreshments and trade exhibitions
16:00	Extensor tendon problems	16:00	Free papers
16:40	Presentations and Awards	17:00	Close of meeting
16:55	Refreshments and trade exhibitions		
17:15	Annual General Meetings Lecture Theatre 1 Lecture Theatre 2 BSSH BAHT		
19:15	Reception in Library and Hunterian Museum		
19:45	Society Dinner in Edward Lumley Hall		

GUEST SPEAKERS

Anne Alexander

Clinical Specialist in Hand Therapy and Plastic Surgery, John Radcliffe Hospital, Oxford

Anne Alexander trained as a Physiotherapist in Bristol and completed a Masters in Physiotherapy from UCL, London in 2007. She has been working as a Clinical Specialist in Hand Therapy and Plastic Surgery at the John Radcliffe Hospital in Oxford since 2007. Her primary clinical interests include the rehabilitation of adult brachial plexus patients and those with peripheral nerve palsy both before and after surgery. She has published a paper on the movement of the median nerve at the wrist.

Speaking in: Rehabilitation after Tendon Transfers – Friday, 11:00



Dr Maggie Bellew, BA (Hons) MSc, PhD, CPychol, AFBPsS

Leeds Teaching Hospitals NHS Trust/Spire Leeds Hospital

Dr Bellew is a Consultant Clinical Psychologist, working at the Leeds Teaching Hospitals NHS Trust and also at the Spire Leeds Hospital. She qualified in 1991, and has Chartered Clinical Psychologist status and also Chartered Health Psychologist status. She is an Associate Fellow of the British Psychological Society and is registered with the Health Professions Council. At the Leeds Teaching Hospitals, Dr Bellew and her team provide a comprehensive, highly specialist psychological assessment and intervention service for patients under the care of plastic, reconstructive & hand surgery; orthopaedics; the Leeds Major Trauma Service and the Emergency Departments at both St James's and the Leeds General Infirmary. They see patients across the life span, from birth to old age, having a variety of difficulties including those arising from congenital anomalies, disease and traumatic injury. Dr Bellew is research active with a number of publications. She is a Senior Consultant in the Department of Clinical and Health Psychology at LTHT, where she heads up the Adult Surgical and Rehabilitation Service (which in addition to the clinical areas described above, covers Oncology and the Prosthetic Rehabilitation Service).

Speaking in: Psychology of recovery from hand injury – Thursday, 12:00



Ms Nikki Chapman

Occupational Therapist and Company Director - The OT Practice

Nikki brought together her extensive clinical experience with forward thinking entrepreneurialism to found The OT Practice in 2006. Initially working as an independent practitioner Nikki has built The OT Practice into a first class therapy consultancy. With over 100 therapists providing coverage throughout the UK She is passionate about delivering enhanced core clinical skills to the private market without the waiting lists or red tape that is often associated with statutory services. The OT Practice hand therapy team is proud to be growing rapidly, with increased referrals and therapy numbers 'OT Practice Hands™' is fast becoming a nationwide hand therapy service provider. The OT Practice maintains close and successful relationships with case managers, solicitors and consultants consistently delivering a high quality service that Nikki would expect for her own family – the very best. Nikki has an interest in research, authoring articles published in the International Journal of Therapy and Rehabilitation and Occupational Therapy News, and is also a book reviewer for the British Journal of Occupational

GUEST SPEAKERS

Therapy. She maintains a high level of professional development and supervision. She serves on the National Executive Committee of the College of Occupational Therapists' Specialist Section in Independent Practice and recently project managed the therapist finder service for members of the public looking to source and independent therapist through the College. Nikki is passionate about encouraging and supporting therapists to move into the innovative and exciting world of private practice. Today she is speaking about the opportunities and challenges for hand therapists in this market place and is opening the floor for a Q and A session to help alleviate some of the myths about taking the plunge into the world of independent practice.

Speaking in: Setting up in Private Practice – Thursday, 14:30



Dr Wim Brandsma, RPT PhD

Hand Centre Utrecht, Netherlands

Most of Dr Brandsma's professional years have been spent outside the Netherlands, working with leprosy affected people in many countries on three different continents. From 1983–1986 he was a research associate at the rehabilitation research department of the Public Health Service (leprosy) hospital in the USA (Chief of Rehabilitation at that time - Paul Brand). He is an honorary member of the Dutch Hand Therapy Society and corresponding editor of the Journal of Hand Therapy. In 1993 he obtained a PhD (University of Utrecht-the Netherlands): (Patho) kinesiology of the Intrinsic Minus Hand: assessment, rehabilitation and reconstruction. He has (co)-authored more than 100 papers, of which many pertain to the hand. His main interests are in assessment and biomechanics of the hand, leprosy, community-based rehabilitation and holistic care.

Speaking in:

Keynote Lecture: Biomechanics of tendon transfer – Friday, 09:00

Rehabilitation after tendon transfers – Friday, 11:00

Keynote Lecture – Friday, 14:30



Mr Adrian Chojnowski, FRCS(Tr&Orth)

Consultant Orthopaedic Surgeon, Norfolk & Norwich University Hospital, Norwich

Adrian Chojnowski is a consultant Orthopaedic Surgeon at the Norfolk and Norwich University Hospital trust with specialist interest in Hand surgery. He graduated from the University of Cambridge and completed higher surgical training in East Anglia. He completed a fellowship at the University of Toronto Hand Programme with appointment to consultancy in 2003. His research interests include Dupuytren's disease with £600,000 in research grants to date. He is currently investigating biomarkers to stratify Dupuytren's with the School of Biology, University of East Anglia. Adrian says "I am honoured to represent the British Association of Hand Therapy as President".

Speaking in: BAHT Presidential Address – Thursday, 14:00

Professor M Costa

Speaking in: Distal Radius Acute Fracture Fixation Trial (DRAFT) – Thursday, 12:30

GUEST SPEAKERS



Professor T R C Davis, FRCS

Consultant Hand Surgeon, Queens Medical Campus, Nottingham University Hospitals, Nottingham

Tim Davis has been a consultant practising hand surgery in Nottingham since 1991. He was appointed as a Special Professor in Trauma and Orthopaedic Surgery at Nottingham University in 1999 and was Editor of the Journal of Hand Surgery, (European Volume) during 2000–4. He was President of the BSSH in 2009 and is presently chairman of the Society's Research and Audit committee. His particular research interests are distal radius fractures, scaphoid fractures, Dupuytren's disease and osteoarthritis of the trapeziometacarpal joint.

Speaking in: Extensor Tendon Problems – Thursday, 16:00hrs



Professor J J Dias, FRCSEd

Professor in Hand and Orthopaedic Surgery and Head of Section of Orthopaedic Surgery, University of Leicester

Professor Dias is the Professor in Hand and Orthopaedic Surgery and Head of Section of Orthopaedic Surgery at the University of Leicester and works at the University Hospitals of Leicester. His research interests are in epidemiology of hand disorders, Dupuytren's contracture, the outcome of interventions in upper limb and hand trauma and interventions for wrist disorders. He has focused on investigations of effectiveness of interventions for hand and upper limb disorders. He has published over 80 peer-reviewed articles and 25 chapters in books on hand surgery. Professor Dias has received a number of grants from societies and companies, including a grant from the BSSH for a national study on the outcome of Dupuytren's contracture surgery in 2006 and a £2.2 million grant from NIHR HTA 2013. He was Editor-in-Chief of the Journal of Hand Surgery (European) and a member of the Editorial Board for the Journal of Bone and Joint Surgery. Professor Dias was President of the British Society for Surgery of the Hand (BSSH) in 2008 and is Immediate Past President of the British Orthopaedic Association (BOA). He is a member of several hand and orthopaedic surgery societies internationally, including FESSH, IFSSH and the Indian Society for Surgery of the Hand. He was Head of School of Surgery at the East Midlands Healthcare Workforce Deanery (South).

Speaking in: Distal Radius Acute Fracture Fixation Trial (DRAFT) – Thursday, 12:30

Mr R Eckersley, FRCS

Consultant Hand Surgeon, Chelsea & Westminster Hospital, London

Speaking in: Overseas Aid Programme – Friday, 11:00

Miss S M Fullilove, FRCS(Orth)

Consultant Orthopaedic Hand Surgeon, Derriford Hospital, Plymouth

Speaking in: BSSH Surgical Outcomes Audit – Thursday, 15:00

Mr H P Giele, FRCS FRACS(Plast)

Consultant Plastic Surgeon, John Radcliffe Hospital, Oxford

Speaking in:

Extensor Tendon Problems – Thursday, 16:00

Surgical Dissection: Live demonstration of commonly used tendon transfers – Friday, 09:30

GUEST SPEAKERS



Mr M J Hayton, FRCS(Tr&Orth) FFSEM

Consultant Orthopaedic Hand Surgeon, Wrightington Hospital, Wigan

Mr Mike Hayton is a Consultant Orthopaedic Hand Surgeon. He works at Wrightington Hospital in the North West of England. Mike's clinical practice is exclusively hand, wrist and elbow surgery and he has a particular interest in sports injuries. He lectures widely in Europe and North America and has published many peer-reviewed articles and written several book chapters.

Speaking in: Extensor Tendon Problems – Thursday, 16:00

Ms Sarah Hazelden BSc(Hons) Physiotherapy, MCSP, BAHT AHT

Norfolk and Norwich University Hospitals NHS Foundation Trust

Sarah Hazelden graduated from King's College, London in 1994. Her desire to work as a hand therapist began as a student, when she was lucky enough to complete an elective placement with Kate Beresford in Windsor. After working in London at King's College and Chelsea and Westminster Hospitals, Sarah returned to Norwich where she works as a Physiotherapy Team Leader in Plastic and Reconstructive Surgery and Hand Therapy. She has a special interest in complex trauma and tendon surgery and rehabilitation. Sarah is a regional representative for BAHT and recently completed her accreditation.

Speaking in: Rehabilitation after Tendon Transfers – Friday, 11:00

Dr C Leclercq

Institut de la Main, Paris

Speaking in:

Surgical dissection: live demonstration of commonly used tendon transfers – Friday, 09:30

Keynote lecture: Treatment of hand problems in cerebral palsy – Friday, 14:00

Mr S P Hodgson, FRCS FRCSEd(Orth) MD

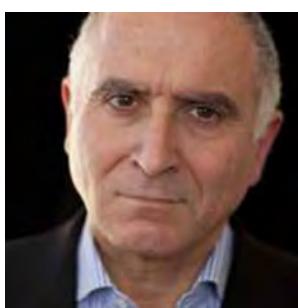
Consultant Orthopaedic Surgeon, Royal Bolton Hospital

Speaking in: Overseas Aid Programme – Friday, 11:00

Professor D A McGrouther, MD MSc FRCS FRCSEG FRCSEd FMedSci

Plastic and Reconstructive Surgery Research, University of Manchester

Speaking in: Keynote Anatomy: The fascia of the hand – Friday, 12:30



Mr D Sammut, FRCS FRCS(Plast)

Consultant Hand Surgeon, Reading, London and Bath

Donald Sammut trained in London, Strasbourg, Paris and Barcelona, and was appointed Hand Surgeon in Bristol in 1993, where he set up the Hand Unit and the Congenital Hand Services. He now works in private practice. He divides his time between clinical practice and the teaching of anatomy and hand surgery. His main work bases are in Reading and in Bath. His interests include the reanimation of paralysed hands, congenital hand surgery and reconstruction after trauma, particularly skin cover. He travels to, works and teaches in Nepal, where he has set up programmes of surgery in leprosy villages, and Italy, where he lectures and previously ran a congenital hand service. He has held posts on Council of BSSH and on various Educational Commit-

GUEST SPEAKERS

tees. He is also an illustrator and artist, both medical and non-medical, providing most artwork for the BSSH and BAPRAS and also illustrating non-medical publications.
www.donaldsammut.com

Speaking in: Extensor Tendon Injuries – Thursday, 09:00

Mr Stephen Southern FRCS(Plast)

Consultant Plastic Surgeon, Pinderfields Hospital, Wakefield

Speaking in: Extensor tendon injuries – Thursday, 09:00



Mr Steve Tolan, MCSP

Professional Advisor, Development and Research Unit, Chartered Society of Physiotherapy

Steve Tolan has been a professional adviser at the CSP for just over two years. Prior to that he was a musculoskeletal specialist clinician but has also worked in a variety of other specialties including burns and plastics. Before becoming a physiotherapist Steve trained for a period to be a teacher and also worked in the City as an underwriter. At the CSP, Steve's area of work at the society is commissioning policy, service redesign, outcomes/experience measures and health informatics. He is the society's liaison officer with the professional network Neuromusculoskeletal Alliance, representative on the National Allied Health Professionals Informatics Strategic Taskforce (NAHPIST) and attends various committees, working groups, multidisciplinary alliances and civil service meetings on behalf of the profession.

Speaking in: Hand therapy practice – Thursday, 14:30



Professor D Warwick, MD FRCS FRCS(Orth) European Diploma of Hand Surgery

Consultant Hand Surgeon, University Hospital Southampton

David Warwick is Consultant Hand Surgeon at University Hospital Southampton (1998–) and Reader in Orthopaedic Surgery at the University of Southampton. He is also Visiting Consultant Hand Surgeon to the State of Jersey. Professor Warwick looks after upper limb problems for elite sportsmen to include Southampton Football Club, Hampshire County Cricket Club, London Irish Rugby, Hampshire Rugby, British Olympic Sailing and British Diving. David's particular interests are rheumatology, distal radio-ulnar joint problems, Dupuytren's disease, hand trauma and wrist instabilities. David is currently Honorary Secretary of the British Society for Surgery of the Hand (BSSH) and Chairman of the FESSH Training Committee. He is also Chairman of the BSSH Instructional Course Committee and past-Chairman of the BSSH Education and Training Committee. He is Section Editor for the *Annals of The Royal College of Surgeons of England*; he has served on the Editorial Board of the Journal of Hand Surgery and the Journal of Bone and Joint Surgery. He has written several book chapters, dozens of papers and most recently has authored and edited the *Oxford Handbook of Hand Surgery* and *Apley's System of Orthopaedics*.

Speaking in: Extensor Tendon Problems – Thursday, 16:00

GUEST SPEAKERS



Mr Adam Watts, FRCS(Tr&Orth)

Consultant Orthopaedic Surgeon, Wrightington Hospital, Wigan

Adam Watts is a Fellowship-trained Hand and Upper Limb Surgeon. He completed his post-graduate training in Orthopaedics in Edinburgh before undertaking Upper Limb Fellowship training in Glasgow, Wrightington, and an Australian Orthopaedic Association accredited Fellowship with Associate Professor Greg Bain in Adelaide, Australia. Adam specialises in hand, wrist and elbow problems and has a keen interest in teaching and research. He is a member of the Research and Audit Committee of the BSSH. He has been an invited speaker at a number of national and international conferences and has been awarded the 2012 ASSH International Travelling Fellowship. Adam has published widely on conditions affecting the hand and upper limb and holds a number of research grants. He is clinical supervisor for a number of PhD projects at Manchester University and is Honorary Senior Lecturer at Salford University.

Speaking in: Extensor Tendon Injuries – Thursday, 09:00

08:00 Registration

08:55 Welcome by the President and Announcements

Plenary Sessions

Extensor Tendon Injuries (Lecture Theatre 1)

Chair: Mr S L Knight

09:00 Surgical repair techniques

Mr S Southern

09:10 Systematic review of results

Mr A Watts

09:20 Rehabilitation techniques

Ms R Marx

09:30 Discussion

Free Papers (Lecture Theatre 1)

Chair: Professor T R C Davis/Ms J Chalmer

09:45 Flexor tendon repair: A comparative study between a knotless barbed suture repair and a traditional four-strand monofilament suture repair

Mr C Joyce, Miss K Whately, Mr J Chan, Dr M Murphy, Professor F O' Brien, Mr S Carroll (Galway)

Introduction and Aims: Barbed suture technology shows increasing promise for flexor tendon repairs. We hypothesise that our novel barbed suture repair has comparable strength to a traditional monofilament repair as well as creating a lower tendon profile at the repair site. This reduced cross-sectional area could improve gliding through the pulley system in vivo.

Materials and Methods: Forty porcine tendons were randomly assigned to a barbed repair group or an Adelaide repair group. Tendons were transected and repairs were carried out. Biomechanical testing was done to assess the ultimate strength of each repair as well as the 2mm gap formation force.

Results and Statistics: The tensile strengths between both tendon groups were very similar. However, less force was required to create a 2mm gap in the four-strand repair method compared with the knotless barbed technique. There was a significant reduction in the cross-sectional area in the barbed suture group after repair compared with the Adelaide group.

Conclusion: Barbed suture devices should be considered as an alternative to four-strand monofilament flexor tendon repairs as the tensile strengths are comparable as shown in our study. The barbed suture repair was quick to perform and no knot was required. The absence of the knot led to a statistically significant reduction in the cross-sectional area at the repair site in the barbed group, which may improve gliding and decreased gapping in vivo, which in turn may decrease the rate of repair rupture.

09:50 Discussion

09:52 A quick and simple four-strand barbed suture repair technique for flexor tendons: A comparison to a traditional four-strand monofilament repair

Mr C Sugrue, Mr C Joyce, Mr J Chan, Mr L Delgado, Mr D Zeugolis, Mr S Carroll, Mr J Kelly (Galway)

Introduction: Barbed suture technology has shown promise in flexor tendon repairs as there is an even distribution of load and the need for a knot is eliminated. We propose that a quick and simple,

novel, barbed technique without any exposed barbs on the tendon surface, has comparable strength and a smaller cross-sectional area at the repair site than traditional methods of repair.

Methods: Forty fresh porcine flexor tendons were randomised to polybutester four-strand barbed repair or to four-strand Adelaide monofilament repair. The cross-sectional area was measured before and after repair. Biomechanical testing was carried out and 2mm gap formation force, ultimate strength of repair and method of failure were recorded.

Results: The mean ultimate strength of the barbed repairs was 54.51 ± 17.9 whilst that of the Adelaide repairs was 53.17 ± 16.35 . The mean 2mm gap formation force for the barbed group was 44.71 ± 17.86 whereas that of the Adelaide group was 20.25 ± 4.99 . The post-repair percentage change in the cross-sectional area at the repair site for the Adelaide group and barbed group was 12.0 ± 2.3 and 4.6 ± 2.8 respectively.

Conclusions: In our ex vivo study on flexor tendons, a four-strand knotless, barbed method attained comparable strength to that of the traditional Adelaide repair technique. The barbed method had a significantly reduced cross-sectional area at the repair site compared to the Adelaide group. Barbed repairs show promise for flexor tendon repairs this simple and quick method warrants further study in an animal model.

09:57 Discussion

- 09:59 Review of a pilot study comparing Total Active Motion of repaired flexor tendons Zone 1–4, comparing active wrist tenodesis early active motion (EAM) versus the Belfast static wrist EAM regimen**
Mrs G Horsfall, Miss C Bernardis, Mr M James (London)

Introduction: Surgery and rehabilitation of injured flexor tendons of the hand has been an area of interest and challenge to surgeons and hand therapists for several decades (Pettengill 2005). Approximately 150–250 surgically repaired flexor tendons per annum at Guy's and St Thomas' Trust (GSTT) require regular reviews of our outcomes. Our aim was to find a flexor tendon regimen that improved our current outcomes.

Method: The regimen of choice had been the early active motion (EAM) Belfast programme (Small et al, 1989). Published evidence suggested including wrist/hand tenodesis motion may improve post surgical flexor tendon outcomes (Amadio 2005). We designed a splint that allowed full wrist flexion and extension and implemented a pilot study incorporating wrist tenodesis EAM exercise performance for repaired flexor tendons, Zone I–IV. The prospective pilot was completed on forty-four patients (22 in each group), age 16–65, 2–4 strand tendon repairs, comparing the Belfast EAM regimen versus Wrist Tenodesis EAM regimen.

Results: The wrist tenodesis group achieved 91% “excellent” Total Action Motion (TAM) (Strickland 2000) outcome measure versus 5% Belfast EAM static wrist programme. The Belfast programme yielded primarily “good” results with 65% of the group in that category.

Conclusion: The wrist tenodesis EAM regimen was completed by one therapist with several years of clinical experience while the Belfast EAM regimen was completed by several therapists/varied skill mix. There was potential for bias in the wrist tenodesis group. To produce more objective evidence we have commenced a randomised controlled trial to compare the two treatment regimens.

10:04 Discussion

- 10:06 Nineteen-year follow-up of hallux-to-thumb transfers - A single surgeon experience**
Mr J S Watson, Ms S Turner, Mr C Ng (Manchester)

Aim: Long-term analysis of thumb reconstruction by complete hallux transfer.

Methods: A detailed retrospective clinical review with work history, use of their thumb and any foot problems.

Results: Seven transfers for traumatic loss were performed, all successful. There were two minor nail revisions and one tenolysis. Six patients were contactable confirming the viability of their transfers and five attended for long-term review. The mean age at surgery was 37 years (range 23–47), average follow-up was 19 years (11–26). All the patients used their reconstructed thumbs, three returned to their pre-injury occupation, one changed his job and one could no longer work.

Mean active IP joint ROM 29° (0–69), average Jamar grip, key and pulp pinch strengths were 21kg (1–38), 5kg (1–10), 5kg (0–8) respectively. Single-point detection of the volar thumb tips was from 3.61SW Monofilaments (four patients) to 4.31SWF (one patient). Three patients scored 100% on modified locognosia testing, two scored 87.5%. One patient had static two-point discrimination of 11mm, the rest >15mm. The mean DASH score was 14 (1–48). The modified Tamai score averaged 68 (52–82). All reported some degree of cold intolerance of the thumb and three in the foot.

Conclusions: Hallux-to-toe transfer was associated with good functional outcomes, high patient satisfaction with regard to function and cosmetic appearance. Cold intolerance remains troublesome. Issues of consent are discussed. It is not possible to compare these thumbs directly with toe wrap or osteo-plastic reconstructions but these excellent outcomes makes a strong case for this method of reconstruction to be considered in future cases.

10:11 Discussion

10:13 Outcome of digital replantations - St Andrew's experience

Miss A Breahna, Mr A Siddiqui, Mr S Jabir, Ms A Tan, Ms A Copsey,
Mr F Iwuagwu (Chelmsford)

Introduction: Traumatic finger loss can be a cause of significant functional and aesthetic impairment. The impact on patients' lives cannot be underestimated. This study evaluates the demographics, operative findings, outcomes and predictive factors for successful replantations in our unit.

