Programme and abstracts

EBJIS2024

42nd Annual Meeting of the European Bone & Joint Infection Society

26 - 28 September 2024 · Barcelona · Spain

#EBJIS2024 #EBJIS

www.ebjis2024.org

EBJIS2024

42nd Annual Meeting of the European
Bone & Joint Infection Society

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EBJIS Membership

Join the European Bone & Joint Infection Society now and explore exciting opportunities for volunteering and active involvement in shaping our organization's future.

Member benefits

- Access to all EBJIS Newsletters and the latest updates related to Bone and Joint Infection.
- Access the EBJIS community that encourages discussion and collaboration between the EBJIS Members on clinical cases.
- Discounted Annual EBJIS Meeting registration fee, which is equivalent to the annual membership fee (130 euros).
- Eligibility to become an EBJIS Fellow, allowing you to apply for the fully-funded annual Travelling Fellowship program at www.ebjis.org/fellowship. Three Travelling Fellowships are granted annually.
- Opportunity to apply for a Country Delegate position, serving to enhance EBJIS promotion in many countries around the world, facilitate connections with interested colleagues, and encourage the growth of Bone and Joint Infection centers in various countries.
- Participation in the EBJIS Annual General Assembly with voting rights on crucial decisions.
- Reduced article processing charges when publishing an open-access article in The Journal of Bone and Joint Infection (JBJI). For more details visit: administrator.copernicus.org/authentication
- Support from the Executive Committee for organizing scientific meetings and promoting them within our membership and on the EBJIS website.

For more information and to register as a member of EBJIS please visit our website:

www.ebjis.org/membership

Annual membership fee: € 130

For further details, contact us here:
info@ebjis.org

European Bone & Joint Infection Society
EBJIS

Welcome to EBJIS 2024 in Barcelona and online!

Dear colleagues and friends,
On behalf of the EBJIS Executive Committee and the EBJIS 2024 Local Organising Committee, we warmly welcome you to the **42nd Annual Meeting of the European Bone & Joint Infection Society** in Barcelona.

Over the next three days, you will have the opportunity to engage with top experts in the field and gain insights into the latest research initiatives from across Europe and beyond. We hope you will benefit from the high-level scientific presentations, knowledge sharing, and networking opportunities.

We are proud to call the EBJIS Annual Meeting a true multidisciplinary conference, uniting surgeons in orthopaedics, trauma and plastics with infection disease specialists, microbiologists, and all professionals dedicated to enhancing the lives of patients with bone and joint infections.

Last but not least, we extend our special thanks to all our industry sponsors and exhibitors for supporting this meeting. Without their efforts, this conference would not have been possible. We encourage you to visit their stands to learn more about their products for prevention and treatment of bone and joint infections.

We hope you will enjoy the conference and your time in Barcelona!

On behalf of the Local Organising Committee and the EBJIS Executive Committee,

Alex Soriano
Local Chair
and Past President

Ricardo Sousa
President of EBJIS

Organisation

The 2024 Local Organising Committee

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Department of Infectious Diseases

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Orthopaedic Surgeon,
Hospital Gregorio Marañón, Madrid

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General information

Conference website
www.ebjis2024.org

Conference venue
Palau de Congressos de Barcelona
Avenida de la Reina Maria Cristina
08004 Barcelona, Spain

Badges
The conference name badges must be worn during the entire conference. Access to the conference venue will not be granted without the name badge issued by the conference organisers.

Entitlements for participants
Admission to all scientific sessions and industry symposia, admission to exhibition, conference bag with programme and abstract book, CME credits, coffee breaks and lunch, welcome reception on Thursday 26 September, farewell lunch on Saturday 28 September and certificate of attendance.

CME credits
The conference has been accredited with 15.5 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME). Participants who wish to apply for CME credits should go to the registration desk to confirm their attendance each day. You will receive an email with more information and the link to download the certificate after the conference.

Cloakroom
A manned cloakroom will be available on the first floor during the scheduled programme.

Information for Speakers
Please bring your presentation, on a USB stick, to the Speakers' Preview room located on level 1. A technician will help you upload the presentation to the computer. Please make sure to upload your presentation at least 2 hours before your session starts. We do not allow the use of personal laptops for presentations. At the end of the conference, all presentations will be deleted to secure that no copyright issues will arise.

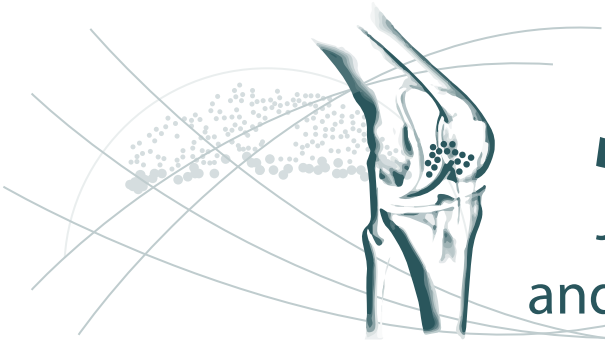
Speakers' Preview room (Level 1)

Opening hours:

Thursday, 26 September	7:00 - 17:00
Friday, 27 September	7:45 - 17:00
Saturday, 28 September	8:00 - 12:00

WIFI
Free access to the WIFI at the conference venue is provided.

Network name:	EBJIS 2024 Conference
Password:	EBJIS2024!



JBJI
Journal of Bone and Joint Infection
Open Access

Journal of Bone and Joint Infection

Editors-in-chief: Parham Sendi & Bryan Springer

The Journal of Bone and Joint Infection (JBJI), as a scientific publication of the European Bone & Joint Infection Society (EBJIS) and MusculoSkeletal Infection Society (MSIS), publishes papers of highest quality in all areas of orthopaedic infections.

The journal is open access and is indexed in PubMed Central.

Types of articles:

- Original full-length articles
- Brief reports
- Guidelines / recommendations / consensus papers
- Reviews
- Viewpoints
- Case reports
- Clinical pictures in Bone and Joint Infections
- Letters

Submit your paper now!

Original papers covering the field of BJI may be submitted to JBJI. EBJIS members receive a 20% discount on the article processing fee.

Find more information on the website:
www.journal-of-bone-and-joint-infection.net

Social events

Welcome Reception
Date 26 September 2024
Time 18:30 - 20:00
Place Exhibition area at the conference venue

The welcome reception takes place in the exhibition area. Join your colleagues for light food and drinks.

The reception is included in the registration fee.

EBJIS Conference Dinner
Date 27 September 2024
Time 20:00 - 24:00
Place Sant Pau Recinte Modernista
Address: C. Sant Antoni Maria Claret 167

Experience a night of great food, music, and networking.

Don't worry about transportation.
Busses will be available at 19:30 from the conference venue to take you to Sant Pau and back.

NB: Admission by pre-booked ticket only.
Tickets must be purchased before the conference.

If you have not secured your ticket, ask at the registration counter if there are still available tickets.

