



The Oxford Bone Infection Unit

7th Annual Oxford Bone Infection Conference (OBIC)

Thursday 22nd & Friday 23rd March 2018

**Examination Schools
High Street
Oxford OX1 4BG**





Oxford University Hospitals **NHS**
NHS Trust

 ESCMID
COLLABORATIVE CENTRE



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INTRODUCTION

Dear Colleagues and Friends

It is a great pleasure and privilege to welcome you to the 7th Oxford Bone Infection Conference.

A founding premise of OBIC is that successful management of complex bone and joint infection depends upon multidisciplinary team working; we hope that this meeting helps to promote and facilitate this process. We are delighted to be able to introduce several international experts in the field of orthopaedic infection and are particularly proud to welcome Professor Eric Senneville from Tourcoing, France as the Cierny-Mader speaker.

The programme provides an opportunity for debate, discussion and the exchange of ideas. In response to feedback from previous years, we have tried to incorporate greater opportunity for delegates to present their own work and for interaction between the disciplines represented.

The conference venue, Oxford University Examination Schools, was designed and built by Thomas Jackson between 1876 and 1881. The building stands on a part of the site of the Angel Inn, which is reputed to have been the first Inn in England. Each year thousands of undergraduates sit their exams in this historical Grade II listed building, which is commonly known as the "Schools". They must wear traditional 'sub-fusc', black and white attire which is an Oxford tradition that is still rigidly enforced.

This year there are again networking and social opportunities including a drinks reception in the Oxford Union and a conference dinner at Exeter College; both are a short walk from the conference venue. The Oxford Union buildings date back to 1857 and include a renowned debating chamber. The union has hosted many international celebrities including the Dalai Lama, four former US presidents, Stephen Hawking and Albert Einstein. Exeter College, founded in 1314, is one of the oldest of 38 constituent colleges of Oxford University; notable alumni include J.R.R. Tolkien and Sir Roger Bannister, athlete and neurologist. Exeter College served as a film location for parts of the 2007 film *The Golden Compass*, based on alumnus Philip Pullman's novel *Northern Lights*.

We would sincerely like to thank all of the speakers and delegates for their contribution to OBIC 2018, and our commercial sponsors without whom this meeting would not have been possible. Please make a special effort to meet with the sponsors' representatives.

We also would ask you to complete a feedback survey which will be sent to you by e mail after the conference. We hope you have an enjoyable and educational meeting.

Maria Dudareva and Matt Scarborough on behalf of the organising committee

The Bone Infection Unit, Oxford

The Bone Infection Unit at the Nuffield Orthopaedic Centre is part of Oxford University Hospitals (OUH) NHS Foundation Trust. It remains dedicated to the investigation and treatment of all aspects of bone and joint infection, including chronic long-bone osteomyelitis, diabetic foot infections, spinal osteomyelitis and orthopaedic device-related infection. In addition to serving the local population, it is a tertiary referral centre for patients across the UK. The centre of activity of the unit is a 26-bed dedicated inpatient ward. Each patient is under the combined care of a consultant infection physician and a specialist orthopaedic surgeon (together with trainees in both specialities). involved significant number of cases also require input from plastic surgeons. The multi-disciplinary team and a large includes specialist outpatient parenteral antibiotic therapy (OPAT) nurses, dedicated musculoskeletal radiologists, physiotherapists, occupational therapists and ward staff. The BIU is an ESCMID collaborative centre and runs observer programmes through ESCMID and by direct communication. There is a research group with publications and on-going projects relating to both medical and surgical management of orthopaedic infection. The unit is closely integrated with infection control and the OUH departments of adult and paediatric infectious diseases and microbiology. The BIU is also a major contributor to the UK Standards for Microbiology Investigations for orthopaedic samples.

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PROGRAMME: THURSDAY 22ND MARCH

08:30 *Registration & refreshments*

09:00 Welcome

Dr Matt Scarborough, *Oxford*

Chair: Dr Matt Scarborough

09:10 Values based practice

Mr Ashok Handa
Vascular Surgeon, Oxford

09.45 **Variation in practice - why do we do what we do**

Chair: Dr Bridget Atkins

Diagnostics

Dr Andrew Brent, *Oxford*

Surgical principles

Mr Martin McNally, *Oxford*

Medical management

Dr Matt Scarborough, *Oxford*

10:50 Introduction of sponsors

11:00 *Tea / coffee, poster viewing and exhibition*

11:30 **Workshops**

A. Foot and ankle infection

Mr Mark Rogers, Mr Constantinos Loizou, Prof Ben Lipsky

SOUTH SCHOOL

B. Upper limb surgical infections

Mr Chris Little, Mr Mike Thomas, Dr Andrew Brent

EAST SCHOOL

C. Fracture related infection

Mr Martin McNally, Prof Matt Costa, Dr Bridget Atkins

ROOM 6

13:00 *Lunch, poster viewing and exhibition*

14:00 **Orthopaedic infection in special circumstances**

Chair: Mr Jamie Ferguson

People who inject drugs

Dr Alysse G. Wurcel, *Boston, USA*

The paraplegic patient

Mr David Stubbs, *Oxford*
Dr James Chan, *Oxford*

Orthopaedic infection in resource poor settings

Dr Antonio Loro, *Uganda*

15:00 **Free papers 1**

Chair: Mr David Stubbs

International survey re the clinical practice of perioperative antibiotic prophylaxis in orthopaedic surgery in Europe

Dr Christof Berberich, *Germany*

Bone infection - the patient's perspective

Miss Philippa Bridgeman, *Birmingham*

Four vs. six weeks of antibiotic therapy for chronic osteoarticular infections after implant removal: first interim analysis of a randomized prospective trial

Dr Mohamed Benkabouche, *Geneva*

Randomized study comparing different durations of antibiotic treatment for diabetic foot infections: first interim analysis

Dr Ilker Uçkay, *Geneva*

A new method using custom made containers with beads to process periprosthetic tissue from patients with suspected periprosthetic infection

Mr Dev Thakker, *Surrey*

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Improved infection rates with staged management of severe open tibia fractures with bone transport with circular frame. Our early experience

Dr Dimitrios Giotikas, *Cambridge*

Service evaluation of University Hospital Southampton (UHS): prosthetic joint infection

Dr Aeron Yeung, *Southampton*

15:30 *Tea / coffee, poster viewing and exhibition*

16:00 **Focus on finance**

Costs, tariff and service structure

Chair: Mr Martin McNally

Mr Jamie Ferguson, *Oxford*

16:30 **Cierny-Mader Lecture**

To communicate excellence and innovation in the multidisciplinary management of bone and joint infection

Chair: Prof Benjamin Lipsky

Chronic antibiotic suppression for prosthetic joint infections

Prof Eric Senneville
Tourcoing, France

17:00 *Close*

Social Programme

18:00 **Drinks Reception** - Oxford Union

19:30 **Conference Dinner** - Exeter College

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08:00	<i>Registration</i>	
08:30	Biofilm and biomaterials	Chair: Dr Andrew Brent
	Animal models	Prof Louise Kruse Jensen, <i>Copenhagen</i>
	Structural hierarchy in bone scaffolds	Prof Jan Czernuszka, <i>Oxford</i>
	Treating biofilms on biomaterials: what's new?	Dr Carlo Romano, <i>Rome, Italy</i>
09:30	Free papers 2	Chair: Mr Mark Rogers
	MRSA infection in bilateral total hip replacement in patient with bilateral metal on metal hip replacement	Mr Naveed Ahmed, <i>Newport</i>
	The progressive microbiology of repeated orthopaedic surgery and effective use of tedizolid	Dr Emma Nickerson, <i>Cambridge</i>
	Osteoarticular infection due to <i>Streptococcus pneumoniae</i> : a case series	Dr Aileen Boyd, <i>London</i>
	Native right knee infection with an unusual pathogen, a diagnostic challenge	Dr Gloria Kiapi, <i>Bristol</i>
	Culture negative prosthetic joint infection – a snappy case report	Dr Helen Chesterfield, <i>Portsmouth</i>
	A limp and some lumps	Dr Emma Hayton, <i>Birmingham</i>
	An unusual case of osteomyelitis	Dr Andrew Taylor, <i>London</i>
10:00	Prevention	Chair: Mr Ben Kendrick
	Incremental advances & Quality Improvements for Surgical Teams (QIST)	Mr Mike Reed, <i>Northumberland</i>
	Laminar flow and the theatre environment	Dr Rob Townsend, <i>Sheffield</i>
	Managing the risk in prosthetic joint infection	Dr Alex Soriano, <i>Barcelona</i>
11:00	<i>Tea / coffee, poster viewing and exhibition</i>	
11:30	Free papers 3	Chair: Dr Matt Scarborough
	Panton-Valentine Leukocidin associated <i>Staphylococcus aureus</i> musculoskeletal infection in children. A reflective case series of long term complications	Dr Grace Yip, <i>Newport</i>
	The correlation between synovial fluid cultures and Gram staining in presumed joint infections	Dr Herbert Gbejuade, <i>Leicester</i>
	The role of theatre shoe contamination in the development of prosthetic joint infection	Mr Kevin Clesham, <i>Ireland</i>
	Bone and Joint Infection Multidisciplinary Team (MDT) meetings in a large district general hospital in London: experience of four years	Dr Guduru Gopal Rao, <i>London</i>
	Experience of implementing OVIVA in a specialist orthopaedic hospital	Mr Tariq Azamgarhi, <i>London</i>
	High prevalence of digital osteomyelitis secondary to delayed presentation	Dr Catriona Luney, <i>Slough</i>
	Assessment of multiplex-PCR as a point of care test	Mr Ahsan Sheeraz, <i>London</i>

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PROGRAMME: FRIDAY 23RD MARCH

12:00 **Workshops**

A. Confessional cases - learning from our mistakes Mr Peter Baird + contributors	SOUTH SCHOOL
B. Interpretation of diagnostic studies and the use of big data Dr Andrew Brent, Prof Ashley Blom	EAST SCHOOL

13:00 *Lunch, poster viewing and exhibition*

14:00 **Best free papers**

Chair: Dr Andrew Brent

Efficacy and safety of a topical gentamicin-collagen sponge (GCS) in combination with systemic antibiotic therapy for moderate or severe diabetic foot ulcer infection (DFUI): a randomized, controlled study

Dr Ilker Uçkay, *Geneva*

A retrospective review of the management of spinal injury patients with pressure ulcers and underlying osteomyelitis at The Royal National Orthopedic Hospital

Mr Gabriel Wallis, *London*

Use of an expendable free muscle flap for dead space management within or adjacent to the joint for staged total knee replacement in presence of chronic sepsis: three cases

Mr Alex Crick, *Salisbury*

Bone transport by hexapod external fixator in tibial segmental bone defects secondary to infection and trauma

Mr Alexandros Vris, *London*

Diagnosing periprosthetic joint infection: an independent, single-centre assessment of the alpha-defensin laboratory test

Dr Marina Diamant, *Middlesbrough*

Rates of antibiotic resistance in prosthetic joint infections: implications for choice of antibiotic prophylaxis

Dr Michael Abouyannis, *Liverpool*

Complex maltreated neglected trauma of the humerus and its revision surgery

Mr Syed Imran Ali Shah, *Karachi*

14:45 **Networks and national visions**

Chair: Dr Bridget Atkins

France

Prof Frederic Laurent, *Lyon*

Spain

Dr Alex Soriano, *Barcelona*

UK

Mr Mike Reed, *Northumberland*

Discussion and next steps

Mr Martin McNally, *Oxford*
Prof Ashley Blom, *Bristol*

16:00 Prizes supported by British Infection Association

16:10 Take home messages and close

Mr Martin McNally, *Oxford*
Prof Eric Seneville, *Tourcoing*

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BIOGRAPHIES

Dr Bridget Atkins

Dr Bridget Atkins is a full time NHS Consultant in Microbiology and Infectious Diseases. In addition to clinical work her roles include:

- Physician, Bone Infection Unit (BIU), Oxford University Hospitals NHSFT
- ID/Micro Training Programme Director (HEE Thames Valley)
- Hon Senior Lecturer, Oxford University

She has a major interest in bone and joint infections, including the optimisation of laboratory diagnostic methods, the multidisciplinary management of such complex infections, treatment protocols, the patient pathway and the optimal delivery of bone infection services. She manages in-patients in the Bone Infection Unit in rotation with others and does combined BIU clinics year round, in both cases working closely with orthopaedic and plastic surgeons. She led the NHS England Bone and Joint Infection service specification published in 2013/14 and provided clinical input for the UK Standard for Microbiology Investigations (SMIs) (prosthetic joint and osteomyelitis samples). She has published and presented widely on diagnostics and management of bone and joint infections. In addition she helps to deliver high quality laboratory services, bedside consults and an antimicrobial stewardship service across the NHS Trust working closely with non infection specialists.

Mr Peter Baird

Peter Baird trained at Cambridge and St Thomas' Hospital, then in orthopaedics via the UCH/Westminster rotation and was appointed at Stephen's Hospital (later rebuilt as C&W) in 1980. He progressed through paediatric orthopaedics, lumbar spine surgery, to hip and knee joint replacement and knee ligament reconstruction with a background abiding interest in the upper limb and then the shoulder in his final 10-15 years.

He discovered the Oxford Bone Infection unit from its early days to the great benefit his own and others patients and has frequently attended these excellent conferences. He has a long term interest in Medicolegal issues surrounding infection.

Professor Ashley Blom

Professor Ashley is an Orthopaedic Surgeon with a specialist interest in infection and arthroplasty. He is an NIHR Senior Investigator and leads the NIHR funded INFORM programme into infection after arthroplasty. INFORM includes work packages on evidence synthesis, analysis of registry/ ONS/ HES data, qualitative work to understand the impact of infection and decision making, a multicentre RCT of 1vs 2 stage revision for infected hip replacement, economic evaluations of treatment for infection and discrete choice experiments.

Dr Andrew Brent

Andrew Brent is Consultant and Honorary Senior Lecturer in Infectious Diseases at Oxford. His clinical work includes inpatient and outpatient care at the Oxford Bone Infection Unit. His research focusses on the epidemiology and diagnosis of bacterial infections including bone and joint infection.

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Dr James Chan

Dr James Chan is an Honorary Clinical Lecturer at NDORMS, University of Oxford, and Senior Registrar in Plastic Reconstructive Surgery at the Oxford University Hospitals NHS Trust. His mission is to bring about translation of lab research to the clinic with the aim of improving patient outcomes.

He graduated from the University of Cambridge in 2004 and gained Membership at the Royal College of Surgeons in 2008. Following national selection to enter Higher Surgical Training in the Oxford Deanery, he embarked upon full time translational research as a Wellcome Trust Clinical Research Training Fellow and Royal College of Surgeons of England Research Fellow at the Kennedy Institute of Rheumatology in 2010.

Under the mentorship of Prof Jagdeep Nanchahal, Prof Nikki Horwood and Prof Sir Marc Feldmann, he identified the innate immune response as a therapeutic target and delineated the early inflammatory pathway in fracture repair, successfully defending his DPhil thesis in 2014. In 2014, he resumed work as a plastic reconstructive surgery registrar in the Oxford Deanery while continuing with their lab research on the role of alarmins and the innate immune system on tissue repair.