Methods: Retrospective review of the St Andrew's trauma database identified all replantations and revascularisations between January 2006 and December 2010. Patient demographics, mechanism of injury, operative and outcome details extracted from medical records and hand therapy notes were recorded on a proforma and analysed.

Results: Ninety-eight digital replantations (68) and revascularisations (30) were identified in 77 patients with a mean age of 40.6 years. Circular saw was the main mechanism of injury (56%). The most frequently involved digit was the ring finger (45%). 50% of replanted digits were in Tamai zone 4. Survival rate was 69.11% (47/68) for replants and 83.33% (26/30) for revascularisations. Return to theatre rate was 20.40% (20/98). Seven digits out of 20 were saved. Venous congestion was the leading cause of replant failure, followed by acute ischemia. Mean sensory recovery was 8.2mm (ranging 3–15 mm) and mean TAM 140 at six months.

Conclusions: Crush and avulsion injuries associated with distal level of amputation (Tamai zones 1 and 2) predicted poor survival rates. Close monitoring and low threshold for revision of anastomosis improve survival, whilst leech therapy was an useful adjunct in treating venous congestion. Patient satisfaction with the replanted fingers was high and did not correlate with objective measurements.

10:18 Discussion

10:20 Bangle avulsion injuries of the forearm

Mr A Sierakowski, Dr H Venkatramai, Dr S Sabapathy (Coimbatore)

Introduction: We have identified the bangle avulsion injury as a specific subset of forearm avulsion injury, analogous to the ring avulsion injury seen in digits. The injury occurs in female machine operators wearing forearm bangles, as is custom in women of Indian and Pakistani origin.

Patients and Methods: We report our experience of seven bangle avulsion injuries treated over a four-year period, with an average follow-up of 23 months. The patients' case notes were reviewed to record details of the primary salvage procedures, as well as the need for secondary surgery. Functional outcome was assessed using Chen's classification system.

Results: The mean age of the patients was thirty-six years. One patient sustained a degloving skin injury with forearm bone fractures but without significant neurovascular injury. Another patient suffered a sub-total amputation at the mid-forearm level requiring fracture fixation and revascularisation. Five patients suffered complete amputation requiring replantation, of which four limbs survived. Of these four, one patient achieved Chen Grade 2 functional outcome, one Grade 3 and two Grade 4. All patients were satisfied to have undergone limb salvage surgery.

Conclusions: Bangle avulsion injuries of the forearm can present anywhere along a spectrum of severity, ranging from a relatively minor soft tissue injury to complete avulsion amputation. Functional recovery may be limited, but patient satisfaction with the procedure is high. We recommend attempting limb salvage in such injuries and outline the key factors important for success. A classification system based on the severity of bangle avulsion injury is also proposed.

10:25 Discussion

10:30 Refreshments and Trade Exhibitions

Plenary Session

Free Papers (Lecture Theatre 1)

Chairman: Professor J J Dias/Ms N Burr

11:00 Clinical outcomes of axial K-wire stabilisation in middle phalangeal finger fractures
Ms C Quinlan, Dr M Hennessy, Mr P Fleming (Cork)

Introduction: Middle phalangeal finger fractures are rare. Closed reduction and percutaneous K-wire fixation is a frequent mode of surgical treatment. The use of a single axial K-wire can cause rotatory instability within the middle phalanx but permits early mobilisation of the proximal interphalangeal joint (PIPJ) of the affected digit.

Aims: The aim of this study was to assess functional outcomes and fracture healing in patients who underwent axial K-wire fixation of a middle phalanx fracture at our institution.

Methods: Patients with middle phalanx fractures in whom manipulation and fixation of the fracture with a single axial K-wire was performed, inserted from the distal phalanx to cross the distal interphalangeal joint, were identified. A retrospective chart and radiology review was conducted. Demographics, fracture location and pattern, radiological healing and post-operative finger function were recorded.

Results: Thirteen patients underwent the procedure between 2009 and 2012. The mean patient age was 24.9 years (range 15–98). The majority were male. Seven fractures were located in the midshaft, six were distal. Most were extra-articular. At a mean of 5.5 weeks post-operatively, ten of 13 patients had full active flexion and extension of the PIPJ. Three had full active distal interphalangeal joint motion. The most recent radiology, recorded at a mean of 54 days post-operatively (range 7 to 365) showed evidence of satisfactory healing in all cases.

Conclusions: The findings of our study suggest the use of a single axial K-wire to stabilise middle phalangeal fractures results in good functional finger movement post-operatively and acceptable healing rates.

11:05 Discussion

11:07 Second to fourth digit ratio confirms aggressive tendencies in patients with boxers' fractures

Mr C Joyce, Mr J Kelly, Mr G Colgan, Mr J Chan, Mr J McCabe, Mr W Curtin (Galway)

Background: Second to fourth digit ratio (2D:4D) has been shown to be dependent on prenatal androgen exposure. A longer relative fourth digit to second digit is indicative of increased intrauterine testosterone exposure prenatally and the converse is also true for oestrogen exposure. This study examined the relationship between persons presenting with a boxer's fracture and 2D:4D. Boxers' fractures are an injury classically incurred during acts of aggression and we postulated that this cohort of patients would have a smaller 2D:4D ratio when compared to the general population.

Methods: One hundred and fifty radiographs from patients with boxers' fractures secondary to aggressive actions were analysed and the 2D:4D ratio was calculated. A further one hundred and fifty X-rays from patients not involved in aggressive activities were used as a control and their 2D:4D ratio was calculated too. Statistical analysis compared the 2D:4D ratios between our two groups.

Results: Our results showed that patients with a boxer's fracture secondary to an aggression related injury had a statistically significant smaller 2D:4D ratio in comparison to the normal population.

Conclusion: Boxers' fractures are injuries that typically occur from an aggressive act. We have shown that boxers' fractures are associated with a smaller 2D:4D ratio than the normal population, thus suggesting that persons exposed to high levels of prenatal androgens are more likely to exhibit aggressive tendencies in adulthood. Our results suggest that smaller digit ratios may predict a predisposition to acts of aggression, and as such result in an increased likelihood of sustaining an injury such as a boxer's fracture.

11:12 Discussion

11:14 Boxer's knuckle in elite athletes

Mr C Hoare, Mr H Singh, Mr M Loosemore, Mr M Hayton (Wrightington)

Introduction: Hand injuries are common in boxing at all levels. Boxer's knuckle has been described as extensor hood disruption at the level of the metacarpophalangeal joint with or without capsular rupture. Previous studies have suggested that the optimal treatment of the extensor hood injury is surgical, but been divided on whether the capsule should be repaired. This has been due to concern regarding lack of post-operative flexion and inability to return to elite level sport.

Method: The senior author has surgically treated twelve digits in ten professional or elite amateur boxers with this injury. All capsular tears and extensor hood injuries were repaired with the joint in maximal flexion. This position was maintained in a splint for four weeks post-operatively.

Results: There were five ulna sided extensor hood injuries, three radial and three central tears in the little finger between the extensor digiti minimi and extensor digiti communis tendons. A capsular tear was noted in five cases. All boxers were able to return to their previous elite level of sport following the surgery. There was no loss of flexion in this cohort. DASH scores and time to return to competitive boxing are being collated.

Conclusion: Capsular integrity has been proposed to help protect the articular cartilage of the metacarpophalangeal joint from chronic injury as seen in boxers. We feel that repair is usually feasible with no loss of flexion and should be attempted to prevent persistent symptoms in this patient group.

11:19 Discussion

- 11:21 An evaluation of custom made thermoplastic splints versus non-thermoplastic custom-made splints and commercially available splints for the conservative treatment of Type I closed mallet finger injuries
Miss F Adams, Mr D Thornton (Leeds)

Introduction: Splinting has been identified as a preferred treatment option for Type I mallet finger injuries. Current literature shows great variation in the types of splints used but clinically, there is a preference for custom-made thermoplastic.

Aims: To determine whether there is a difference in outcomes when treating Type I mallet injuries with custom-made thermoplastic splints when compared to other non-thermoplastic custom-made splints (e.g. aluminium splints or casts) and commercially available splints (eg stack splint).

Methods: A meta-analysis of five randomised trials that compared outcomes for two or more splints in the treatment of Type I mallet finger injuries was performed. There was a total of 357 participants with seven different splints. Four of the five trials used the Abouna and Brown criteria (1968) as a primary outcome measure. One trial used their own criteria which was similar.

Results: Both fixed and random effects models of meta-analysis showed insubstantial heterogeneity between studies ($\text{Chi}^2 = 5.29, p=0.38, \text{I}^2=6\%$). Data pooling, using the fixed or random effects modelling, showed that overall, within this group of studies, no one splint is statistically more effective than another (odds ratio 1.5, 95% CI: 0.92 to 2.45; total effect size = 1.63, $p=0.10$). Sensitivity analyses were carried out with similar findings.

Conclusion: The review has shown that the data is incomplete. There is a need for a larger randomised controlled trial that not only looks at the success in getting the finger straight, but also considers other variables that affect the primary outcome.

- 11:26 Discussion

- 11:28 Corticocancellous radial bone graft for reconstruction of total or subtotal traumatic loss of the distal phalanx with preservation of the soft tissue envelope
Mr A Mishra, Mr M Sood (Birmingham)

Introduction: Total or subtotal loss of the distal phalanx with preservation of either the entire soft tissue envelope or of sensate pulp is an unusual and difficult problem and can result in terminalisation of the digit. We present a method of reconstruction of the distal phalanx in such injuries in three patients.

Material and Methods: The distal phalanx is reconstructed using a non-vascularised corticocancellous bone graft from the distal radius. The entire procedure is carried out under brachial block anaesthesia and does away with the need for an iliac crest bone graft with its attendant post-operative pain and morbidity. We discuss the technique of harvest and points of technique regarding placement and fixation of the bone graft.

Results: The use of this technique has resulted in salvage of digits, which would otherwise have required terminalisation. Digital length and sensation have been preserved, nail growth has been maintained and function has been maintained using this technique.

Conclusions: We present a technique of reconstruction of total or subtotal loss of the distal phalanx in three patients, using a corticocancellous radial bone graft. The distal phalanx is reconstructed in one stage with minimal morbidity and maintenance of length, sensation and function using this technique.

- 11:33 Discussion

11:35 Predicting the risk of pathologic fracture for enchondromas of the hand using reproducible clinical and radiographic criteria

Dr R Ramaesh, Dr S Riester, Dr D Wenger, Professor A van Wijnen,
Dr S Kakar (Edinburgh)

Enchondromas are benign cartilage tumours that can cause pathologic fractures in the hand. The aim of this study is to identify objective, reproducible clinical criteria that can be used in a clinical prediction rule for fracture risk in enchondromas.

Seventy-six cases of surgically treated enchondromas involving the hand were retrospectively reviewed. The presence or absence of fracture for each case was determined by pre-operative radiographs and intra-operative findings. Cases without pre-operative radiographs and syndromic cases were excluded. Criteria examined in this study included age, the hand involved, the bone involved, the digit involved and longitudinal percentage of the occupied up by the lesion on AP radiographs. Odds ratios were calculated for each clinical criterion, statistical significance was evaluated using the chi-squared test.

There was a statistically significant difference between the fracture and non-fracture group in regards to age ($p=0.0271$), the digit involved ($p=0.0075$), bone involved ($p=0.0307$), and percentage of the bone invaded by the lesion on AP radiographs ($p=0.0168$). The small finger and the distal and proximal phalanx bones were most associated with fracture. There was a direct relationship between percentage of longitudinal bone involvement on AP radiographs and presence of fracture.

This study showed that patient age, the affected finger, the affected bone, and the percentage of the bone occupied by the pathologic lesion on AP radiographs correlate with pathologic fracture. These criteria have the potential to predict fracture risk and guide clinical decision-making in patients presenting with enchondromas of the hand.

11:40 Discussion

11:42 Open hand fractures: Two years of experience at a hand centre

Mr A Bolt, Mr R Wei, Mr R Pinder, Mr J Hodson, Mr M Waldram,
Mr D Chester (Birmingham)

Introduction: Despite open fractures of the hand being relatively common, little has been published on this subject regarding their prevalence, mechanism of injury and outcomes such as non-union.

Method: A retrospective case note review was performed of all patients presenting with open metacarpal, proximal and middle phalangeal fractures over a 25-month period at a regional hand centre.

Results: Eighty-five patients were included (median age of 43 years). “Sharp” injury was the commonest mechanism (39%). Eighty-four patients received prophylactic antibiotics (16.5% oral). All patients except one underwent surgery. 43% were managed with ORIF. Patients who underwent ORIF were significantly more likely to require revision surgery compared to other fixation methods (51% versus 27%, $p=0.026$). The bone involved was not a significant predictor of revision surgery. Four patients developed non-union. Overall superficial infection rate was 9.4%. One patient developed deep infection requiring intravenous antibiotics, there were no cases of osteomyelitis. No infections developed in the group receiving oral antibiotics alone. Neither age, mechanism of injury, nor antibiotic route were shown to be predictors of infection. Follow-up was for a mean of 159 days.

Conclusion: This study demonstrates high revision rates for bony fixation and provides useful important data for counselling patients. This study also raises the possibility of managing some of these injuries with oral antibiotics.

11:47 Discussion

11:49 Biomechanical study of the efficacy of a new design of wrist guard
Mr G Giddins, Miss M Maurel, Miss L Fitzgerald, Professor T Miles [Bath]

Hypothesis: Wrist guards have been shown to reduce wrist fractures by reducing the energy of impact on the wrist, but they restrict movement. We have tested the hypothesis that a wrist guard that allows wrist movement can work as effectively at reducing transmitted forces and thus reducing wrist fractures.

Methods: A biomechanical test rig was developed to simulate an adult fall from height. The ability of the new guard to reduce peak impact forces and absorb energy on impact was tested with different levels of padding and compared to a commercially available wrist guard. A rig had a hand model with the wrist held in 80° extension (the published median position of wrist extension on fall impact). A load cell of 2kg capacity fitted to the base of the rig measured the ground reaction force transmitted. This force indicated the effectiveness of the wrist guards in absorbing the impact energy.

Results: The use of any guard reduced peak impact forces by a minimum of 31.8%. The new guard demonstrated the same reductions in peak force (48%, P<0.01) and ability to absorb energy on impact as the standard guard.

Summary:

- The new guard, which allows wrist movement, has the same ability to reduce impact forces and absorb energy as a commercially available guard despite its substantially reduced impact area.
- This appears to be a significant advance in wrist fracture prevention.

Declaration: The senior author holds a patent on this device which he is marketing.

11:54 Discussion

Plenary Sessions

Keynote Lecture (Lecture Theatre 1)

Chair: Mr S L Knight

12:00 Psychology of recovery from hand injury
Dr M Bellew

12:30 Distal Radius Acute Fracture Fixation Trial (DRAFT)
Professor J J Dias, Professor M Costa

13:00 SWIFT Investigators' Meeting (Lecture Theatre 1)

13:00 Lunch and Trade Exhibitions

Parallel Sessions**Lecture Theatre 1 (go to page 18)**

- 14:00 Free Papers
15:00 BSSH Surgical Outcomes Audit
15:20 Instructional Courses in Hand Surgery

Lecture Theatre 2 (information below)

- 14:00 BAHT Presidential Lecture
Move a hand with fractures, don't stiffen it with a splint
Mr A Chojnowski
14:30 Hand Therapy Practice: Thinking about the future

Merge at 15:30 (page 22)

BAHT Presidential Address (Lecture Theatre 2)

Chair: Ms J Chalmer

- 14:00 **Move a hand with fractures, don't stiffen it with a splint**
Mr A Chojnowski

Hand Therapy Practice – Thinking about the future (Lecture Theatre 2)

- 14:30 **Accredited Hand Therapy Award**
Mrs N Burr
- 14:40 **Setting up in private practice**
Ms N Chapman
- 14:50 **Case management**
Ms C Manley
- 15:00 **CPS perspectives on commissioning, consultations and NICE**
Mr S Tolan
- 15:20 **Discussion**
- 15:00 **BSSH Surgical Outcomes Audit (Lecture Theatre 1)**
Miss S M Fullilove
- 15:20 **Instructional Courses in Hand Surgery (Lecture Theatre 1)**
Mr J L Hobby

Go to page 22

Free Papers (Lecture Theatre 1)

Chair: Mr J L Hobby, Dr C Jerosch-Herold

- 14:00 Which is the most valid patient-reported outcome measure (PROM) for studying Dupuytren's disease?**

Mr J Rodrigues, Dr W Zhang, Professor B E Scammell, Miss S Fullilove, Mr P Russell, Mr I Chakrabarti, Mrs D Davidson, Professor T R C Davis (Derby/Nottingham/Livingston/Plymouth/Rotherham)

Introduction: Different PROMs can assess hand function in Dupuytren's disease, but their validity cannot be assessed directly as there is no "gold" standard. Factor analysis identifies 'latent variables' and may be used to validate PROMs.

Methods: Patients at five centres (Derby, Livingston, Nottingham, Plymouth, Rotherham) were invited to participate in service evaluation. These included pre-operative and post-operative patients, following needle aponeurotomy, fasciectomy or dermofasciectomy. One assessor examined the total passive extension deficit (TPED) in all patients. All completed the DASH, EQ5D, Patient Evaluation Measure (PEM) and URAM. They rated which was most appropriate. Factor analysis was performed using SPSS.

Results: Fifty-six patients participated, with two excluded for incomplete PROMs. Eighteen were pre-operative. A Pearson correlation coefficient matrix demonstrated weakest correlations between EQ5D and other measures. EQ5D was therefore excluded from factor analysis:

	TPED	DASH	URAM	PEM
DASH	0.49			
URAM	0.64	0.78		
PEM	0.67	0.81	0.89	
EQ5D	0.04	-0.53	-0.37	-0.36

One latent factor was identified, accounting for 79% of variance shared by all measures. Although the precise nature of the "latent factor" requires interpretation, it is assumed to be a measure of hand function. The factor loadings of measures to this latent factor were:

PEM: 0.981
 URAM: 0.936
 DASH: 0.804
 TPED: 0.664

The PEM correlated most closely, suggesting it best measures hand function. Patients' preferences were: DASH 46%, URAM 32%, PEM 15%, EQ5D 7%.

Conclusions: Of PROMs studied, PEM may measure hand function best, although patients may prefer DASH. Angular deformity correlated less with hand function than all PROMs studied.

- 14:05 Discussion**

- 14:07 Unraveling the signalling pathways promoting fibrosis in Dupuytren's disease reveals TNF as a therapeutic target**

Mr L Suleman Verjee, Miss J Verhoeckx, Mr D Izadi, Mr J Chan, Dr T Krausgruber, Dr V Nicolaïdou, Ms D Davidson, Dr K Midwood, Professor M Feldmann, Professor J Nanchahal (Oxford)

Introduction: The cell responsible for matrix deposition and contraction in Dupuytren's disease is the myofibroblast. Therefore, we sought to unravel the signalling pathways leading to the development of myofibroblasts in Dupuytren's disease.

Methods: We characterised cells from freshly isolated Dupuytren's tissue and measured the levels of pro-inflammatory cytokines. We compared effects of these cytokines on contraction and profibrotic signalling pathways in palmar and non-palmar fibroblasts of Dupuytren's patients, and palmar fibroblasts from non-Dupuytren's patients. Finally, we examined the effects of targeted cytokine inhibition on myofibroblasts.

Results: Dupuytren's tissue contained myofibroblasts (87%), and immune cells including macrophages (8%) that secreted pro-inflammatory cytokines. Of these cytokines, only TNF but not IL-6 or IL-1 β promoted differentiation specifically of palmar fibroblasts from Dupuytren's patients into myofibroblasts ($p<0.0001$) via activation of the Wnt signalling pathway. In contrast, TGF- β 1 converted all fibroblasts into myofibroblasts, irrespective of the site of origin. Neutralising antibodies to TNF inhibited contractility of Dupuytren's myofibroblasts ($p<0.0001$) and led to reduced α -smooth muscle actin mRNA and protein expression and disassembly of stress fibres.

Conclusion: We have shown that Dupuytren's disease is a localised inflammatory disorder and TNF contributes to development of myofibroblasts. There is currently no treatment for early disease or for preventing recurrence following treatment of affected tissue in advanced disease. Based on our findings, local injection of an anti-TNF to prevent the progression of early stages of Dupuytren's disease or avoid recurrence following surgery, needle fasciotomy, or collagenase digestion is ready to test in a clinical trial.

14:12 Discussion

14:14 Collagenase injection for the treatment of moderate Dupuytren's disease - A prospective study

Mr J Mcfarlane, Dr A Syed, Mr D Powers, Ms T Chester, Dr A Talbot-Smith, Mr F Sibly (Hereford)

Introduction: There is increasing interest in the use of Clostridium Histolyticum Collagenase (CHC) injections to treat Dupuytren's disease. This pilot study investigated the efficacy and safety of injectable CHC in patients with moderate Dupuytren's contracture at the metacarpophalangeal joint (MCPJ).

Method: The study included forty-three patients with a single cord affecting the MCPJ only with a contracture angle of 30° to 60°. Each patient was given one injection of CHC into the cord in clinic with manipulation the next day at a cost of approximately £720. Efficacy assessments were undertaken by measuring the contracture angle of the affected MCPJ using goniometry and the Unité Rhumatologique des Affections de la Main (URAM) scale with follow-up at one, three, six and 12 months.

Results: The mean contracture angle was -2.42 at one month follow-up ($n=43$), 0.00 at six months ($n=15$) and 0.75 at 12 months ($n=4$) compared to 43.0° pre-injection, showing mean improvements of over 40°. Mean URAM scores were 2.7 at one month, 0.3 at six months and 0.5 at 12 months compared with a pre-injection score of 19.1, an improvement of over 16 points. All side effects were mild, primarily localised bruising and small skin tears.

Conclusion: This is the first prospective UK NHS hospital study to demonstrate the clinical efficacy, safety and cost-effectiveness of CHC injections in moderate Dupuytren's disease involving the MCPJ. The results showed clinically significant improvements and substantial cost savings compared to surgery for the patients that fulfilled our inclusion criteria.

14:19 Discussion

14:21 How dynamic are Dupuytren's contractures?

Mr J Rodrigues, Dr W Zhang, Professor B E Scammell, Professor T R C Davis (Nottingham)

Introduction: Dynamism of Dupuytren's contractures that cross both the metacarpophalangeal and proximal interphalangeal joints (MCPJ and PIPJ) is recognised. Extension deficit at the PIPJ may be more severe when the MCPJ is extended and vice versa. This has implications for outcomes based on angular measurements. We are unaware of published data that quantifies this effect.