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Programme

Thursday, 26 September 2024

		Plenary Room: Auditorium (Level 2)	
07:30		Registration opens	
08:30-08:40		**Opening Session:** ***Welcome by EBJIS President and Local Chair***	**Ricardo Sousa (PT) &** **Alex Soriano (ES)**
08:40-09:40		**Key session 1:** **Using local and systemic antibiotics in BJI:** **a match made in heaven?**	**Chairs:** **Dolors Rodriguez-Pardo (ES)** **& Matt Scarborough (UK)**
		Evidence for local and systemic antibiotics in open fractures	Charalampos Zalavras (US)
		What can animal experiments tell us about antibiotics in bone?	Louise Kruse Jensen (DK)
		Can local antibiotics improve antibiotic stewardship? The SOLARIO trial	Martin McNally (UK)
09:40-10:30		**PRO/CON:** **Should all patients receive suppressive treatment after DAIR?**	**Chairs:** **Alex Soriano (ES) &** **Charles Vogely (NL)**
		PRO	Aaron Tande (US)
		CON	Marjan Wouthuyzen-Bakker (NL)
10:30-11:00		☕ ***Coffee break / Poster walks / Exhibition***	
10:35		**Poster Walks (P1-P37)** - See an overview on page 36	Poster Area 1 - Level 0
11:00-12:30		**Free Paper Session A:** **Fracture related infections** (10 x 6 min + 2 min)	**Chairs:** **Charalampos Zalavras (US) &** **Willem Metsemakers (BE)**
	FP A1	Is DAIR or implant exchange best for fracture-related infection?	Martin McNally (UK)
	FP A2	Infections of foreign material for ligament, meniscus, and tendon reconstructions	Samo Roskar (SI)
	FP A3	Antimicrobial bioactive glass for treatment of traumatic or pathological bone defects	Bolaji John Samuel (DE)
	FP A4	Approaches for the treatment of complications following war injuries in Ukrainian patients	Olga Pidgaiska (DE)
	FP A5	High failure rates in concomitant periprosthetic joint infection and periprosthetic fracture treatment – A study of 41 total hip arthroplasties	Markus Jaschke (DE)
	FP A6	Tibial osteomyelitis requiring reconstruction with a free flap: A single centre review of outcomes	Poonam Valand (UK)
	FP A7	A comparison of causative microbial pathogens in osteomyelitis and prosthetic joint infection: A retrospective observational cohort study	Annalise Unsworth (AU)
	FP A8	Clinical evidence of biomaterials in osteomyelitis treatment. Literature review and decision-making considerations	Chris Arts (NL)
	FP A9	Nanoscale zinc-substituted hydroxyapatite: A bone grafting biomaterial with enhanced antibacterial properties	Rofida Wali (UK)
	FP A10	The management of unhealed fracture-related infections with a single-stage protocol and without bone graft	Florian Frank (CH)
12:30-14:00		🍴 ***Lunch break / Posters / Exhibition***	
12:45-13:45		**Industry Symposium A** **(Please see page 161 for the agenda)**	**Room 5 (Level 2)**
12:45-13:45		**Editorial board meeting of JBJI (By invitation only)**	**Room 4 (Level 1)**

Parallel Session Room: Room 6 (Level 2)

10:30-11:00		***Coffee break / Poster walks / Exhibition***	
11:00-12:30		**Free Paper Session B:** **Prosthetic joint infection** (10 x 6 min + 2 min)	**Chairs:** **Marta Sabater (ES) &** **Tristan Ferry (FR)**
	FP B1	Assessing the efficacy of a pre-formulated irrigation solution for acute periprosthetic joint infection: Initial findings from a randomized controlled trial	Rafael Oleo Taltavull (ES)
	FP B2	Intravenous versus intraosseous vancomycin in total knee arthroplasty – A prospective single-blinded randomized controlled trail	Saurabh Gupta (IN)
	FP B3	Two stage revision for late prosthetic joint infection in megaprosthesis following bone sarcomas: A multicentric EMSOS study	Andrea Sambri (IT)
	FP B4	Liposomes-conjugated on the bacteriophage surface for delivering antibiotics to combat multidrug-resistant bacterial infections	Lei Wang (CN)
	FP B5	A clinical evaluation of the safety and tolerability of a novel antimicrobial peptide in prosthetic joint infection of the knee, treated by debridement, antimicrobials and implant retention (DAIR)	Martin McNally (UK)
	FP B6	In vitro study on chemical debridement during periprosthetic joint infection surgery: What is the best treatment strategy?	Miguel Márquez Gómez (ES)
	FP B7	Genomic characterization and clinical evaluation of prosthetic joint infections caused by *Cutibacterium acnes*	Clara Liew-Littorin (SE)
	FP B8	Revision for infection after primary total hip arthroplasty – Time trends in surgical strategy	Pål Høvding (NO)
	FP B9	Is the presence of a positive blood culture a risk factor for DAIR failure in haematogenous total knee arthroplasty infection?	Gloria Pedemonte (ES)
	FP B10	DAIR for periprosthetic joint infections – One week to save the joint?	Vatsal Gupta (UK)
12:30-14:00		***Lunch break / Posters / Exhibition***	
12:45-13:45		**Industry Symposium B** **(Please see page 163 for the agenda)**	**Room 6 (Level 2)**

Due to CME regulations no industry names or logos are allowed in the scientific programme.
Detailed programme of industry symposia is available on pages 159-173

Programme

Thursday, 26 September 2024

		Plenary Room: Auditorium (Level 2)	
14:00-15:00		**Key Session 2:** **Large clinical trials in Bone and Joint Infection**	**Chairs:** **Martin McNally (UK) &** **Jaime Lora-Tamayo (ES)**
		Clinical trials in fracture-related infection	Mario Morgenstern (CH)
		How playing the PIANO led to a ROADMAP to guide management of PJI	Joshua Davis (AU)
		Registry studies in Bone & Joint Infection	Håvard Dale (NO)
15:00-15:50		**Free Paper Session C:** **Antibiotic treatment for bone and joint infections** (6 x 6 min + 2 min)	**Chairs:** **Laura Morata (ES) &** **Matteo Ferrari (IT)**
	FP C1	Rifampicin combination therapy versus targeted antimicrobial monotherapy in the oral antimicrobial treatment phase of staphylococcal prosthetic joint infection (RICOTTA-trial): Protocol for a randomized, controlled, open-label, non-inferiority trial	Jaap Hanssen (NL)
	FP C2	Transitioning from empiric to culture specific antibiotic therapy following surgical debridement in bone and prosthetic joint infection how long do we need to wait?	Asanka Wijendra (UK)
	FP C3	A therapeutic drug monitoring approach for dalbavancin (Montalbano)	Simona Landonio (IT)
	FP C4	Trough levels of dalbavancin during long-term treatment of prosthetic joint infections	Bo Söderquist (SE)
	FP C5	Combination therapy of high dose daptomycin plus continuous infusion (CI) fosfomycin may be equally effective in the treatment of staphylococcal osteoarticular infections even if the CI fosfomycin dose is reduced from 16g to 8-12g daily	Sara Tedeschi (IT)
	FP C6	Long-term dalbavancin concentrations in target tissues relevant for PJI treatment: A 5-week experimental porcine setup utilizing microdialysis	Johanne Gade Lilleøre (DK)
15:50-16:20		☕ ***Coffee break / Poster walks / Exhibition***	
15:55		**Poster Walks (P38-P77)** - See an overview on page 36	Poster Area 1 - Level 0
16:20-17:20		**Key session 3:** **Tips for surgery in FRI and PJI** **(discussion of clinical cases)**	**Chairs:** **Daniel Perez-Prieto (ES) &** **Ricardo Sousa (PT)**
Discussants	FRI	Willem Metsemakers (BE) and Geertje Govaert (NL)	
Discussants	PJI	Rihard Trebše (SI) and Pier Indelli (US)	
17:25-18:25		**Industry Symposium C** **(Please see page 165 for the agenda)**	**Room 5 (Level 2)**
18:30-20:00		**Welcome Reception & Poster Walks at the venue** *(included in the registration fee)*	
18:45		**Poster Walks (P78-P153)** - See an overview on page 36	Poster Area 2 - Level 2