As a clinician scientist, he has access to patients and human specimens both for ex vivo experiments as well as clinical trials. His clinical research experience as a Cochrane Fellow has also enabled him to bridge the transition from the lab to clinic.

Professor Matthew Costa

Matthew Costa is Professor of Orthopaedic Trauma Surgery at the University of Oxford and Honorary Consultant Trauma Surgeon at the John Radcliffe Hospital, Oxford.

Matt's research interest is in clinical and cost effectiveness of musculoskeletal trauma interventions. He is Chief Investigator for a series of randomised trials and associated studies supported by grants from the UK NIHR, Musculoskeletal Charities and the Trauma Industry. His work has been cited widely, and informs many guidelines from the National Institute for Health and Care Excellence.

Matt is Chair of the NIHR Clinical Research Network Injuries and Emergencies Specialty Group and the NIHR Musculoskeletal Trauma Trials Network. He is also a member of the NIHR HTA Research Board. He Chairs the British Orthopaedic Association Research Committee and is the Specialty Lead in Orthopaedic Trauma for the Royal College of Surgeons of England. He is Associate Editor for Trauma and Research Methods at the Bone and Joint Journal.

Matt is the President Elect of the Orthopaedic Trauma Society and President Elect of the International Fragility Fracture Network.

Professor Jan Czernuszka

Professor Jan Czernuszka (BSc(Hons) (London), ARSM, PhD (Cambs) MA(Oxon)) is in the Department of Materials, where has been a recent Chair of Faculty. He is Head of the Biomaterials Group and has published over 100 papers. He won the CBI/Toshiba Year of Invention Award for the development of bone analogues, and the ICIS Alpha Innovator of the Year Award for Oxtex Ltd – a spinout from his work. Jan Czernuszka is also Tutor in Materials and Fellow of Trinity College. He has been Dean of Trinity College and is currently vice-President.

Mr Jamie Ferguson

Mr Jamie Ferguson currently works at the Nuffield Orthopaedic Centre, in Oxford, UK. Jamie does research in limb reconstruction techniques, osteomyelitis, local antibiotic carriers and fracture non-union.

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Mr Roger Gundle

Roger Gundle is Consultant Orthopaedic Surgeon to the Nuffield Orthopaedic Centre, Oxford University Hospitals. He has wide experience of hip and knee surgery with particular expertise in the surgical management of inflammatory joint diseases and prosthetic joint infection and has been part of the Oxford Bone Infection Unit from its inception. Prior to appointment as Consultant in Oxford in 1995 he was Clinical Lecturer in Orthopaedic Surgery to the University of Oxford for seven years during which time he gained a doctorate for research on human bone cell biology. He is Honorary Senior Clinical Lecturer in Orthopaedic Surgery to the University of Oxford and a Fellow of University College Oxford, teaching anatomy to undergraduate students and clinical surgery to graduate medical students.

Mr Ashok Handa

Ashok Handa is Associate Professor of Surgery at Oxford University and Consultant Vascular Surgeon at the John Radcliffe Hospital in Oxford. He is the Director for Surgical Education and responsible for the Undergraduate curriculum in surgery as well as Associate Director of Clinical Studies with responsibility for assessment. He is Co-Director of the Collaborating Centre for values based practice in Health and Social Care based at St Catherine's College, Oxford. He is responsible for education and Research for the centre. He is Fellow in Clinical Medicine and Tutor for Graduates at St Catherine's College. He is the Principle Investigator for the OxAAA study, investigating the cause of abdominal aortic aneurysms.

Professor Louise Kruse Jensen

Louise Kruse Jensen is a veterinarian educated from the University of Copenhagen in 2008. During the last two years of here education she specialised in experimental animals and translational medicine. From 2009-2013 she was employed as a PhD student at the section of Veterinary Pathology, University of Copenhagen. During her PhD she became interested in bone pathology and the title of her PhD thesis was Development, characterisation and application of a porcine model for haematogenous osteomyelitis in children. During the past 5 years Louise has received external funding of more than 1 million Euro to study different aspects of bone infections in animal models. Since the beginning of her PhD and until now Louise has participated in the daily routine pathological diagnostic work of farm animals and experimental animals at the section of Veterinary Pathology, University of Copenhagen. Today Louise is employed as Associated Professor and alongside her diagnostic work and research, she also teaches veterinary students and PhD students in general pathology, special veterinary pathology and biomedicine.

Mr Ben Kendrick

Mr Ben Kendrick is a Consultant Hip and Knee Surgeon at the Nuffield Orthopaedic Centre specialising in primary and revision arthroplasty, with particular emphasis on the treatment of periprosthetic infection. During his training in the Oxford Deanery he undertook a DPhil at the Botnar Research Centre researching fixation in unicompartmental knee replacement.

He regularly teaches medical students, in both small groups for clinical tutorials and larger groups for lecture/discussion based sessions. From a higher surgical training perspective, he teaches on both the Oxford and Miller FRCS(Orth) examination courses with a focus on adult pathology and basic science.

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Professor Frederic Laurent

Prof Frédéric Laurent is a Professor of Microbiology at the Faculty of Pharmacy of Lyon at the University Claude Bernard Lyon 1 and practices as a Hospital Practitioner in the bacteriology laboratory of the Croix Rouse Hospital within Civil Hospitals of Lyon.

He holds the Specialized Dome of Medical Biology. He obtained his pharmacy thesis in 1997, a university doctoral thesis in 2000 and a research leadership (HDR) in 2005. He completed a post-doc at St George's Hospital-University of London dedicated to use of genetic approaches (DNA chips) for understanding the pathophysiology of staphylococcal infections.

He is co-principal investigator of the "Pathogenesis of Staphylococcal Infections" team at the International Infectiology Research Center in Lyon and is in charge of a research axis, specifically dedicated to understanding the pathophysiology of staphylococcal osteoarticular infections.

He is also the co-director of the National Reference Center for Staphylococci, which is the pathogen most frequently implicated in osteoarticular infections. It has more than 150 publications since 1995 as well as numerous book chapters. He is a member of the Executive Committee of the European Staphylococcus Study Groups (EGES) of the European Society for Microbiology and Infectious Diseases.

He dedicates the majority of his routine activity and research to osteoarticular infections and coordinates the microbiology activity of CRIOAc Lyon.

Dr Antonio Loro

Dr Antonio Loro got his medical degree from the University of Padua and then the MMed in Orthopaedics from the University of Verona. His professional career started in 1982 when he worked as a medical volunteer at the Regional Hospital in Dodoma, Tanzania. After a brief stint in Italy, in 1986 he went back to Tanzania to assume the position of Head of the recently opened Orthopaedic Department, a position he held until the end of 1992. From 1993 to 2006 he worked as a surgeon in three different public hospitals on the north-eastern side of Italy, continuing to have a major interest in bone and joint infections. In 2006 he began to work in Uganda, where he is still practicing. From 2006 to 2009 he acted as Head of the Orthopaedic Unit attached to Mengo Hospital, located in Kampala. From 2009 he has been in charge of the Orthopaedic Department of the CoRSU Rehabilitation Hospital, located in Kisubi, on the outskirts of Kampala. He has presented papers on management of bone and joint infections in the paediatric population at several international congresses.

Professor Ben Lipsky

Professor Lipsky is Associate Fellow at Green Templeton College, Visiting Professor (Infectious Diseases and Microbiology) at University of Oxford, and Professor of Medicine Emeritus at University of Washington. He was previously at the Veterans Administration Medical Center affiliated with University of Washington, as Chair of Infection Control, Hospital Epidemiologist, Director of the Primary Care Clinic, and directed a Wound Infection Research Clinic. Professor Lipsky has authored over 350 scientific publications and textbook chapters, and two books on infectious diseases. He has chaired the guideline committees on diabetic foot infections of both the Infectious Diseases Society of America and International Working Group on the Diabetic Foot since their inception. In recognition of his research and leadership he has been elected to Fellowship in two UK Royal Colleges and received the Diabetic Foot Global Conference's "Edward James Olmos Award", The American Diabetes Association's "Roger Pecoraro Award", the International Symposium on the Diabetic Foot's "Karel Bakker Award", the Aydin (Turkey) Diabetic Foot Association "Honored Award", and the "Lifetime Achievement Award" of the Veterans Affairs Society of Practitioners of Infectious Diseases.

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Mr Chris Little

Chris Little currently works at the Nuffield Orthopaedic Centre and in the Trauma Unit at the John Radcliffe Hospital.

Mr Little has been a Consultant Hand and Upper Limb Surgeon in Oxford since 2006. He graduated from the University of Bristol in 1993, with degrees in Medicine and Physiology, and undertook his initial surgical training in Bristol and Gloucester. He completed his orthopaedic and trauma surgery training in Oxford, working as a clinical lecturer at the University of Oxford. He has completed fellowship training in hand, wrist and elbow surgery in the West Midlands at the Royal Orthopaedic Hospital, Diana, Princess of Wales Children's Hospital and University Hospitals of Birmingham. He was awarded the Intercollegiate Board Examination in Orthopaedic and Trauma Surgery in 2003.

Mr Little has published original clinical research in international journals on scaphoid fracture surgery, elbow replacement surgery and outcome assessment after elbow surgery. He is actively involved in research projects on scaphoid surgery and shoulder rotator cuff repair, and in the teaching and training of medical students and orthopaedic trainees in Oxford. He edits the orthopaedic modules of the Royal College of Surgeons of England Surgical Training Programme (newSTEP) and reviews articles for the leading European orthopaedic journal.

Mr Constantinos Loizou

Constantinos Loizou has been recently appointed as a Consultant Orthopaedic Surgeon at the Nuffield Orthopaedic Centre at Oxford with a specialist interest in elective conditions of the adult foot and ankle as well as the diabetic foot and bone infection. He also has an interest in foot & ankle ultrasound and he is CASE accredited. He qualified from the University of Cambridge and undertook his specialist training at the East of England. He is fellowship trained in adult foot & ankle surgery, having spent a year at Oxford (Nuffield Orthopaedic Centre) and six months in Australia (Melbourne Orthopaedic Group). He has a basic science background having studied molecular & cell biology at the University of Bath and gained a PhD in clinical biochemistry from the University of Cambridge.

Mr Martin McNally

Martin McNally is the Lead Surgeon in the Oxford Bone Infection Unit at the Nuffield Orthopaedic Centre, Oxford University Hospitals, UK and Honorary Senior Clinical Lecturer at Oxford University. He spends almost all of his time in infection management. He was trained in Northern Ireland, USA and Oxford. He has a particular interest in bone reconstruction in osteomyelitis, infected fractures and non-unions. He runs research projects in outcome of treatments for bone infection and local antibiotic delivery systems. He has published over 100 peer-reviewed papers, reviews and book chapters and contributes regularly to instructional courses and international meetings on bone infection and limb reconstruction. He is President of the European Bone and Joint Infection Society and Honorary Secretary of the Girdlestone Orthopaedic Society.

Recent articles:

McNally MA, Ferguson JY, Lau ACK, Diefenbeck M, Scarborough M, Ramsden AJ, Atkins BL. Single-stage treatment of chronic osteomyelitis with a new absorbable, gentamicinloaded, calcium sulphate/hydroxyapatite biocomposite. *Bone Joint J* 2016; 98-B: 1289-1296.

McNally MA. Decision-making in infected nonunion: is the surgery more important than the condition? Invited Editorial *Bone Joint J* 2016; 98-B: 435-436.

Ferguson J, Diefenbeck M, McNally M. Ceramic biocomposites as biodegradable antibiotic carriers in the treatment of bone infections. *J Bone Joint Infect* 2017; 2: 41-54.

McNally M, Ferguson J, Kugan R, Stubbs D. Ilizarov treatment protocols in the management of infected non-union of the tibia. *J Orthop Trauma* 2017; 31: S47-54.

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BIOGRAPHIES

Mr Mike Reed

Following medical school in Newcastle and his MD in Sheffield, Mike trained in Trauma and Orthopaedics in the North of England, and completed fellowships in New Zealand. In 2012, he was chosen to represent Britain as an ABC Fellow. Currently, he is a fulltime hip and knee replacement surgeon, with trauma commitments within a busy Trauma Unit.

At Trust level, Mike has run improvement programmes in hip fracture care, infection prevention and enhanced recovery. He is the Clinical Director at Northumbria leading a high performing team, supported by a group of committed and talented colleagues.

His research, supported by industry, charity and government funding, focuses on clinical outcomes and on his specialist interest in infection prevention, diagnosis and management. With Northumbria, he is leading large national collaboratives on hip fracture care and enhanced recovery. In addition, Mike supervises basic science research at Newcastle University, which focuses on vitamin D and infection, and particularly biofilm modification with an extracellular DNase. He is also Chief Investigator for clinical trials on clinical outcomes and infection prevention at the Universities of York and Oxford.

Mike co-authored the Trauma and Orthopaedic curriculum and at present, leads the UK Trauma and Orthopaedic eLogbook. He was an MD/PhD examiner at the Universities of Newcastle, Sheffield, Copenhagen, Auckland and University College London. Until recently he enjoyed being the Training Programme Director for the Northern Deanery, and was awarded the National Programme Director of the Year award in 2015 by the British Orthopaedic Trainees Association. He Chaired the Education Committee for the British Orthopaedic Association (BOA) between 2014 and 2017 and was an elected Trustee of the BOA Council between 2015 and 2017. In January 2018, Mike joined the steering committee of the National Joint Registry.

Mike's interests include travelling, running, and spending time with friends and his two children, Ben and Anna.

Dr Carlo Romano

Dr Carlo L. Romanò specialised in Orthopaedic and Trauma at the University of Milano, Italy.

Consultant at the Gaetano Pini Orthopaedic Institute of Milan in the Departments of Hip Surgery, Knee Surgery and Foot and Ankle Surgery, he has been also been working at the Department of Bone and Joint Infection of the same Institute since year 1989. From year 2008 he is the Director of the Centre for Reconstructive Surgery and Bone and Joint Infections and co-Director of the "Milano Biofilm Centre" at the IRCCS Orthopaedic Institute Galeazzi, Milan, Italy.

Co-founder and past-President of the Italian Study Group on Osteo-articular Infections (GISTIO), he served as a President of the European Bone and Joint Infection Society (EBJIS) and received the "Best Research" and "Very Promising Research" EBJIS Awards in 2010 and 2013. He is one of the co-founders and Secretary General of the World Association against Infection in Orthopaedic and Trauma (www.waiot.world).

Adjunct Professor of Orthopaedics at the Università Statale di Milano, his clinical and research interests focus on the prevention, diagnosis, and treatment of bone and joint infections, particularly within prosthetic surgery, local antibiotic therapy, anti-biofilm technologies and biomaterials. He has published extensively on prevention, diagnostic and management of bone and joint infections and implant- and biofilm-related infections.

Mr Mark Rogers

Mark Rogers trained in Bristol and Oxford and was appointed as a Consultant Foot and Ankle Surgeon at the Nuffield Orthopaedic Centre, Oxford in 2013. His practice covers all aspects of Foot and Ankle Surgery. He is the appointed Foot and Ankle Surgeon to the Bone Infection Unit and runs a combined osteomyelitis clinic in conjunction with the Bone Infection Unit Consultants.