Methods: Pre-operative patients attending pre-admission clinic prior to undergoing fasciectomy or dermofasciectomy at a single UK centre were invited to participate in a service evaluation of their treatment between December 2011 and April 2013. One hundred and ten consented to participate, six declined. Eighty-five had contractures involving the PIPJ and were included. Baseline data capture of the study included goniometric assessment of MCPJs and PIPJs of the digit undergoing surgery by a single observer. PIPJs were measured in passive extension, with the MCPJ in maximum passive flexion, and again with the MCPJ in maximum passive extension.

Results: Three index, eight middle, 19 ring and 54 little fingers were assessed. Seventy-six digits showed dynamism (89%). Nine digits showed $>30^\circ$ of dynamism (11%). Mean PIPJ dynamism was 14.1° (95% CI 11.2–17.0), and mean MCPJ dynamism was 5.4° (95% CI 3.6–7.2). The difference between best and worst angles was highly significant for both MCPJs and PIPJs ($p<0.001$, paired t-test). Dynamism was not significantly affected by previous ipsilateral surgery. It was greater at index PIPJs than other digits.

Conclusions: Dynamism is very common in contractures involving the PIPJ. It may be an important source of bias in clinical practice and research.

14:26 Discussion

14:28 A nurse-led trigger finger clinic

Mr D Jack, Mrs H McPhee, Dr M Seah, Mrs D Davidson (Edinburgh)

Introduction and Aims: The two main modalities of treatment of trigger finger (TF) are corticosteroid injection or A1 pulley release (either open or percutaneous). There is increasing support for non-operative management as first line in these patients. We present the results of patient outcomes from a nurse-led trigger finger injection clinic over a two-year period.

Materials and Methods: All patients triaged to our nurse-led trigger finger clinic (NLTFC) over a two-year period were included. Patients presenting with active triggering of a digit were offered an initial corticosteroid injection around the A1 pulley and were offered a review appointment if the triggering recurred. Return patients were offered a second steroid injection. The outcomes of each patient's treatments were recorded prospectively on a proforma. In particular, failure of injection treatment and subsequent progression to surgical release were documented. Minimum follow-up time was twelve months.

Results: 781 patients were triaged to attend the NLTFC. Of these, 131 failed to attend and 84 no longer were symptomatic by the time of appointment. 566 patients received a first injection of corticosteroid into a triggering digit. Of these, 45 patients requested a second injection and six subsequently progressed to surgical A1 pulley release.

Conclusions and Clinical Reference: We present a useful model whereby trigger finger can be successfully treated non-operatively in a nurse-led setting. Our results reinforce previous studies which have shown the effectiveness of repeat corticosteroid injection as a means of treatment of trigger finger.

14:33 Discussion

14:35 Functional wrist motion required for gripping a car steering wheel: A simulated static analysis

Mrs L Booth, Mr T Okoro, Mr R Kanvinde (Bangor)

Introduction: No set guidelines exist from licensing agencies, insurance companies or medical professionals regarding an appropriate time to return to driving after wrist injury. This study aimed to investigate the functional range of wrist motion required for gripping a car steering wheel.

Method: An age and sex matched population was recruited. Participants' in-car driving positions were assessed and replicated in a static model. Range of motion (ROM) for functional gripping positions on a static steering wheel model, marked with a clockface, was measured with a goniometer.

Pearson's correlation coefficient was used to assess relationships between directions of movement and points on the clock face.

Results: Twenty participants (two males and two females from each of the age groups (18–30, 31–40, 41–50, 51–60, 61–65). The optimal positions on the clock face to measure motion for the right wrist were at 2 and 5 o'clock, with 7 and 10 o'clock optimal for the left wrist. The functional static ROM for the right wrist in gripping a steering wheel was: 4–26° flexion, 12–78° extension, 2°–30° ulnar deviation, 5–10° radial deviation, 2–111° pronation, and 6–85° supination. The functional ROM for the left wrist used in gripping a steering wheel was: 10–70° extension, 2–36° ulnar deviation, 2–15° radial deviation, 3–100° pronation and 1–80° supination

Conclusion: The 2, 5, 7, and 10 o'clock positions appear optimal for assessment of functional wrist ROM required in gripping a static steering wheel. This may enable assessment of recovery of functional ROM for the same activity in wrist-injured patients.

14:40 Discussion

14:42 Rheumatoid hand surgery - is there a decline? A 22-year population based study

Mr R Gogna, Mr G Cheung, Ms M Arundell, Dr C Deighton, Mr T Lindau (Derby)

Introduction: Rheumatoid arthritis (RA) is the most common idiopathic inflammatory arthritis, affecting 0.8% of the population. It can cause significant hand and wrist dysfunction. Recent advances in anti-rheumatic treatments have the potential to decrease the prevalence of hand deformities in patients with RA.

Aims: Our aim was to investigate whether there has been a decline in the number of hand surgical procedures being undertaken for patients with RA, and whether this correlates with the introduction of new medical therapies.

Materials and Methods: We performed a retrospective, population-based (Derbyshire) study of all patients with RA who underwent hand surgery at the Pulvertaft Hand Centre from 1990 to 2012. Index procedures included (1) teno-synovectomy and soft tissue procedures, (2) wrist arthrodesis/arthroplasty, (3) finger arthrodesis/arthroplasty and (4) combined procedures.

Results: A total of 297 procedures were performed in 153 Derbyshire patients with RA over the 22-year period, with mean age at surgery 59 years (range 24–88 years). The female to male ratio was 2.5:1. The overall trend showed a peak in 2004 and a subsequent decline thereafter. This coincides with an increasing tendency by local rheumatologists to introduce earlier and more intensive conventional disease-modifying drugs, and biological therapies for more resistant disease.

Conclusion: There has been a decline in the number of hand surgery procedures being performed on patients with RA during our 22-year population based study. It indicates that medical treatments and strategies have been successful at preventing disease progression.

14:47 Discussion

14:49 Trapeziometacarpal arthrodesis: A comparison between K-wire and internal fixation

Mr C Hoare, Mr H Singh, Mr R Anakwe, Mr N Beresford-Cleary, Mr M Hayton (Wrightington)

Introduction: Arthrodesis of the trapeziometacarpal joint gives good pain relief and durable functional results when union occurs. Non-union rates of up to 39% have been reported and numerous fixation methods have been tried. We report our experience of trapeziometacarpal arthrodesis with a number of fixation methods.

Methods: A retrospective review identified patients who had undergone trapeziometacarpal fusion between April 2007 and May 2013 under the care of the senior author. The rates of union were noted. A DASH score was completed post-operatively. All surgery was performed under general

anaesthesia via a dorsal approach. K-wires, plates, headless compression screws and memory staples were used for fixation.

Results: We identified sixty-three arthrodeses in 57 patients with a mean of 36 months follow-up (range 6 - 62). The mean age was fifty (range 20 - 78) and there were 36 men and 21 women. K-wires were used in thirty-one cases, staples in 12, plates in five and screws in 15. The overall rate of non-union was 11%, however, using K-wires it was 20%. There were no non-unions in the staple or screw groups. DASH scores were significantly higher in those with non-union compared to those that united (66.7 versus 21.9, $p=0.01$).

Conclusion: Trapeziometacarpal arthrodesis gives good clinical outcomes when union occurs. In this study K-wire fixation led to a 20% non-union rate and as a result of this the senior author no longer uses this method of fixation.

14:54 Discussion

15.30 Refreshments and trade Exhibitions

Plenary Session

Extensor Tendon Problems (Lecture Theatre 1)

Chair: Mr R Eckersley/Ms R Marx

16.00: The persistently droopy mallet finger
Professor T R C Davis

16:10 Saggital band rupture
Professor D Warwick

16:20 The fight bite
Mr H P Giele

16:30 The failed closed Boutonniere
Mr M Hayton

16:40 Hand Diploma and Accredited Hand Therapy Award Presentations

16:55 Refreshments and trade exhibitions

17:15 Annual General Meetings
BSSH in Lecture Theatre 1
BAHT in Lecture Theatre 2

19:15 Reception in the Library and Hunterian Museums

19:45 Society Dinner in the Edward Lumley Hall

08:30 Registration

Plenary Sessions

Keynote Lecture (Lecture Theatre 1)

Chair: Mr S L Knight

09:00 Biomechanics of tendon transfer

Dr W Brandsma

Surgical Dissection: Live demonstration of commonly used tendon transfers (Lecture Theatre 1)

Chair: Professor V C Lees

09:30 Extensor indicis to extensor pollicis longus transfer

Dr C Leclercq

09:50 Opposition transfer

Mr D Sammut

10:10 Radial nerve transfers

Mr H P Giele

10:30 Refreshments and Trade Exhibitions

Parallel Sessions

Lecture Theatre 1 (go to page 24)

11:00 Free Papers

Lecture Theatre 2 (information below)

11:00 Rehabilitation after tendon transfers

Merge at 12:00 (page 28)

Rehabilitation after tendon nerve transfers (Lecture Theatre 2)

Chair: Ms V Frampton

11:00 EI to EPL

Ms S Hazeldon

11:15 Opponensplasty

Dr W Brandsma

11:30 Radial nerve transfer

Ms A Alexander

11:45 Discussion

Go to page 28

Free Papers (Lecture Theatre 1)

Chair: Mr R H Milner / Ms D Pipe

- 11:00 Is specialist outpatient follow-up for carpal tunnel decompression necessary? A patient satisfaction survey**
Mr P Mahapatra, Mr E Leong, Mr H Belcher (London)

Introduction: There is no consensus as to what is the optimum follow-up period for carpal tunnel. This study aims to identify an optimum follow-up regimen.

Method: Two follow-up regimens were instigated: ad hoc (no routine follow-up) versus planned (routine follow-up). Questionnaires were sent out to patients four months post-operatively. The following subjective parameters were recorded: details of follow-up, complications, satisfaction (with surgery and service), functional score, pain and tenderness, appearance.

Results: Fifty-eight questionnaires (40 ad hoc versus 18 planned) were sent. No significant differences found in complication rates or patient questionnaire results.

Table 1: Patient Survey Results (All values answers ranked 1–4 with 1 being the best result)
33% of patients in the ad hoc group arranged follow-up themselves, 50% of that group seeing their GP with minor complications. However, 97% of all patients were happy to have been discharged post-operatively without routine follow-up.

	Ad Hoc	Planned	p values (Mann-Whitney U)
Number of Responses	36	14	
Age	64.1	55.8	0.118
Functional Score	1.75	1.79	0.873
Pain Score	1.97	1.79	0.344
Appearance Score	1.25	1.5	0.085
Composite Outcome	4.97	5.14	0.792
Surgery Satisfaction Score	1.39	1.36	0.663
Service Satisfaction Score	1.11	1.36	0.2
Composite Satisfaction	2.5	2.7	0.718

Conclusion: With these findings, we propose a system of open appointments to empower patients post carpal tunnel decompression to arrange their own follow-up on an ad hoc basis. The obvious advantages include reduced waiting times, less pressure on hospital resources and lower costs.

- 11:05 Discussion**

- 11:07 Do patients benefit from ulna nerve decompression at the elbow despite normal nerve conduction tests?**
Mr G Roberts, Mr A Maclean, Mr A Logan (Cardiff)

Introduction: Ulna nerve compression at the elbow is the second most common neuropathy of the upper limb. It has been suggested that nerve conduction tests are required to correctly make the diagnosis; however, we hypothesise that patients with normal nerve conduction testing benefit from ulna nerve decompression.

Methods: Between 2009 and 2012 all patients diagnosed with a clinical diagnosis of ulna nerve compression at the elbow underwent nerve conduction testing and were offered surgery. These patients were prospectively scored (mini-DASH and PEM) pre-operatively and at post-operative intervals up to twelve months. These scores were compared with the severity of the ulna nerve compression as diagnosed on nerve conduction testing (Padua et al. 2001.)

Results: Fifty-six patients were analysed. Twenty-six had normal ulna nerve conduction whilst 30 had abnormal nerve conduction suggestive of ulna nerve compression at the elbow. The average PEM score pre-operatively was 56% in the normal group and 59% in the abnormal group. The quick-DASH score was 51 in the normal group and 48 in the abnormal group. The mean post-operative improvement in the PEM score was 22% in the normal group and 18% in the abnormal group. The post-operative improvement in the quick-DASH was 22.8 in the normal group and 15.5 in the abnormal group.

Conclusion: We conclude that patients who clinically have ulna nerve compression still benefit from ulna nerve decompression despite normal nerve conduction tests.

Reference: Padua et al. Neurol Sci. 2001 Feb;22(1):11–6. Neurophysiological classification of ulnar entrapment across the elbow.

11:12 Discussion

11:14 Iatrogenic injuries of peripheral nerves

Mr R Pinder, Mr A Mishra, Miss C Miller, Mr M Megson, Mr S Tan,
Mr D Power (Birmingham)

Introduction: The Peripheral Nerve Injury Service (PNIS) was established in 2010 at the Queen Elizabeth Hospital in Birmingham as a result of the increasingly complex spectrum of upper limb trauma presenting in both civilian and military casualties. The hospital is also designated as the Royal Centre for Defence Medicine and is the receiving hospital for all injured UK military personnel from combat deployment.

Method: The prospectively collated database of all patients seen in the PNIS was examined to identify iatrogenic nerve injuries, and data analysed using Excel.

Results: Six hundred and twenty patients with complex peripheral nerve disorders have been assessed over a three-year period. The number of iatrogenic injuries seen was sixty-nine (11%). 88% of cases involved the upper limb or neck and the commonest referral was following orthopaedic surgery (54% - trauma 23 cases, elective 14 cases). Seven cases occurred as a consequence of regional anaesthesia for surgery, and 13 whilst under the care of other surgical specialties (vascular, plastic, general, and ENT surgery). 72% of patients required surgery to address the peripheral nerve injury. Nerve service referrals continue to grow at approximately 30% per annum. Referral patterns, including timing of referral will be discussed, along with the interventions required.

Conclusion: Iatrogenic nerve injuries continue to represent a considerable burden to an ever-stretched NHS, both in terms of service provision and as a source of potential litigation. Recognition must be prompt and we advocate well documented referral agreements with early referral to the PNIS of suspected cases of nerve injury.

11:19 Discussion

11:21 The Birmingham rehabilitation protocol for motor nerve transfer surgery

Mrs C Miller, Mrs C Cooke, Dr N Birch, Mr R Pinder, Mr S Tan, Mr D Power
(Birmingham)

Introduction: Nerve transfer surgery has extended the reconstructive options following peripheral nerve injury. Distal motor nerve transfer directs axons to a denervated muscle with short re-innervation times and improved functional results. The technique avoids the complications of proximal mixed nerve repair and provides a treatment option for patients presenting late after proximal nerve injury when standard nerve grafting techniques will not achieve re-innervation before irreversible motor end plate degeneration. The evidence supporting rehabilitation strategies for motor nerve transfer surgery is limited. Targeted therapy to facilitate cortical re-organisation, strength, muscle balance and control are essential to achieving optimal functional outcomes.

Method: The Birmingham rehabilitation protocol for motor nerve transfers was developed during the treatment of twenty-two patients who underwent 36 motor nerve transfer surgeries over a three-year period. The protocol has been used successfully in both standard and innovative motor nerve transfers, including functioning free muscle transfers.

Results: The Birmingham protocol involves five key stages of targeted therapy interventions: pre-operative, protection, prevention, power and plasticity. The progression between stages is individualised depending on the timing of muscle re-innervation. In addition, there are common therapeutic aims throughout the whole recovery period.

Conclusion: The therapist has a key role with motor nerve transfer surgery that starts in the pre-operative period. The key stages will be presented with video case illustrations.

11:26 Discussion

11:28 Gender related differences in patients with carpal tunnel syndrome Mr J Annan, Mr O Stone, Miss J McEachan (Dunfermline)

Aims: The aim of this study was to evaluate the gender differences in the presentation and outcomes following treatment of patients with carpal tunnel syndrome.

Methods: All patients presenting with a diagnosis of carpal tunnel syndrome over an eight-year period were prospectively audited. The diagnosis was made using a combination of clinical examination and nerve conduction studies. Patients were treated with steroid injections and/or carpal tunnel decompression.

Results: 759 men and 1537 women were entered into the database, giving a male to female ratio of 1:2. 1584 wrists with complete datasets were analysed. The average age of men and women was 56.8 and 54.8 years respectively. Males presented with a longer duration of symptoms than females by an average of four months (58 and 40 weeks respectively), but a lower DASH score (43.18 in males and 56.81 in females), indicating less severe disability. There was no difference between genders in disease severity assessed by nerve conduction studies. Of those patients treated with carpal tunnel decompression, the average improvement in DASH score was less in men than in women (25 points in men, 36 in women). Men were overall less satisfied with their treatment.

Conclusions: Men present with a longer duration of symptoms, but less severe disability than women. Men improve less following treatment, and are less satisfied with their outcome than women. These results are relevant when discussing treatment options with male patients with less severe disease.

11:33 Discussion

11:35 A prospective study of deliberate self-harm injuries in the upper limb Mr N Mopuri, Mr Q Frew, Mr F Iwuagwu, Mr N Mopuri (Chelmsford)

Introduction: Deliberate self-harm (DSH) involving the upper limbs in the UK is one of the highest in Europe and forms a large proportion of the workload in hand trauma centres. There is a dearth of knowledge of the relationship between suicidal tendencies and DSH in the literature. We therefore prospectively studied the outcome of these injuries in the upper limb and aimed to see if suicidal intention of this population correlated with depth of injury.

Methods: Patients treated between January 2007 and December 2012 were included. A DSH proforma was devised to collect data including demographics, suicide intent (using Pierce Suicide intent Scale (PSIS)), operative findings and outcome. Depth of injuries was classified as previously described (Dewing et al., EJPS, 2010). Statistical analysis was with SPSS software.

Results: There were seventy-four patients with a mean age of 42 +/-17.8 years and a male to female ratio of 2:1. 64% had previous history of psychiatric problems, with 49% with only one episode of DSH. Psychiatric input as recommended by the DoH is clearly documented only in 80% of

patients. Grade 3 injuries were the most prevalent. There was no statistical correlation of side of injury with handedness. There was statistically significant correlation between the PSIS and the depth of injury ($p=0.045$).

Conclusions: Understanding of the positive correlation between depth of injury and suicidal tendencies can help identify high risk patients and plan appropriate levels of care.

11:40 Discussion

11:42 Glomus tumours of the upper limb - A clinicopathological review of cases presenting to a regional hand unit over a ten-year period

Dr S Jabir, Dr M Petkar, Mr F Iwuagwu (Chelmsford)

Introduction: Glomus tumours are rare neoplasms arising from neuromyoarterial cells which comprise the glomus body. We carried out a clinicopathological review of cases presenting to our unit over the last ten years.

Methods: Case notes, investigations and pathology results of patients with glomus tumours presenting to our unit between January 2003 and January 2013 were reviewed and data extracted.

Results: Forty patients (22 female, 18 male) were identified. Average age was 50.6 years. Average time to diagnosis was 6.1 years. Twenty-nine patients (73%) had tumours of their digits while 11 (27%) had them at locations between the palm and axilla. Six patients (15%) had no symptoms, while the rest presented with pain. Tumours in seven (17.5%) patients occurred in a region of the hand which had previously suffered a traumatic event. Only five patients had characteristic sequelae of glomus tumours on examination. Nine (22.5%) required an MRI to help achieve a diagnosis. The recurrence rate was 12.5% with all five patients having more than one recurrence. Apart from recurrences, all remaining patients were treated satisfactorily with only excision biopsy. Apart from one case of mitotic proliferation, all other cases displayed benign disease on pathological examination. All patients had good function and resolution of symptoms following surgical excision.

Conclusions: Patients suffer with pain for several years before presentation. A single recurrence appears to predispose patients to multiple recurrences. There might be an association with trauma. The vast majority of cases are benign and excision biopsy is sufficient in most cases giving good outcomes.

11:47 Discussion

11:49 Review of post-operative management of isolated digital nerve repairs

Miss A Kyle (Swansea)

Introduction: Post-operative management of isolated digital nerve repairs often varies between surgeons and hand therapy units. A review of current evidence and existing post-operative guidelines was undertaken to ensure the implementation of best practice.

Method: A comprehensive literature search revealed little relevant, recent and robust evidence. Three patient studies and three in vitro studies were identified as appropriate for review utilising the 'Critical Appraisal Topic' (CAT) template. Evidence did not support immobilisation of digital nerve repairs post-operatively. Authors recommended various regimes ranging from protected mobilisation to full active mobilisation. A survey of current practice was completed due to inconclusive recommendations from the literature. A questionnaire was circulated to twenty-two hand therapy units throughout the UK. Fifteen (68%) completed questionnaires were returned.

Results:

Routine post-operative regime	Number of Hand Therapy Units	Percentage
Dorsal splint with active exercises	1	6.67%
No splint / bulky dressings	13	86.67%
Surgeon preference dependant	1	6.67%

Nine of the 13 responses (69%) who do not splint routinely apply a dorsal splint if the repair is reported as being under tension by the operating surgeon.

Conclusion: Completion of this literature review and survey has resulted in a change in practice guidelines within the Plastic Surgery Unit at Morriston Hospital from immobilisation of digital nerve repairs to free active mobilisation within a bulky dressing. Exceptions to this regime are as a result of clinical decision making between the operating surgeon and treating therapist.

11:54 Discussion**Plenary Sessions****Overseas Aid Programme (Lecture Theatre 1)**

Chair: Mr S P Hodgson

12:00 Introduction

Mr S P Hodgson

12:02 Surgical perspective

Mr R Eckersley

12:12 Therapists' perspective

Ms R Marx and Ms R Swerdlow

12:22 Overview and future

Mr S Hodgson

Keynote Anatomy (Lecture Theatre 1)

Chair: Mr S L Knight

12:30 The fascia of the hand

Professor D A McGrouther

13:00 Lunch and Trade Exhibitions**13:55 Presidential handover****Keynote Lecture (Lecture Theatre 1)**

Chair: Mr S L Knight

14.00 Treatment of hand problems in cerebral palsy

Dr C Leclercq

Parallel Sessions**Lecture Theatre 1 (go to page 29)**

14:30 Free Papers

Lecture Theatre 2 (information below)

14:30 Keynote Lecture

Merge at 15:30 (page 33)

Keynote Lecture (Lecture Theatre 2)

Chair: Ms R Box

14:30 Know your hands

Dr W Brandsma

Go to page 33

Free Papers (Lecture Theatre 1)

Chair: Mr I A Trial / Ms M Ryan

- 14:30 Removal of metalwork from the forearm/wrist of children aged sixteen or younger - Assessment of complication rate following removal of metalwork**
Dr A Kheiran, Mr D Makki, Mr R Gadiyar, Mr D Ricketts (Leicester)

Displaced forearm fractures in children are common and often fixed operatively with either plates and screws or intramedullary nails. There are no clear guidelines concerning operation for the removal of metalwork (ROM). The aim of this study was to assess the complication rate following ROM from children aged sixteen years or younger in our hospital.