Parallel Session Room: Room 6 (Level 2)

15:00-15:50		**Free Paper Session D:** **Prevention of prosthetic joint infection** (6 x 6 min + 2 min)	**Chairs:** **Pablo Sanz (ES) &** **Marjan Wouthuyzen-Bakker (NL)**
	FP D1	Extended surgical antibiotic prophylaxis not superior to a single dose in total hip and knee revision arthroplasty: A multicentre open-label randomized controlled trial	Karin Veerman (NL)
	FP D2	What do we really know about hand-disinfection-performance during patient care on surgical wards?	Robin Otchwemah (DE)
	FP D3	Infection after primary total hip arthroplasty; a comparison of time trends in two national health registers in Norway from 2013-2022	Håvard Dale (NO)
	FP D4	How does smoking affect quality of life after surgery for bone and joint infection?	Maria Dudareva (UK)
	FP D5	Preventing periprosthetic joint infection: A novel antimicrobial sol-gel approach	Sarah Boyce (UK)
	FP D6	The impact of untoward events during primary or revision total hip or knee arthroplasty surgery	Neža Trebše (SI)
15:50-16:20		***Coffee break / Poster walks / Exhibition***	
16:20-17:20		**Key session 4:** **Current and upcoming strategies to prevent and treat metallic implant infections**	**Chairs:** **José Luis del Pozo (ES)** **& Holger Rohde (DE)**
		Surface modifications, from silver to peptides	Fintan Moriarty (CH)
		Bubbles and electric fields	Lluís Font-Vizcarra (ES)
		Structural modification of metal surface	Jaime Esteban (ES)
17:25-18:25		**Industry Symposium D** **(Please see page 167 for the agenda)**	**Room 6 (Level 2)**

Due to CME regulations no industry names or logos are allowed in the scientific programme.
Detailed programme of industry symposia is available on pages 159-173

Programme

Friday, 27 September 2024

		Plenary Room: Auditorium (Level 2)	
7.45		**Registration opens**	
08:30-09:30		**Key Session 5:** **Painful prosthesis, is it really an infection?**	**Chairs:** **Rihard Trebše (SI) &** **Daniel Perez-Prieto (ES)**
		Unexpected positive intra-operative culture, is this an infection?	Ernesto Muñoz-Mahamud (ES)
		Allergy to metals, reality or fiction?	Lex Boerboom (NL)
		Wear debris	Martin Clauss (CH)
09:30-10:30		**Key Session 7:** **Open questions in 2-stage exchange**	**Chairs:** **Irene Sigmund (AT) &** **Luisa Sorlí (ES)**
		Are holidays necessary?	José Luis Del Pozo (ES)
		Rifampin in between first and second stage, yes or no?	Tobias Kramer (DE)
		Antibiotic prophylaxis for definitive implant, what to cover?	Richard Kühl (CH)
10:30-11:00		***Coffee break / Poster walks / Exhibition***	
10:30-12:00		**Country Delegates meeting (By invitation only)**	**Room 4 (Level 1)**
10:35		**Poster Walks (P154-P81)** - See an overview on page 36	Poster Area 1 - Level 0
11:00-12:25		**Free Paper Session E:** **Classification of prosthetic joint infection** (10 x 6 min + 2 min)	**Chairs: Juan Carlos Martinez-Pastor (ES) &** **Charles Vogely (NL)**
	FP E1	What is the best surgical option for prosthetic joint infection (PJI) due to *Candida* species?	Martin McNally (UK)
	FP E2	Predicting periprosthetic joint infection: External validation of preoperative prediction models	Seung-Jae Yoon (NL)
	FP E3	Polymorphisms in the il-1β and il-10 genes affect the risk of periprosthetic joint infection in total hip and knee arthroplasty patients	Valentina Granata (IT)
	FP E4	External validation of the JS-BACH classification for predicting outcome in periprosthetic joint infections: A cohort of 653 patients	Nicolai Kristensen (DK)
	FP E5	Prognostic value of three different classifications systems for periprosthetic joint infections	João Seixas (PT)
	FP E6	An analysis of the definition of variables in periprosthetic joint infection research	Geno Tai (US)
	FP E7	The importance of biomechanical restoration on dislocation rates after two-stage spacer-free total hip arthroplasty revision: Risk factor analysis and functional outcomes	Stavros Goumenos (GR)
	FP E8	Systemic inflammation response index (SIRI) and monocyte to lymphocyte ratio (MLR) are predictors of good outcomes in surgical treatment of periprosthetic joint infections of lower limbs: A single-center retrospective analysis	Raffaele Vitiello (IT)
	FP E9	Are current definitions reliable in the preoperative diagnosis of shoulder prosthetic joint infection? – Comparing the EBJIS and the 2018 ICM shoulder definition	Bianca Sousa Barros (PT)
	FP E10	Are KLIC and CRIME-80 scores useful to assist decision making initially or at the moment of repeat DAIR? – A retrospective study	Joana Contente (PT)
12:25-13:45		***Lunch break / Posters / Exhibition***	
12.35-13.35		**Industry Symposium E** **(Please see page 171 for the agenda)**	**Room 5 (Level 2)**