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BIOGRAPHIES

Dr Matt Scarborough

Matt studied medicine at Queens University Belfast and undertook post graduate training mainly in London and Oxford. He currently works as a consultant physician in clinical infection and general medicine at Oxford University Hospitals NHS Trust. His research interests include orthopaedic infection, bacterial meningitis and blood stream infections.

Professor Eric Senneville

Professor Eric Senneville, MD, PhD, trained in medicine in Lille University, France before specializing from 1983 to 1991 in Cardiology, Nephrology, Internal Medicine and Infectious Diseases. Working with Professor Yves J Mouton, he established a diabetic foot clinic in 1996 with a special interest in the management of diabetic patients with osteomyelitis of the foot. Professor Senneville has been Consultant at the Department of Orthopedic Surgery of the Lille University Hospital since 1995. He is responsible for a 42-bed unit in the University Department of Infectious Diseases at the Gustave Dron Hospital of Tourcoing, France and, since 2008, is the coordinator of one of the 9 French national referent center for the management of patients with complex osteo-articular infections.

Professor Senneville is part of the expert panel of both the Infectious Diseases Society of America (IDSA) and the International Working Group on the Diabetic Foot Infection (IWGDF) for the guidelines on the management of diabetic foot infections. He has authored more than 170 indexed review articles and original articles and over 30 textbook chapters.

Dr Alex Soriano

Dr Alex Soriano is the Chief of Infectious Diseases Department of Hospital Clinic of Barcelona, a position that he has held since 2016 and Assistance Professor of the University of Barcelona. Dr Soriano carried out his training in Medicine at the University of Barcelona and subsequently completed his residency in Internal Medicine at the Hospital Clinic in 1996. Furthermore, Dr Soriano obtained a PhD in Medicine at the University of Barcelona in 2006. Thus far in his career Dr Soriano has authored over 200 publications, with his current research with the Hospital Clinic study group focusing on the treatment and management of bacteremia due to Gram-positives and infections related to orthopedic implants. Dr Soriano is the current Chairperson of the European Study Group in Implant Associated Infections (ESGIAI) of the European Society of Clinical Microbiology and Infectious Diseases and Board Member of the European Bone and Joint Infection Society (EBJIS).

Mr David Stubbs

David Stubbs is a full time Orthopaedic Consultant at the Nuffield Orthopaedic Centre. His workload is divided equally between joint replacement and limb reconstruction surgery with a special emphasis on bone infection and problem fractures. He trained in Sheffield and Oxford and completed fellowships in Oxford and Sydney in limb reconstruction and joint replacement respectively.

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BIOGRAPHIES

Mr Michael Thomas

Mr Michael Thomas FRCS(Ed), FRCS(Orth) was appointed in 1994 Consultant Orthopaedic Surgeon to Heatherwood and Wexham Park Hospitals, Berkshire, now part of Frimley Health Foundation Trust, to establish a service in shoulder and elbow surgery. He has a busy trauma and elective practice which involves replacement surgery with a specialist interest in rheumatoid arthritis.

He is the Immediate Past President of the British Elbow and Shoulder Society (BESS), has been the UK delegate to the European Society for Surgery of the Shoulder and Elbow (SECEC) and has served on the Medical Advisory Committee of the National Joint Registry. He is an Associate Editor of Shoulder and Elbow (the official journal of BESS), a BESS representative to the International Shoulder Arthroplasty Consortium (ISAC) and Specialist Adviser to NICE's Interventional Procedures Programme.

He has published articles and book chapters on shoulder and elbow arthroplasty and has lectured on shoulder and elbow surgery nationally and internationally. He has also co written and published a number BESS / British Orthopaedic Association (BOA) Patient Care Pathways (PCP) on shoulder problems, has just completed a Surgical Procedure Guideline (SPG) on the Provision of Primary and Revision Elbow Replacement Surgery in the NHS and is currently a member of the BESS Periprosthetic Joint Infection group.

Dr Rob Townsend

Rob Townsend is currently a Consultant Medical Microbiologist at Sheffield Teaching Hospitals NHS Foundation Trust. He is also an Honorary Clinical Lecturer for both Sheffield Hallam University and the University of Sheffield. He started his working life as a biomedical scientist in microbiology and had his first scientific publication in 1991. Rob went on to pass his BSc honours degree in Biomedical Sciences and subsequently obtained a distinction in his MSc in Pathological Sciences. Rob successfully applied for medical school in 1995 and qualified in medicine in 2000, having done house jobs in medicine, surgery and infectious diseases. Rob was a SHO in infectious diseases before becoming a medical registrar in microbiology in 2002. In 2007 Rob was elevated to his current consultant role.

Rob's main clinical interest area is orthopaedic infections, where he has initiated orthopaedic ward rounds and an arthroplasty MDT on a weekly basis. He also co-created a new bone joint research group at Hallam University, whose special interest is antibiotic implant coatings. Rob gives educational lectures both nationally and internationally on orthopaedic infections. He is one of the main organisers of the annual Orthopaedic Infections meetings held in Sheffield and is currently on the national working party, responsible for the production of national guidelines for the management of orthopaedic infections.

Dr Alysse G. Wurcel

Dr Alysse Wurcel has over fifteen years of experience as a clinician and research working with vulnerable populations, including people who use drugs and criminal justice involved populations. She graduated *magne cum laude* with Highest Thesis Honors in Sociology from Tufts University in Boston, Massachusetts. She worked for three years as HIV and Hepatitis C Virus (HCV) Research Coordinator at the Lemuel Shattuck Hospital and Massachusetts General Hospital in Boston, Massachusetts prior to matriculation at University of Pennsylvania for medical school. She completed internal medicine residency at Massachusetts General Hospital and Infectious Disease Fellowship at Columbia-Presbyterian Hospital in New York City and Tufts Medical Center in Boston. She completed a Masters in Clinical Research at Tufts University School of Medicine. She is an Infectious Diseases Clinician at Tufts Medical Center, and has a joint appointment Assistant Professor in the Department of Medicine, Division of Geographic Medicine and Infectious Diseases and the Department of Public Health and Community Medicine at Tufts University School of Medicine. She is the Infectious Diseases Consultant at four Massachusetts jails. She has authored over 30 articles on the epidemiology and pathophysiology of infections related to drug use including bacterial endocarditis, HIV and HCV. She currently receives funding from National Institute of Health, the Health Resources Service Administration, and industry. Her current research interests include investigating demographic trends in infectious-diseases related healthcare delivery to people who use drugs, and working with a broad range of clinician and non-clinician stakeholders to decrease morbidity and mortality of injections complications of injection drug use.

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SPEAKER ABSTRACTS: THURSDAY

VALUES BASED PRACTICE

Mr Ashok Handa

Last year's Supreme Court ruling in the case of *Montgomery v Lanarkshire Health Board* shifted consent in medicine from the "prudent clinician" test to a "product patient" test. Clinicians are now required to enter into a dialogue with their patients to help them make choices about their treatment that reflect the patient's values. The judgement means that doctors need to learn how to work with values, as well as with evidence.

The idea that values are important in clinical decision making is not new. The General Medical Council's *Good Medical Practice* and the National Institute for Health and Care Excellence guidelines both emphasise the importance of responding to patients' concerns, needs, and preferences.

We describe here our experience running a series of clinician-patient workshops in values based surgical care.

The joint workshops

We ran seven two hour workshops and invited consultant surgeons, trainees, medical students, specialist nurses, allied healthcare professionals, patients, relatives and carers. Numbers were limited to 25 people for each session. All the workshops ended with participants completing a feedback form.

We began each seminar with two short exercises. In the first, participants wrote down three words "that mean values to you".

The second exercise focused on how values came together with evidence in clinical decision making. Here participants had to decide between two hypothetical treatments for a fatal disease they had contracted.

This exercise showed the importance of values in clinical decision making. Everyone started with the same evidence base but, having different values, they made different choices.

Values in the clinical context

In the final part of the session we used anonymised clinical cases. In one workshop we discussed a young woman, working full time in a high pressure job, who was diagnosed with breast cancer shortly after becoming engaged. Values arising in the discussion included: aesthetics in a wedding dress; plans to have a family (chemotherapy and infertility); hormone therapy and reduced fertility; potential risk of pregnancy (in terms of breast cancer recurrence); time off work; and self esteem.

What we learnt

The experiences of four participants illustrated some of the key learning outcomes relevant to the *Montgomery* judgement.

1. What matters is often not obvious

Many participants said that they came away with a raised awareness of the diversity of values. This is an essential first step towards understanding what matters. Often as doctors we assume we know what matters without realising that our assumptions reflect our own values rather than those of the patient. One trainee surgeon who did the workshop with her partner of six years was shocked to find that his value for X was 18 months. "If I could misjudge the values of the man I share my life with so profoundly, just how wrong might I be in assuming that I know what is important to my patients?" she asked.

2. We may not find out what matters

In the breast surgery workshop a senior surgeon showed the group her typical outpatient clinic discussions with a new patient. Both clinicians and patients pointed out, however, that this approach was far from the norm. A breast cancer patient told us how she felt during her treatment, and she was determined that her experience would be different when she had a breast reconstruction two years later.

3. Teamwork is vital

When first diagnosed, patients are exposed to a baffling array of options and may not be ready or able to open up about their real concerns. Working as a team allows sensitive issues to come up naturally at different points in an individuals journey through assessment and treatment.

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A radiographer explained how patients often talked about their concerns and fears for the first time when they were undergoing imaging, and that she felt unsure how to deal with them. When it comes to values, everyone in the team has a role to play.

4. "What would you do, doctor?"

At the heart of the Montgomery criterion for valid consent is the recognition that when it comes to assessing risks and benefits "the doctor's and the patient's perception may differ." But this does not mean that clinical decisions should be passed back to the patient or that they should be bombarded with technical information. The doctor should aim for the patient to understand the risks and benefits from their own point of view.

Even so, many patients end up asking, "So what would you do, doctor?" One consultant surgeon said that his answer starts with, "Well that depends on what is important to you? If you tell me that I can help you make a better decision." The dialogue then develops from there.

Ashok I Handa, Vascular Surgeon
Lucy Fulford-Smith, Core Trainee in Surgery
Nuffield Department of Surgical Sciences, John Radcliffe Hospital

Zoe E Barber, Speciality Trainee Year 4 in General Surgery
Thomas D Dobbs, Speciality Trainee Year 3, Academic Clinical Fellow in Plastic and Reconstructive Surgery
KWWM (Bill) Fulford, Emeritus Professor of Philosophy and Mental Health
Ed Peile, Emeritus Professor, Medical Education
Collaborating Centre for Values-based Practice in Health and Social Care, St Catherine College, Oxford

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SPEAKER ABSTRACTS: THURSDAY

VARIATION IN PRACTICE - WHY WE DO WHAT WE DO

DIAGNOSTICS

Dr Andrew Brent

The laboratory is central to diagnosis of orthopaedic device related infections (DRI) and in characterising the microbiology of infections to guide antimicrobial therapy. We review the effects of optimized tissue sampling, device sonication, and culture methods on diagnosis of orthopaedic DRI.

SURGICAL PRINCIPLES - WORKUP, SAMPLING, PRIMARY CLOSURE

Mr Martin McNally

Surgery is an integral part of the management of most bone and joint infections. Workup for surgery in bone infection is directed towards:

- optimisation of patients with relevant co-morbidities
- confirming the presence and nature of the infection
- understanding the anatomical distribution of the disease
- planning adequate excision and reconstruction

To achieve this, patients must have a planned, specific series of imaging and tissue diagnostic tests. Choice of imaging usually includes plain x-ray and MRI, in the absence of metal implants. CT and ¹⁸F¹⁸FDG PET-CT scanning are reserved for special situations. Plain isotope bone scanning is rarely indicated.

In theatre, there is no place for an 'open up and see' approach. Surgical sampling, dead bone excision and reconstruction (bone and soft tissue) should be planned in advance and follow accepted and validated protocols.

There are few occasions when it is necessary to leave wounds open after excision of chronic bone infections. In some acute infections, with a systemically unwell patient, a rapid, life or limb-saving operation may be needed, with minimal reconstruction, followed by a second stage definitive procedure to eradicate infection. However, good workup will usually allow effective treatment in a single surgical stage.

MEDICAL MANAGEMENT

Dr Matt Scarborough

This talk looks at some of the variables used to determine the choice, dose, route and duration of antibiotic therapy in bone and joint infection. We consider the interdependence of medical and surgical treatments and review some of the recent advances as well as the gaps in the evidence base. As always, the focus necessarily keeps the patient, their symptoms and their functional outcome at the centre of the management strategy. We hope that it will put into context the importance of MDT working and stimulate debate around the optimal management of these often complex patients.

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SPEAKER ABSTRACTS: THURSDAY

WORKSHOPS

FOOT AND ANKLE INFECTION

Mark Rogers, Con Loizou, Ben Lipsky

UPPER LIMB SURGICAL INFECTIONS

Chris Little, Mike Thomas, Andrew Brent

FRACTURE RELATED INFECTION

Martin McNally, Matt Costa, Bridget Atkins

These three workshops will provide an opportunity for interactive discussion around the management of upper limb, foot and ankle or fracture related infection. Much of the discussion will revolve around illustrative case histories that highlight the challenges, tips and tricks, and progress in each sub-specialty. The workshops will be facilitated by both surgical and infection specialists, and active participation of delegates is both welcomed and encouraged.

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SPEAKER ABSTRACTS: THURSDAY

ORTHOPAEDIC INFECTION IN SPECIAL CIRCUMSTANCES

PEOPLE WHO INJECT DRUGS

Dr Alysse G. Wurcel

Osteoarticular infections can occur in people who inject drugs. The management of patients with infections related to injection drug use can be challenging. Pain and withdrawal management in the hospital can require multidisciplinary management, and transitioning patient out of the hospital safely often requires outpatient addictions and harm reduction services. In this lecture, topics specific to osteoarticular infections in people who use drugs will be reviewed, with an emphasis on (1) the changing epidemiology and microbiology of osteoarticular infections related to drug use (2) pros and cons of outpatient intravenous antibiotics treatment in people who use drugs and (3) harm reduction strategies that may help reduce morbidity and mortality in this vulnerable populations.

THE PARAPLEGIC PATIENT

Mr David Stubbs, Dr James Chan

In this talk we hope to explore the particular issues important in the successful management of pelvic osteomyelitis and to demonstrate that with sensible microbiological advice and strict adherence to some basic principles that this still remains well within the scope of the average orthopaedic and plastic surgeon.

ORTHOPAEDIC INFECTION IN RESOURCE POOR SETTINGS

Dr Antonio Loro

Bone and joint infections, although preventable, affect thousands of children in low-income countries around the world and are quite common in areas where poverty, ignorance and inadequate health services coexist. They target underprivileged and disadvantaged children living in remote areas, typically in families that live with less than \$2 per day. They were and still are, regrettably, a marker of the social status of the children affected.