We identified one hundred and six suitable patients who had fixation followed by ROM at our hospital between 2006 and 2011. We noted the type of fixation, refracture rate, time from fixation to ROM, time from ROM to refracture, age at refracture, cause of refracture, management of refractures and noted groups at particular risk of refracture. The two-tailed Fisher Exact test was used to evaluate the rate of re-fractures per age and time between insertion and removal of metalwork. A p value of 0.05 or less was considered statistically significant. There were twenty complications in 106 patients (18.8%). Of these, fifteen were refractures and five soft tissue complications.

Based on our data we do not recommend routine ROM after uncomplicated forearm fracture fixation in children. The advantages of ROM remain largely theoretical and the risks in our series were significant: the overall complication rate was 18.8 % and the refracture rate was 8.9% for plates and 13.9% for nails. A further (third) operation was required for 9% of patients. Should ROM be considered, even in the presence of radiographic union, we do not recommend ROM earlier than six months for intramedullary nails and 12 months for plates and screws.

- 14:35 Discussion**

- 14:37 Treatment of paediatric distal radius fractures: MUA or K-Wires**
Mr D Murray, Mr D Johnson, Miss G Eastwood, Mr S Royle (Manchester)

Introduction and Aims: Metaphyseal distal radius fractures in children are common. There is debate towards type of operative treatment for angulated/displaced fractures. Previous studies suggest percutaneous pin fixation is required for grossly angulated or off-ended fractures. The aim of this study is to compare outcomes of MUA, one wire fixation, and two wire fixation in this fracture type.

Methods: One hundred and eight consecutive fractures were reviewed. Extra-articular, metaphyseal fractures requiring reduction were included. Salter-Harris fractures were excluded. Each case was followed until discharge. An outcome measure of re-manipulation was regarded as failure.

Results: 60% of fractures were dorsally angulated (range 11–58°), 28% off-ended, and the remainder volarly angulated. Over 90% of dorsally angulated fractures were treated with MUA, with none needing re-manipulation. Of the off-ended fractures, 50% were treated with MUA and 50% with one or two K-wires. One case needed re-manipulating and wire insertion, in the MUA group. No differences in outcome for cases treated with one or two wires were recorded. The majority of volarly angulated fractures were treated with MUA, no cases required remanipulation.

Conclusions: Our results show a low re-manipulation rate (<4%) for off-ended fractures treated with MUA alone. No dorsally angulated fractures treated with MUA required re-manipulation. K-wires have recognised complications due to pain, infection and patient anxiety on removal. Our results support the consideration of MUA and cast, for dorsally angulated fractures, and maybe even for some off-ended fractures. If K-wires are used, we suggest no difference in outcome between placing one wire or two.

- 14:42 Discussion**

- 14:44 Cost-effectiveness of volar locking plate versus percutaneous fixation for the treatment of distal radius fractures: An economic evaluation alongside a clinical trial**
Miss A Karantana, Professor B E Scammell, Professor D K Whynes, Professor T R C Davis (Nottingham)

Introduction: This study compares the cost-effectiveness of treating displaced distal radius fractures via volar locking plate (VPL) fixation versus percutaneous K-wire ± supplemental bridging external fixation.

Methods: Cost-utility analysis from the perspective of the NHS on an intention-to-treat basis of a single-centre randomised controlled trial of one hundred and thirty patients. The methodology is in line with NICE guidance on the methods of technology appraisals. We used “bottom up” micro-costing to calculate costs for each treatment pathway, prospectively collecting information on consumables, inpatient and outpatient resource use (fracture clinic, physiotherapy, A&E and plaster room), complications and additional procedures up to a year post surgery. We present data on return to work and driving.

Results: Quality-of-life scores were marginally, but not significantly, better for the plate group at six weeks and three months follow-up. Both groups returned to baseline at one year. NHS costs for the plate group were higher ($p<0.001$). For an additional £713 plus VAT (SED 109), VLP fixation offered 0.0178 (SED 0.025) additional QALYs in the year post surgery. The incremental cost effectiveness ratio (ICER) for VLP fixation at NHS list price was £40,068. When adjusting for a 20% hospital discount, the ICER was £31,898. A VLP implant would have to cost approximately £621 plus VAT, to achieve an ICER of £25,000 and £532 for an ICER of £20,000.

Conclusion: This is the first cost-effectiveness study of VLP fixation. Notwithstanding their increasing use and popularity, volar locking plates, at their current price, are cost-ineffective according to NICE threshold criteria.

14:49 Discussion

- 14:51 Volar locking plates: Are radiological and clinical outcomes influenced by fracture complexity and individual surgeons' experience?**
Mr S Barton, Mr P Wykes, Mr J Warner, Mr S Hodgson (Manchester)

In our institution we believe the optimal treatment for displaced, unstable distal radial fractures is with a volar locking plate.

Aims: To establish if fracture complexity and the primary surgeon's experience influence radiological and clinical outcomes.

Methods: We retrospectively reviewed one hundred consecutive patients treated with a volar locking plate (DePuy). All fractures were classified using the AO system. All patients were followed up in dedicated physiotherapy clinics, rehabilitation initiated two weeks post-operatively. Standardised radiographs were taken at two and six weeks and compared with pre-operative films.

Reduction was classified:

1. Anatomical
2. Acceptable (dorsal tilt = 0° , radial inclination = 10° , loss =5mm radial length, IA step =2mm)
3. Unacceptable

Independent classification of implant position was correlated to give an overall radiographic outcome:

1. Excellent
2. Acceptable
3. Unacceptable

The grade and subspecialty of the primary surgeon was recorded. Functional outcome was measured with the Patient Rated Wrist Evaluation (PRWE) score at six weeks.

Results: Mean age 60, Male:Female 21:79. Forty extra articular, 11 partially articular, and 49 complete articular fractures.

Cumulative Radiographic Outcome	Upper Limb		Lower Limb			Staff Grade	UNIT
	Consultant	Registrars	Consultants	Registrars	Staff Grade		
Excellent	13	6	7	12	1	39	
Acceptable	12	7	12	18	3	52	
Unacceptable	2	2	4	1	0	9	
TOTAL	27	15	23	31	4	100	

72% of patients had PRWE scores <40 (mild disability) six weeks post-operatively. Fracture complexity did not affect the ability to achieve an excellent/acceptable surgical result, and was not predictive of early PRWE. Upper limb registrars were significantly more likely to achieve excellent radiographic outcome (OR 5.8, CI 1.5–23.0). Lower limb consultants were significantly more likely to achieve unacceptable radiographic outcome (OR 3.0, CI 0.7–12.4). There was a trend towards improved PRWE with best reduction ($p=0.07$).

Conclusions: Volar locking plates continue to achieve excellent early functional outcomes irrespective of fracture complexity. Our study highlights the importance of surgeon experience in achieving good radiological outcomes.

14:56 Discussion

14:58 Thumb CMCJ prosthetic arthroplasty using ARPE: A review of 241 cases

Mr A Siddiqui, Ms L Onwordi, Mr G Packer (Southend on Sea)

Introduction: Osteoarthritis of the thumb basal joint (CMCJ) is the most common presentation for degenerative joint disease of the hand. CMCJ arthritis of thumb has been treated surgically using a variety of techniques. We reviewed our surgical outcomes following 241 ARPE prosthetic arthroplasty procedures over five years (2007 - 2011).

Methods: We used a cement-less total prosthetic arthroplasty using ARPE prosthesis in our series. A retrospective study of case notes with details of demographics, operations, complications and further surgery has been recorded. The outcome measure has been done using the DASH questionnaire. The follow-up period ranges from eighteen months to 66 months.

Results: In our series patients had prosthetic arthroplasty and 92% of patients went on to have pain free hand function. There was a 6.2% ($n=15$) dislocation rate. 1.2% ($n=3$) of patients needed revision surgery (periprosthetic fracture, exchange of head for stiffness and excision of osteophytes at metacarpal base for continued pain). 1.6% ($n=4$) of patients presented with post-operative periprosthetic fractures of which three were managed conservatively. One patient developed CRPS and 1.6% ($n=4$) had hypertrophic scars. There was an infection rate of 2.9% ($n=6$) all managed conservatively with antibiotics. Mean DASH score was 23.4.

Discussion: In our series, total joint arthroplasty of the thumb CMC joint has proven to be an effective treatment with good range of motion, strength and a high degree of pain relief. In our series of 241 prosthetic arthroplasty procedures for CMCJ arthritis to date, we report a low complication rate and a low revision rate.

15:03 Discussion

15:05 Is there a role for acupuncture in the non-surgical management of basal thumb arthritis?

Miss A Barnard, Mrs V Jansen, Miss S Hinchliffe, Mrs M Arundell, Professor F D Burke (Derby)

Introduction: Western medical acupuncture is in common use for the management of pain. Its efficacy is fiercely debated, with varying results in clinical studies. Many physiotherapists are trained in acupuncture, using this alongside 'conventional' therapy for different conditions. We present a single-blinded RCT comparing acupuncture to sham (non-penetrating) needling for the treatment of symptoms of basal thumb arthritis.

Method: Acupuncture naïve patients with basal thumb arthritis were randomised to receive true acupuncture or sham needling. Blinded baseline and post-treatment assessments included VAS pain scores for different grips and for movement. Overall function was assessed using the Nelson questionnaire.

Results: Thirty-six patients received real acupuncture, 37 sham. Both groups showed statistically and clinically significant improvements in VAS pain scores.

Table 1: Change in some outcome measures, compared to baseline, following real or sham acupuncture

Measure	Real acupuncture	Sham acupuncture	Difference real vs. sham
Change in key pinch pain VAS (mm)	Median 15 (IQR 0, 43) P=0.0020	Median 13 (IQR -4, 34) P=0.0167	No P=0.3011
Change in movement pain VAS (mm)	Median 14 (IQR -11, 38.25) P=0.0155	Median 16.5 (IQR -1.25, 30.25) P=0.0023	No P=0.7920
Change in Nelson score	Mean 5.08 (95% CI: 0.46, 9.71) P=0.0320	Mean 5.69 (95% CI: 1.51, 9.86) P=0.0091	No P=0.8454
VAS data	Wilcoxon signed-rank/Mann-Whitney U tests		
Nelson scores	paired/two sample t-tests		

Conclusion: Both groups showed significant improvements in pain scores following treatment, but little difference was seen between real and sham acupuncture. The VAS pain score changes were comparable to published data for standard therapy treatments.

15:10 Discussion

15:12 Post-operative rehabilitation following trapeziectomy - What is the evidence base?
Mrs L Ingham, Mr D Russell, Mr D Newington (Swansea)

Introduction: Trapeziectomy is a well described and established method of treating osteoarthritis of the first carpometacarpal joint. There appears to be poor consensus among therapists regarding rehabilitation protocols following this procedure. The aim of the study was to establish the evidence base for post-operative rehabilitation following trapeziectomy with or without ligament reconstruction to ensure evidence based practice.

Method: A literature based review was conducted by the hand therapy team, utilising a critical appraisal topic (CAT) template to evaluate relevant literature. Search strategies included trapeziectomy and trapeziectomy with tendon interposition with ligament reconstruction to identify articles sighting aspects of post-operative rehabilitation to identify rationales for current management.

Results: Forty-two research papers were identified, although from reviewing abstracts, only ten articles were selected for appraisal due to the other articles not including any discussion on post-operative rehabilitation. Of the ten articles appraised, three were RCT's and one a systematic

review. Other papers were mainly retrospective case studies with low series numbers and only two of the articles reviewed maintained a focus on therapy and rehabilitation.

Conclusion: The current evidence supports a period of three week immobilisation, based on the rationale that adequate gap is maintained between the base of the metacarpal and the scaphoid after this time. Prolonged immobilisation is not supported by the evidence and guidelines and protocols for rehabilitation should be reviewed on this basis.

15:17 Discussion

- 15:19 **Thumb CMCJ replacement versus trapeziectomy - Is recovery following replacement quicker? Early results of a prospective non-randomised consecutive case series**
Mr A Siddiqui, Ms A Tan, Mr M Sood (Chelmsford)

We report early results of a non-randomised prospective case series of consecutive patients operated upon by a single surgeon to determine whether post-operative recovery is quicker in CMCJ replacement compared to trapeziectomy.

Materials and Methods: Both groups were immobilised in identical splints for two weeks followed by an identical mobilisation protocol. Patients were administered a DASH and Michigan Hand Questionnaire and underwent measurements of pinch and grip, active range of motion in the thumb pre-operatively, at six weeks and at three months. This study compares fourteen consecutive patients who underwent CMCJ replacement with 12 patients who underwent trapeziectomy and APL sling.

Results: Following trapeziectomy the average DASH score reduced from 57.5 to 48.3 (16 %) and the Michigan score increased from 39.3 to 50 (21.4 %) at six weeks. Following replacements the average DASH score reduced from 57.8 to 16.7 (71%) and the Michigan score increased from 37.7 to 61 (38.2%) at six weeks. The improvement in the DASH and Michigan scores between six weeks and three months was : DASH 34.6% and 21.6% Michigan in trapeziectomies; DASH 1.82% and 11.6% Michigan in CMCJ replacement.

Conclusions: DASH and Michigan scores show that patients with CMCJ replacements recover quicker than those with trapeziectomies. The majority of improvement occurs by six weeks in replacements with little change between six weeks and three months. Patients with trapeziectomies show much less improvement by six weeks but a greater degree of improvement occurs between six weeks and three months.

15:24 Discussion

15:30 Refreshments and trade exhibitions

Plenary Session

Free Papers (Lecture Theatre 1)

Chair: Professor D Warwick / Ms Z Clift

- 16:00 **The long-term results following the Sauve Kapandji procedure for the treatment of Madelung deformity**
Miss S Jones, Mr A Bebbington, Mr D Russell, Mr D Newington (Swansea)

Introduction: The treatment of Madelung deformity is controversial with many surgical procedures described to correct it. We present our series of patients with Madelung deformity treated with the Sauve Kapandji procedure

Materials and Methods: Twelve patients have been reviewed with a mean follow-up post surgery of eight years. Nine patients had idiopathic Madelung deformity and three patients developed it post trauma. All were female with a mean age of 18 years at the time of surgery. Three quarters of

patients presented with ulna sided wrist pain, some loss of motion, and all patients were troubled by the appearance of the wrist(s).

Results: All patients had improvement in forearm rotation, ulna deviation and grip strength. Everyone was also pleased with the improved cosmetic appearance of the wrist and stated that they would all undergo the procedure again despite three patients requiring remedial procedures to remove bone ossifying in the ulna gap and three patients had removal of screws. No patient had ulna stump instability.

Conclusion: The Sauve Kapandji procedure is an excellent procedure for the treatment of Madelung deformity in the skeletally mature patient with ulna sided wrist pain. A moderate increase in forearm rotation can be expected, with improved cosmesis and good, long-term patient satisfaction.

16:05 Discussion

16:07 Wrist Arthrodesis: Outcomes in a district general hospital from 1996–2012
Mrs A Isaacson, Mrs C Heaver, Dr L Thompson, Mr I Bhoora (Stafford)

Introduction: Wrist arthrodesis is used to reduce pain and improve function in patients with degenerative disease, e.g. rheumatoid arthritis. However, it is not without complications. We present our experiences in a district general hospital over a sixteen-year period.

Method: A retrospective review of patients' notes identified indications, operative technique, and complications. Radiographs were reviewed to confirm fusion and any metalwork complications. Patients then filled in the Disabilities of the Arm, Shoulder and Hand (DASH) and Patient Rated Wrist Evaluation (PRWE) questionnaires to assess their comfort and function.

Results: Fifty-six wrist arthrodesis were performed in 45 patients. The male:female ratio was 11:34, with an average age of 56 (20–79). 71% of arthrodesis were performed for rheumatoid arthritis. Arthrodesis was achieved using a Steinman pin fixation in 79%. Simultaneous Darrach's procedure was performed in 80% of patients and bone graft in 93%. 10.7% experienced minor complications and 10.7% experience major complications. A 69% questionnaire response rate was achieved. The mean DASH score was 48/100 (8–97) and the mean PRWE score was 46/100 (9–96), where 0 = no disability and 100 = complete disability. Patients reported mild pain whilst at rest (2/10) and mild difficulty when performing most activities of daily living e.g. preparing a meal, washing and dressing.

Conclusion: Wrist arthrodesis is a valuable treatment option, whilst it does not return patients to a pre-diseased state, it does provide pain relief and improve function during activities of daily living.

16:12 Discussion

16:14 A retrospective study of thirty-three patients who underwent a combined procedure of partial wrist denervation and wrist arthroscopic debridement to alleviate chronic wrist pain
Mr G Prasad, Mr J Nicholl (Tunbridge Wells)

Introduction: When intra-articular wrist conditions have been refractory to conservative pain management, partial wrist denervation (anterior and posterior interosseous nerves) has proven to be reliable and effective at relieving pain and preserving motion. In addition to partial denervation, we performed wrist arthroscopy to treat any pathology amenable to arthroscopic treatment, such as unstable flaps, fibrillation of articular cartilage and TFCC tears. It also allowed us to assess the state of the articular surfaces of the wrist and mid-carpal joints for planning of any possible future surgery.

Material and Methods: Following approval by the Clinical Audit Department, thirty-three case notes were reviewed retrospectively. Patient information sheet and questionnaires (Visual Analogue Score and QuickDASH scores) were posted to the study group.

Results: Gender: twenty-two male, 11 female; mean age: 58 years (37–79); mean follow-up: 31 months (8–61). Diagnoses: arthritis (66%), SLAC (16%), SNAC (12.5%), Kienbock's (5.5%). We received twenty-seven responses. The average post-operative VAS was 3.9 (0–8) and QuickDASH score was 34.61 (0–72.73). Thirteen patients felt much better, seven slightly better and no change in four. Three cases felt worse but did not have any further surgery. Of our non-responders, three patients have subsequently had a total wrist arthrodesis for persisting severe pain.

Conclusions: 74% of our patients felt better with minimal residual pain and good functional outcome, such that they have not so far required a more major procedure. We recommend the combined procedure as a safe and minimally invasive treatment option to alleviate chronic wrist pain and preserve wrist motion.

16:19 Discussion

16:21 Capito-lunate fusion as an alternative to classic four corner arthrodesis in the management of the SNAC wrist Professor M Quolquela (Egypt)

Introduction: Scaphoid excision with fusing capitate, lunate, triquetrum and hamate is the standard treatment for scaphoid nonunion and radio-scaphoid joint arthritis, i.e. SNAC wrist. This procedure requires extensive dorsal dissection of the wrist, bone decortication and grafting with hardware bulk for fixation of fusion mass. Long-term follow-up revealed a close correlation between clinical outcome and success or failure of healing of fusion at the capito-lunate joint as it is the main load bearing joint after scaphoid excision. Fusing of the capito-lunate joint alone without bone grafting was suggested as a simpler alternative to four corner fusion.

Patients and Methods: Sixteen patients with SNAC wrist and an average age of 29 years were treated. The average total wrist movement was 50°. Average grip strength was 40% of the normal side. Through dorsal approach, after removal of collapsed scaphoid, the joint between lunate and capitate was decorticated. Double Herbert screws were inserted antegradely across the capito-lunate joint. Splinting for ten days was followed by gentle active wrist movement as tolerated.

Results: The follow up-period was twenty-eight months. Average post-operative total wrist movement was 90°. Grip strength was a mean of 75% of the contralateral side. Healing of fusion site was confirmed radiologically within an average of eleven weeks. The Mayo wrist score improved from a mean of 37 pre-operatively to 78 post-operatively.

Conclusions: Capitolunate fusion is a simple procedure with less hardware and no bone grafting. It is gaining more popularity over the classic four corner fusion technique.

16:26 Discussion

16:28 Ulna shortening osteotomy complications: A departmental experience over a decade Mr M Shakokani, Dr O El-Tayar, Mr T Southern, Mr P Chapman (Norwich)

Introduction: Ulna shortening osteotomy (USO) is carried out to relieve symptoms of ulna impaction syndrome, secondary to positive ulna variance. Complication rates vary widely in the literature, with non-union being particularly undesirable. We have reviewed the results of USO within our department, collating data from over eighty USO, and report rates of complications and changes in technique over a twelve-year period.

Methods: A retrospective analysis of all patients undergoing USO between 2000 and 2012 at a University Hospital was performed. Data gathered included patient demographics, indications for USO, pre-operative MRI scan findings, intra-operative arthroscopy findings, types of fixation used, complications and indications for further surgery. Radiographs were reviewed by two independent observers for time to achieve union.

Results: Eighty-one patients were reviewed, (33 male, 48 female) with an average age of 44. Average time to radiological union was ninety-one days. Average intra-operative shortening was 4mm.

Rate of non-union was of 7.2% and delayed union was 2.4%. The non-union rate decreased to 2.9% once the Stanley jig was used preferentially. 38% of the patients had their plate removed, of those, 74% of removals were due to plate irritation.

Conclusion: To our knowledge this is the largest series in the literature investigating the non-union rate for USO. Our rate of non-union has decreased over the past decade. There is potentially a link with the use of the Stanley jig and a reduction in the non-union rate. We believe that non-union rates may be under reported in the literature.

16:33 Discussion

16:35 A novel device for the in-vivo measurement of distal radio-ulnar joint translation in clinically stable and unstable patient groups

Mr G Pickering, Mr H Nagata, Mr G E B Giddins (Bath)

Aims: Distal radio-ulnar joint (DRUJ) instability is increasingly recognised. Clinical assessment of DRUJ instability can be difficult and subjective. We assessed the use of a new device to measure DRUJ instability in 'normal' and clinically unstable patients.

Methods: Fifty healthy adult volunteers without previous wrist/DRUJ injuries or symptoms were recruited. The jig held the subjects' elbows at 90° flexion with the distal ulna fixed securely. A dorso-palmar shear force was applied at the level of the DRUJ and maximal displacement measured. This was performed with the hand in neutral, ulnar and radial deviation and with the forearm in pronation and supination. Fifty patients with clinical DRUJ instability were also tested using the same device and in the same manner.

Results: Mean age of participants was thirty-one. The mean normal translation in neutral was 5.5mm (SD 1.0). DRUJ translation with the hand held in ulnar (3.7mm) or radial (3.1mm) deviation, as well as with the forearm held in pronation (4.4mm) or supination (4.1mm), was significantly reduced ($p<0.001$). In patients with clinically proven instability the mean translation was increased substantially (mean 14.5mm, $p<0.001$). Again wrist radial and ulnar deviation or forearm pronation or supination reduced but did not abolish the stability.