Parallel Session Room: Room 6 (Level 2)			
08:30-09:30		**Key Session 6: Multi-drug resistant pathogens in PJI: how to deal with this problem?**	**Chairs: Efthymia Giannitsioti (GR) & Richard Kühl (CH)**
		Best options for MDR Gram-negative infections in biofilm infections	Jaime Lora-Tamayo (ES)
		New options for methicillin-resistant staphylococci	Laura Morata (ES)
		How phages could help in the era of multi-drug resistance	Tristan Ferry (FR)
10:30-11:00		***Coffee break / Poster walks / Exhibition***	
11:00-12:25		**Free Paper Session F: Diagnostics in prosthetic joint infection** (10 x 6 min + 2 min)	**Chairs: Irene Sigmund (AT) & Ernesto Muñoz (ES)**
	FP F1	Pre-treating PJI with systemic antibiotics decreases tissue and implant bacterial counts: Results from an in vivo model	Alberto Carli (US)
	FP F2	Diagnostic value of preoperative biopsies after dry tap joint aspiration for diagnosing periprosthetic joint infection; A retrospective study	Bart Copier (NL)
	FP F3	Optimizing prosthetic joint infection diagnostics: The impact of intraoperative direct sonication on time to positivity	Javad Parvizi (TR)
	FP F4	The value of synovial calprotectin in the diagnosis of periprosthetic joint infection after hip and knee arthroplasty	Wouter Bekkers (NL)
	FP F5	Can the use of a synthetic synovial fluid medium in combination with isothermal microcalorimetry improve accuracy and reduce time to detection in periprosthetic joint infections?	Amber De Bleeckere (BE)
	FP F6	Ultrasound-guided synovial biopsy for the preoperative diagnosis of prosthetic joint infection	Catriona Stoddart (UK)
	FP F7	Synovial fluid NMR-based metabolomics in septic and aseptic revision total knee arthroplasty: Implications on diagnosis and treatment	Ana Carolina Leal (BR)
	FP F8	The value of synovial calprotectin prior to second-stage procedure in periprosthetic hip and knee joint infections (PJI)	Jennyfer A Mitterer (AT)
	FP F9	Neutrophil extracellular trap-related biomarkers are increased in synovial fluid of patients with periprosthetic joint infections	Osamu Kimura (BR)
	FP F10	Infect eradication after prefabricated or individual spacers in two-stage revision: 10 years experience at a tertiary academic center	Vincent Lallinger (DE)
12:25-13:45		***Lunch break / Posters / Exhibition***	
12.35-13.35		**Industry Symposium F** **(Please see page 173 for the agenda)**	**Room 6 (Level 2)**

Due to CME regulations no industry names or logos are allowed in the scientific programme.
Detailed programme of industry symposia is available on pages 159-173

Programme

Friday, 27 September 2024

		Plenary Room: Auditorium (Level 2)	
13:45-14:45		**Key session 8:** **Microbial etiology in PJI and new diagnostic techniques**	**Chairs: Marjan Wouthuyzen-Bakker (NL) &** **Jaime Esteban (ES)**
		Microbiology in PJI: insights and challenges	Natividad de Benito (ES)
		Classical PCR for the diagnosis of PJI, usefulness of available tests	Andrea Vergara (ES)
		The future in the molecular diagnostics for BJI	Holger Rohde (DE)
14:45-15:45		**Free Paper Session G:** **Local and systemic antibiotic treatment** (7 x 6 min + 2 min)	**Chairs:** **Matt Scarborough (UK) &** **Jaime Lora-Tamayo (ES)**
	FP G1	First-time evaluation of intra- and postoperative cefuroxime target spine tissue concentrations in long-lasting spine surgery following repeated weight-dosed intravenous administrations	Magnus A. Hvistendahl (DK)
	FP G2	Dynamic distribution of systemically administered antibiotics in orthopedically relevant target tissues and settings	Maria Bech Damsgaard Nielsen (DK)
	FP G3	Biopolymer-encapsulated silver reservoir: Investigating biocompatibility in an in vivo study of a novel anti-infective implant coating	Melanie Nonhoff (DE)
	FP G4	Reconsider cloxacillin dosage guidelines in orthopaedic joint surgery	Katja Wallander (SE)
	FP G5	Chronic suppressive antibiotic treatment for prosthetic joint infection	Ben Clark (AU)
	FP G6	A longer duration of intravenous antibiotic treatment for patients with early periprosthetic joint infections does not improve implant survival	Marjan Wouthuyzen-Bakker (NL)
	FP G7	International practice variation of suppressive antimicrobial treatment for prosthetic joint infections: A global survey study	Jaap Hanssen (NL)
15:45-16:15		***Coffee break / Poster walks / Exhibition***	
15:50		**Poster Walks (P182-P208)** - See an overview on page 36	Poster Area 1 - Level 0
16:15-17:15		**Free Paper Session I:** **Biofilm** (7 x 6 min + 2 min)	**Chairs:** **Natividad de Benito (ES) &** **Richard Kühl (CH)**
	FP I1	Enhanced efficacy against MRSA biofilms: Evaluation of enzymatic cocktail adjuvant with rifampicin and vancomycin dual therapy	Randy Buzisa Mbuku (BE)
	FP I2	In vitro efficacy of different irrigation solutions against biofilm in orthopaedic surgery. A systematic review and network meta-analysis	Marcos Gonzalez Alonso (ES)
	FP I3	Radioimmunotherapy combating methicillin-resistant *Staphylococcus aureus* and its biofilm in vitro	Zijian Ye (NL)
	FP I4	*Galleria mellonella* larvae: A promising animal model to study biofilm maturation in orthopaedic infections	Martijn Riool (DE)
	FP I5	Antibacterial properties of nisin layer-by-layer based coating on titanium k-wires in G*alleria mellonella* implant-associated infection model	Gopala Mannala (DE)
	FP I6	Combination of sonication with Dithiothreitol treatment does not improve bacterial dislodging from biofilm in an in-vitro model	Elena De Vecchi (IT)
17:30-18:45		**EBJIS General Assembly** ***For EBJIS members, by invitation only***	**Room 5 (Level 2)**
19:30		**Bus transportation for the conference dinner**	**Meeting point:** Conference venue
20.00		**EBJIS Conference Dinner at Sant Pau** *(Admission by pre-booked ticket only)*	**Address:** C. Sant Antoni Maria Claret 167