There are no precise data concerning bone infections in Uganda but in medical circles the feeling is that they are widespread, common, unmet, demanding and extremely costly for the National Health System and for the society at large. At CoRSU Rehabilitation Hospital, located in Kisubi, records indicate that in the last eight years, 20% of all surgical procedures were carried out for eradication of infections. In 2017, 339 new cases were handled in our setting; nearly 2.000 since the hospital opening in 2009. They are haematogenous in origin, seen in very advanced stage, difficult to classify due to extremely variable clinical and radiological aspects. Multiple sites localization is not uncommon as well the association with arthritis of the adjacent joint. Operative treatment is the cornerstone of management, not only for the eradication of the infection but also for the reconstruction of bone and soft tissues which is often required once the infection has been controlled.

Proper and timely access to qualified medical institutions represents the key for proper and timely treatment since early presentation can facilitate the cure and prevent the onset of complications that, currently, make permanently disabled quite a good number of children in Uganda.

All these issues will be discussed in detail, with focus on the management system currently in use, while surgical aspects will be presented and highlighted with presentation of clinical cases.

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SPEAKER ABSTRACTS: THURSDAY

FOCUS ON FINANCE

COSTS, TARIFF AND SERVICE STRUCTURE

Mr Jamie Ferguson

In the current financial climate the NHS is expected to drive efficiency savings whilst maintaining the highest standards of patient care. We discuss the pressures faced in delivering multidisciplinary infection services within the current financial situation. We consider the potential future shape of infection services in the UK and highlight the ways in which infection services can take steps to remain sustainable.

CIERNY-MADER LECTURE

CHRONIC ANTIBIOTIC SUPPRESSION FOR PROSTHETIC JOINT INFECTIONS

Professor Eric Senneville

Revision is recommended in patients with diagnosed chronic PJIs in order to remove the implants or at least to debride the infected site and to change the mobile parts of the implants. The aim is to reduce the bacterial load, and the biofilm against which most antibiotics only have a weak activity. In some cases, however, removal of all or part of the infected implants surgery is not in the best interest of the patient for several reasons. In other cases, patients may have lower probability of remission due to suboptimal surgery and/or curative antibiotic therapy, and/or bad general conditions. Chronic antibiotic suppression (CAS) aims to increase in these cases the chance of retaining a functional prosthesis and to reduce the risk of worsening of the infection. However, some important questions such as (i) is there a consensus on what we call « CAS » or « suppressive antibiotic therapy (SAT) » ? (ii) is a patient receiving CAS a failure patient ? (iii) how long should CAS be prescribed ?, and (iv) what are the most appropriate antibiotics to be considered for CAS ? are still unresolved.

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SPEAKER ABSTRACTS: FRIDAY

BIOFILMS AND BIOMATERIALS

ANIMAL MODELS

Professor Louise Kruse Jensen

Bacterial biofilm formation is one of the main reasons for a negative treatment outcome of bone infections. The optimal way to study both the biofilm forming bacteria and the host response simultaneously is by using discriminative, reliable and reproducible animal models. In this presentation the development of a porcine osteomyelitis model will be demonstrated. The pig is the animal of choice when developing and applying large animal models of infectious diseases in humans due to similarities regarding the anatomy, physiology and immune system. The presentation will also show how the porcine model has been used to study antibiotic penetration of infected bone tissue and histological staining procedures that can diagnose and characterize biofilm of bone infections in-vivo.

STRUCTURAL HIERARCHY IN BONE SCAFFOLDS

Professor Jan Czernuszka

This talk will present an overview of the work we have performed over the past few years in developing a set of bone analogues and articular cartilage, made from calcium phosphate, collagen (I and II) and polysaccharides. All of these materials are constituents of bone and cartilage. We use the concept of structural hierarchy to help build up increasingly more biological friendly scaffolds. At the molecular level, collagen is used as a semi-permeable membrane separating reservoirs of calcium ions and phosphate ions. The ions diffuse into the collagen membrane and precipitate within the membrane as a substituted hydroxyapatite. Maintaining the optimized conditions results in optimum values of crystal size, shape and proportions for both mechanical and cellular response.

Larger scale samples are now being produced using solid freeform fabrication. This is akin to an ink jet printer and has allowed us to create three dimensional shapes with complex interior channels and architectures. Several examples of the use of this technology are now currently being developed. We are producing structures with a quasi-haversian system, and graded microarchitectures.

TREATING BIOFILMS ON BIOMATERIALS: WHAT'S NEW?

Dr Carlo Romano

Orthopaedics is currently the largest market of biomaterials worldwide. Implant-related infections, although relatively rare, remain among the first reasons for joint arthroplasty and osteosynthesis failure. Bacteria start implant infection by adhering to biomaterials and producing biofilms, that represent a major reason for bacterial persistence, in spite of antibiotic treatment and host's defense. In the last two decades, a number of different antibiofilm agents have been identified and validated in preclinical and clinical studies. In particular, chemical debonding of bacteria and resorbable antibacterial coatings of implants have recently become available in Europe and in some extra-European countries. Clinical applications of antibiofilm strategies open promising perspectives concerning improved pathogen detection, infection prevention and treatment.

PREVENTION

MANAGING THE RISK IN PROSTHETIC JOINT INFECTION

Dr Alex Soriano

The two-stage exchange is the current gold standard for the treatment of prosthetic joint infections. The clinical success rate in many study cohorts is higher than 90%, however, the majority of these studies just consider those patients that were reimplanted and they do not describe the complications related with the spacer (luxation, superinfection), the rate of positive cultures during reimplantation or the infection rate of the new prosthesis that reach 20% of cases in several reports. Taking into account all these complications the success rate would be <80%. In this lecture we will review the recent advances showing the importance of a positive culture during reimplantation as a predictor of the infection of the new prosthesis and potential solutions to improve the outcome of this procedure.

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SPEAKER ABSTRACTS: FRIDAY

WORKSHOP

INTERPRETATION OF DIAGNOSTIC STUDIES AND THE USE OF BIG DATA

Dr Andrew Brent, Professor Ashley Blom

The workshop will examine synergies between evidence synthesis and analysis of existing datasets such as NJR to determine risk factors for prosthetic joint infection.

NETWORKS AND NATIONAL VISIONS

FRANCE

Professor Frederic Laurent

The management of BJI was included in the 2nd (2005-2008) French national plan to combat nosocomial infection. It is a question of improving management by bringing together in a single reference center the competencies of the various specialties concerned, inspired by the reference centers on rare disease that have been in operation in France for several years. Care quality is basically founded on an organizational set-up ensuring rapid access to diagnosis and appropriate treatment. This involves coordination between the main specialties: surgery, infectious diseases, microbiology, radiology and the general practitioner. Thus, in 2008, the General Directorate for Provision of Healthcare (*Direction Générale de l'Offre de Soins: DGOS*) of the French Health Ministry (*Ministère des Affaires Sociales et de la Santé*) founded a network of regional centers, with particular rules and funding, to facilitate the management of complex BJI: the CRIOAcs (*Centres de Référence des Infections Ostéoarticulaires complexes*). It first approved first eight (and soon nine) CRIOAcs, as well as approval of "corresponding centers" (CCs), in order to provide the most appropriate care possible throughout the national territory.

The aim of the presentation is: (i) to describe the history of this unique national network and how it works; (ii) to specify the missions of the CRIOAcs; (iii) to evaluate the activity of the network over the first decade; and (iv) to discuss global perspectives and innovations with a special topic on the use of phagotherapy.

SPAIN

Dr Alex Soriano

The knowledge in prevention, epidemiology, clinical manifestations, surgical or medical treatment of prosthetic joint infections (PJI) have evolved during the last 20 years. However, the advances have been limited due to the complexity of these infections and the need of a multidisciplinary approach to obtain good results. These characteristics make difficult the inclusion of these patients in clinical trials and the majority of the evidence comes from observational studies. During many years these studies included a few number of patients and it was difficult to obtain definitive conclusions. This was evident in the American guidelines or in the international consensus performed in Philadelphia in 2014. In the first decade of 2000, several centers in Spain and particularly those located in Barcelona, focused their basic and clinical research in PJI but we realized that the conclusions from the individual studies were limited. For this reason, it was decided to start multi-center studies that led to important publications in this field. During this lecture, we will review the organization of this Network, the goals achieved as well as the limitations of the group and the need to look for an European Network able to promote prospective studies and clinical trials to generate definitive answers to so many still open questions.

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FREE PAPERS 1

Title	International survey re the clinical practice of perioperative antibiotic prophylaxis in orthopaedic surgery in Europe
Authors	Christof Berberich ¹ , Nora Renz ² , Andrej Trampuz ²
Addresses	¹ Department of Medical Training, Heraeus Medical GmbH, Wehrheim, Germany ² Centrum für Muskuloskeletale Chirurgie, Charité, Universitätsmedizin Berlin, Corporate Member of Freie Universität, Humboldt-Universität and Berlin Institute of Health, Berlin, Germany

Abstract

Introduction: Due to the easy bacterial colonization of implants, perioperative antibiotic prophylaxis (PAP) is considered mandatory in arthroplasty. However, increasing antibiotic resistancies & higher patient infection risks have raised concerns about the adequacy of current perioperative antibiotic prophylaxis (PAP) strategies.

Aim: To determine & compare the current clinical PAP practice before arthroplasty surgery in university & community hospitals across Europe.

Method: In an anonymous web-based survey, 18 questions were submitted to >2000 registered users of the PRO-IMPLANT Foundation (www-pro-impant-foundation.org) in Feb. 2017.

Results: A total of 358 questionnaires were received & analysed. Countrywise, the majority of answers came from Germany (n=141), Spain (n=38) and Switzerland/Austria (n=37). 249 (70%) questionnaires were filled out by surgeons, 85 (24%) by infectious disease specialists & microbiologists. Most participants work in university or larger community hospitals (>80%).

Key Observations:

1. Cephalosporins (1./2. gen.) are still most widely used in routine PAP (94%).
2. First alternative antibiotic of choice are glycopeptides (65%, in Spain 85%), followed by clindamycin (40%, in Spain 6%).
3. Single shot prophylaxis was reported by 62%. In Spain, however, most participants (70%) favor multiple doses (15% even beyond 24h).
4. Customization of PAP in response to bacterial resistance (MRSA, GNB) was reported by 33% (in Spain 53%).
5. Customization of PAP because of higher infections risks was reported by 72% (in Spain 84%). Main reasons were: septic revisions (80%), long duration of surgery (65%), unclear MRSA status (51%).
6. Dual PAP was considered in determined risk situations in 51% (in Spain 77%). A combination of glycopeptide & cephalosporin was then preferred (57%).
7. Use of a combination of systemic & local antibiotics was reported by 87%. Antibiotic-loaded bone cement (ALBC) with gentamicin was the preferred choice as local antibiotic carrier (92%). 50% use high dose ALBC in high risk patients & septic revisions.

Conclusions: The clinical practice reflects guideline recommendations in many countries (except UK). However, deviations from standard (PAP customization/dual antibiotics) are frequently performed in response to antimicrobial resistance & infection risks. This trend was more pronounced in the South of Europe (e.g. Spain), which may be explained by the higher prevalence of multiresistant pathogens there.

Title **Bone infection – the patient’s perspective**

Authors Philippa Bridgeman, Eve Murphy

Address *University Hospital Birmingham NHS Foundation Trust, Birmingham*

Abstract

Background: Many patients with osteomyelitis require lengthy and often complex management. Outcomes often concentrate on the medical and physical results of treatment with little attention to how osteomyelitis can affect patients’ mental health and social well-being. The aim of this study was to explore the affect osteomyelitis can have on patients’ psychological health, their rehabilitation, home and work life.

Methodology: This was a small single centre study using patient reported questions to assess how patients felt about the wider effects of osteomyelitis. A convenience sample of 10 patients was used. Patients were asked 4 open questions about their personal experience of osteomyelitis and how it affected their lives. Results were collated and common themes extrapolated.

Results: Themes that emerged were feelings of helplessness and dependence on family with concern for the effects on family and caregivers. Loss of role within the family or workplace was identified as a problem with resulting strain on relationships. Patients described psychological effects ranging from low mood to longer term psychological disturbances including post-traumatic type symptoms.

Conclusion: Osteomyelitis has a significant effect on patients social and psychological health and further research is needed into the ongoing support and education required for this patient group.

Title **Four vs. six weeks of antibiotic therapy for chronic osteoarticular infections after implant removal: first interim analysis of a randomized prospective trial**

Authors Mohamed Benkabouche¹, Ilker Uçkay¹, Daniel Lew¹, Benjamin A. Lipsky^{1,2}

Addresses ¹*Geneva University Hospitals, Geneva, Switzerland.* ²*University of Oxford*

Abstract

Objective: The optimal duration of systemic antibiotic therapy for chronic osteoarticular implant-related infections after surgical drainage and implant removal is unknown.

Methods: We conducted a prospective, unblinded interventional study including all adult patients hospitalized on our Orthopaedic Surgery Service for complete removal of an infected osteoarticular implant (including prosthetic joint infections in the two-stage exchange procedure) who were willing to participate. Eligible patients were randomized (1:1) to a 4 or 6 week duration of antibiotic therapy and followed for a minimum of 12 months.

Results: Among 95 included patients, 33 (14 in the 4 weeks’ antibiotic arm, and 19 in the 6 weeks’ arm) who have reached the required 12 month follow-up time were fully analysed. The median age of these patients was 56 years, 23 (70%) were men. The median duration of post-operative intravenous therapy was 3 days. The types of infection treated: two-stage exchange procedure for prosthetic joint infections (n=4); plate infections (16); and, screw or nail infections (5). The most common pathogen was methicillin-susceptible *Staphylococcus aureus*. No multiply resistant bacteria were isolated. There was no difference in the recurrence of infection, which occurred in 1 patient in the 4 weeks’ arm and 1 patient in the 6 weeks’ arm, both after 3 weeks following the stop of antibiotic treatment (1/14 vs. 1/19; two-sided Fisher-exact-test $p=1.0$).

Conclusion: This first interim analysis showed no significant difference with only 4 versus 6 weeks of systemic antibiotic therapy after removal of an infected osteoarticular implant. The trial continues.

Title	Randomized study comparing different durations of antibiotic treatment for diabetic foot infections: first interim analysis
Authors	Ilker Uçkay ¹ , Benjamin Kressmann ¹ , François Jorvaynaz ¹ , Giacomo Gastaldi ¹ , Mohamed Benkabouche ¹ , Benjamin A. Lipsky ^{1,2}
Address	¹ Geneva University Hospitals, Geneva, Switzerland. ² University of Oxford

Abstract

Objective: The optimal duration of systemic antibiotic therapy for diabetic foot infections (DFI) is debated, but has not been properly studied.

Methods: This is a prospective, unblinded, randomized (1:1), two-strata, single-centre trial reflecting real-life conditions. After DFI patients underwent surgical debridement (not amputation), we randomised them to receive either 3 or 6 weeks of systemic antibiotic therapy if they had osteomyelitis, and to 10 or 20 days if soft tissue infections.

Results: Among 131 patients with a DFI screened during 6 months, only 34 (26%) were included and finished the study for this first interim evaluation (15 soft tissue infections, 19 osteomyelitis). The median numbers of surgical debridements for infection or necrosis was 1 (range, 0-2). The median duration of initial intravenous antibiotic therapy was 3 days (range, 0-7 d). The most frequently prescribed oral antibiotics were co-amoxiclav, levofloxacin, and doxycycline.