Conclusions: The device is reliable, reproducible and appears to be a simple valid test of DRUJ translation. DRUJ instability is a physically measurable phenomenon and translation is statistically increased within the clinically unstable group. The jig should prove a useful research tool to measure causes of and treatments for DRUJ instability.

16:40 Discussion

16:42 Characterisation of intraosseous ganglia occurring at the wrist

Dr A George, Mr R Pinder, Mr A Mishra, Mr D Power (Birmingham)

Introduction and Aims: Intraosseous ganglia (IOG) are rare, although they remain the most frequently occurring bone lesion within the wrist. They are often described as an incidental finding on imaging, however, have been known to be a cause of wrist discomfort for patients. We aimed to identify the demographics of patients and characteristics of IOG occurring in a population of patients having undergone MRI of the wrist.

Materials and Methods: A comprehensive search was performed to identify patients having undergone MRI wrist scans since January 2009 where the keyword 'ganglion' or 'ganglion cyst' appeared within the radiological report. Imaging for one hundred and forty-two patients were reviewed, including clinical indications for undertaking the study. We evaluated the demographics of these patients and the radiological characteristics of any IOG identified on imaging.

Results and Statistics: A total of ninety-six IOG of the wrist were identified in 55 patients. See Table 1 for patient demographics and Table 2 for locations of IOG. Sixty-seven were found to be in communication with the joint surface with a mean size of 3.4mm (SD 1.92).

Conclusions and Clinical Reference: To our knowledge, this is the largest series to date evaluating features of IOG within a population of MRI wrist patients. We found a slight female preponderance, with the majority occurring within the third to fifth decades of life. Furthermore, the most common location for IOG was found to be the capitate, followed by lunate and triquetrum bones, with the majority in communication with the joint surface. In the large proportion, MRI was undertaken following trauma and/or persisting pain of the wrist.

Table 1: Patient demographics of patients with identified IOG

Frequency (%)	
Gender	
Male	22 (40)
Female	33 (60)
Age (at time of MRI)	
10–20	1 (2)
21–30	9 (16)
31–40	14 (25)
41–50	18 (33)
51–60	10 (18)
60+	3 (5)

Table 2: Locations of IOG occurring at the wrist

Bone	Frequency (%)
Capitate	29 (30)
Lunate	20 (21)
Triquetrum	15 (16)
Scaphoid	7 (7)
Hamate	5 (5)
Distal radius	5 (5)
1st MC head	5 (5)
Distal ulna	4 (4)
Trapezoid	2 (2)
3rd MC head	2 (2)
Trapezium	1 (1)
2nd MC head	1 (1)

16:47 Discussion

16:49 The natural history of scaphoid non-union

Professor J Compson, Miss I Reichert, Mr M Al-Mukhtar (London)

Scaphoid non-unions behave differently to extra-articular non-unions as there is often significant bone loss, cyst formation, and deformity. A three-dimensional appreciation is essential to predict prognosis and restore the scaphoid to its normal shape. Following previous work on acute scaphoid fracture pattern using radiographs, we now use CT, particularly 3D reconstruction, to plan surgery for scaphoid non-union. This allows us to visualise the pattern of collapse over time.

We performed an analysis of displacement, bone loss, cyst formation, scalloping and midcarpal collapse on one hundred and twenty-two cases of non-union with adequate CT scans and known time between acute fracture and CT since 2008.

We have observed three main types which deform in a predictable fashion:

1. Stable Waist (21)

2. Unstable Waist (62)
3. Proximal Pole (39)

Clinical Relevance:

1. Stable waist fractures wear by gradual loss of length with limited pronation but no flexion of the distal pole and either no or late mid-carpal collapse. They are atrophic, sclerotic or cystic.
2. Unstable waist fractures collapse rapidly with extension of the proximal pole and flexion of the distal pole with pronation. There is scalloping of the distal pole by the volar cortex of the proximal pole, dorsal opening and formation of a dorsal spike. Mid-carpal collapse often occurs within months of non-union.
3. Proximal pole fractures usually maintain fracture alignment. The majority develops cystic non-union apart from those with proximal pole sclerosis or fragmentation. A rare variant is unstable, possibly associated with ligament injury and rapid mid-carpal collapse.

16:54 Discussion

17:00 Close of meeting

- 1 Trapeziectomy excision arthroplasty: A prospective audit comparing outcome with published large series including simple trapeziectomy and trapeziectomy with adjunctive procedures
Mr P Goon, Miss A Brunswicker, Ms S Hibbert, Ms D Larson, Mr A Chojnowski (Norwich)

Introduction: Trapeziectomy excision arthroplasty is a common and well established operation for treating arthrosis of the 1st carpo-metacarpal joint and pan-trapezial arthritis. It can be combined with various adjunctive procedures (such as ligament reconstruction, sling reconstruction, K-wire stabilisation, tendon interposition), but no single procedure has been shown to give a reliably better outcome than standard trapeziectomy. An audit was performed in our unit to monitor the results of simple trapeziectomy on follow-up, compared with other published large series.

Method: Prospective audit of three years for all patients undergoing standard trapeziectomy, with prospective outcome measures. All patients included had confirmed Stage 3 or 4 arthritic changes on X-ray, had full pre-operative assessment, and completed hand therapy and clinic follow-up until discharge.

Results: A total of ninety-two patients were included. The results are comparable to other large series of standard trapeziectomy. Furthermore, comparison with other recent large series of trapeziectomy with adjunctive procedures did not show an appreciable difference in outcome. Patient satisfaction was generally very good, and mirrored by significantly improved QuickDASH scores.

Conclusions: The audit results demonstrate comparable outcome with other similar large studies, including those with adjunctive procedures. We recommend the continued practice of standard trapeziectomy for uncomplicated, advanced 1st CMCJ arthritis in our unit, with an audit cycle of five years.

Outcome measures	Pre-operative	Post-operative	Change
QuickDASH	44.87	24.88	-19.99
Tripod pinch (kg)	3.42	3.54	0.12
Grip strength (kg)	12.43	14.67	2.24
MCPJ extension (cm)	-5.48	-16.4	-10.92
MCPJ flexion (cm)	41.92	33.02	-8.9
IPJ extension (cm)	-11.12	-13.49	-2.37
IPJ flexion (cm)	53.94	55.65	1.71
Palmar abduction	7.36	8.25	0.89
Radial abduction	7.47	8.07	0.6
Kapandji score	7.63	8.7	1.07

- 2 Tissue engineering in hand surgery: Current concepts and challenges
Miss A Ibrahim, Dr E Kloczko, Mr D Nikkhah, Mr A Mosahebi (London)

Background: Hand surgery employs an array of innovative techniques. Whilst progress has been achieved, the use of implants, arthroplasty and tissue transfer still produce variable outcomes. Tissue engineering can potentially regenerate missing subunits of the hand providing an autologous solution to restore architecture and function free of the risks associated with current methods. This comprehensive review presents current evidence for hand tissue engineering and future work.

Methods: A literature search was conducted on MEDLINE/OVID and WEB OF SCIENCE. Studies reporting in vivo and in vitro findings of tissue engineering of bone, tendon, nerve, vessels and skin in hand reconstruction were sought. 2745 papers identified. Forty-eight were included.

Results: Skin substitutes are already clinically available but future work is aimed at creating reliably vascularogenic one-step alternatives for acute use. Engineered bone has been successfully incorporated into clinical application in case reports. Bioengineered tendon is yielding promising in vitro results and in animals. Neurons, glial cells and nerve conduits have been generated in vitro, whilst

whole peripheral nerves successfully reconstructed in primates. Blood vessels using autologous stem cells on a decellularised scaffold have proved functional in animals.

Conclusions: Tissue engineering using autologous stem cells can revolutionise hand reconstruction by providing vascularised tailor-made tissue eliminating risks of extrusion, donor-site morbidity and life-long immunosuppression associated with current synthetic, autologous and transplant options. Future work aims to optimising stem cell sources, differentiation protocols and bioabsorbable scaffolds to produce reliable tissue capable of successfully reconstructing defects and the complex interplay between the subunits of the hand.

- 3 **Synovial osteochondromatosis of the carpometacarpal joint of the thumb: A case report**
Miss R Hill, Mr A Islam, Mr R Swaminathan (Manchester)

Synovial osteochondromatosis is an uncommon metaplasia of the synovial membrane into cartilaginous tissue that usually affects the large joints of males. It rarely affects the wrists and hands. The typical history is of progressive joint pain and swelling. This case illustrates the rare presentation of synovial osteochondromatosis at the carpometacarpal joint of the thumb (CMC).

Only one other case of synovial osteochondromatosis of the CMCJ has been found in the English-language literature: the case, a man in his twenties, was reported in Japan in 2007. Multiple bodies were found at the dorsal aspect of the CMCJ of the thumb. Our case is particularly unusual as it concerns a female, in her seventies and a solitary, large mass. Additionally, we report superficial radial nerve paraesthesia with neuropathic pain as a consequence of the proximity of the mass.

X-ray images are presented, revealing a radio-opaque shadow with well-defined margins at the base of thumb radial to scaphoid, with evidence of osteoarthritis and subluxation of CMC joint. MRI scan images reveal a non-enhancing swelling with signal characteristic of a bone.

Excision biopsy of the lesion under regional block anaesthetic was performed. At post-operative follow-up at eight weeks the altered sensation was resolved, however she remains with mild discomfort at the CMCJ, which is attributed to the underlying osteoarthritis.

This case demonstrates that synovial chondromatosis should be considered as a differential diagnosis in those patients who present with pain and swelling with imaging evidence of ossification in soft tissues.

- 4 **Intra-neural angiomyoma of the median nerve at the wrist**
Miss S S Jing, Mr T Giesen (Chelmsford)

We report an extremely rare finding of an intra-neural angiomyoma of the median nerve in a sixty-three year-old right-hand dominant woman. The patient presented with a two-year history of a slowly growing mass in the palmar aspect of her left wrist. Clinical examination showed a non-pulsatile, tender and firm 3x3cm subcutaneous lesion ulnar to the midline at the distal wrist crease. MRI illustrated a 3x1.5x2.3cm oval lesion arising from the median nerve, suggestive of a nerve sheet tumour. During surgical exploration, a hyper-vascularised encapsulated mass embedded within the median nerve was observed, causing dispersion of the fascicles. A prominent branch of the median artery was noted to be feeding into the mass. The mass was shelled out preserving all fascicles. Post-operative recovery was unremarkable. Histology showed a completely excised leiomyoma with numerous ectatic vascular channels. To our knowledge, only one intra-neural angiomyoma of the median nerve has been previously reported in the literature.

- 5 **Mycobacterium Kanasii flexor tenosynovitis**
Miss S S Jing, Mr F Iwuagwu (Chelmsford)

Atypical mycobacterium infection of the hand is unusual. We report an extreme case of mycobacterium Kanasii flexor tenosynovitis in a sixty-five year-old left-hand dominant Caucasian housewife. The patient presented with a sub-acute flare up of a painless, red and swollen left middle finger. She previously had repeated steroid injections at the local practice with some response. She reported a vague history of childhood pulmonary tuberculosis, but was otherwise of good health.

Clinical examination showed a grossly swollen finger with ulcerated pustules on the palmar aspect. There was no movement at the interphalangeal joints. ESR was mildly raised. MRI elicited marked circumferential soft tissue swelling mainly within the flexor compartment originating from the common flexor tendon sheath with collapsed abscesses. The flexor digitorum profundus was ruptured. There was no evidence of septic arthritis or osteomyelitis or recurring pulmonary tuberculosis. *Mycobacterium Kanasii* was later isolated from tissue biopsy.

This case shows that atypical mycobacterium infections can occur in relatively healthy individuals. It illustrates the importance of careful steroid use. The patient was later diagnosed with vitamin D deficiency, which may have contributed to her relative immune deficiency.

- 6 The use of individualised hand therapy regimes following complex multiple limb injury**
Mrs L Jordan, Mrs T Daniel, Mr M Craigen, Mr D Power, Miss S Beale (Birmingham)

Military trauma patients often present with complex multiple injuries involving both the upper and lower limbs, presenting a challenge to the therapist in terms of the therapy intervention and rehabilitation that is required.

Management of such unique injuries requires engagement of a skilful multidisciplinary team working closely together. Surgical management of the upper limb injuries may combine not only bony fixation, but also tendon and nerve repairs, skin grafting or more complicated flaps. Upper limb surgery is often performed alongside surgical interventions for lower limb injuries.

As experience of this type and pattern of injury management has developed, we recognise that each patient needs an individualised therapy regime. These often deviate from traditional therapy regimes, with the primary aim being return to hand function as soon as possible following definitive management, to allow the soldier return to independent function.

To demonstrate these principles we present a case resulting from an Improvised Explosive Device (IED). The patient sustained bilateral lower limb amputations and multiple upper limb injuries, including multiple digital amputation, hand and wrist fractures and skin loss in both upper limbs, in association with high median and ulnar nerve injuries on the non-dominant limb. We describe the challenges met in protection and rehabilitation of the surgical repairs in the upper limb, whilst facilitating lower limb therapy, and independent transfer from bed to chair.

We will demonstrate the outcome achieved by adapting the therapy regimes and maintaining a flexible, individualised approach to hand rehabilitation.

- 7 Hand therapy challenges in rehabilitation following cage plate fixation of proximal phalangeal joint fracture-dislocations**
Mrs L Jordan, Mrs T Daniel, Miss C Simpson, Mr D Power, Miss S Beale (Birmingham)

The proximal phalangeal joint (PIPJ) fracture-dislocation can be a devastating injury to a digit, resulting in severe functional restrictions. Surgical management of these injuries with open reduction and internal fixation can be fraught with difficulties, but with the recent advancements in fixation device technology, it can represent a reasonable option.

Within this institution, such injuries have been managed with a volarly applied cage plate to reduce and stabilise the fracture-dislocation and facilitate early mobilisation. Hand therapy is directed at regaining optimal range of motion of the PIPJ, whilst providing protection for the delicate fixation. Therapy aims include avoidance of joint contractures, tendinous adhesions and need for late intervention.

We present the series of cases managed in this manner and review the therapy interventions that have been pursued. We discuss the outcomes in terms of range of movements obtained, DASH scores, grip strength, and need for secondary intervention. Radiographic outcomes in terms of joint congruence and early development of degenerative changes will also be highlighted.

We believe that the cage plate is a useful addition to the surgical armamentarium of management of the PIP joint fracture-dislocation, but requires closely monitored input from the hand therapy team to improve the overall outcome and reduce the need for secondary intervention.

- 8 Locked dislocation of the pisiform: A rare complication of a triquetral fracture**
Mr W W Ng, Mr R Pinder, Mr D Power (Birmingham)

The triquetrum is the second most commonly fractured carpal bone and most injuries involve dorsal ligamentous avulsions. Fractures involving the articulation with the pisiform are rare and the evidence suggests that pisiform excision is a satisfactory treatment option for posttraumatic arthritic pain. A soldier was repatriated to the Royal Centre for Defence Medicine after a heavy fall whilst deployed on combat operations overseas, presenting with a locked dislocation of the pisiform following a triquetral fracture through the articular facet. The diagnosis was confirmed on axial computed tomography. The dislocated pisiform was reduced and stabilised with internal fixation of the triquetrum in order to maintain the integrity of the pisotriquetral joint in this young active patient. A good radiographic and functional outcome was achieved. The published literature on pisiform dislocation is limited to isolated pisiform instability. There are no published reports of locked pisiform dislocation. The biomechanics of the pisotriquetral joint, contribution to wrist stability and to power grip will be reviewed.

- 9 Trans-scaphoid perilunate fracture dislocation: Union of an extruded scaphoid proximal pole fragment**
Mr P Goon, Mr A Magan, Mr A Chojnowski (Norwich)

Introduction: An unusual trans-scaphoid perilunate fracture-dislocation is reported, where there was both a volar and a dorsal-dislocation of a free scaphoid proximal pole fragment. The fragment was completely avascular but went on to unite with a good functional result after surgery.

Case Report: A patient sustained a closed trans-scaphoid perilunate dorsal-dislocation of the carpus, with a scaphoid fracture. The proximal pole was dislocated in a volar and proximal direction. Initial treatment included closed manipulation and wrist immobilisation. Repeat X-rays demonstrated unexpected volar to dorsal migration of the proximal pole. At surgery, the extruded fragment was located in subcutaneous tissue, having ruptured through the dorsal capsule, and completely denuded of all soft tissue attachments. Scapholunate (SL) and lunotriquetral (LT) ligament injuries were noted. The fragment was retrieved, reduced and stabilised with a cannulated headless compression screw, supplemented by distal radius bone graft. Two transverse Kirschner wires were placed through the scaphoid to neutralise rotational forces and reduce the scapholunate interval. Soft tissue procedures included dorsal capsule and SL ligament repairs. Follow-up at two years demonstrated good function, with the patient returning to full-time employment as a builder.

Conclusion: This case highlights a rare but serious injury to the wrist, namely a trans-scaphoid perilunate fracture-dislocation with an unusual dislocation pattern not previously described. It also demonstrates that early surgical intervention to fix such serious fractures with an avascular fragment can still achieve fracture union with a favourable outcome, despite the severity.

- 10 Compartment syndrome secondary to group A streptococcus infection in the presence of a congenital haemangioma**
Miss S Karcoff, Miss G Smith (London)

Introduction: Compartment syndrome commonly follows trauma producing muscle necrosis secondary to increased intracompartmental pressure.¹ Emergent fasciotomy is the mainstay of treatment. Non trauma-related compartment syndrome is infrequently described in the paediatric patient, and rarer in the presence of a congenital haemangioma.

Material: We report a case of a healthy fourteen month old boy, fully immunised, with a congenital haemangioma on his left dorsoradial forearm, who presented with toxic shock syndrome and an acute compartment syndrome of the left forearm. The child had no other predisposing causes for a compartment syndrome. Fasciotomies were performed and viable forearm muscles found. Blood cultures and wound biopsies were positive for Beta Hemolytic Group A Streptococci (BHGAS).

Results: The patient was treated with intravenous penicillin and supportive measures on intensive care. The wounds were closed successfully after several days, with split thickness skin grafts, despite persistent growth of BHGAS. The child made a full functional recovery.

Conclusion: The haemangioma may have acted as a “locus minoris resistantiae” for haematogenous spread of the infection. Compartment syndrome due to infection should be considered in the presence of a non-traumatic painful child’s arm and is most likely to be due to BHGAS. Grafting in presence of BHGAS may be successful if being treated by appropriate antibiotics. Early release may save hand function but the need for systemic support via ITU should be considered in advance.

References:

- Trice M, Colwell CW. A historical review of compartment syndrome and Volkmann's ischemic contracture. *Hand Clin* 1998; **16**: 335–341.

11 Bilateral Madelung's deformity in twin sisters: A forty-year follow-up with a comparison of clinical, radiological and genetic findings and treatment
Mr P Goon, Miss A Brunswicker, Mr S Bhagat, Mr P Chapman (Norwich)

Background: A long-term evaluation of twin sisters with bilateral Madelung deformity, comparing clinical course, radiological findings, functional level and genetic investigations.

Case Description: Twin sisters diagnosed with Madelung's deformity of the wrists at an early age, presenting with similar symptoms but undergoing different surgical management. Both patients were continually followed-up for forty years and their clinical course charted, including surgery, complications from surgery and subsequent salvage operations and outcome.

Discussion: As this is a rare and difficult condition to treat, it is important to document its long-term clinical course, including its presentation, functional limitations, treatment and genetics. The description in twin sisters allows a more objective comparison of all aspects of the condition. The aetiology, radiological changes (Table 1) and current concepts of treatment are reviewed together with salvage options. In particular, the salvage options post-Darrach's procedure is covered. This report also documents the long-term surgical outcomes (Table 2).

Table 1: Radiological features at the time of presentation for surgery

Radiological features	Twin 1		Twin 2	
	Left	Right	Left	Right
Increased dorsal and radial convexity of distal radius	Yes	Yes	Yes	Yes
Decreased length of radius	Yes	Yes	Yes	Yes
Dorsal subluxation of distal ulna	Yes	No	Yes	No
Pyramiding of carpal bones	Yes	No	No	No
Wide interosseous space between radius and ulna	Yes	Yes	Yes	Yes
Increased palmar and ulnar tilt of distal radius articular surface	Yes	Yes (Mild)	Yes	Yes (Mild)
Localised area of lucency	No	No	Yes (Ulnar)	Yes (Ulnar)
Radial head subluxation/osteophytes	Yes	No	Yes	No
Radial-carpal/DRUJ arthritis	No	No	Yes	Yes

Table 2: Similarities and differences in clinical features.

Features	Twin 1	Twin 2
Height	165cm	165cm
Age at 1st presentation	27 years	33 years
Length of follow-up	37 years	43 years
Hand dominance	Right	Right
No. of procedures	2	1
Occupation	None	Domestic cleaner
Forearm length: Right/Left	68.5/63.5 cm	71.1/63.5 cm
Procedure type (Left) Darrach's procedure	[1977] (Left) Radio-ulnar synostosis	[2005] (Left) DRUJ arthrodesis
QuickDASH at final follow-up (0=no disability, 12=normal)	9.09/100	18.18/100
Wrist Active ROM (degree): Flexion/Extension Supination/Pronation Radial/Ulnar deviation	Right 70/60 Left 34/64 34/20 10/20	Right 80/60 Left 58/62 68/60 18/22
Grip strength (kg)	22 / 14	14 / 10
Genetics	No deletion of SHOX	No deletion of SHOX

- 12 A case of chronic osteomyelitis of the metacarpal bone caused by pseudomonas aeruginosa**
 Miss A Brunswick, Mr P Goon, Mr S Baghat, Mr P Chapman (Norwich)

Introduction: Chronic osteomyelitis of the metacarpals is a rare condition and only two cases have been reported so far in both of which no causative organism could be identified. Amongst all cases of osteomyelitis, gram-negative osteomyelitis affects the tubular bones of the hand in only 6%.

Case: We present a patient who presented with chronic osteomyelitis of the third metacarpal bone ten years after his first episode of osteomyelitis. In his case, there was no evidence of direct trauma, but the patient was treated for a tibia fracture with an external fixator complicated by pin site infection, two years prior to his first episode of osteomyelitis. The diagnosis of chronic osteomyelitis was confirmed by MR imaging, which showed signal changes within the distal metaphysis of the right third metacarpal bone. Exploration, biopsy, and thorough curettage were undertaken. Surgical histology showed fibrosis and chronic inflammation corroborative of the diagnosis of chronic osteomyelitis. Cultures grew *pseudomonas aeruginosa*. The patient received a course of a quinolone antibiotic according to the sensitivity profile. At his four-week follow-up, the patient was symptom free.