		Parallel Session Room: Room 6 (Level 2)	
13:45-14:45		**PRO/CON:** **Do we need to know the microorganism for 1-stage exchange?**	**Chairs:** **Marta Sabater (ES) & Parham Sendi (CH)**
		PRO	Mustafa Citak (DE)
		CON	Irene Sigmund (AT)
14:45-15:45		**Free Paper Session H:** **No implant-related bone and joint infections** (7 x 6 min + 2 min)	**Chairs:** **Andy Miller (US) & Martin Clauss (CH)**
	FP H1	DISC penetration sign: A distinctive MRI sign indicating the severity of pyogenic spondylitis	Liang Wang (CN)
	FP H2	Empirical antibiotic therapy regimen in native joint septic arthritis: Insights from clinical practice	Filipa Adan e Silva (PT)
	FP H3	Investigating osteolysis in osteomyelitis, what to believe?	Anton Alexander Peterlin (DK)
	FP H4	Soft tissue coverage with vastus lateralis flap in girdle stone resection arthroplasty for managing chronic hip septic arthritis and proximal femur osteomyelitis in patients with spinal cord injuries: A case series	Daniele De Meo (IT)
	FP H5	Microporous polysaccharide hemosphere efficacy and safety in hip and knee revision arthroplasty: A control-matched prospective cohort study of 89 patients	Sebastian Meller (DE)
	FP H6	Ultrathin silver-polysiloxane-coated plates for revision of infected femoral non-union - first results	Rita Schoop-Schmetgens (DE)
	FP H7	Prophylaxis of prosthetic joint infection in megaprosthesis, is the use of antibiotic loaded calcium sulphate beads beneficial?	Guilherme Madeira (PT)
15:45-16:15		***Coffee break / Poster walks / Exhibition***	
16:15-17:15		**Free Paper Session J:** **Molecular techniques for microbiology diagnosis** (8 x 6 min + 2 min)	**Chairs: Efthymia Giannitsioti (GR) & Jaime Esteban (ES)**
	FP J1	Inoculation of homogenized tissue and bone biopsies in blood culture bottles for diagnosing orthopaedic device-related infections: Preliminary results from an ongoing study	Ann-Sophie Jacob (BE)
	FP J2	Evaluation of a new point-of-care approach for synovial fluid cell-free DNA quantification for periprosthetic joint infection diagnosis	Ana Carolina Leal (BR)
	FP J3	Routine sonication leads to clinically relevant improvement of periprosthetic joint infection diagnosis	Anas Zouitni (NL)
	FP J4	Development and validation of a multiplex PCR for the detection of the most common pathogens in prosthetic joint infections	Anja Erbeznik (SI)
	FP J5	16s RRNA v3-v4 amplicon next-generation sequencing in the diagnosis of prosthetic joint infections	Anja Erbeznik (SI)
	FP J6	Can molecular techniques become the new “gold standard” in diagnostics of prosthetic joint infections?	Anja Erbeznik (SI)
	FP J7	Novel molecular approach is useful in culture-negative periprosthetic hip and knee joint infections	Sujeesh Sebastian (AT)
	FP J8	Quantification of sonicated implants from patients with osteoarticular implant infections	Jaime Esteban (ES)

Programme

Saturday, 28 September 2024

		Plenary Room: Auditorium (Level 2)	
08:30-08:45		**Travelling Fellowship Report 2023** Presented by: Danguolė Važnaisienė, Lithuania Alejandro Vallejo Díaz, Colombia Álvaro Auñón Rubio, Spain	**Chair:** **Ricardo Sousa**
08:45- 09:00		**Managing FRIs in post-war Afghanistan - Challenging the multidisciplinary approach**	**Geertje Govaert (NL)**
09:00-10:00		**Key Session 9:** **Innovation impact on BJI (robotics, AI and app)**	**Chairs:** **Martin Clauss (CH) &** **Pablo Sanz (ES)**
		Robotics, impact on infection rate	Juan Carlos Martínez-Pastor (ES)
		App for predicting the infection risk	Javad Parvizi (TR)
		AI (artificial intelligence) for research and academic writing, how can it help us? - Tips for dummies	Miguel Marcos (ES)
10:00-10:30		***Coffee break / Posters / Exhibition***	
10:30-12:00		**Best Papers Session** (10 x 6 min + 2 min)	**Chairs:** **Ricardo Sousa (PT) &** **Alex Soriano (ES)**
	BP1	Is one dose non-inferior to four doses of systemic antibiotic prophylaxis against periprosthetic joint infection in primary arthroplasty?	Olav Lutro (NO)
	BP2	Accuracy of different test methods for diagnosing low-grade periprosthetic joint infections	Markus Luger (AT)
	BP3	Postoperative antibiotic treatment does not lower re-revisionrate in presumed aseptic hip and knee revision arthroplasties with unexpected positive intraoperative cultures - A propensity score matched cohort study	Sebastian Simon (AT)
	BP4	Setting the stage for tailoring cefuroxime dosing as prophylaxis and treatment of prosthetic joint infections using pharmacokinetic modeling	Wout Veltman (NL)
	BP5	Sonication fluid incubation in blood culture bottles is more sensitive for periprosthetic joint infection than classical cultivation of sonication fluid	Samo Roskar (SI)
	BP6	The burden of broad-spectrum antibiotic use in orthopaedic infection: Systemic antibiotic prescribing in the SOLARIO trial	Maria Dudareva (UK)
	BP7	Local antibiotic therapy with aminoglycoside alone or in combination with vancomycin in the management of bone infection	Annalise Unsworth (AU)
	BP8	Does antibiotic-loaded cement reduce the risk of prosthetic infection in primary total knee arthroplasty? Analysis of the Catalan arthroplasty registry	Roger Rojas Sayol (ES)
	BP9	Septic ortho-plastic reconstruction surgery: Outcomes from a 6-year collaborative study	Audrey Lentini (BE)
	BP10	Vancomycin elution kinetics from antibiotic augmented allograft and resorbable synthetic bone filler superior to antibiotic augmented bonecement. An in-vitro study over 42 days	Mathias Glehr (AT)
12:00-12:30		**Honorary lecture**	**Chairs:** **Ricardo Sousa (PT) &** **Ernesto Guerra (ES)**
		What we cannot forget to prevent PJI: from sink to suture	Javad Parvizi (TR)
12:30-12:45		**Closing Remarks & Prizes**	
12:45-14:00		***Farewell lunch with a local flavour***	