Cure occurred in 29 patients (85%) at two-months' follow-up. The failures were due to: 1 recurrence; 1 progression to osteomyelitis; 1 new pathogen; and, 2 amputations due to progressive necrosis. For soft tissue infections, 10 days of antibiotic therapy had a similar cure rate as 20 days (8/8; 100% vs. 6/7; 86%; Fisher-exact-test; $p=0.5$); for osteomyelitis, 3 weeks of antibiotic therapy had a similar success as six weeks (7/7; 100% vs. 8/12; 67%; $p=0.2$).

Conclusion: This first and very early interim analysis with 34 patients showed no apparent difference in outcome for shorter compared to longer duration of systemic antibiotics for various diabetic foot infections. The trial continues.

Title	A new method using custom made containers with beads to process periprosthetic tissue from patients with suspected periprosthetic infection
Authors	Manjula Meda, Marcial Navarro, Dev Thakker, Seb Sturridge
Address	Frimley Health Foundation NHS Trust, Frimley

Abstract

Preventing the risk of contamination of peri-prosthetic tissue (PPT) samples from patients with suspected prosthetic joint infections (PJI), either at the time of collection or while processing in the laboratory, is one of the greatest challenges while collecting and processing these samples.

PPT processing has been by various methods, including the collection of samples in containers with Ballotini beads and broth. This is then homogenised and incubated for 5 to 14 days followed by subculture onto plates. This method has been shown to minimise contamination and allow recovery of organism, however, the potential for contamination during repeated subcultures remain.

Recent studies have shown that inoculation of homogenised tissue into blood culture (BC) bottles to be a more sensitive culture method for isolation of the pathogens than culture of manual broths.

In this study we evaluated the effectiveness of using a tissue homogeniser to homogenise PPT followed by inoculation onto blood culture bottles. The aims of the study were we access: 1) if the tissue homogeniser was more effectively than Ballotini beads; 2) which of the 2 - Zirconium vs stainless steel beads were more effective in homogenisation; 3) optimal duration of tissue homogenisation. We also compare rates of tissue contamination between the two methods.

Homogenisation of PPT in stainless steel beads in custom made sterilised containers with inoculation into blood culture bottles is a novel method of processing PPT minimises contamination, is more sensitive compared to manual broth cultures and reduces staff time required for processing these tissues within the laboratory.

Title	Improved infection rates with staged management of severe open tibia fractures with bone transport with circular frame. Our early experience.
Authors	<u>Dimitrios Giotikas</u> , Matija Krkovic
Address	Cambridge University Hospitals NHS Foundation Trust, Cambridge

Abstract

The aim of this study is to present our method and early results on the management of severe open tibia fractures with circular frame and bone transport. Patients were treated in two stages. The first stage consisted of serial bone debridement, temporary fracture fixation and definitive soft tissue coverage. The second stage consisted of definitive fixation with circular frame.

The study was designed as a retrospective cohort study. Inclusion criteria were: patients older than 16 years with open tibia fractures with segmental bone loss, treated with bone transport with circular frame. Clinical and radiological data was collected and analysed with descriptive statistics.

Seventeen fractures in seventeen patients with a mean age of 44 years (20 to 69) were identified. There were fifteen Gustillo grade IIIB and two IIIA tibia fractures. Mean follow-up was 20 months. The mean timing for the first and second stage was six and 26 days since injury respectively. At the most recent follow up, union was achieved in 16 cases; one case was progressing towards union. No amputations were needed. No deep infection was encountered. Alignment and range of movement was satisfactory. The mean time on the frame was 473 days. Mean external fixator index (EFI) was 84 days/cm. Two patients sustained re-fracture within three months after removal of frame. On average, patients required six surgeries and 14 outpatient appointments.

In severe open tibia fractures, early proactive management with radical bone debridement and bone transport with circular frame may significantly improve the infection rates.

Title	Service evaluation of University Hospital Southampton (UHS): prosthetic joint infection
Authors	<u>Aaron Yeung</u> , <u>Edward Gardner</u> , Graeme Jones
Address	¹ University of Southampton

Abstract

Background: Prosthetic joint infections (PJI) are a devastating complication of joint arthroplasty. Infection may be difficult to diagnose, and treatment poses significant challenges for the patient and multi-disciplinary team. Treatments include DAIRs, one and two-stage revisions.

Aims: To examine the outcomes of the combined microbiology and surgical approach of treating PJI at UHS in comparison to the existing literature.

Methods: 94 patients with an infected total hip or knee replacement were identified from our database between 2014-16. The median length of follow up was 15 months. Patients were recorded infection-free if at last follow up there were no signs of ongoing infection. Secondary outcomes were determined using Oxford hip and knee scores.

Results: There were 27 infected hip replacements and 67 infected knee replacements from the 94 patients. A total of 118 surgical operations were recorded. Infection was cleared in 51% of the 41 DAIR procedures and in 43% of the 7 one-stage revisions. Infection was cleared in 73% of the 70 two-stage revisions. There were 3 amputations and a 24% complication rate. There were significant increases in health gain after treatment. Any procedure was more likely to fail if the infection was polymicrobial or involved *Streptococcus* bacterium ($p=0.0013$).

Conclusion: Our two-stage revisions had a success rate comparable to the literature despite UHS being a tertiary referral centre. DAIR and one-stage procedures had lower success rates, this may be attributed to limiting the number of operations for frail patients. We advocate a combined Surgical and Microbiology approach towards treating PJIs.

7TH ANNUAL OXFORD BONE INFECTION CONFERENCE

Thursday 22nd & Friday 23rd March 2018

FREE PAPERS 2

Title	MRSA infection in bilateral total hip replacement in patient with bilateral metal on metal hip replacement
Authors	<u>Naveed Ahmed</u> , Samer Shamooun, Scott Parker, Aled Evans
Address	<i>Royal Gwent Hospital, Newport</i>

Abstract

Introduction: Septic failure in metal on metal (MOM) total hip replacement (THR) is unusually high. Some reporting an incidence as high as 6.7%. Infection in bilateral hips presenting at the same time can be devastating to the patient and hard to manage for the surgeon with two stage revision surgery.

Aim: To highlight a rare presentation of bilateral MRSA infection in bilateral metal on metal hip presenting at the same time and to discuss the challenges in the management of the patient.

Method: This 70 year old patient presented with acute left hip pain over a period of 3 days. He has a background history of bilateral (MOM) THR (CLS/Durom hip) done 10 and 13 years ago. He had raised inflammatory markers. There was lysis around the left greater trochanter on X-ray. MARS MRI which showed extensive collections around both hips. Bilateral hip aspiration grew MRSA growth on cultures in both the hips. First stage revision performed at the same time for both hips showed frank pus with tracking into soft tissues. Cups were removed but stems were retained as they were well fixed. Extensive metallosis was found with the synovitis. We used antibiotic infused palacos cement with two ceramic heads. We managed to close the wounds primarily.

Discussion: Infected MOM hips pose a significant problem. Bilateral first stage revision surgery is a challenge in post-operative care.

Conclusion: High index of suspicion is required for patients with Mom hips for the possibility of infection.

Title	The progressive microbiology of repeated orthopaedic surgery and effective use of tedizolid
Authors	<u>Emma Nickerson</u> , Kenan Kursumovic, Katherine Sharrocks, Andrew Carrothers
Address	<i>Addenbrooke's Hospital, Cambridge</i>

Abstract

The 81-year old patient initially presented in July 2017 following a road traffic accident with multiple fractures including vertebrae, ribs and right acetabulum, on a background of diabetes, metallic valve replacements, atrial fibrillation and hypothyroidism. She underwent a right acetabular open reduction and internal fixation of posterior wall fracture combined with right total hip replacement 4 days after admission. The metalwork subsequently became infected with *E. coli* and *Klebsiella pneumoniae*. The infection was managed with a washout and debridement followed 8 days later by formal debridement and implant retention (DAIR). Her antibiotics were initially flucloxacillin, then broadened to empirical vancomycin and tazocin and following cultures rationalised to co-amoxiclav. Late culture growth revealed *Serratia marcescens* from the DAIR operation so her therapy changed to meropenem. The situation was further complicated by a right tibial plateau fracture managed conservatively with a brace, and a haematoma subcutaneously over the hip which was washed out and the femoral head exchanged. Cultures from this operation grew *Pseudomonas aeruginosa* and vancomycin-resistant *Enterococcus faecium*. The latter was only sensitive to linezolid and tigecycline, for which oral linezolid was used. In light of sensitivity results the meropenem was changed to oral ciprofloxacin. Her in-patient rehabilitation was complicated by dislocating her right hip and progressive bone marrow suppression on linezolid. When she became significantly pancytopenic, we switched her linezolid to tedizolid to complete her antibiotic course, nearly another 7 weeks. On tedizolid she recovered her blood counts. She successfully completed treatment and remains infection free 2 months later...

Title **Osteoarticular infection due to *Streptococcus pneumoniae*: a case series**

Authors Kate Woods, Aileen Boyd

Address *Homerton University Hospital, London*

Abstract

We describe 5 cases of osteoarticular infection due to *Streptococcus pneumoniae* presenting to an inner London hospital between April 2015 – March 2017. 4 patients were male, one female, median age was 52 years (range 36-59 years) 4 were of black ethnicity. Four patients had spondylodiscitis, two of whom also had septic arthritis (1 knee, 1 elbow). One patient had septic arthritis of the knee without spinal involvement. Risk factors for invasive pneumococcal disease were identified in 3 patients: HIV, diabetes and paraproteinaemia. Pneumococcal infection was confirmed by blood culture in 3 patients, 1 of whom also had *S. pneumoniae* isolated from joint fluid. *S. pneumoniae* was isolated from joint fluid and tissue biopsy in the remaining two patients respectively. All isolates were penicillin sensitive and serotyping indicated that only 1 [k1] was vaccine preventable.

Patients received intravenous antibiotics (benzyl penicillin or ceftriaxone) for between 4 and 8 weeks, followed by oral antibiotics for 4 to 8 weeks (doxycycline, clindamycin, amoxicillin or levofloxacin). Two patients received adjunctive oral rifampicin throughout their course.

Three patients deteriorated symptomatically and/or radiologically despite commencing appropriate antimicrobial therapy and had a prolonged treatment course. Four patients had persisting pain or reduced joint movement at the end of treatment.

Conclusion: Pneumococcus is an under-recognised cause of bone and joint infection and in our case series has been associated with severe, multi-focal disease particularly involving the spine. The majority of patients had pain or reduced mobility at the end of treatment despite appropriate therapy.

Title **Native right knee infection with an unusual pathogen, a diagnostic challenge**

Author Gloria Kiapi

Address *Great Western Hospital NHS Trust, Swindon*

Abstract

A 74 year old male presented to Accident and Emergency on 24th December 2017 with right knee swelling. His background medical history included severe right knee osteoarthritis for which he was receiving steroid injections from his GP. Ten days prior to presentation, he had received a steroid injection into his right knee.

On examination, he was afebrile but non-weight bearing with reduced range of movement, right knee effusion and mild erythema. His white cell count was 12.9 with a C-reactive protein of 82.

Microscopy of a joint aspirate showed calcium pyrophosphate crystals, white cells seen but no organisms. On culture the *Staphylococcus caprae* isolated and identified by vitek was on balance considered to be a contaminant and patient discharged home with a diagnosis of pseudogout.

Presented to A/E on 2nd January 2018 with increased knee swelling and c-reactive protein.

An arthroscopic knee washout was done and the patient covered with intravenous benzylpenicillin and flucloxacillin as per trust guidance for native knee joint infection. However CRP continued to rise and patient developed atrial fibrillation from sepsis.

Open knee wash out done and tissues sent grew *Staphylococcus caprae* from both samples. The isolate was sensitive to flucloxacillin and mecA negative. He was started teicoplanin monotherapy with good results.

Discussion: Challenging case around a native knee septic arthritis caused by a skin commensal in the context of multiple joint pathology. Interestingly, despite flucloxacillin sensitivity and MecA gene negativity, the isolate did not respond to flucloxacillin requiring a glycopeptide and further joint washout.

Title **Culture negative prosthetic joint infection - a snappy case report**

Authors Helen Chesterfield, John McFall

Address Portsmouth Hospitals NHS Trust, Portsmouth

Abstract

A 54-year-old woman with bilateral total knee replacements presented with suspected pyelonephritis and was commenced on IV co-amoxiclav.

Within twenty-four hours she developed a painful, swollen left knee. A synovial aspirate was sent for MC&S and empiric IV Vancomycin and Gentamicin was commenced. The patient underwent surgical debridement and implant retention (DAIR) 3 days later. All samples were culture negative after 7 days incubation.

16s PCR subsequently revealed *Capnocytophaga canimorsus*. On further questioning it transpired the patient had received a seemingly innocuous dog bite to her hand a few days before admission. She attended the local minor injuries unit and was discharged with advice to seek medical help if the wound became infected. No antibiotic prophylaxis was offered.

C. canimorsus is a rare cause of culture negative prosthetic joint infection. It is a fastidious gram-negative rod, commonly found in dog saliva, and is difficult to culture. It is a cause of sepsis and peripheral gangrene after dog bite exposure and PHE guidelines recommend prophylactic antibiotics within 72 hours. Successful treatment of *C. canimorsus* prosthetic joint infection, treated with exchange arthroplasty has previously been reported.

Post-discharge the patient received six weeks of PO Ciprofloxacin 750mg BD and is completing a 4-month course of PO Amoxicillin 1g TDS. She has made excellent progress.

Arthroplasty patients should be strongly advised to request prophylactic antibiotics promptly following dog bite exposure. A thorough history is crucial as patients with *C. canimorsus* infection do not always have obvious infection at the original bite.

Title **A limp and some lumps**

Authors Emma Hayton^{1,2}, Martin Siguier¹, Samia Hamane¹

Addresses ¹Hopital Saint-Louis, APHP, Paris, France. ²Heart of England Foundation Trust, Birmingham

Abstract

A 25 year old West African man presented with several weeks of left hip pain. He had no relevant past medical history. On examination, he had pain on hip flexion and difficulty weight bearing. He had several subcutaneous skin nodules, and left inguinal lymphadenopathy. On further questioning, he reported night sweats and had already consulted a dermatologist, who had prescribed doxycycline, and an orthopaedic surgeon, who had requested a CT scan of the lumbar spine, reported as normal.

He was HIV and hepatitis C negative but hepatitis B positive.

Diagnosis was made on an aspirate from a skin nodule. Microscopy showed yeast forms and PCR and culture were positive for *Histoplasma capsulatum* var *duboisii*; a dimorphic fungus endemic in central and west Africa. Further imaging showed a large psoas abscess and involvement of the left acetabulum. Bone and soft tissue samples were also positive for *Histoplasma*.

He underwent surgical drainage of skin nodules and of the psoas abscess and was treated with 4 weeks of intravenous liposomal amphotericin B followed by oral itraconazole.

African histoplasmosis is rare, and usually reported in HIV- positive patients with severe immunosuppression.