Discussion: The case reported is unusual in that osteomyelitis caused by *pseudomonas aeruginosa*, a gram-negative organism, occurred as long as a decade after the first episode of osteomyelitis. Prompt surgical curettage and targeted antibiotic therapy guided by resistogram successfully controlled this case of chronic osteomyelitis.

- 13 Chronic compartment syndrome affecting a sedentary office worker: An unusual presentation of the condition**
 Miss N Patel, Mr A Lahiri (Birmingham)

Chronic compartment syndrome of the forearms is not common and the majority of reported cases are in athletes or those with exertional vocations.

We present a case of bilateral forearm compartment syndrome in a middle aged female office worker. Her work did not involve many repetitive movements and she denied any active or labour intensive activities. The patient presented with ill-defined pain over both forearms for an extended period of time. Following multiple investigations, nerve compression was excluded as a cause, and referral to various specialties, in addition to a course of physiotherapy, did not provide diagnosis nor relief of symptoms. A diagnosis of chronic compartment syndrome was made by

exclusion, and the patient was offered surgical decompression of the flexor compartment using a closed fasciotomy technique. There was immediate relief of symptoms and the patient requested subsequent surgery to the contralateral arm. There were no complications or recurrence of symptoms post-operatively.

We present an unusual case of chronic compartment syndrome and a patient with a sedentary lifestyle and maintain surgical decompression as an effective treatment option. Despite the condition commonly affecting those with a more active lifestyle or athletic patients, a diagnosis should still be considered in those with similar symptoms, as a diagnosis of exclusion.

14 The rehabilitation of the UK's first vascularised composite allograft of the hand

Miss F Adams, Professor S P J Kay, Miss S Taplin, Mr D Wilks, Dr B Clark, Dr R Baker, Miss C Herton, Mr D Thornton, Miss G Bourke, Mr S L Knight, Dr M Bellew, Mrs J Burdan, Mrs M Shortland, Miss M Everitt (Leeds)

Introduction: Hand and upper limb (HAUL) transplantation is becoming an accepted method for reconstruction of the upper limb that is absent or devoid of function. The UK's first HAUL transplant was performed in December 2012. Here we report the process of rehabilitation and outcomes at six months following surgery.

Methods: We describe, using a single case study, the physiotherapy and occupational therapy regimens and treatment principles. We highlight unexpected variances between standard protocols used following replantation.

Results: The poster will demonstrate an overview of the rehabilitation techniques and splint management used in the treatment of this patient. The early outcomes achieved with regards to movement, sensation and function will also be demonstrated. Therapy is performed for three hours, twice per week as an outpatient. Rehabilitation broadly follows established protocols of upper limb replantation. A modified early active motion protocol is used. Modification takes account of delayed tissue healing in the presence of high dose immunosuppression. Additional emphasis is placed on oedema control with compression garments.

Conclusion: With modifications to standard therapy protocols, excellent functional results can be achieved following HAUL transplantation. Sensory and motor recovery is seen earlier than would be expected following replantation.

15 Exercise induced ulna nerve neuropathy: A rare case of an abductor digiti minimi variant causing compression

Mr D Murray, Mr S Royle (Manchester)

We present a case of a sixteen year old female, who complained of paraesthesia to the ulna digits, associated with swimming.

The subject gave a six-month history of symptoms initiated by periods of prolonged training. Examination revealed no obvious muscle wasting to the intrinsic muscles or hypothenar eminence. Sensation to the autonomous zone of the ulna nerve was normal to light touch, pain, and vibration. No previous trauma had been described and a radiographic tunnel view of the carpus revealed no bony abnormality. An MR scan did not show any obvious pathology around Guyon's canal and nerve conduction studies were normal. An ultrasound scan (USS) was performed to investigate the symptoms dynamically. USS demonstrated an accessory abductor digiti minimi (ADM) overlying the ulna nerve at Guyon's canal. Explorative surgery was performed and was consistent with the USS findings. The accessory slip of ADM was excised.

The subject made a good recovery with complete resolution of symptoms when swimming within four weeks. Intra-operative photographic images and illustrations accompany this case report.

This phenomenon is rare with few reported cases in the literature. As to our knowledge there are no reported cases describing symptoms being initiated with exercise.

- 16 **Post-traumatic avascular necrosis of the pisiform bone**
Mr D Murray, Dr S Moeinoddini, Mr L Jacobs (Manchester)

Avascular necrosis (AVN) of the pisiform is rare, with only two previously published reports. The pisiform receives a rich blood supply from surrounding vessels, hence AVN is uncommon. We report a case of AVN of the pisiform following trauma. Radiographic images form part of this case report, however are not attached with this abstract.

A sixty-one year old female presented with ulna sided wrist pain, following a hyperextension injury five days prior. AP and lateral X-rays of the wrist showed widening of the scapholunate junction, suggestive of ligament dissociation.

The subject was reviewed in clinic at one week. Further history revealed previous injury at age sixteen, described as a fall to an outstretched hand. The subject described “generalised weakness and occasional pain” since.

AVN of the pisiform was suggested on review of the X-rays by the senior author. X-rays showed sclerosis and collapse of the pisiform. A magnetic resonance imaging (MRI) scan showed fragmentation of the pisiform bone with areas of low signal, suggestive of osteonecrosis, with associated synovitis and arthritis of pisotriquetral articulation. The MRI report suggested an old fracture of the pisiform leading to chronic AVN.

AVN was discovered as an incidental finding, and pisotriquetral arthritis was most probably the cause of chronic wrist pain. We suggest pisotriquetral osteoarthritis, as a result of AVN of the pisiform, may have a higher incidence than reported due to under investigation and should form part of a differential diagnosis in chronic ulna sided wrist pain.

- 17 **Acute osteomyelitis of the capitate presenting with compartment syndrome in the hand: Case report and review of the literature**
Dr T Kenney, Mr R MacFarlane, Dr N Mehta, Mr M De Matas, Mr D Brown (Liverpool)

Introduction: Osteomyelitis affecting the carpus is rare in adults, and has not previously been reported in the capitate. OM affecting the wrist typically presents with diffuse pain and swelling, and is treated with antibiotics and surgical debridement and washout. We describe a case of OM affecting the capitate presenting with acute compartment syndrome of the hand.

Case Report: A forty-five year old man attended the emergency department at our institution with severe pain and swelling of the hand and wrist. Raised inflammatory markers and magnetic resonance imaging demonstrated acute OM of the capitate. Due to increasing pain and poor response to analgesia, decompression of all compartments of the hand was performed. Blood cultures revealed *Staphylococcus Aureus* as the causative organism. Treatment with intravenous antibiotics for six weeks was commenced and the patient underwent six months of hand therapy. At final follow-up (two years) the range of palmar flexion was 40°, extension 20°, supination 70°, pronation 80°. QuickDASH score 0. Radiographic follow-up revealed no persisting radiological evidence of infection.

Discussion: To our knowledge, this is the only case of OM affecting the capitate in the literature and the only case of acute wrist infection presenting with compartment syndrome in the hand. Prompt diagnosis with appropriate imaging and biochemistry, early surgical intervention, a full course of antibiotic therapy, and a full programme of hand therapy are likely to be the key contributing factors to a good outcome in this case.

- 18 **A systematic review of methods used to report range of movement as an outcome measure for Dupuytren's disease**
Mrs C Ball, Ms A Pratt (Oxford)

Introduction: In a recent systematic review (Ball et al 2013) Range of Motion (ROM) was the most frequently used outcome measure used to evaluate treatment for DD but the lack of consensus of

ROM reporting precludes comparison between studies. This study identifies the methods used to assess improvement in ROM following treatment of DD.

Methods: A literature search was performed (May 2013) for all publications describing surgical treatment, percutaneous needle aponeurotomy or collagenase injection for primary or recurrent Dupuytren's disease in the last twenty years where outcomes had been monitored using ROM.

Results: One hundred and three studies reported outcomes using ROM. However, the methods of recording were diverse, with twenty-one different descriptors. In order of frequency, measurement of flexion contracture ($n=26$) and joint extension deficit ($n=19$) were most commonly used. Tubiana grading systems ($n=18$) and passive joint contracture/extension deficit ($n=16$) were also widely utilised. Sixteen other methods were used in 45 studies.

Conclusion: The reporting of ROM in one hundred and three studies was inconsistent, making comparison between publications difficult. Future studies should clearly describe the method used to ensure reproducibility due to the lack of a standardised measurement protocols. ROM measurements should be transparent, reporting both active flexion and active extension of individual joints, pre and post-treatment, to detect change and reflect function. Additional measures may be useful to supplement data in order to describe pre-operative severity and provide context.

19 Five-year outcomes and associated factors following Dupuytren's disease surgery: A multi-centre retrospective cohort study in the UK

Mr J Rodrigues, Dr W Zhang, Professor B E Scammell, Miss S Fullilove,
Mr I Chakrabarti, Mr P Russell, Mrs D Davidson, Professor T R C Davis (Derby/
Livingston/Nottingham/Plymouth/Rotherham)

Introduction: Reported recurrence after Dupuytren's surgery varies widely, due to inconsistent definition and follow-up length. Additionally, 'recurrence' does not describe other patient-centred outcomes such as hand function. Only a few studies have analysed factors influencing recurrence. None have investigated influences on functional outcome. This project investigated outcome at strict one-year and five-year endpoints, and analysed factors associated with poor outcome.

Methods: Patients receiving aponeurotomy, fasciectomy and dermofasciectomy at five UK centres were invited to participate retrospectively. A single observer assessed those who provided written consent in local clinics at one or five years after surgery. Demographics, clinical examination and DASH were recorded. Hierarchical binary logistic regression analysis was used to control confounding factors.

Results: Four hundred and thirty-three procedures were studied. Re-operation rate was not different between procedures for one-year post-operative patients ($p=0.363$, Chi-square test), but was significantly higher after aponeurotomy in the five-year group (30% versus 7% after fasciectomy versus 0% after dermofasciectomy, $p=0.002$). Poor functional outcome (defined as DASH >15 , in keeping with DASH Manual guidance) was not significantly different between aponeurotomy, fasciectomy and dermofasciectomy at one or five years, even controlling for re-operation rate and other differences between cohorts. Diabetics, women and those undergoing revision surgery all had significantly higher odds of poor functional outcome (odds ratios of poor outcome were 3, 6 and 2.5 respectively).

Conclusions: Whilst needle aponeurotomy has a higher five-year re-operation rate, it may achieve comparable functional outcome to fasciectomy and dermofasciectomy. The variables associated with poor outcome here differed from traditional diathesis factors associated with 'recurrence'.

20 Have we missed the boat to conduct an RCT looking at limited fasciectomy versus Xiapex® injection for the treatment of Dupuytren's in the UK?

Mr R Pinder, Mr M Brewster (Birmingham)

Aim: We aimed to discover the current usage of Xiapex® amongst UK surgeons, their views on its effectiveness, whether they felt there was a need for a RCT comparing it to limited fasciectomy (LF) and whether they would participate in it.

Methods: In June 2013 we survey BSSH members. Eighty-nine full members replied and the anonymous survey results were analysed.

Results: 60% currently use Xiapex®. 57% were happy with the results of Xiapex®, however 96% of those who actually used it were happy with their results. 84% felt there was a need for an RCT. 28% who use the injection and 39% who don't currently use the injection would have an ethical issues entering their patients into an RCT comparing it with LF. 82% said they would take part in an RCT; however, many wanted to include a comparison with PNF and felt recruitment may be difficult with the increased publicity and awareness of Xiapex®.

Conclusion: The use of Xiapex® is becoming common-place in the UK and the NHS. The majority of surgeons using the product are happy with their results although many without experience of Xiapex® are still sceptical as to its effectiveness. Surgeons would like to see a RCT comparing Xiapex® to LF; however, a number would have ethical issues involving their patients in the trial. There is also a feeling that trial recruitment would be difficult due to the growing awareness of the injection amongst patients and a comparison with PNF may be more acceptable and meaningful.

21 A comparison of outcomes of surgical versus conservatively managed bony mallet finger injuries

Miss S Eltz, Mr S Fazal, Mr C Record, Miss K Wallis, Mr A Fleming, Mr J Colville (London)

Introduction and Aims: Surgical management of bony mallet fractures involving more than one third of the articular surface or with palmar subluxation is currently accepted practice. This study compares outcomes of surgical versus conservatively managed bony mallet finger injuries.

Methods: Data was collected retrospectively for twenty-five patients with bony mallet injuries with greater than one third of the articular surface involved or with palmar subluxation. The bony mallets were classified according to Wehbe and Schneider's classification. Outcomes were measured according to the Crawford Classification, extensor lag, loss of flexion and residual pain.

Results: Fifteen patients were managed conservatively with a dorsal gutter splint and ten patients with K-wire stabilisation. Mean follow-up times were 131 and 61 days respectively. The conservative group consisted of twelve (80%) IB injuries, one (7%) IC and two (13%) patients with palmar subluxation. The surgical group consisted of five (50%) IB, two (20%) IC and three (30%) IIA, IIB or IIC. Conservatively managed patients (15) yielded the following outcomes: six excellent (40%), two good (13%), six fair (40%) and one poor (7%). Surgically managed patients (10) yielded: one excellent (11%), one good (11%), seven fair (67%), one poor (11%). Mean extensor lags for conservative treatment (four cases) versus surgery (seven cases) were 1.5 versus 5.2 respectively. No significant difference in pain was recorded.

Conclusions: This study suggests that the outcome for surgical management in bony mallet injuries affecting more than one third of the articular surface or subluxation does not show good results when compared to conservative management.

22 Rehabilitation following surgical fixation of proximal phalanx fractures: Evaluation of the BHC protocol

Mrs L Jordan, Mrs T Daniel, Miss S Beale, Mrs S Mahroof, Miss C Simpson, Mr R Jose (Birmingham)

Introduction: There is no consensus in literature about the management of proximal phalanx fractures. Treatment options range from conservative treatment in plaster to open reduction/internal fixation.

Open fixation provides anatomical reduction of fractures and allows early mobilisation, but has been criticised for the risk of developing tendon adhesions and subsequent tenolysis. Our unit has been performing open reduction and internal fixation for proximal phalanx fracture for more than a decade. An audit of our results found that the problems with this method were mainly tendon adhesions and PIP joint contractures.

Based on this audit we have developed a rehabilitation regime for these patients - the BHC (Birmingham Hand Centre) protocol. This study has prospectively assessed the outcome of surgically managed proximal phalangeal fractures treated using this protocol in terms of range of movements and tenolysis rates. This is a currently ongoing audit project in our unit and the preliminary results will be presented, based on the first twenty five cases.

Results: Twenty five fractures of proximal phalanges were included in the study. All these cases were treated with open reduction/internal fixation using lag screws or plate and screws. Data were collected using pre-tested proforma and included details of surgery, follow-up details and outcomes at six weeks and three months.

Conclusion: Open reduction/internal fixation of proximal phalanges provides good anatomical reduction and enables early mobilisation. The risk of tendon adhesions and PIP joint contractures can be reduced using the protocol used in our unit.

23 A review of rehabilitation following proximal phalangeal fracture fixation management: Impetus for a change

Mrs L Jordan, Mrs T Daniel, Miss S Beale, Miss C Simpson, Mrs S Mahroof, Mr R Jose (Birmingham)

Background: This audit was undertaken following awareness of high rates of removal of metal work, tenolysis and management of patients undergoing proximal phalanx fractures. Therapists identified requirements for a unilateral regime and approach in treating these injuries.

Introduction: This audit was to evaluate and review the surgical strategies, outcomes and therapy regimes described for proximal phalanx fixations at the Birmingham Hand Centre. A total of thirty-one patients over a 6/12 period were identified as undergoing open reduction internal fixation of the proximal phalanx (ORIF). Operative approaches were longitudinal, interval between central slip and lateral band, chamay and volar brunner. Patients were seen by therapist post-operatively and it was identified that there were varied requests for post-operative splintage and mobilisation. This included time seen from surgery, mobilised or immobilised, splinted or non-splinted and duration of splintage.

Methodology: Patients were identified for audit through the following methods: theatre books, case note and therapy note review.

Results: Thirty-one patients, 32 fractures proximal phalanx were identified, fracture site distal three patients, midshaft fracture 17 patients, proximal fracture 11, closed fractures 28 patients, open fractures three patients. On average, the time from injury to surgery was 10.2 days, the time from surgery to therapy was 7.5 days. The results were collated using TAM score with a total of twelve patients with goniometric measurements. All patients with documented PIP joint measurements had extensor lag, ranging from -2° to -30°. Complications and possible reasons for further surgery tenolysis were recorded.

24 Combined high median and ulnar nerve injuries - An approach to therapy management in an unusual case

Mrs L Jordan, Miss S Beale, Mrs T Daniel, Miss C Simpson, Mr D Power (Birmingham)

It is clinically recognised that a combined peripheral nerve injury to the upper limb, involving the median and ulnar nerve, results in functional limitations due to lack of innervation of both the extrinsic and intrinsic muscles of the hand. Principles for hand therapy in these cases aim to preserve the function that exists in the hand, using a range of techniques, while anticipating the potential need for surgical intervention should nerve recovery not occur.

To illustrate these principles, we present a case of a patient who sustained a shrapnel injury to his right dominant upper limb in March 2011. At presentation no innervation of either extrinsic flexors or intrinsic muscles of the hand was demonstrated. Progressive recovery in some of the median nerve innervated muscles was initially seen, and nerve recovery was merely monitored by observation, whilst hand rehabilitation aims were pursued.

Once it became apparent that the ulnar nerve recovery was limited, surgical intervention became necessary to improve the intrinsic function of the hand. We highlight the need to maintain a close working relationship between therapist and surgeon in the best interests of the patient. The patient's progress and therapy requirements, both pre and post-operatively, will be discussed. We also offer a short review of the available management strategies in such combined injuries.

25 Excision arthroplasty for management of recent comminuted intra-articular distal humeral fracture

Professor M Quolquela (Egypt)

Introduction: Fragments of comminuted intra-articular distal humeral fracture are difficult to fix, as they are small and covered with cartilage. They may not heal, ending up as loose bodies with joint locking and later osteoarthritis. Fixation of these fragments precludes early joint mobility with risk of stiffness. Removal of such fragments and fixing both humeral columns was suggested to avoid these problems. Stability was supposed to be offered by intact olecranon posteriorly, coronoid and brachialis muscle anteriorly and intact trochlear ridges and collateral ligaments on both sides.

Patients and Methods: Fourteen Patients with an average age of 29 years with comminuted intra-articular distal humeral fracture were treated surgically. Through posterior midline skin incision and trans-olecranon approach, both columns were reduced and fixed with 3.5 mm reconstruction plates. Extensive trochlear comminution pushed us to remove these fragments. Post-operative splinting was continued for a couple of days, followed by gentle passive then active movements as progressively tolerated.

Results: The average follow-up period was forty-two months. Fractures healed within an average of fifteen weeks. Average total flexion/extension arc of the elbow was 102°. Average hand power grip was 71% of the contra-lateral side. Strength of elbow extension against resistance was grade three on average. All elbows were reasonably stable to varus and valgus stresses. Mayo elbow performance score had an average of 76 points (range 60 to 91).

Conclusions: Excision of comminuted trochlear fragments in the presence of intact trochlear ridges with rigid medial and lateral column fracture fixation yield satisfactory clinical results.

26 Reliability of occupational therapy students using the figure-of-eight technique of measuring hand volume

Dr M Nadar, Miss D Al-Kandari, Dr M Taaqi (Kuwait)

Objective and Background: The figure-of-eight technique is a measure for hand volume that has been validated among experienced American clinicians and physical therapy students, but not Middle Eastern occupational therapy students. The purpose of this study was to assess the intrarater and interrater reliability, and concurrent validity, of the figure-of-eight technique of measuring hand volume by fourth year (of a five year curriculum) occupational therapy students.

Methods: The study employed a cross-sectional design of a single-group with three level repeated measures of five raters. Twenty-three healthy students participated in this study. Five raters (fourth year occupational therapy students) performed three separate blinded figure-of-eight measurements of hand volume for each hand. Two independent examiners performed one volumetric measurement for each hand by using a water volumeter. Intrarater and interrater correlation coefficients (ICC) were used to examine reliability of figure-of-eight measurements. Pearson product moment correlation coefficient was used to establish concurrent validity relative to the gold standard of the volumeter.

Results: Intrarater reliability (ICC, 3k) ranged from 0.98 to 0.99. The interrater reliability (ICC, 2k) was 0.99. The Pearson correlation coefficient for the concurrent validity was $r = 0.929$ ($p < 0.001$).

Conclusion: This study demonstrated that five occupational therapy students in the fourth year of a five-year curriculum were reliable raters for hand volume when using the figure-of-eight tech-

nique, after being trained and tested for competency. The students can use the figure-of-eight technique for systematically assessing hand volume with confidence in their clinical field work.

- 27 Combined transfer of the medial triceps branch to the infraspinatus branch of the suprascapular nerve and the axillary nerve for restoration of shoulder abduction and external rotation in upper brachial plexus palsy: A cadaveric study**
Mr A Mishra, Mr M Khalid, Mr D Power (Birmingham)

Introduction: Complete injury to the C5/6 roots of the brachial plexus results in loss of shoulder abduction, shoulder external rotation and elbow flexion. Nerve transfer surgery provides more reliable reinnervation. The aim of this cadaveric study is to explore the option of separate targeted reinnervation of the infraspinatus branch of the suprascapular nerve through a direct nerve transfer from the medial triceps branch of the radial nerve.

Methods: Six fresh frozen cadavers were dissected to identify the anatomy of the medial triceps branch, the axillary nerve and the suprascapular nerve and nerve to infraspinatus.

Results: The nerve to infraspinatus is reliably found deep to the infraspinatus proximal muscle belly, 1cm lateral to the end of the junction between the scapula spine and blade. Attempts were made to mobilise the infraspinatus branch and to deliver this distally between infraspinatus and teres minor after neurotom. The nerve was delivered superior to the infraspinatus and length of recipient pedicle was recorded. The medial triceps branch was mobilised to allow coaption of one donor branch to the main axillary nerve and a second to the infraspinatus branch. The transfers are completed without tension for a full range of shoulder motion.