Poster overview

No.	Title	Authors	Category
P1	OUTCOME OF SPINAL IMPLANT-ASSOCIATED INFECTIONS: A RETROSPECTIVE COHORT OF 193 PATIENTS	Tudor Cosma | Vilijam Zdravkovic | Thomas Forster | Carol Bernhard Strahm	Osteomyelitis-spondilytis
P2	PREVALENCE OF INFECTIOUS SPONDYLITIS WITH NORMAL INFLAMMATORY MARKERS	Hyeon Jae Jo | Nam Joong Kim | Kyung-Hwa Park | Eu Suk Kim	Osteomyelitis/ spondylitis
P3	INTRAVENOUS (IV) FOSFOMYCIN IN CHALLENGING CASES OF SPONDYLODISCITIS – RESULTS FROM THE MULTI-NATIONAL FORTRESS STUDY	Jan Rupp | Stefan Hagel | Stefan Kluge | Michael Zoller | Jan T. Kielstein | Sebastian Kintrup | Matthias Vossen | Claudio Mastroianni | Christian Mayer | Klaus-Friedrich Bodmann	Osteomyelitis/ spondylitis
P4	THE EXTERNAL FIXATION AND TOTAL CONTACT CAST IS EFFECTIVENESS OF HARD-TO-HEAL HEEL ULCER WITH CUBOID AND CALCANEAL OSTEOMYELITIS	Yuta Terabe	Osteomyelitis/ spondylitis
P5	IMPLANT ASSOCIATED SPINAL INFECTIONS CAUSED BY CARBAPENEM-RESISTANT KLEBSIELLA PNEUMONIAE: A CASE SERIES	Sara Tedeschi | Eleonora Zamparini | Giacomo Fornaro | Marta Malosso | Alessandro Gasbarrini | Luca Boriani | Pierluigi Viale	Osteomyelitis/ spondylitis
P6	FLUCLOXACILLIN TREATMENT FOR STAPHYLOCOCUS AUREUS VERTEBRAL OSTEOMYELITIS: A SINGLE-CENTRE RETROSPECTIVE COHORT STUDY	Staffan Tevell | Johan Wern | Bo Söderquist	Osteomyelitis/ spondylitis
P7	CEFAZOLIN PENETRATION INTO INTERVERTEBRAL DISC DURING MULTILEVEL DISCECTOMY SURGERY	Aleksejs Repnikovs | Sigita Kazune | Peteris Studers | Kalvis Briuks | Dace Bandere | Arturs Paulausks | Austris Mazurs	Osteomyelitis/ spondylitis
P8	DIAPHYSEAL OSTEOMYELITIS OF THE RADIUS AND RECONSTRUCTION DESIGN USING 3DTECHNOLOGY	Olga Torrent Alsina | Anna Maudos Segarra | Mireia Lalanza Martínez | Inca Vilar Sastre | ISABEL MUR ARIZON | Raquel Cliville Abad | Anna Murgadella | Ana Coloma Conde | Oriol Bermejo | Lluis Font	Osteomyelitis/ spondylitis
P9	THERAPEUTIC STRATEGY OF HUMERAL CHRONIC OSTEOMYELITIS AS A SEQUEL TO LIMB LENGTHENING	Olga Torrent Alsina | Mireia Lalanza Martínez | Inca Vilar Sastre | ISABEL MUR ARIZON | Raquel Cliville Abad | Anna Murgadella | Ana Coloma Conde | Oriol Bermejo | Lluis Font	Osteomyelitis/ spondylitis
P10	THE HEMI LATISSIMUS DORSI FLAP: A REVIEW OF TECHNIQUE, VERSATILITY AND FUNCTIONAL OUTCOMES FOR SOFT TISSUE RECONSTRUCTION IN CASES OF OSTEOMYELITIS FROM A SINGLE CENTRE	Poonam Valand | Leela Sayed | Sue Leahy | Florian Frank | Alex Ramsden	Osteomyelitis/ spondylitis
P11	SPONDYLODISCITIS IN CHILDREN: A RETROSPECTIVE STUDY	Andrzej Krzysztofiak | Marco Roversi | Antonio Musolino | Costanza Tripiciano | Martina Di Giuseppe | Marco Cirillo | Osvaldo Mazza | Laura Lancella	Osteomyelitis/ spondylitis
P12	CLINICAL REPORT AND PREDICTORS OF SEQUELE OF 399 CASES OF PEDIATRIC BACTERIAL OSTEOMYELITIS	Andrzej Krzysztofiak | Antonio Musolino | Marco Roversi | Marco Cirillo | Costanza Tripiciano | Martina Di Giuseppe | Francesco Falciglia | Claudio Altini | Francesca Soscia | Stefania Mercadante | Laura Lancella	Osteomyelitis/ spondylitis
P13	SYNOVIAL GLUCOSE AND SERUM-TO-SYNOVIAL GLUCOSE RATIO PREDICT FAILURE AFTER DAIR IN ACUTE POSTOPERATIVE PROSTHETIC KNEE JOINT INFECTION	Marta Sabater Martos | Laia Boadas Girones | Laura Morata | Alex Soriano | Juan Carlos Martínez	Prognosis
P14	SITE SPECIFIC VARIABILITY OF PROTEUS MIRABILIS IN HIP AND KNEE PERIPROSTHETIC JOINT INFECTIONS	Stephanie Huber | Jennyfer A Mitterer | Susana Gardete-Hartmann | Yasin Lari | Sebastian Simon | Bernhard J.H. Frank | Jochen Hofstaetter	Prognosis

No.	Title	Authors	Category
P15	BONE AND JOINT INFECTION IS A GROWING CONCERN FOR CLINICIANS IN AFRICA: RESULTS FROM AN INTERNATIONAL SURVEY	Elizabeth Tissingh | Claude Martin Jr | Martin McNally | Loic Fonkue | Vuyisa Mdingi | Kidanemariam Abrha | Leonard Marais | Maritz Laubscher | Jim Harrison	Prognosis
P16	PROSTHETIC INFECTIONS BY RESISTANT S. EPIDERMIDIS: A DARK OMEN FOR THE PROGNOSIS?	Ricardo De la Concha Azuara | Javier Sanado Fernández | Cristina Ortega Portas | Antonio Blanco García | Jaime Esteban-Moreno | Alvaro Auñon	Prognosis
P17	SEPTIC ARTHRITIS DURING PREGNANCY AND POSTPARTUM PERIOD: A SYSTEMATIC REVIEW OF EPIDEMIOLOGY, CLINICAL PRESENTATION AND RISK FACTORS	Clara Vander Stichele | Manuel Martens | Marie Huys | Jeroen Neyt	Prognosis
P18	FINANCIAL RETURNS FROM ORTHOPEDIC SURGERY INFECTION PREVENTION INVESTMENT	Raquel Bandeira | Thiago Gontijo | Gabriel Colen | Ana Carolina Morganti | Ana Paula Ladeira | Braulio Couto | José Américo Bahia Filho | Glauco Sobreira | Pedro Augusto Moreira | Gabrielle Adriane Mota | Mauro Salles	Prognosis
P19	SURVEY OF PREVENTIVE MEASURES AND DIAGNOSTIC STRATEGIES OF FRACTURE-RELATED INFECTIONS AMONG BRAZILIAN ORTHOPEDIC SURGEONS	Ícaro Santos Oliveira | Lais Sales Seriacopi | Taiana Ribeiro | Carolina Coelho Cunha | Thomas Stravinkas Durigon | Carlos Augusto Finelli | Fernando Baldy dos Reis | Mauro Salles	Prognosis
P20	OUTCOME AND PREDISPOSING FACTORS FOR INFECTION AFTER SURGICAL TREATMENT OF PROXIMAL FEMUR FRACTURES IN THE ELDERLY	Lais Sales Seriacopi | Guilherme Falotico | Thomas Stravinkas Durigon | Maria Augusta Rebouças | Ingrid Nayara Marcelino Santos | Mayara Silva | Mariana Neri Lucas Kurihara | Luiz Fernando Cocco | Mauro Salles	Prognosis
P21	OPTIMIZATION OF PROCEDURE MANAGEMENT IN ORTHOPEDIC SURGERY: STUDY OF CAUSES OF CHANGE AND IMPROVEMENT STRATEGIES	Said Abid| Jacem Saadena	Prognosis
P22	MULTIDISCIPLINARY COLLABORATION: A REVOLUTION IN OSTEOARTICULAR INFECTIONS MANAGEMENT	Jacem Saadana | khouloud Khemili | Meriam Abdeljelil | said abid | Chaouch Firas | ADNENE TOUMI | Abid Abderrazek	Prognosis
P23	ECZEMA IS NOT ASSOCIATED WITH POSTOPERATIVE INFECTION FOLLOWING COMMON ORTHOPEDIC KNEE SURGERIES	Olivia Tracey | Ruth Jones | Akshitha Adhiyaman | Emilie Lijesen | Daniel Green | Moira McCarthy | Andy Miller | Peter Fabricant	Prognosis
P24	CAN ARTIFICIAL INTELLIGENCE PREDICT OUTCOMES IN PERIPROSTHETIC JOINT INFECTIONS? – THE NECESSITY OF SPECIFIC DATABASES	Igor Lazic | Florian Hinterwimmer | Niels Heine | Fiona Charitou | Benjamin Schlossmacher | Rüdiger von Eisenhart-Rothe	Prognosis
P25	MANAGING TREATMENT FAILURE IN BONE FRACTURE REPAIR AMIDST THE COVID-19 PANDEMIC: UNVEILING RISK FACTORS AND CLINICAL STRATEGIES	Carolina Coelho Cunha | Stefânia Bazanelli Prebianchi | Eduardo Cezar Silva dos Santos | Ingrid Nayara Marcelino Santos | Mariana Neri Lucas Kurihara | Mayara Silva | Laura Batista Campos | Paula Caroline Werlang Custodio | Thomas Stravinkas Durigon | Carlos Augusto Finelli | Adriana Macedo Dell Aquila | Mauro Salles	Prognosis
P26	RISK OF SURGICAL SITE INFECTION AFTER HIP HEMIARTHROPLASTY OF FRACTURED NECK OF FEMUR: A SYSTEMATIC REVIEW AND POOLED RATE ANALYSIS	Christof Berberich | Silas Ubong	Prognosis
P27	EPIDEMIOLOGY AND OUTCOME OF PROSTETHIC JOINT INFECTION FOLLOWING HIP HEMIARTROPLASTY TO TREAT FEMURAL NECK FRACTURE IN GERIATRIC PATIENTS	Sara Tedeschi | Michele Cantini | Lorenzo Morante | Azzurra Paolucci | Andrea Sambri | Giacomo Fornaro | Eleonora Zamparini | Massimiliano De Paolis | Pierluigi Viale | Chiara Bendini	Prognosis