Title **An unusual case of osteomyelitis**
Authors AJ Taylor, P Arkell, I Kamara, A Arnold
Address *St George's Hospital, Tooting, London*

Abstract

A 54 year old gentleman presented to hospital in July 2017 with right leg pain after dropping a fridge on his right leg. He had a past medical history of intravenous drug use in his youth and was Hep C antibody positive (RNA negative). He mentioned that he had a pet dog who was currently unwell.

Imaging showed osteomyelitis in the distal femur and proximal tibia, and he underwent debridement and washout. Initial samples grew *Variovarus paradoxus* and *Staph. epidermidis*, and 16S subsequently identified *Capnocytophaga canimorsus* in 2 samples. He initially improved on Ertapenem and Teicoplanin but later developed a discharging sinus from the knee. A further washout was performed and a large cavity was seen in the tibia. Cultures were negative but 16S again identified *Capnocytophaga canimorsus* in 1/3 samples and 18S (fungal PCR) identified *Lecytophthora* sp. Histology showed evidence of granuloma. He was treated for a chronic osteomyelitis caused by *Capnocytophaga* sp. with ceftriaxone followed by oral co-amoxiclav + amoxicillin and for *Lecytophthora* sp with oral voriconazole. He is currently clinically improving and has regular follow up.

This case describes an unusual cause of osteomyelitis by 2 organisms. *Capnocytophaga* is a recognized cause of osteomyelitis, commonly associated with dog bites, and is more common in the immunosuppressed. *Lecytophthora* is an ascomycete fungi which is rarely implicated in human disease. Disseminated infection has been described in the immunosuppressed and osteomyelitis has been reported in animals.

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FREE PAPERS 3

Title	Panton-Valentine Leukocidin associated <i>Staphylococcus aureus</i> musculoskeletal infection in children. A reflective case series of long term complications.
Authors	Grace Yip ¹ , Dominic Davenport ¹ , Tejshri Shah ¹ , Gavin Spence ^{1,2} , Fabian Norman-Taylor ^{1,2} , Michail Kokkinakis ¹
Addresses	¹ Evelina London Children's Hospital, London. ² Great Ormond Street Hospital, London

Abstract

Background: Panton-Valentine Leukocidin (PVL) is a cytotoxin made by some strains of *Staphylococcus aureus*. PVL-positive *S. aureus* infections (PVL-SA) can result in septic shock, extensive and/or multiple soft tissue, bone and/or joint infections and necrotising pneumonia. This case series of PVL-SA infections with musculoskeletal involvement in a paediatric population illustrate presentation, management and destructive sequelae.

Cases:

Case 1: 2 month old with septic shock, ARDS and leg swelling. Subsequently she had distal femoral growth arrest secondary to acute osteomyelitis. She also had myositis.

Case 2: 20 month old with septic shock, ARDS and acute shoulder septic arthritis. There was subsequent chronic osteomyelitis of the humerus with pathological fracture and non-union treated with vascularised fibula graft.

Case 3: 15 year old with acute ankle septic arthritis, subsequent chronic osteomyelitis of the distal tibia with chondrolysis and clinical arthrodesis.

Case 4: 10 year old with right distal femoral osteomyelitis, pathological fracture and bone loss treated with external fixator and bone transport. He also had infective endocarditis and thromboemboli.

Conclusion: PVL-SA should be considered in patients presenting with severe sepsis. PCR is essential for diagnosis. Early microbiology/infectious disease advice is essential as medical treatment targeting the toxin in addition to empirical antimicrobials and supportive care may improve outcomes. For musculoskeletal infections, multiple surgical debridements are necessary and devastating long term complications of joint destruction and bone loss can develop. Increased awareness of the rapid onset and severe consequences of PVL-SA with early microbiology/infectious disease and surgical input are essential.

Title **The correlation between synovial fluid cultures and gram staining in presumed joint infections**

Authors Herbert Gbejuade, Mohamed Elsakka, Lucy Cutler

Address ¹*University Hospitals of Leicester*

Abstract

Background: Gram stain analysis is one of the parameters commonly used to investigate suspected joint infection. However, the reports of low sensitivity of this test raises concerns that a negative gram stain report may result in a false reassurance despite the presence of infection. Therefore, we evaluated the correlation between joint aspirate cultures and gram stain.

Method: We retrospectively reviewed microscopy and culture reports of aspirates from suspected infected joints, between August 2015 and Aug 2017. Majority of the samples were retrieved from knee joints and hip joints (81%) and samples from both native joints (46.4%) and prosthetic joints (53.6%) were evaluated.

Results were statistically analysed for sensitivity and specificity.

Results: 1,885 consecutive synovial fluid samples were evaluated. 596 samples were excluded due to incomplete data or clerical errors.

From the 1,289 samples remaining, organisms were cultured in only 221 samples. Of these, 185 samples yielded gram positive bacteria only (with positive corresponding gram stain results in 35 samples); 29 samples yielded gram-negative bacteria only (all with negative gram stain results); 3 samples yielded a mixture of gram positive- and negative bacteria (but with all samples being negative for gram staining) and 4 samples yielded fungi (all of which were negative for gram staining).

Statistical analysis revealed the sensitivity of gram stain to be 18.6%, specificity of 99.6% and a negative predictive value of 87%.

Conclusion: Our study shows that gram staining has a poor sensitivity but high specificity for detecting gram stain positive organisms in synovial fluid.

Title **The role of theatre shoe contamination in the development of prosthetic joint infection**

Authors Kevin Clesham¹, Phelim Ryan², Colin Murphy¹

Addresses ¹*Department of Trauma & Orthopaedic Surgery, Galway University Hospitals, Ireland*
²*Department of Microbiology Galway University Hospitals, Ireland*

Abstract

Background: Theatre shoes worn daily in an orthopaedic theatre have the potential to accumulate and transmit harmful bacteria. No standard guidelines exist for their hygiene, with many owners cleaning their shoes only when extensive visible contamination is present.

Objectives: Assess a sample of orthopaedic shoes for the presence of bacteria known to cause prosthetic joint infection, difference between named and communal shoes and to establish if shoes with abundant visible spatter carry more bacteria.

Study Design & Methods: 40 theatre shoes worn regularly in an orthopaedic theatre were selected. These were tested for staphylococci, streptococci, enterococci and resistant organisms (MRSA & VRE). Faecal occult blood test assessed for presence of blood and percentage of blood spatter was measured using Irfanview 4.27.

Results: Coagulase negative *Staphylococcus* was isolated from 25 shoes (65%), *Staphylococcus aureus* from 16 (40%), Methicillin-resistant *Staphylococcus aureus* (MRSA) from 10 (25%), and vancomycin-resistant *Enterococcus* in 2 (5%). Blood was present in 80%. Increased blood spatter was associated with an increased presence of *Enterococcus faecalis* ($p < 0.01$), decreased spatter associated with presence of MRSA ($p < 0.01$) and *Staphylococcus epidermidis* ($p < 0.02$). Un-named shoes carried more *Staphylococcus aureus* ($p < 0.04$).

Conclusions: Common organisms causative of prosthetic joint infection are found on the surface of theatre shoes. MRSA and VRE were also found on a selection of shoes, with MRSA in particular was more likely to be found on shoes appearing 'cleaner'. These results demonstrate the importance of a universal cleaning protocol to be developed, and we provide recommendations for this to be implemented.

Title	Bone and Joint Infection Multidisciplinary Team (MDT) meetings in a large district general hospital in London: experience of four years
Authors	<u>Guduru Gopal Rao, Muhammad Alam, Waleed Chaudhry, Cenk Oguz, Hassan Hirji, Tumena Corah, Priya Khanna, Denis Remedios</u>
Address	<i>Northwick Park Hospital, Harrow</i>

Abstract

Against a background of inconsistent diagnoses and management of joint replacements and complicated bone and joint infections (BJI) in the trust for several years, we started a weekly Bone and Joint Infection MDT meeting (BJIM) in July 2013. The BJIM group comprises consultants in orthopaedic surgery, microbiology, radiology and infectious diseases.

The aim of the BJIM was to provide consistent, evidence based multidisciplinary expert advice for management of BJI and to identify and review clinically important post-operative infections. A further objective was to supplement and provide accurate information for Public Health England's surgical site infection surveillance programme. Since its inception, BJIM has advised on over 500 infections and receives referrals from orthopaedics, microbiology, rheumatology, paediatrics and care of the elderly departments. The advice of BJIM is recorded in the 'E-trauma' database and also communicated to clinical teams.

In a review of referrals (n=84) received since March 2017, we found that advice was given to stop antimicrobial therapy in 13% (n=11), to alter antimicrobial therapy in 7% (n=6) and advice regarding the total length of antimicrobial therapy in 38% (n=32) of referrals. Surgical intervention was recommended in 19% (n=16) and 21% (n=18) of patients were sent for further investigations.

In conclusion, BJIM plays an important role in antimicrobial stewardship, avoiding unnecessary antimicrobial treatment, prolonged hospital admissions and has substantially improved diagnosis and management of bone and joint infections in our hospital.

Title	Experience of implementing OVIVA in a specialist orthopaedic hospital
Authors	<u>Tariq Azamgarhi¹, Chin Swee¹, Katy Crick¹, Shara Palanivel^{1,2}, Ashik Shah¹, Simon Warren^{1,2}</u>
Addresses	¹ Royal National Orthopaedic Hospital, London. ² Royal Free Hospital, London

Abstract

Aim: To describe our experience of implementing OVIVA in a specialist orthopaedic hospital.

Method: We collected data on demographics, treatment, factors influencing treatment decisions and costs.

We gathered data prospectively for nine months after the change in practice (May 2017 to December 2017), and retrospectively on all patients receiving treatment for similar time period before the change in practice (May 2016 to December 2016).

Results: In the pre-OVIVA group there were a total of 60 patients, of which 31 were male. The average age was 63 years (21-91). At 6 weeks there was cure in 24 patients, improvement in 32 and failure in 4 (6.7%).

In the post-OVIVA group there were a total of 53 patients, of which 26 were male. The average age was 57 years (21-82). 21 (38.9%) received IV and 32 (61.1%) received PO treatment. Reasons for intravenous treatment included multi-drug resistance (16), concern regarding adherence (2), allergies (1), malabsorption (1) and other (1). At 6 weeks there was cure in 38 patients, improvement in 8 and failure in 7 (13.2%), of which 5 were in the oral group. In the intravenous group there were 2 adverse drug reactions (ADRs) compared with 9 in the oral group, including 3 readmissions.

Conclusions

- There was a slight increase in early clinical failure in the post-OVIVA group.
- 38.9% of our cohort still required IV treatment.
- There were more ADRs and readmissions in the PO group.

Title **High prevalence of digital osteomyelitis secondary to delayed presentation**

Authors Catriona Luney, Roba Khundkar

Address *Wexham Park Hospital, Slough*

Abstract

Introduction: Osteomyelitis, infection of bone most commonly affecting the metaphyses and the distal phalanx, in fingers is uncommon (1% of hand infections) however is of great clinical significance with delayed management potentially leading to amputation. Risk factors for developing osteomyelitis include patient factors; immunocompromised, extremes of age, systemic disease and delayed presentation of soft tissue infections, and direct factors; recent trauma, post-surgical, haematological and contiguous spread. Can key determinants be identified to minimise risk and prevent osteomyelitis?

Results: Retrospective data was collected from August 2015-2017 at a single Plastic Surgery Department. 27 patients were diagnosed with osteomyelitis of an upper limb digit. 48% of patients presented with chronic paronychia that failed to respond to treatment in the community. 37% presented with history of trauma. 100% patients underwent x-ray imaging and 50% also had magnetic resonance imaging. 81% patients had osteomyelitis confirmed through this modality. Gram positive bacteria were the most common pathogens with 11 cases of *Staphylococcus aureus*, 1 MRSA, 2 *Staphylococcus epidermidis*, 2 *Staphylococcus lugdunensis* and 2 *Enterococcus* species. All patients underwent surgical debridement; 85% within 7 days of presentation. Antibiotic treatment was given in line with microbiology guidelines and with consultation with Consultant Microbiologists.

Conclusion: Results demonstrate a high incidence of osteomyelitis in our population with no clear patient characteristics. However almost half of our patients incurred a delay in presentation whilst being treated in the community with prolonged courses of antibiotics. There needs to increased awareness in primary care regarding the prompt treatment and referral of hand infections, thus reducing the risk of developing osteomyelitis.

Title **Assessment of multiplex-PCR as a point of care test**

Authors Hamish Lowdon, Ahsan Sheeraz, Akash Patel, Tony Andrade, Shabnam Iyer

Address *Royal Berkshire Hospital, Reading*

Abstract

Background: With the increasing adoption of joint replacement to improve mobility in all age groups, the incidence of prosthetic joint infections (PJIs) is rising. It is imperative to diagnose PJIs and start targeted antibiotics early to get an effective outcome. We report the results of the Multiplex-PCR system as a point of care test in the orthopaedic theatre.

Methods: This was a prospective observational study, conducted between April and December 2017, to compare the automated m-PCR Unyvero I60 ITI cartridge system with conventional culture. Patients over the age of 18, where microbiological samples were being taken for potential diagnosis of infection were included and patients with incomplete data or invalid samples were excluded.

Results: 39 valid samples from 27 patients were included in the study. There were 15 males and 12 females, average age 64.7 (32-87). The results showed the m-PCR Unyvero system as having a sensitivity of 57%, specificity of 84%, positive predictive value of 67% and a negative predictive value of 78%.

Conclusion(s): m-PCR system gives a rapid identification of 114 bacterial or fungal pathogens along with anti-microbial resistance markers, with results available within 4-5 hrs at the point of care, hence targeted antibiotics can start instead of patient remaining on generic antibiotics for days awaiting conventional culture results. The overall diagnostic results are comparable to culture, and this is superior in detection of low-virulent bacteria as well as detection of organism in patients already on antibiotics.

The numbers in the study are however small and more large scale studies are needed for further analysis.

Implications: This study has wide reaching implications, because it saves crucial time allowing effective treatment to start within hours, saving multiple bed days for the NHS and a more satisfactory experience for the patient.

7TH ANNUAL OXFORD BONE INFECTION CONFERENCE

Thursday 22nd & Friday 23rd March 2018

BEST FREE PAPERS

Title	Efficacy and safety of a topical gentamicin-collagen sponge (GCS) in combination with systemic antibiotic therapy for moderate or severe diabetic foot ulcer infection (DFUI): a randomized, controlled study
Authors	Ilker Uçkay ¹ , Benjamin Kressmann ¹ , Sarah Malacarne ¹ , Anna Toumanova ¹ , Jaafar Jaafar ¹ , Daniel Lew ¹ , Benjamin A. Lipsky ^{1,2}
Addresses	¹ Geneva University Hospitals, Geneva, Switzerland. ² University of Oxford

Abstract

Objective: Outcomes of treatment of moderate/severe infected foot ulcers in persons with diabetes are suboptimal, despite appropriate systemic antibiotic therapy.

Methods: In this single-center, investigator-blinded, pilot study, all eligible patients with a DFUI received systemic antibiotic therapy (levofloxacin [\pm clindamycin] or amoxicillin-clavulanate) for 14-28 days, and were randomized (1:1) to receive either adjunctive treatment with a GCS or no sponge.