Conclusion: Combined transfer of the medial triceps branches to the axillary nerve and the infraspinatus branch of the suprascapular nerve is technically possible without interposition nerve grafts. Clinical evaluation of this technique is needed to assess for improved shoulder external rotation in the abducted shoulder.

- 28 Nerve injuries following interscalene brachial plexus block - A case series**
Miss Z Lin, Mr A Mishra, Mr R Pinder, Mr S Tan, Mr D Power (Birmingham)

Introduction: Peri-operative nerve injuries cause significant debility to patients. The incidence can be reduced with greater awareness among anaesthetists, and with its prompt recognition.

Methodology: Case series reviewing four patients referred to the Peripheral Nerve Injury Clinic (PNIC) of our Trauma and Orthopaedics Department between 2012 and 2013, for peri-operative nerve injuries following shoulder surgery.

Results: 75% of patients are males; mean age was fifty (range 21–87 years). Mean time from surgery to presentation at PNIC was twenty-one weeks (range 4–37 weeks). Presentation involved the upper limb and proximally to the neck. Three patients had sensory symptoms (including paraesthesia, neuropathic pain, hyperaesthesia, numbness), all had motor symptoms (including weakness, muscle wasting, change in posture), three had positive Tinel's test, none had autonomic changes. Three patients underwent electromyography tests, all positive for nerve injury and muscle re-innervation. All underwent shoulder surgery, 75% arthroscopic, 25% open. All had general anaesthesia with brachial plexus regional anaesthesia (RA), 75% specified as interscalene blocks. During RA administration, mean anaesthesia volume was 24ml (Range 10–40ml); two patients were awake, one sedated; 75% used neurostimulator, 50% used ultrasound; anatomical approach was unspecified. Eventually, one patient underwent surgical intervention, three patients recovered spontaneously.

Conclusion: In our review, patients were referred later than the ideal two weeks after RA, despite complaints of sensory and motor changes. Documentation of RA technique could be improved and standardised with these parameters: type of RA, anatomical approach, method of nerve localisation used, consciousness of patient, components and volume of anaesthetic used.

- 29 **Accuracy of clinical assessment in intra-articular positioning for injections of the joints of the hand and wrist**
 Mr A Hunter, Mr T Sinnett, Miss A Davy, Miss E Taylor (London)

Introduction: Intra-articular injections are routinely performed for painful joints of the hand and wrist. We aimed to determine the accuracy of clinical assessment of intra-articular positioning for a range of injections.

Methods: Data was collected prospectively over a three month period. All injections were undertaken in the operating theatre. In each case, the needle was placed into the position clinically assessed to be the joint. Accuracy of needle placement was then assessed with fluoroscopy using orthogonal views. If an intra-articular position had not been achieved clinically then fluoroscopy was further used to aid positioning.

Results: Twenty-five injections on 19 patients were performed (M=6, F=13) with a mean age of 60 years.

Joint	Number Injected	Successful localisation by clinical assessment (%)
Ulno-carpal Joint	2	50
Thumb Carpometacarpal Joint (CMCJ)	9	56
5th Carpometacarpal Joint	2	0
Metacarpophalangeal Joint (MCPJ)	3	67
Interphalangeal Joint	7	0
Scapho-trapezio-trapezoidal Joint	2	0

In all cases where clinical intra-articular positioning failed, subsequent positioning by use of fluoroscopy was successful.

Conclusions: This is the first study examining the accuracy of clinical assessment of intra-articular position for a range of joint injections in the hand and wrist. Accuracy of clinical assessment was limited in all joints, although it was higher in the larger joints (thumb CMCJ and MCPJ and the ulno-carpal joint) than in the smaller joints of the phalanges and wrist. The use of fluoroscopy is therefore recommended for reliably accurate needle placement for these intra-articular injections, particularly in the smaller joints of the hand and wrist.

- 30 **What evidence is there to support the use of splints with paediatric patients?**
 Mrs L Pitcher, Mrs L Girvan (Wirral)

Background: In the Hand Occupational Therapy Department at Arrowe Park Hospital, there are an increasing amount of referrals received from paediatric therapists, requesting splint assessments to address issues with positioning and function. To assist in clinical decision making, a review of existing evidence was needed to ascertain the effectiveness of upper limb splinting in paediatric patients.

Aim: To establish whether there is any quality evidence to support the use of orthotics for the upper limb with paediatric patients.

Methods: A comprehensive identification of all the relevant literature was completed, and critical appraisal tools were used for rigorous evaluation. Specific databases were used to identify the key words for the evidence search. Inclusion and exclusion criteria were established. The value of various study designs were identified using the hierarchy of evidence. The methodologies of the studies were assessed and common themes were extracted and their value critiqued.

Results: The prevalence of study designs was established and the outcome measures used in each study were listed along with the different standardised assessment tools. The studies were found to be predominantly of poor quality, having low validity and reliability. Findings were therefore considered anecdotal, although displayed for interest's sake.

Conclusion: Insufficient quality evidence was available to support the use of orthotics for the upper limb with paediatric patients and to support clinical decision making regarding use of orthotics. Clinical decisions are therefore made using experience, knowledge and skills as there is no identified evidence base and further research is required.

31 What is the evidence to support the use of acupuncture in the management of post-operative pain in adults following hand surgery?

Miss S Thomson (Swansea)

Introduction: Surgical procedures exist to address pain and reduced function of the arthritic hand when conservative methods have failed. Post-operative pain can significantly reduce recovery and increase health costs. Many modalities exist to address pain, including analgesia and electrotherapy. Evidence exists to support that acupuncture is cost-effective, has few contraindications and is used in post-operative pain management of most peripheral joints osteoarthritis.

Methodology: A critical appraisal tool was used to evaluate the evidence for acupuncture in pain management of patients undergoing peripheral joint surgery for osteoarthritis, and apply to the question: ‘What is the evidence to support the use of acupuncture in the management of post-operative pain in adults following hand surgery?’ Four papers were identified as meeting the criteria and were critically appraised.

Conclusions: The literature suggests:

- a) Acupuncture was cost effective
- b) Acupuncture significantly reduced analgesia required post-operatively
- c) Acupuncture was weakened if anaesthesia was administered beforehand
- d) Eight or more acupuncture sessions applied over a period of time post-operatively can help alleviate pain and stiffness
- e) Choice of acupoints may have reduced the acupuncture effect due to risk of infection. Only one study was identified on acupuncture for hand arthritis and did not identify the acupoints used.

Although there is little evidence to support the use of acupuncture in the management of post-operative pain in adults following hand surgery, some of the evidence could be replicated in management of pain following hand surgery osteoarthritis. However, further research into the efficacy of acupuncture in the treatment of hand pain is warranted.

32 The hand trauma co-ordinator effect - One year on

Miss A Aretaki, Miss J Hocking, Miss K Owers (London)

Introduction and Aims: A hand trauma co-ordinator (HTC) is essential to running an efficient day-case hand trauma service. In September 2011, inspired by the Birmingham experience, we introduced a HTC post into our Hand Unit. We present the impact this role has had on our service.

Materials and Methods: We compared data for one year prior to and one year following the HTC appointment date. The Student's T-test for paired samples was used to check for differences.

Results and Statistics: There was a statistically highly significant increase in the monthly income ($p<0.001$) and numbers of patients treated ($p=0.001$), pre and post the HTC appointment date. The mean increase in income was £38,110 per month and an average of twelve extra patients were treated each month. Differences in sessions used, procedure time, active time, late starts, early finishes, turnaround time in theatre all were not statistically significant.

As well as these quantitative measures the employment of a HTC has led to a more efficiently delivered service, as they have an overview of the whole service, which allows for optimal utilisation of theatre time and surgical skills, continuity of care, crisis management and patient support, both pre and post-operatively. Finally, the HTC also manages the hand trauma clinics, gathers data for audit purposes and relieves junior doctors from some administrative duties.

Conclusions and Clinical Reference: In conclusion, we believe that the HTC role has improved our hand trauma service delivery in numerous ways and is also cost effective.

33 Improving outcomes following peripheral nerve injury: National standards, education and training

Mr A Mishra, Dr R Chawla, Major M Foster, Mr D Power (Birmingham)

Introduction: The NHS Commissioning Board undertook a review of orthopaedic services in 2013. It has assigned brachial plexus and peripheral injury specialist status, defined as rare, complex and tertiary referral surgery to be undertaken only in specialist centres with the aim of driving up national standards. All those involved in the delivery of trauma services must be able to diagnose nerve injuries, identify those that need referral to a specialist and facilitate prompt and appropriate specialist care. The BOA published guidance on the management of peripheral nerve in July 2011 as part of the standards for trauma series. We conducted a survey of orthopaedic trainees to evaluate the awareness and also to disseminate these audit standards.

Methods: A survey of orthopaedic trainees in the West Midlands was conducted to establish trainee awareness of published standards, diagnostic and management pathways in common clinical scenarios, timing and location of specialist referral. Directed training in national standards of nerve injury management improved trainee performance when assessed.

Results: None of the trainees were aware of these specific standards on peripheral nerve injuries. 60% were aware of the local referral pathways for these injuries. Clinical assessment skills were poor but there was a trend towards higher standards with more senior trainees. Trainee performance improved significantly with directed teaching on peripheral nerve injury management.

Conclusion: Improving standards in peripheral nerve surgery requires improved uptake of national best practice guidance and targeted training in the management of peripheral nerve injuries.

34 Hand infection surgical workload in a Level 1 trauma centre

Mr C Hoare, Dr P DeBarr, Mrs L Leonard, Mr C Williams (Wrightington)

Introduction: Hand infections are common and can often be treated on an outpatient basis. There is, however, very little data on the surgical burden to the NHS. The surgical workload and resources in a Level 1 trauma centre are discussed.

Methods: The electronic operative records for all trauma cases were reviewed for twelve months from February 2011 to January 2012. All hand surgery operations for infection were identified. The number of operations, length of stay, patient age and infection type were noted.

Results: There were ninety-nine operations for infection in 58 patients in a total of 852 hand trauma cases. The average number of operations was 1.7 (range 1 - 8). A total of four hundred and five bed days was required in 50 patients (average 8.1, range 0 - 119). There were fifty-four adults and four children. Eight cases were post-operative infections (seven trauma and one elective) and six of these were open injuries. Joint sepsis accounted for ten cases, bites for seven, hand space infection 12, lacerations 21, foreign bodies six and implants only two.

Conclusions: Hand infections requiring surgery are uncommon but are costly and consume a large amount of resources. This study shows an incidence of 0.12 cases per 1,000 persons based on a population catchment of 484,000. The number of bed days and operations was 0.84 and 0.20 per 1,000 population respectively. For our population an average of one bed a day was required for a hand infection requiring surgery.

- 35 A randomised controlled trial comparing dynamic and static splinting following extensor pollicis longus (EPL) repair
Ms K Pank, Mrs P Smith (East Grinstead)

Introduction: The aim of this poster is to present a research project currently being undertaken at the Queen Victoria Hospital, East Grinstead, regarding therapy rehabilitation of extensor pollicis longus (EPL) tendon repairs.

Method: A comprehensive literature review was completed. Problems identified from this were: poor quality data, small sample sizes and inconsistency in outcome measures. Therefore we designed a study to address these issues. Prior to the randomised controlled trial (RCT) itself, we completed a goniometry audit of intra and inter rater reliability in the department. This led to training and a standardised method of recording range of movement (ROM) of thumbs. Our inclusion criteria in the RCT was isolated EPL injuries zones 2–6, over eighteen years of age, capacity to consent and fluent in English. Ethical approval was granted. Following patient consent, participants were allocated randomly to a static forearm splint with thumb in extension combined with early active exercises or a dynamic splinting regime with passive extension exercises. They followed a standardised therapy regime over twelve weeks. Data was collected at four, eight and 12 weeks post repair on a standardised pro forma.

Results: Data has been gathered over a two-year period. Thus far seventy-five participants have been recruited. Outcome measures include: Total Active Movement (TAM), White System, Buck Gramcko, Pinch Grip, Disability of the Arm Shoulder and Hand (DASH). Initial findings will be presented.

Conclusion: This trial is still in progress but hopes to contribute to identifying the most effective therapy rehabilitation method for EPL repairs.

- 36 Segmental V-Y flaps for the reconstruction of longitudinal defects of the digits
Mr R Baker, Mr N Niranjan (Chelmsford)

Introduction and Aims: Flap reconstruction of digits depends on the shape and length of the defects. Linear axial defects of the finger that extend beyond one phalangeal segment, such as wounds that expose the flexor tendon, are challenging to reconstruct because of their elongated shape. Bipedicled strap flaps may be raised adjacent to the defect and advanced to the midline as described for dorsal defects. However, this results in a linear scar crossing more than one joint and is therefore at high risk of scar contracture. We present the use of segmental V-Y flaps to reconstruct these defects. These are two or more V-Y flaps orientated transversely and advanced segmentally to close the defect, avoiding a linear scar.

Material and Methods: Cadaveric dissection of the digit demonstrates the digital arterial anatomy and vascular supply of these flaps. A series of case photographs illustrates the versatility of these flaps in several clinical scenarios.

Results and Statistics: Nine patients had soft tissue defects of the digits successfully reconstructed with segmental V-Y flaps. There were no total or partial flap failures and all flaps retained sensation. Digital dissection suggests these flaps rely on the transverse arches between the digital arteries for their circulation.

Conclusions and Clinical Reference: Segmental V-Y flaps are a safe method for reconstructing digital defects and are particularly useful in the reconstruction of axial defects. They have the advantages of being homodigital, sensate, technically easy, allow direct closure of the donor site, replace like with like and break up linear defects that might otherwise lead to contractures.

- 37 **Local flap techniques of closure of medium-size palmar defects by rearrangement of the palmar skin**
Mr A Sierakowski, Mr D Elliot (Chelmsford)

Introduction: The closure of full-thickness defects of the palm of the hand exposing the neurovascular bundles and flexor tendons poses a difficult reconstructive problem. We describe two local techniques of closure of medium sized palmar defects.

Methods: **Technique 1:** V-Y Advancement Flap(s). A triangular flap is designed immediately adjacent to the defect and on the side of the defect which provides the greatest availability of normal palmar skin. Alternatively, two or three smaller flaps can be designed adjacent to the defect and advanced towards each other.

Technique 2: Zig-Zag Bipedicle Flaps. This method is suited to longitudinally orientated defects. A zig-zag line is drawn parallel to each side of the defect to delineate two opposing bipedicle flaps. The bipedicle flaps are transposed towards each other to close the primary defect. The superficial lateral wounds are allowed to heal under moist antiseptic dressings.

Results: We have utilised the V-Y flap technique to reconstruct medium-sized defects of the palm and volar surface of the digits in fifteen patients. The zig-zag bipedicle flap has been used in five patients. We have experienced no incidences of flap loss, wound breakdown or scar contracture.

Conclusions: These techniques are simple to perform and heal like with like. We have found these techniques particularly useful during secondary flexor tendon surgery which necessitates the excision of unstable or tethered overlying skin. The avoidance of skin grafting of these defects allows early mobilisation to start within one or two days of surgery.

- 38 **Pedicled radial osteocutaneous flap reconstruction of an ipsilateral chronic clavicular defect from a dystrophic denervated limb following brachial plexus injury**
Mr A Mishra, Major M Foster, Mr D Chester, Mr D Power (Birmingham)

Introduction: Osteocutaneous defects of the clavicle follow surgical management of chronic infections, tumors and trauma. We present the use of filleted radial forearm osteocutaneous flap for clavicular reconstruction in a late presenting global brachial plexus palsy patient as a means of salvage from a denervated limb.

Patient and Method: A forty-four year-old man who had presented late with a global brachial plexus injury following a RTA. He had undergone multiple surgeries for plexus and subsequent clavicle non-union all of which had failed. He had a protracted collapsing anterior shoulder due to no support and skin tether. Clavicular non-union worsened the dragging sensation in the arm. The patient had requested amputation due to trophic changes and had asked for a functional prosthetic. Various options were discussed with him in a multidisciplinary complex upper limb trauma clinic. He underwent radial forearm osteocutaneous filleted pedicled flap for clavicle reconstruction to enable him to have a good shoulder for prosthesis for his mid humeral amputation.

Result: The flap healed well with the radius providing reconstruction of his 6cm clavicular defect and volar surface of his forearm providing the soft tissue padding over his scarred clavicular region. He showed signs of radiological bone healing of his reconstructed clavicle at three month follow-up and his pain issues have settled. He has been referred for an aesthetic prosthesis.

Conclusion: Spare part surgery principles can be utilised for salvage in complex trauma. The increased risk of osteoporosis in dystrophic limb requires the use of vascularised bone flaps.

- 39 **A novel technique of first metacarpal suspension with palmaris longus tendon graft with trapeziectomy to prevent proximal migration/abutment**
Mr R Baker, Mr M Sood (Chelmsford)

Introduction and Aims: This article describes a novel technique of first metacarpal suspension to the second metacarpal, using a palmaris longus tendon graft along with trapeziectomy. The

patient had Eaton and Lambert stage IV thumb base osteoarthritis. The first metacarpal had migrated proximally and the carpus translated ulnar-wards, such that the first metacarpal would be in danger of articulating with the radial styloid after simple trapeziectomy. The advantage of this technique over traditional suspensionplasty procedures using APL or FCR is that it allows a more distal anchorage of the first metacarpal, thus reducing the risk of a painful radio-metacarpal or scaphometacarpal abutment. This poster illustrates this technique and demonstrates its usefulness in this scenario.

Material and Methods: DASH, Michigan and VAS pain scores were calculated before and after surgery. Measurements of pinch and grip strength and AROM were performed. Pre and post-operative radiographs were taken to demonstrate the distal suspension of the first metacarpal.

Results: No complications were encountered and the patient remains pain-free at three months. DASH, Michigan Hand Outcome and VAS scores were 64.7, 22% and 8/10 pre-operatively and all were improved at eight weeks after surgery: 52.6, 78% and 0/10 respectively. The difference in the position of the bases of the first and second metacarpals was reduced from 9.7mm pre-operatively to 5.2mm eight weeks post-operatively.

Conclusions: A novel technique of first metacarpal suspension following trapeziectomy, using a palmaris longus tendon graft, which successfully suspends the base of the first metacarpal and prevents proximal migration and painful abutment, is presented.

40 Results of ulnar shortening with 2.7 mm LCP Synthes ulna osteotomy system
Mr T Finnigan, Mr A Bauman, Mr N Makaram, Mr M Srinivasan (Blackburn)

Introduction: Ulnar shortening osteotomy in its distal third and removal of a wafer of pre-determined thickness of bone is an accepted standard technique to reduce pain and unload the Triangular Fibro-Cartilage Complex (TFCC). Various techniques have been described in the literature. We present the first twenty-five cases using the low profile, angular stable fixation Synthes ulnar shortening system.

Indications: Twenty-five patients with clinically significant pain from relevant ulnar impaction syndrome due to congenital or post-traumatic conditions, without OA of the distal radio-ulnar joint or malunion of the ulna, underwent ulnar shortening with the Synthes system. Post-operative care involved immobilisation in a below elbow OT brace for eight weeks or until union was confirmed by CT scans. Data was collected on pain, function, range of motion, grip strength, radiographic analysis including CT, bony union and complications.

Results: Follow-up after a mean period of 24 months and shortening of 4mm showed a reduction of pain by an average of 90% on the visual analog scale. The range of motion improved in pronosupination by 15%, dorsiflexion and palmar flexion improved by 10%. On the Jammar dynamometer grip strength improved by 20%. Average time to union was eight to nine weeks (range six weeks to 12 weeks). Complications included one non-union and four cases of loss of sensation around the incision site.

Conclusion: Distal ulnar shortening osteotomy is a predictable excellent procedure for the treatment of ulnar impaction syndrome, with consistent satisfaction in pain relief and function.

41 A comparison of complications of total wrist fusion and silastic arthroplasty
Miss S Hassan, Dr F Carpenter, Dr P Estridge, Mr A Malhas, Mr C Wigderowitz (Dundee)

Introduction: We report our long-term complications of wrist fusion compared with silastic arthroplasty.

Method: A retrospective case note analysis of all patients undergoing wrist arthroplasty or wrist fusion for clinical follow-up was undertaken.

Results: From 1998–2010, eighteen unilateral and three bilateral patients underwent silastic arthroplasty (mean age 62 years (34–82), 19 female and 2 male). Mean clinical follow-up twenty-six

months (1–144) and mean community follow-up five years (0.5–15). Thirty-one patients underwent wrist fusion (mean age 51 (30–75), 16 female and 15 male). Mean clinical follow-up twenty-three months (1–144) and mean community follow-up six years (1–12).

Silastic Arthroplasty: There were three reported complications: a post-operative wound infection, a complex regional pain syndrome and on-going pain requiring debridement of the distal radius. There were no implant fractures at last radiographic review. Five year survivorship was 100% with re-operation as the end-point with implants lasting up to fifteen years.

Wrist Fusion: The majority of these cases were undertaken for osteoarthritis, with one case of avascular necrosis of capitate. Post-operative complications include haematoma, complex regional pain syndrome, DRUJ pain requiring Darrach's procedure in four patients, screw revision following prominence and four cases where the metalware was removed. All fusions went on to unite. Survivorship at five years was 91% with re-operation as the end-point.

Discussion: In this small series of cases, silastic wrist arthroplasty has shown relatively few complications at five years. It suggests that for properly selected patients, silastic arthroplasty remains a good option for the treatment of inflammatory arthropathy.

42 Patient-related outcomes following the Mannerfelt wrist arthrodesis in a rheumatoid population

Mr N Beattie, Mr F Elherik, Professor S Breusch (Edinburgh)

Background: Wrist arthrodesis has been established as a mainstay form of surgical intervention in the rheumatoid wrist. Despite this however, there is a distinct lack of patient rated outcome measure (PROM) studies justifying the efficacy of this procedure. The aim of this study was to report any change in function or pain following the tunnel Mannerfelt wrist arthrodesis in a single surgeon series of rheumatoid patients over a six-year period.

Methods: Fourteen patients (15 wrists) who had undergone the tunnel Mannerfelt wrist arthrodesis were followed retrospectively with a mean follow-up period of forty-five months. The primary outcome measures included the validated Patient Rated Wrist Evaluation (PRWE) questionnaire and a satisfaction questionnaire.

Results: The mean total pain score improved from 41 points pre-operatively to 14.2 points post-operatively, correlating with a 65.4% improvement in overall pain outcomes. The mean total functional score improved from 83.67 points pre-operatively to 45.5 points post-operatively, demonstrating a 45.6% improvement in overall function at the time of follow-up.