No.	Title	Authors	Category
P28	THE INCEPTION OF A NATIONAL BONE AND JOINT INFECTION SOCIETY	Pere Foguet | Jakub Kozdryk | Rhidian Morgan-Jones | Tim Petherham | Mike Reed | Vatsal Gupta | Nikhil Premchand | Bilal Jamal | David Shields	Prognosis
P29	PHOTODYNAMIC THERAPY WITH PROTOPORPHYRIN IX PRECURSORS USING ARTIFICIAL DAYLIGHT IMPROVES SKIN ANTISEPSIS FOR ORTHOPAEDIC SURGERIES	Tiziano Angelo Schweizer | Julia Würmli | Julia Prinz | Maximilian Wölfle | Roger Marti | Hendrik Koliwer-Brandl | Adrian Egli | Laurence Imhof | Philipp Bosshard | Yvonne Achermann	Prognosis
P30	IMPACT OF IMMUNOMODULATORY MEDICATIONS ON PREOPERATIVE LABORATORY ASSESSMENT FOR PERIPROSTHETIC JOINT INFECTION: A CASE SERIES STUDY	Mia Fowler | Edward Grabov | Shay Warren | Michael Henry | Andy Miller | Elizabeth Robilotti	Prognosis
P31	RETAINED CEMENT IN ORTHOPEDIC SURGICAL TRAYS: SHOULD WE WORRY ABOUT INFECTION RISK? AN INVESTIGATION OF AUTOCLAVE EFFICACY AGAINST CONTAMINATED SURGICAL MATERIALS	Andrew Thomson | Christina Chao | Mohammed Hammad | Mario Mendia | Mathias Bostrom | Alberto Carli	Prognosis
P32	IS IT POSSIBLE TO PREDICT THE OCCURRENCE OF DIFFICULT-TO-TREAT MICROORGANISMS PROSTHETIC JOINT INFECTION (PJI) IN THE PREOPERATIVE STAGE?	João Lucas | Ana Ribau | Miguel Rocha | Guilherme Madeira | Ricardo Sousa	Prognosis
P33	HOW DOES TREATMENT IMPACT QUALITY OF LIFE IN BONE AND JOINT INFECTIONS?	Andrew Hotchen | Shao-Ting Jerry Tsang | Irene Katharina Sigmund | Bridget Atkins | Matthew Scarborough | David Stubbs | Martin McNally	Prognosis
P34	CAN CLASSIFICATIONS PREDICT OUTCOMES IN LONG BONE OSTEOMYELITIS?	Andrew Hotchen | Maria Dudareva | Ruth Corrigan | Florian Frank | Alex Ramsden | David Stubbs | Jamie Ferguson | Martin McNally	Prognosis
P35	DOES PREVIOUSLY TREATED OSTEOMYELITIS OR SEPTIC ARTHRITIS INCREASE THE RISK OF COMPLICATIONS FOLLOWING JOINT ARTHROPLASTY SURGERY?	Andrew Hotchen | Eoghan Pomeroy | Jamie Ferguson | Martin McNally | David Stubbs	Prognosis
P36	SKIN-SPARING DEBRIDEMENT IN NECROTIZING SOFT TISSUE INFECTIONS IS POSSIBLE TO BOTH LIMB-SALVAGE AND LIFESAVING -4-YEAR SINGLE-CENTER RETROSPECTIVE ANALYSIS	Chikashi Morikawa	Prognosis
P37	MICROBIAL DYNAMICS AND ANTIBIOTIC RESISTANCE IN RECURRENT PERIPROSTHETIC JOINT INFECTIONS: A RETROSPECTIVE ANALYSIS	Naglis Dubosas | Gabija Imbrasaite | Danguole Vaznaisiene | Laura Pereckaite | Justinas Stucinskas	Prognosis
P38	THE EFFECT OF MULTIPLE SURGERIES FOR BONE INFECTION ON HEALTH-RELATED QUALITY OF LIFE	Shao-Ting Jerry Tsang | Maria Dudareva | Ricardo Sousa | Irene Sigmund | Volker Alt | Mike Reed | Jamie Ferguson | Matthew Scarborough | Martin McNally	Revision PJI
P39	POST-VACCINATION IMMUNE RESPONSES AND RISK OF PERIPROSTHETIC JOINT INFECTION AFTER PRIMARY TOTAL HIP ARTHROPLASTY - A POPULATION-BASED COHORT STUDY	Sonia Rojewski | Marianne Westberg | Lars Nordsletten | Haakon Meyer | Kristin Holvik | Ove Furnes | Anne Marie Fenstad | Håvard Dale | Jesper Dahl	Revision PJI
P40	PERIPROSTHETIC JOINT INFECTION RISK FOLLOWING PRIMARY ARTHROPLASTY IN JOINTS WITH HISTORY OF SEPTIC ARTHRITIS	Manuel Martens | Clara Vander Stichele | Jean Vervelghe | Folkert Dehouwer | Jessie Nantongo | Jeroen Neyt	Revision PJI