Results: Over 3 years we enrolled 88 DFUI episodes (77 moderate, 11 severe): 43 patients were in the gentamicin-sponge arm and 45 in the control arm. Overall, 64 (73%) of the patients achieved clinical cure of their DFUI, 13 (15%) had significant improvement, 1 was a failure; 46 (52%) showed eradication of all baseline pathogens at the final visit. By multivariate analysis adjusting for the case-mix, there was no significant difference in clinical cure rate between those who received the GCS and those who did not in combined "cure and improvement" (26/45 [58%] vs. 31/43 [88%], Pearson- χ^2 -test; $p=0.16$). There was also no significant difference in the rate of pathogen eradication. Those in the GCS arm tended to a more rapid healing and the sponge was well-tolerated, without any attributable adverse events.

Conclusions: In this randomized controlled trial, adjunctive therapy with a GCS added to systemic antibiotic therapy did not significantly improve resolution of infection or eradication of pathogens. The GCS was, however, well-tolerated and tended to shorten the healing time.

Title **A retrospective review of the management of spinal injury patients with pressure ulcers and underlying osteomyelitis at The Royal National Orthopedic Hospital**

Authors Gabriel Wallis^{1,2}, Chris Dugan^{1,2}, Simon Warren^{1,2}

Addresses ¹Royal National Orthopaedic Hospital, London. ²Royal Free Hospital, London

Abstract

We carried out a retrospective review of admissions to the Royal National Orthopedic Hospital Spinal Rehabilitation Unit between April 2011 and October 2017. During this time 58 admissions took place for definitive management of pressure ulcers with underlying osteomyelitis.

58 admissions were identified for this study and included 48 men and 10 women. Age ranged from 24 to 91 years (mean 49). All patients had a preexisting spinal injury. Patients were managed with debridement followed by either primary closure, (23 patients) negative pressure wound therapy, (12 patients) skin grafting / flap surgery (22 patients).

Length of stay ranged from 21 to 458 days (mean 123). Length of stay was highest in patients managed with debridement and negative pressure wound therapy (mean 155 days). Length of stay in patients managed with debridement and skin grafting or flap surgery (mean 144 days) was higher than patients managed with debridement and primary closure (mean 83 days).

At the time of writing 3 patients have died and 14 patients have relapsed. Of the patients who have relapsed the time to relapse ranged from 11 to 1792 days (mean 487). Relapses were seen in patients managed with negative pressure wound therapy (4 patients), primary closure (6 patients) and skin grafting or flap surgery (4 patients).

This retrospective analysis supports debridement and primary closure as the optimal management strategy for spinal injury patients with pressure ulcers and osteomyelitis based on shorter length of stay. Relapse rates were similar in all groups although numbers were small.

Title **Use of an expendable free muscle flap for dead space management within or adjacent to the joint for staged total knee replacement in presence of chronic sepsis: three cases**

Authors Alex Crick¹, Neal Jacobs¹, Simon Tilley², Nick Hancock²

Addresses ¹Salisbury NHS Foundation Trust, Salisbury
²University Hospital Southampton NHS Foundation Trust, Southampton

Abstract

Introduction: Total knee replacement (TKR) is a challenging problem in the presence of an inadequate skin envelope and bone sepsis and requires a staged orthoplastic approach to reconstruction.

Method: One case presented with increasingly painful osteoarthritis and chronic osteomyelitis of the proximal tibia. The second case presented with florid implant associated sepsis following primary total knee replacement. The third case presented with sepsis extending into the joint following internal fixation of a proximal tibial fracture. All cases underwent excision +/- removal of metalwork creating the definitive skin and bone defect at the first stage. Reconstruction with a chimeric free flap was undertaken at the second stage during the first admission using a skin flap to reconstruct the skin defect and a muscle flap to manage dead space within the bone or joint. TKR was undertaken at the third stage during a second admission, excising the muscle flap. A free fabricated chimeric flap with gracilis muscle in sequence with an anterolateral thigh flap was used for two cases and a free indigenous chimeric flap consisting of an anterolateral thigh flap plus vastus lateralis muscle was used for one case.

Results: All patients healed primarily. There were no flap related complications. All implants are retained 3.5 years, 18 months and 3 months following TKR.

Conclusion: A muscle flap that is subsequently excised may be considered as an alternative to cement or bone substitute in the management of bone defects in the presence of sepsis pending TKR.

Title **Bone transport by hexapod external fixator in tibial segmental bone defects secondary to infection and trauma**

Authors Hamed Mazoochy, [Alexandros Vris](#), Jade Brien, Nima Heidari

Address *Royal London Hospital, London*

Abstract

Introduction: Segmental bone defect is a challenging problem. We report our experience of bone transport by hexapod external fixator.

Method: Fifteen patients had bone transport with Taylor Spatial Frame from 2012 to 2017. All were treated by the senior author NH.

Parameters measured included age, sex, diabetes, smoking, diagnosis, method of fixation prior to treatment use of a free flap, bone defect size, frame-time, external fixation index.

Results: Mean age at the time of frame application was 42.7 years. Mean follow-up after frame removal was 23.7 months. Three were diabetic, one smoked and one quit smoking during treatment. Seven had Gustilo 3B (47%) and 5 Gustilo 3A (33%) open fractures. Three (20%) had closed fractures. Nine (60%) had internal fixation with plate in eight and IM nail in one. Ten patients (67%) had soft tissue defect that required a free flap in seven, local flap in two and skin graft in one. Mean transport was 62 mm. Mean external fixator time and latency were 350.1 and 12 days, respectively. Mean External fixator, distraction and maturation indices were 2.1, 0.52 and 1.43 month per centimeter, respectively. Ten Extra- procedures were required in 7 patients. There were no docking site procedures, non-union of regenerate, adjunctive stabilization after frame removal, recurrence of bone infection and recurrence of deformity.

Conclusion: Segmental resection and transport by TSF is an effective method to achieve length, alignment and eradicate infection. Although our cohort had longer external fixator indices than similar studies, the complication rate was low.

Title **Diagnosing periprosthetic joint infection: an independent, single-centre assessment of the alpha-defensin laboratory test**

Authors Ali Raza, [Marina Diamant](#), Igor Kulbelka, Paul Baker, James Webb, Andrew Port, Simon Jameson

Address *James Cook University Hospital, Middlesbrough*

Abstract

Introduction: Periprosthetic joint infection (PJI) is difficult to diagnose. The efficacy of the alpha-defensin laboratory test was examined and compared with other modalities in the diagnostic workup of arthroplasty patients.

Methods: A retrospective review of 210 episodes (86 hips, 124 Knees) in 172 patients at one centre, including samples from acute admissions, elective aspirations, and planned revisions. MSIS (musculoskeletal infection society) major and minor criteria were used for diagnosing PJI. Patients were investigated using a standardised protocol with inflammatory markers, synovial fluid white cell count (SWCC) and polymorphonuclear leukocytes percentage (PMN %), and synovial fluid/tissue culture. Synovial fluid was also tested for alpha-defensin.

Results: Fifty-two (24.8%) episodes defined as 'PJI' using MSIS criteria, and 158 'non-PJI'. Alpha-defensin had 71.2% (95% CI 56.9-82.9) sensitivity, 94.3% (89.5-97.4) specificity. Positive predictive value was 80.4% (68.1-88.8), negative predictive value was 90.9% (6.6-93.9).

Thirty-seven (of 52 PJI) were 'culture positive' (identical microorganism on ≥ 2 samples). Eighty (of 158 non-PJI) satisfied no MSIS criteria, none of these patients subsequently had a PJI. In this sub-set of 117, alpha-defensin had 64.9% (47.5-79.8) sensitivity, 98.7% (92.9-99.9) specificity, whilst sensitivities of CRP (>20), SWCC (>3000) and PMN (>80%) were 94.6% (81.8-99.3), 86.5% (71.2-95.5) and 83.8% (68.0-93.8).

93 episodes satisfied at least 1 minor criterion and/or a sinus was present, but weren't 'culture positive'. Alpha-defensin had 85.7% (57.2-98.2) sensitivity and 88.4% (78.4-94.9) specificity.

Discussion and conclusion: Alpha-defensin test has a lower sensitivity than previously reported, limiting its use for diagnosing PJI. SWCC and PMN % are cheaper, with similar sensitivity.

Title	Rates of antibiotic resistance in prosthetic joint infections: implications for choice of antibiotic prophylaxis
Authors	Michael Abouyannis ¹ , Gareth Roberts ² , Jonathan Folb ¹
Addresses	¹ Royal Liverpool University Hospital, Liverpool, United Kingdom. ² Liverpool Clinical Laboratories, Liverpool

Abstract

Background: Over recent years, rates of antibiotic resistant bacteria have risen both in the hospital and community setting. Prior to orthopaedic surgery it is routine practice to administer prophylactic antibiotics; often a cephalosporin. We reviewed the microbiology of prosthetic joint infections, and used this to guide choice of prophylactic antibiotic.

Method: All sterile fluid samples and tissue samples at Liverpool Clinical Laboratories from hip and knee sites with prosthesis in-situ from September 2014 until August 2016 were retrospectively included. Cultures were only deemed significant if isolated from two or more samples from the same patient and site. Antibiotic resistance of organisms were compared to potential prophylactic regimens.

Results: 322 samples from 84 patients were included in the analysis (200 hip samples; 122 knee samples). 80 patients were infected with a gram positive organism (44 Coagulase negative Staphylococci, 31 Staphylococcus aureus, 15 Enterococci and 8 Streptococci), and 27 were with gram negative organisms. The prophylactic regimen of Cefuroxime alone, covered 55% of gram positive organisms and 81% of gram negative organisms. For reliable gram positive coverage, Teicoplanin was most reliable (96% susceptible). For gram negative cover, all samples were susceptible to gentamicin, and 81% to ciprofloxacin.

Conclusion: Rising rates of antibiotic resistance add further complexity to the choice of prophylactic antibiotic regimen. The decision to offer broader spectrum antibiotics as prophylaxis must be countered against the risk of toxicity, as well as the potential to promote further antimicrobial resistance. At present, there is limited evidence to guide choice of antibiotic prophylaxis.

Title	Complex maltreated neglected trauma of the humerus and its revision surgery
Authors	Syed Imran Ali Shah, Syed Junaid Ali Shah
Address	AO Clinic, Karachi, Pakistan

Abstract

1936 cases of neglected/maltreated long bone fractures were seen over the last 10 years. 252 of these cases were humeral fractures that required attention and surgical intervention.

Humeral revision trauma cases are particularly interesting and the most challenging of long bone neglected fractures due to the close proximity of neurovascular structures especially in infected non united fractures as structures get entangled within the fibrous tissue which forms due to weeks/years of neglect after the initial erroneous management.

In this presentation, we cover our principles of management for these Infected Humeral complex cases and our results are very encouraging, with 3 re-infection after revision surgery and no non-unions.

Various forms of fixations which included plating, I/M nailing, external fixation and conservative method were used which unfortunately failed due to either poor fixation or poor biology or both of the fracture.

Conclusion: Predictive excellent results can be achieved if the surgeon respects soft tissue handling and the fixation is stable, augmenting these complex operations with autologous bone graft give the added benefit of expedited bone union.

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POSTER ABSTRACTS

Poster 001

Title	Does pretreatment of samples with Dithiothreitol improve bacterial detection in chronic implant infections? - Review of current clinical evidence
Author	<u>Christof Berberich</u>
Address	<i>Department of Medical Training, Heraeus Medical GmbH, Wehrheim, Germany</i>

Abstract

Background: The low number of planktonic bacteria in clinical samples poses a challenge in the diagnosis of chronic implant infections. To dislodge bacteria from biofilms, sonication and – more recently – the chemical pretreatment of implants and tissue biopsies with dithiothreitol (DTT) has been introduced.

Method: The available clinical studies in the period 2013 to 2017 were analysed (Medline, Embase, PubMed), in order to compare the diagnostic value of DTT-pretreatment of samples with sonication & culture of native biopsies or swabs.

Results: 2 studies from orthopaedic centers with n=106 patients (48 with presumed aseptic condition & 58 with prosthesis infection) compared the culture of samples after prior sonication or prior DTT-pretreatment of explanted prosthesis material. The number of true positive cultures was higher in the DTT than in the sonication group in both studies (sensitivity: +14,5% and +12,3%; specificity: comparable). In particular *S. epidermidis* was more frequently detected in the DTT group. 1 study from a septic orthopaedic unit with n=70 patients (45 non-infected & 25 infected) randomly allocated tissue samples from the same site either to DTT or saline pretreatment before culture. The sensitivity & specificity of the test was higher when DTT-treated tissues were plated on agar plates compared to native biopsies (+16% & +6,7%). 1 study from a trauma department enrolled 30 patients with presumed septic conditions and compared the number of positive & negative samples using the specific MicroDTTect™ device or swabs. The DTT-based method showed a higher sensitivity compared to swabs (+31%) and was associated with more positive results (+15%). There were also significant differences in the type of microorganisms isolated with both methods. 1 case report from cardiology described the successful detection of *S. aureus* & *P. mirabilis* from the biofilm of an aortic valve as culprits for the infective endocarditis case using the DTT-method.

Conclusions: DTT-pretreatment of samples from chronic implant infections may improve the identification of microbial pathogens. If combined with a completely closed system of sample processing, the number & costs of false negative & false positive results will be reduced. Further studies are needed to validate this new diagnostic procedure.

Title **Is prior malnutrition a risk factor for orthopaedic infections? Result of a pilot study**

Authors Ilker Uçkay¹, Nastassia Guanziroli¹, Benjamin A. Lipsky^{1,2}, Didier Hannouche¹

Addresses ¹Geneva University Hospitals, Geneva, Switzerland. ²University of Oxford

Abstract

Objective: Current literature suggests that patient malnutrition may be a risk factor for orthopaedic infections, and one that might be addressed by improving nutrition. There are, however, few data addressing this issue.

Methods: During 2016, we assessed the nutritional status of 23 infected (nosocomial and community-acquired infections) and 18 uninfected patients consecutively hospitalized for any indication on our Orthopaedic Service. We used the Mini Nutritional Assessment Tool (MNA®) of the Nestlé Nutrition Institute, the body mass index (BMI), the weight, history of weight loss in the last 3 months, history of gastrointestinal diseases or diabetes mellitus, levels of serum albumin, serum total protein and serum pre-albumin levels at admission, and by observing if the patient typically finished his/her meals during hospitalization. We excluded patients with alcohol dependency and major psychiatric co-morbidities. We then compared the infected and uninfected patients to see if there were any statistically significant differences in group comparisons for these parameters (analyzed by the Pearson- χ^2 or Fisher exact test).

Results:

Key characteristics of hospitalized patients with and without orthopaedic infection

Characteristic	Infection	p value	No infection
	n = 23		n = 18
Female sex	12 (52%)	0.89	9 (50%)
Median age	74 years	0.49	74.5 years
Immune suppression	7 (30%)	0.57	7 (39%)
Diabetes mellitus	7 (30%)	0.84	6 (33%)
Elective surgery	2 (9%)	0.22	4 (22%)
Weight (median)	80 kg	0.13	72 kg
Weight loss last 3 months (median)	3 kg	0.21	0 kg
Body mass index (median)	28.9 kg/mm ²	0.45	24.3 kg/mm ²
Gastrointestinal disease	3 (13%)	0.85	2 (11%)
Serum albumin (median)	32 g/L	0.11	33 g/L
Serum pre-albumin (median)	170 g/L	0.89	174 g/L
Serum proteins (median)	65 g/L	0.31	63 g/L
Finishes meals	100%	0.47	100%
MNA questionnaire (median score)	9 points	0.79	9 points

Conclusion: In this pilot evaluation of patients at Geneva University Hospitals, there were no significant differences between those with and without infections in any of nine standard parameters used to estimate their nutritional status.