Conclusions: All patients reported an overall improvement in pain and functional capacity. The satisfaction results were excellent. All patients reported that they would elect to have the procedure again, with the vast majority being very pleased with the outcome of their surgery (93.7% very pleased and 6.3% fairly pleased). Therefore we can recommend the tunnel Mannerfelt wrist arthrodesis for improving both pain and level of function in the rheumatoid wrist.

43 Mid-term results of dorsal capsulodesis for chronic scapholunate instability

Miss S Hassan, Mr S Nandra, Mr A Malhas, Mr C Wigderowitz (Dundee)

Introduction: We present our long-term outcomes for patients undergoing dorsal intercarpal ligament capsulodesis for the treatment of static scapholunate instability.

Methods: Retrospective case note review of all patients undergoing dorsal capsulodesis in our unit over a twelve-year period. Radiographical images together with functional and pain assessment was evaluated.

Results: Thirty-eight patients were included in the study with a mean follow-up of 28 weeks. Mean pre-operative scapholunate angle improved from 55.4° to 47.5° post-operatively ($p \leq 0.001$). A mean reduction in the scapholunate gap of 3.2mm to 2.2mm post-operatively was established with

58% of patients obtaining a gap less than or equal to 3mm. We had one case of increased scapholunate gap post-operatively, but this was not by more than 5mm.

Absence of pain was noted in 68% of patients, whilst chronic regional pain syndrome occurred in 5%. Patient satisfaction, defined as ability to carry out activities of daily living, was higher in patients with a pre-operative scapholunate angle less than 70° (84% versus 57%). The functional range of motion at the wrist was taken as 5° of flexion and 30° of extension, 63% of patients were able to achieve this. Radiological arthritic changes developed in 5% of patients.

Discussion: This small sample series identifies improvement in radiological parameters following dorsal capsulodesis and an associated relief of pain and maintenance of a functional wrist at mid-term follow-up. Dorsal capsulodesis remains an important option in the early treatment of scapholunate instability.

44 Comparison of the Matti Russe procedure with interpositional K-wires in non-united fractures of the scaphoid

Miss S Hassan, Mr I Persad, Mr A Malhas, Mr C Wigderowitz (Dundee)

Introduction: We report our experience of treating scaphoid fractures with avascular necrosis using the Matte Russe technique and compare this with an interpositional graft technique and Kirschner wire fixation.

Method: A retrospective case note review of patients treated by the senior author.

Results: Twenty-one patients underwent the Matte Russe procedure compared with 29 interpositional grafting (mean age 27.6 years, range 15–57) with a mean time to surgery of 15.5 months (range 3 to 96 months). 76% of patients reached scaphoid union at the end of each procedure. In the Matte Russe group, 89% of patients had correction of their DISI deformity compared with 63% in the interpositional graft group. Mean post-operative immobilisation in the Matte Russe group and the interpositional group were similar (7.3 and 6.9 weeks respectively). Radiographic evidence of union was not significantly associated with pre-operative DISI deformity, operative procedure or cigarette smoking. Post-operative arthritic changes were associated with time interval between injury and surgery ($p=0.002$) but not with type of procedure ($p=0.61$), cigarette smoking ($p=0.4$) or post-operative DISI deformity ($p=0.37$).

Discussion: Our small study demonstrates comparable rates of scaphoid union and DISI deformity correction between the Matte Russe and the interpositional graft techniques. We did not find that the presence of a DISI deformity was a contra-indication for the Matte Russe procedure. Proximal fracture location and delay to definitive surgery are associated with a higher nonunion rate regardless of operative technique.

45 Clinical outcome following scaphoid excision and four corner fusion using memo staples
Miss A Brunswicker, Mr P Goon, Mr A Chojnowski (Norwich)

Introduction: Scaphoid excision with four-corner fusion (4CF) is a common motion-preserving salvage procedure for the treatment of wrist degenerative changes, such as scaphoid nonunion (SNAC) or scapholunate advanced collapse (SLAC). A variety of techniques used have been described so far including circular plates, memo-plates and headless compression screws. We present a prospective case series of 4CF using memory staples and examine clinical outcome.

Methods: A prospective study was performed in a cohort of ten patients who underwent 4CF with memory staples for a diagnosis of SLAC, SNAC or midcarpal arthrosis between 2009 and 2013. Pre and post-operative range of motion, grip strength, Quick DASH scores and bone union status were obtained, post-operative complications noted and statistical analysis performed, using a paired t-test.

Results: Range of motion measurements post-operatively showed an average extension of 21.3° and flexion of 35.4°. Compared to the pre-operative measurements (mean extension 35.3°, mean flexion 36.4°) there was significantly less extension post-operatively ($p=0.0188$). There was no

significant difference in flexion ($p=0.8372$). Grip strength averaged 72% of the uninjured side ($p=0.0368$). Quick DASH scores were significantly lower post-operatively ($p=0.0043$). Radiographs demonstrated union in all of the cases. There were no significant complications.

Conclusions: Memory staples produced excellent and reliable results in our series with no significant complication or nonunion. We showed that with extension significantly reduced, the middle of the motion arc is shifted towards flexion. Quick DASH scores were significantly lower after 4CF indicating improved functional outcome.

Variable	Mean	Std Error	Std Deviation	95% CI
Extension pre-op	35.3	6.34	20.05	20.95–49.65
Extension post-op	21.3	3.52	11.13	13.33–29.27
Flexion pre-op	36.40	3.92	12.40	27.53–45.27
Flexion post-op	35.40	4.04	12.79	26.25–44.55
QUICK DASH pre-op	57.47	6.35	16.79	42.94–73.00
QUICK DASH post-op	24.25	7.44	19.68	6.06–42.45
Grip strength pre-op	22.25	3.49	11.02	14.36–30.14
Grip strength post-op	30.80	5.10	16.25	19.26–42.34

Table 1: Outcome variables pre- and post-operative after scaphoid excision and four corner fusion using memory staples.

46

Arthroscopic-assisted percutaneous stabilisation for chronic scapholunate instability

Mr R MacFarlane, Mr Y Khan, Dr R Zhou, Mr T Donnelly, Mr M Waseem (Macclesfield)

Introduction: Long-term sequelae of chronic scapholunate ligament (SLL) injury can be debilitating, and treatment is often challenging with variable results. We present our experience with an arthroscopic assisted percutaneous SLL stabilisation technique.

Methods: A retrospective casenote review was performed of all patients treated over a five-year period. Patients were subsequently invited for a final independent clinical and radiographic review.

Results: A total of twenty-five patients were included in the study, comprising 15 males and ten females. Mean age forty-nine (range 22–68). On initial AP radiographs, the mean scapholunate interval distance was 3.1mm (range 2.6–4.4mm). The mean pre-operative QuickDASH score was 53.5 (range 12–75.5) and the median VAS pain score was 5 (range 2–9).

At final follow-up (mean 30 months, range 8–48) the mean scapholunate angle was 50.3° (range 40.2–88.8°), SL distance was 2.5mm (range 1.4mm–4.9mm). Final ranges of motion were: extension 27° (range 5–40°), flexion 20° (range 5–35°), pronation 55° (range 10–60°) and supination (5–70°). The mean final QuickDASH score was 21.5 (range 5–65). Median VAS was 3 (range 0–7).

Discussion: We have found this to be a safe and reliable technique and results compare favourably with others in the literature. We recommend consideration of this technique in all active patients presenting with chronic SL instability.

MEETING INFORMATION

REGISTRATION

Doctors or scientists engaged in research AND presenting a paper will not be charged a registration fee for the day they are presenting if they can confirm in writing that they have no access to study leave expenses. They must, however, pay £55 per day. This is the day delegate rate charged to the Society by the venue for each individual attending.

Exemption from payment of registration fees is not available to those who have access to study leave funding. If all funding for the year has been utilised, full registration fees must be paid.

REGISTRATION FEES

BSSH Full Members and Associates who are Consultants	£280 Whole meeting £140 One day
BSSH Associates who are Trainees, Companion Members	£180 Whole meeting £90 One day
BSSH Honorary and Senior Members	£55 per day
BAHT Members	£180 Whole meeting £90 One day
Trainee Non-members	£180 Whole meeting £90 One day
Other Non-members	£380 Whole meeting £190 One day
Speakers who are Research Doctors or Scientists	£55 per day

On-site registration excludes a ticket to the Society Dinner.

REGISTRATION AND ENQUIRY DESK

The Registration and Enquiry Desk (situated in the Foyer on the ground floor of the Royal College of Surgeons) will be open at the following times:

Thursday: 08:00–17:15
Friday: 08:30–16:00

The telephone number of the Registration and Enquiry desk during the meeting is: 07930 509 646 (BSSH Mobile).

HONORARY AND SENIOR MEMBERS

Honorary and Senior Members will not pay a registration fee. A charge of £55 will be made for refreshments and luncheon each day. This is the day delegate rate charged to us by the venue for each delegate.

VENUE OF THE SCIENTIFIC MEETING

The meeting will be held in Lecture Rooms 1 and 2 of the Royal College of Surgeons.

CONGESTION CHARGE

The Royal College of Surgeons is within the charging area.

MEETING INFORMATION

CAR PARKING

There is no car parking at the Royal College of Surgeons. There is an NCP on Kemble Street, off Kingsway.

ACCOMMODATION

No block bookings have been made for the meeting.

LUNCHEON AND REFRESHMENTS

Luncheon and refreshments will be served in the Edward Lumley Hall and in the Council Room.

CONTRIBUTORS INFORMATION

There will be projection facilities for PowerPoint presentations only.

Speakers are asked to keep strictly to the time allocated for their presentations.

CONTINUING MEDICAL EDUCATION

The following number of points have been awarded for each day:

Thursday:	6.0
Friday:	6.0
Total:	12.0

SOCIETY DINNER

Thursday 17th October

19:15 Reception in the Library and Hunterian Museum

19:45 Dinner in the Edward Lumley Hall

Dress code: business attire

The Society Dinner is open to Honorary, Senior and Full Members and Associates of BSSH and all BAHT Members, all of whom may invite guests. One ticket was included in the registration fee for those who pre-registered for the whole meeting.

PRIZES

Journal of Hand Surgery Prize

A prize consisting of book vouchers to the value of £500 will be awarded to the best paper presented at the meeting.

Poster Prize

A prize consisting of book vouchers to the value of £250 will be awarded to the best poster presented at the meeting.

MEETING INFORMATION

KEYNOTE LECTURES

Thursday, 17th October

- 12:00 Psychology of recovery from hand injury
Dr M Bellew (Lecture Theatre 1)
- 12:30 Distal Radius Acute Fracture Fixation Trial (DRAFT)
Professor J J Dias and Professor M Costa (Lecture Theatre 1)
- 14:00 Move a hand with fractures, don't stiffen it with a splint
Mr A Chojnowski (Lecture Theatre 2)

Friday, 18th October

- 09:00 Biomechanics of tendon transfer
Dr W Brandsma (Lecture Theatre 1)
- 12:30 The fascia of the hand
Professor D A McGrouther (Lecture Theatre 1)
- 14:00 Treatment of hand problems in cerebral palsy
Dr C Leclercq (Lecture Theatre 1)
- 14:30 Know your hands
Dr W Brandsma (Lecture Theatre 2)

SYMPOSIA

Thursday, 17th October

- 09:00 Extensor tendon injuries (Lecture Theatre 1)
- 14:30 Hand Therapy Practice: Thinking about the future (Lecture Theatre 2)
- 16:00 Extensor tendon problems (Lecture Theatre 1)

Friday, 18th October

- 09:30 Surgical dissection: Live demonstration of commonly used tendon transfers (Lecture Theatre 1)
- 11:00 Rehabilitation after tendon transfers (Lecture Theatre 2)

MEETINGS

BSSH Annual General Meeting

The BSSH Annual General Meeting will be held on Thursday 17th October at 17:15 in Lecture Theatre 1 (open to Members and Associates only).

BAHT Annual General Meeting

The BAHT Annual General Meeting will be held on Thursday 17th October at 17:15 in Lecture Theatre 2.

BSSH Meetings in 2014

- 1st-2nd May: Hilton Newcastle Gateshead
- 16th-17th October: The Royal College of Surgeons, London

MEDICAL AND TECHNICAL EXHIBITION

Firms supplying instruments, appliances, materials and books will be exhibiting throughout the two days in the Edward Lumley Hall, where refreshments and luncheon will be served. It is hoped that everyone will support this exhibition.

TRADE EXHIBITORS

ACUMED LTD

Huebner House, The Fairground, Weyhill, Andover SP11 0QN
Telephone: 01264 774 450, Fax: 01264 774 459, Email: debbie@acumed.uk.com
Contact: Mr B Cradduck

STAND NO 5

ALLARD SUPPORT UK LTD

Coes Road, Dundalk, Co Louth, Ireland
Telephone: 00 353 42 932 8177, Fax: 00 353 42 932 8182, Email: peter.roe@allarduk.co.uk
Contact: Mr P Roe

STAND NO 8

ARTHREX LTD

Unit 9, 3 Smithy Wood Drive, Smithy Wood Business Park, Sheffield S35 1QN
Telephone: 0114 232 9180, Fax: 0114 257 8929, Email: lauren.reece@arthrex.co.uk
Contact: Ms L Reece

STAND NO 12

BIOMET UK HEALTHCARE LTD

Waterton Industrial Estate, Bridgend, South Wales CF31 3XA
Telephone: 0787 644 362, Email: Daniel.tabor@biomet.com
Contact: Mr D Tabor

STAND NO 11

B BRAUN MEDICAL

Thorncliffe Park, Sheffield S35 2PW
Telephone: 0114 225 9000, Email: chris.banks@bbraun.com
Contact: Mr C Banks

STAND NO 17

BSSH AUDIT DATABASE

British Society for Surgery of the Hand, Royal College of Surgeons, 35–43 Lincoln's Inn Fields, London WC2A 3PE
Telephone: 07580 433 826, Email: Sharon.ross@bssh.ac.uk
Contact: Ms S Ross

STAND NO 2

DEPUY SYNTHES

Capitol Boulevard, Capital Park, Leeds, Yorkshire LS27 0TS
Telephone: 01707 823 320, Email: hill.kerry@synthes.com
Contact: Ms K Hill

STAND NO 9

EXACTECH UK LTD

Grosvenor House, Prospect Hill, Redditch B97 4DL
Telephone: 01527 951 555, Fax: 01527 951 044, Email: Joanna.barrett@exac.co.uk
Contact: Ms J Barrett

STAND NO 14

KARL STORZ ENDOSCOPY (UK) LTD

392 Edinburgh Avenue, Slough SL1 4UF
Telephone: 01753 503 500, Fax: 01753 578 124, Email: sanderson@karlstorz-uk.com
Contact: Mr S Anderson

STAND NO 23

LAVENDER MEDICAL LIMITED

Unit 28, Wedgwood Way, Stevenage SG1 4QT
Telephone: 0845 676 9733, Fax: 0845 676 9734, Email: ramzi.saab@lavendermedical.com
Contact: Mr R Saab

STAND NO 7

MEDICAL AND TECHNICAL EXHIBITION

MEDARTIS LIMITED**STAND NO 15**

Suite 63, Annexe 4, Batley Business Park, Technology Drive, Batley, West Yorkshire WF17 6ER
Telephone: 01924 476 699, Fax: 01924 472 000, Email: anna.walsh@medartis.com
Contact: Ms A Walsh

MEDIRACER UK LTD**STAND NO 19**

Technology Centre, Wolverhampton Science Park, Wolverhampton WV10 9RU
Telephone: 0844 800 2617, Fax: 0844 800 2618, Email: nick.hamar@mediracer.com
Contact: Mr N Hamar

MERCIAN SURGICAL**STAND NO 21**

10 Topaz Business Park, Topaz Way, Bromsgrove B60 0GD
Telephone: 0844 879 1133, Fax: 0844 879 1155, Email: john.duffy@merciansurgical.com
Contact: Mr J Duffy

NORTHSTAR ORTHOPAEDICS LTD**STAND NO 13**

26 Kingfisher Court, Hambridge Road, Newbury, Berkshire RG14 5SJ
Telephone: 01635 275 380, Fax: 01635 275 381, Email: sacha@northstar-ortho.co.uk
Contact: Ms S Bartlett

OSTEOTEC LTD**STAND NO 16**

9 Silver Business Park, Airfield Way, Christchurch BH23 3TA
Telephone: 01202 487 885, Fax: 01202 487 886, Email: susann@osteotec.co.uk
Contact: Ms S Idres

PATTERSON MEDICAL LTD**STAND NO 20**

Nunn Brook Road, Huthwaite, Sutton-in-Ashfield NG17 2HU
Telephone: 01623 448 793, Email: alwyn.richards@pattersonmedical.com
Contact: Mr A Richards

PHOENIX SURGICAL INSTRUMENTS LIMITED**STAND NO 4**

14b Pindar Road, Hoddersdon, Hertfordshire EN11 0BZ
Telephone: 01992 979 444, Fax: 01992 487 787, Email: info@phoenixsurgical.co.uk
Contact: Mr L Simmons

PROMEDICS ORTHOPAEDIC LTD**STAND NO 18**

Port Glasgow Industrial Estate, Gareloch Road, Port Glasgow PA14 5XH
Telephone: 07919 623 340, Fax: 01475 746 400, Email: carolleech@promedics.co.uk
Contact: Ms C Leech

SAGE PUBLICATIONS LTD**STAND NO 3**

1 Oliver's Yard, 55 City Road, London EC1Y 1SP
Telephone: 020 7324 8608, Fax: 020 7324 8700, Email: Catherine.marshall@sagepub.co.uk
Contact: Ms C Marshall

SOVEREIGN MEDICAL LTD**STAND NO 10**

Unit16, MII Business Link, Stansted CM24 8GF
Telephone: 01279 816 167, Fax: 01279 816 299, Email: david@sovereignmedical.co.uk
Contact: Mr D King

STRYKER UK**STAND NO 22**

Hambridge Road, Newbury, Berkshire RG14 5AW
Telephone: 01635 262 455, Email: Amanda.quinn@stryker.com
Contact: Ms A Quinn

MEDICAL AND TECHNICAL EXHIBITION

THE OT PRACTICE

STAND NO 6

60 High Street, Chobham, Surrey GU24 8AA

Telephone: 01628 857 144, Email: Susannah@theotpractice.co.uk

Contact: Ms S Young

VBS DIRECT LTD

STAND 2A

1 Mill View Close, Bulkeley, Cheshire, SY14 8DB

Telephone: 0845 528 0336, Fax: 0845 528 0358, Email: info@vbsdirect.co.uk

Contact: Mr S Barabas

VERTEC SCIENTIFIC

STAND NO 1

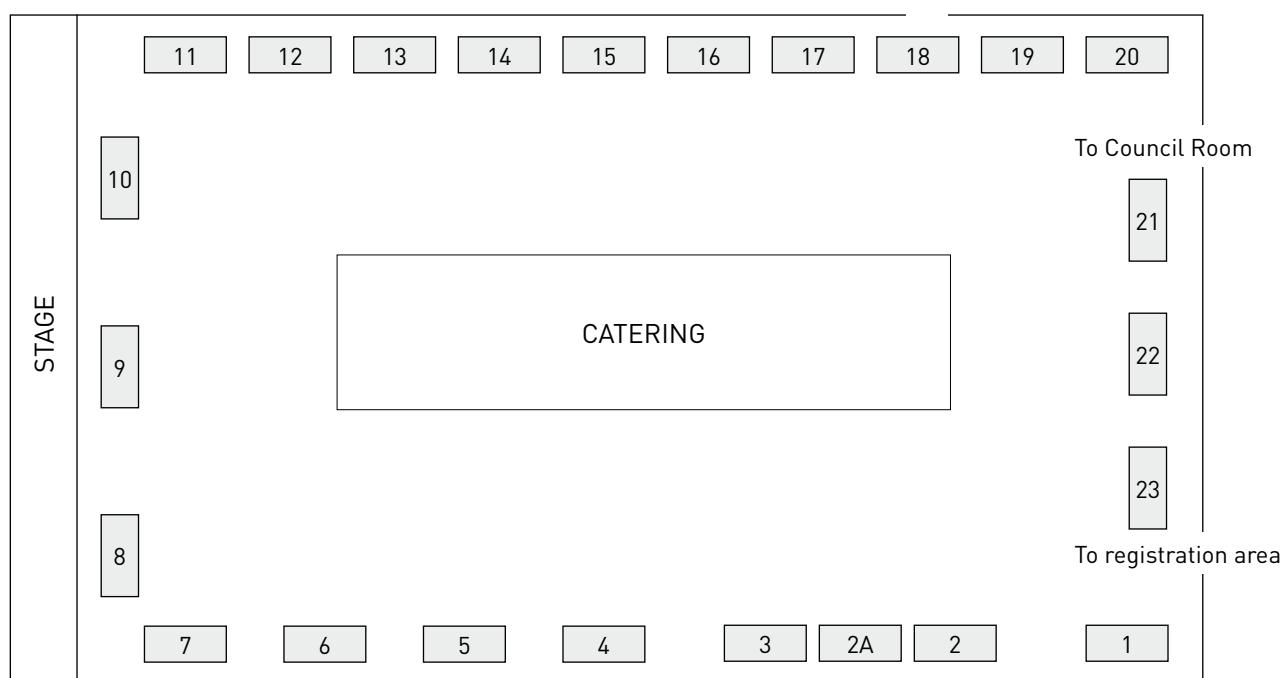
Unit 44, Easter Park, Benyon Road, Silchester, Reading RG7 2PQ

Telephone: 01189 702 104, Fax: 01189 701 861, Email: nvicars@vertec.co.uk

Contact: Mr K Lakin

EXHIBITION FLOOR PLAN

Edward Lumley Hall



1 Vertec Scientific

12 Arthrex Ltd

2 BSSH Audit Database

13 Northstar Orthopaedics

2A VBS Direct Ltd

14 Exactec UK Ltd

3 Sage Publications

15 Medartis Ltd

4 Phoenix Surgical Instruments Ltd

16 Osteotec Ltd

5 Acumed

17 B Braun

6 The OT Practice

18 Promedic Orthopaedic Ltd

7 Lavender Medical Ltd

19 Mediracer UK Ltd

8 Allard Support UK Ltd

20 Patterson Medical Ltd

9 DePuy Synthes

21 Mercian Surgical

10 Sovereign Medical Ltd

22 Stryker UK

11 Biomet UK Healthcare Ltd

23 Karl Storz Endoscopy (UK) Ltd





BSSH

The British Society for
Surgery of the Hand

at the Royal College of Surgeons
35–43 Lincoln's Inn Fields
London WC2A 3PE

Tel: 020 7831 5162
Fax: 020 7831 4041
Email: secretariat@bssh.ac.uk