Poster 003

Title **Developing adipose tissue mesenchymal stem cells for potential treatment of (infected) diabetic foot ulcers**

Authors Olivier Preynaz-Seauve¹, Ilker Uçkay¹, Karl-Heinz Krause¹, Vincent Kindler¹, Mathurin Baqui^{1,2}

Addresses ¹Geneva University Hospitals, Geneva, Switzerland. ²Neurix, Geneva, Switzerland

Abstract

Objective: Mesenchymal stromal cells (MSC, also called mesenchymal stem cells) are heterogeneous populations of cell precursors that reside in the stromal fraction of many adult tissues. MSC harbor self-renewing capacities allowing: (i) their *ex vivo* expansion; (ii) *in vitro* differentiation into many cell types; and, (iii) production of a large spectrum of factors involved in tissue repair. Among MSC, adipose-derived stem cells (ASC) are purified from human adipose tissue. These MSC could potentially be used for the regeneration/angiogenesis of tissue in diabetic patients with an ischemic or infected foot infection.

Methods: We collected several ASC lines from the abdominal adipose tissue of diabetic patients, with or without evidence of lower extremity ischemia. Subsequently, we compared these cells with bone marrow-derived MSC.

Results: We confirmed the ASC identity of all derived lines by their ability to: (i) adhere to a plastic surface in standard culture conditions; (ii) express a MSC surface antigen profile; (iii) differentiate *in vitro* into adipocytes, osteoblasts and chondroblasts; and, (iv) reduce CD3/CD28 mediated activation of T cells *in vitro*. The expansion of these cells *in vitro* was significantly increased by replacing fetal bovine serum with a lysate of human platelets.

Conclusion: ASC can be successfully derived from the adipose tissue of diabetic patients and expanded *in vitro* in animal-free culture conditions. This process offers the opportunity to evaluate the clinical potential of these cells in the autologous treatment of (infected) diabetic foot ulcers.

Poster 004

Title **Two versus four weeks of targeted oral antibiotic therapy after surgical drainage for native joint hand septic arthritis: second interim analysis of a randomized trial**

Authors Ilker Uçkay¹, Ergys Gjika¹, Daniel Lew¹, Benjamin A. Lipsky^{1,2}, Jean-Yves Beaulieu¹

Addresses ¹Geneva University Hospitals, Geneva, Switzerland. ²University of Oxford

Abstract

Objective: The optimal duration of antibiotic therapy for septic hand arthritis is unknown.

Methods: We conducted a prospective, unblinded, interventional study of adult patients agreeing to participate in a trial in which they are randomization (1:1) to either 2 or 4 weeks of systemic antibiotic therapy after surgical drainage for native joint infection of the hand or wrist. Empiric therapy was administered intravenously for 0-2 days, and then switched to oral.

Results: Among 120 enrolled patients, 66 (33 in the 2 week antibiotic arm and 33 in the 4 week arm) form the basis for this second interim analysis. The most frequent origin of infection was traumatic (bites, cooking, gardening, work and recreational activities). The median number of surgical lavages was 1 and the median duration of intravenous therapy was 1.5 days. The most frequently prescribed antibiotic drug was amoxicillin-clavulanic acid (3 x 1 g/d orally), followed by levofloxacin (1 x 500 mg /d) or clindamycin (3 x 600 mg/d) orally. Overall, recurrence of infection after stop of antibiotic treatment was noted in only 4 (6%) of patients: 2 in the 2 week arm and 2 in the 4 week arm (two-sided Fisher-exact-test $p=1.0$). In contrast, the proportion of mechanical sequelae during the two-months' follow-up was as high as 20%-30%.

Conclusion This second interim analysis did not show any difference in outcomes between the 2 weeks and 4 week duration of targeted antibiotic treatment given after surgical drainage for hand septic arthritis. The trial continues.

Title **Harvesting of proangiogenic Tie2 monocytes from blood in various patient populations, including those with (infected) diabetic foot ulcers**

Authors Ilker Uçkay¹, Benjamin Kressmann¹, Beat Imhof¹, Benjamin A. Lipsky^{1,2}, Adama Sidibe¹

Addresses ¹Geneva University Hospitals, Geneva, Switzerland. ²University of Oxford

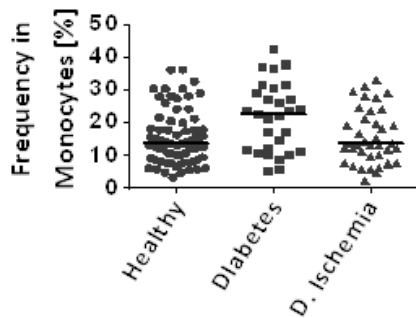
Abstract

Objective: A subset of monocytes that has been shown to express Tie2 in tissue neovascularization of tumors and a mouse model of clinical limb ischemia may promote angiogenesis, suppress T cell activation and induce regulatory T cells. These effects could be beneficial to patients with (infected) diabetic foot ulcers.

Methods: We conducted a prospective pilot observational study investigating the ability of Tie2 monocytes to express growth factors needed for angiogenesis. We collected blood samples from three orthopaedic patient populations (with or without infections): non-diabetic non-ischemic; diabetic non-ischemic; diabetic with vascular necrosis/ischemia. We isolated peripheral blood mononuclear cells with Ficoll-Paques gradient and analysed cell population by flow cytometry. Angiogenic monocytes were CD16+.

Results: We sampled 81 different patients, some several times. We sampled non-diabetic nonischaemic patients 68 times, diabetic non-ischaemic patients 29 times, and diabetic patients with ischemia 38 times. The median age of the patients was 70 years (range 42-86 y). The percent of proangiogenic monocytes was increased in diabetic patients compared to non-diabetic donors as well as the diabetic patients suffering of vascular problem, who had the lowest percent.

Circulating human proangiogenic monocytes:



Conclusion: We found it was possible to extract proangiogenic Tie2 monocytes from blood of healthy patients and also diabetic patients without clinical ischemia, while their proportion in diabetic patients with lower extremity ischemia was smaller. The implications of these findings will require further studies.

Title **Improved infection rates with staged management of severe open tibia fractures with bone transport with circular frame. Our early experience.**

Authors Dimitrios Giotikas, Matija Krkovic

Address *Cambridge University Hospitals NHS Foundation Trust, Cambridge*

Abstract

The aim of this study is to present our method and early results on the management of severe open tibia fractures with circular frame and bone transport. Patients were treated in two stages. The first stage consisted of serial bone debridement, temporary fracture fixation and definitive soft tissue coverage. The second stage consisted of definitive fixation with circular frame.

The study was designed as a retrospective cohort study. Inclusion criteria were: patients older than 16 years with open tibia fractures with segmental bone loss, treated with bone transport with circular frame. Clinical and radiological data was collected and analysed with descriptive statistics.

Seventeen fractures in seventeen patients with a mean age of 44 years (20 to 69) were identified. There were fifteen Gustillo grade IIIB and two IIIA tibia fractures. Mean follow-up was 20 months. The mean timing for the first and second stage was six and 26 days since injury respectively. At the most recent follow up, union was achieved in 16 cases; one case was progressing towards union. No amputations were needed. No deep infection was encountered. Alignment and range of movement was satisfactory. The mean time on the frame was 473 days. Mean external fixator index (EFI) was 84 days/cm. Two patients sustained re-fracture within three months after removal of frame. On average, patients required six surgeries and 14 outpatient appointments.

In severe open tibia fractures, early proactive management with radical bone debridement and bone transport with circular frame may significantly improve the infection rates.

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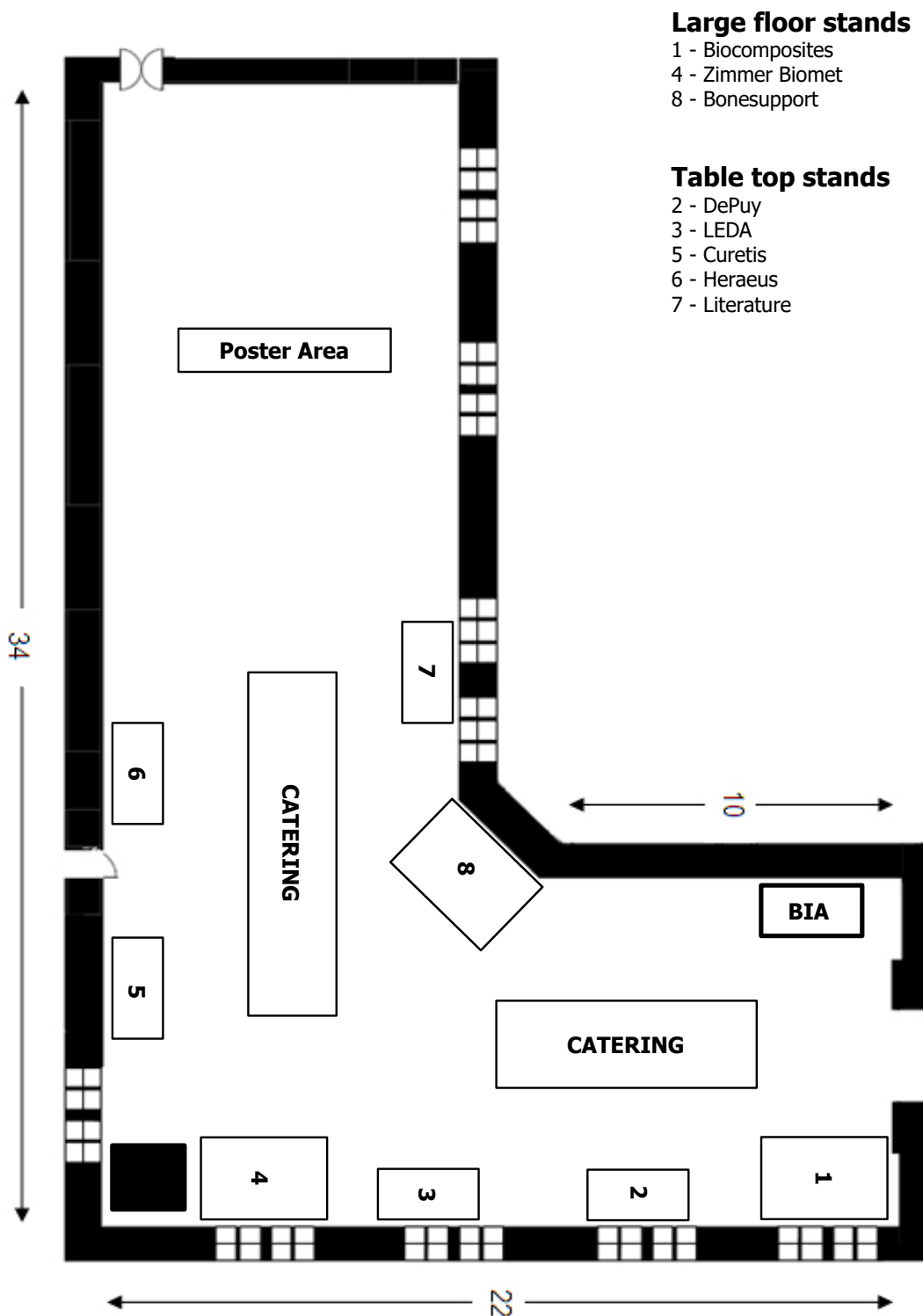
In 2009, the British Infection Society merged with the Association of Medical Microbiologists to form the British Infection Association. With over 1400 members, the BIA promotes the science and practice of medicine in relation to infection, and provides support for all infection specialists and trainees, whether in clinical practice, laboratory medicine, public health, research or education. The Association is committed to working collaboratively with other professional bodies and external agencies to produce standards and evidence-based guidance to improve patient care.

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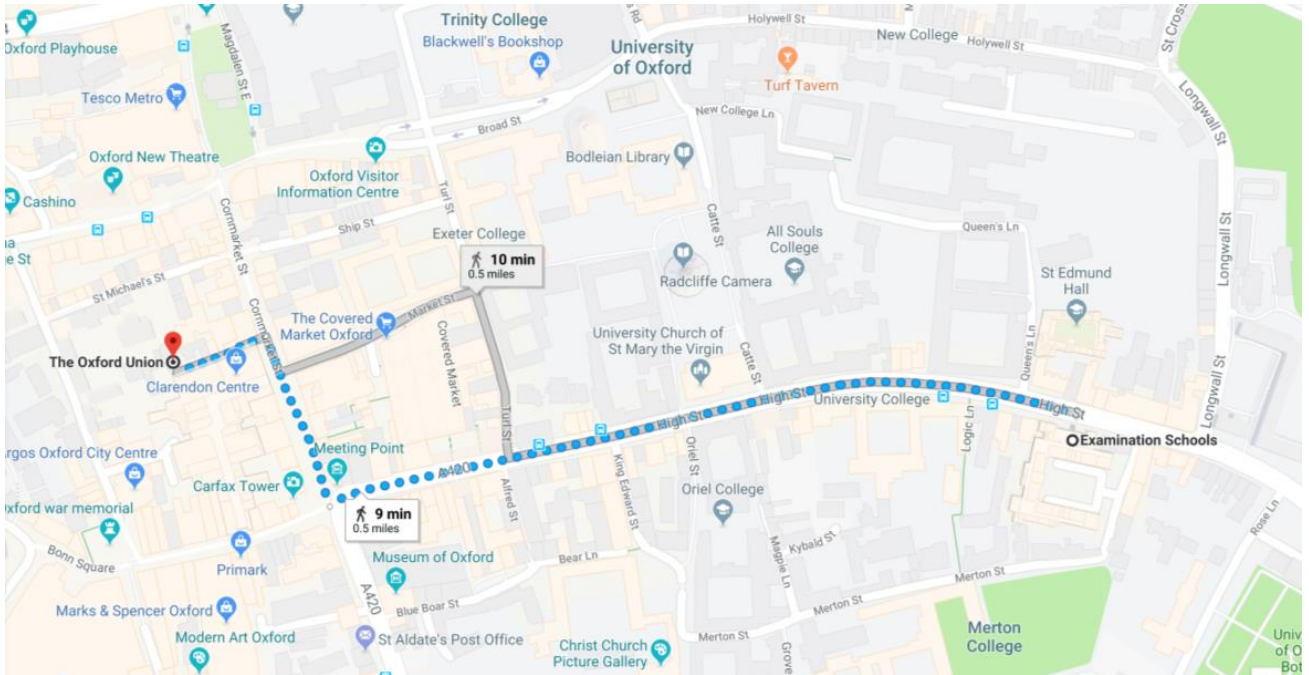


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SOCIAL PROGRAMME MAPS

Examination Schools to Oxford Union



Oxford Union to Exeter College