No.	Title	Authors	Category
P41	DEBRIDEMENT, ANTIBIOTICS AND IMPLANT RETENTION – IS IT EQUALLY EFFECTIVE AFTER PRIMARY OR REVISION SURGERY?	Joana Contente | Carlos Ferreira | Mário Silva | Guilherme Madeira | Ana Ribau | Ricardo Sousa	Revision PJI
P42	A NEW APPROACH IN THE TREATMENT OF PERIPROSTHETIC INFECTIONS BY USING A SMART DIGITAL SPACER	Vincent Lallinger | Nguyen Bach Tran | Christoph Dillitzer | Igor Lazic | Andreas Obermeier | Rainer Burgkart | Oliver Hayden	Revision PJI
P43	DO COMPONENTS IN HUMAN SERUM REDUCE THE ANTI-INFECTIVE EFFICACY OF SILVER IONS FROM A NOVEL ANTI-INFECTIVE IMPLANT COATING IN VITRO?	Melanie Nonhoff | Jan Puetzler | Julian Hasselmann | Georg Gosheger | Manfred Fobker | Silke Niemann | Martin Schulze	Revision PJI
P44	RETENTION OF METAL IMPLANTS IN FRACTURE-RELATED INFECTIONS: A CONTROVERSIAL CONCEPT IN ORTHOPAEDIC SURGERY	Manuel Martens | Jan Victor | Jeroen Neyt	Revision PJI
P45	MECHANICAL COMPLICATIONS OF CEMENTED HIP SPACERS IN THE SETTING OF STAGED REVISION FOR PERIPROSTHETIC INFECTIONS	Andrea Sambri | Michele Fiore | Claudia Rondinella | Lorenzo Morante | Azzurra Paolucci | Massimiliano De Paolis	Revision PJI
P46	A COMBINED USE OF CUSTOM-MADE PARTIAL PELVIC REPLACEMENT AND PROXIMAL FEMUR MEGA-PROSTHESIS IN THE TREATMENT OF SEVERE BONE LOSS AFTER MULTIPLE TOTAL HIP ARTHROPLASTY REVISIONS IN PJI	Massimiliano De Paolis | Azzurra Paolucci | Renato Zunarelli | Marta Bortoli | Andrea Montanari | Lorenzo Di Prinzio | Stefania Parisi | Michele Fiore | Andrea Sambri	Revision PJI
P47	PERIPROSTHETIC INFECTION OF MEGAPROSTHESES AFTER LIMB-SALVAGE SURGERY	Vasileios Karampikas | Stavros Goumenos | Ioannis Trikoupis | Panayiotis Gavriil | Anastasios Roustemis | Olga Savvidou | Vasileios Kontogeorgakos | Panayiotis Papagelopoulos	Revision PJI
P48	ARE STREPTOCOCCAL PROSTHETIC JOINT INFECTIONS TOUGHER TO BEAT? A SINGLE INSTITUTION REVISION OF 46 PATIENTS	Javier Sanado Fernández | Ricardo De la Concha Azuara | Llanos Salar Vidal | Antonio Blanco García | Jaime Esteban-Moreno | Alvaro Auñon	Revision PJI
P49	OUTCOME OF DAIR PROCEDURES IN FRACTURE-RELATED INFECTION – COMPARING INTRAMEDULLARY NAILS TO PLATES	Florian Frank | Andrew Hotchen | Poonam Valand | David Stubbs | Jamie Ferguson | Martin McNally	Revision PJI
P50	REVISION FOR INFECTION AFTER PRIMARY TOTAL HIP ARTHROPLASTY – TIME FROM PRIMARY TOTAL HIP ARTHROPLASTY TO MAJOR- OR MINOR REVISION	Pål Høvding | Geir Hallan | Ove Furnes | Håvard Dale	Revision PJI
P51	EIGHT-YEAR RESULTS AFTER DEBRIDEMENT, ANTIBIOTICS, AND IMPLANT RETENTION (DAIR) IN THE TREATMENT OF PERIPROSTHETIC KNEE INFECTIONS	Marcos Gonzalez Alonso | Adrián Guerra González | Alfonso Lajara Heredia | Vega Villar Suárez | Luis Díaz Gallego | Jaime Sánchez Lázaro	Revision PJI
P52	SEQUENTIAL REPEATED TIBIAL TUBERCLE OSTEOTOMY IN A TWO-STAGE EXCHANGE STRATEGY: A SUPERIOR APPROACH TO TREATING A CHRONICALLY INFECTED KNEE ARTHROPLASTY?	Rafael Oleo Taltavull | Oriol Pujol | Pablo Corona | Marta Perez Gil | Matías Vicente Goma-Camps | Carles Amat | Lluis Carrera Calderer	Revision PJI
P53	SILVER-COATED HIP REPLACEMENT WITH BACTERIOSTATIC ACTIVITY PREVENTS PJI IN PATIENTS AT HIGH RISK OF INFECTION BY REDUCING DAIR PROCEDURES	Matteo Romagnoli | Concetto Battiato | Luca Memè | Andrea Sambri | Domenico Tigani | Marco Zaffagnini | Massimiliano De Paolis	Revision PJI

No.	Title	Authors	Category
P54	COMPLIANCE WITH RECENT BOAST GUIDELINES IN MANAGING ACUTE AND SUSPECTED PERIPROSTHETIC JOINT INFECTIONS IN A HIGH-VOLUME ARTHROPLASTY UNIT: INSIGHTS AND RECOMMENDATIONS FOR PRACTICE	Namitha Varghese | Ibrahim Ibrahim | Leon Francis | Shahid Akhtar	Revision PJI
P55	PERIPROSTHETIC JOINT INFECTION MORTALITY FOLLOWING TOTAL KNEE ARTHROPLASTY SURPASSES 5-YEAR RATES FOR COMMON CANCERS: A META-ANALYSIS	Michael Ramos | Brian Benyamini | Varun Kompala | Shujaa Khan | Alison K. Klika | Kyle Kunze | Anabelle Visperas | Nicolas Piuzzi	Revision PJI
P56	MORTALITY ASSOCIATED WITH PERIPROSTHETIC JOINT INFECTION AFTER TOTAL HIP ARTHROPLASTY: COMPARABLE TO 5-YEAR RATES OF COMMON CANCERS	Michael Ramos | Brian Benyamini | Varun Kompala | Shujaa Khan | Alison K. Klika | Kyle Kunze | Anabelle Visperas | Nicolas Piuzzi	Revision PJI
P57	UNICOMPARTIMENTAL KNEE ARTHROPLASTY IS ASSOCIATED WITH A LOWER RISK OF PERIPROSTHETIC JOINT INFECTION IN THE SWISS NATIONAL ARTHROPLASTY REGISTRY SIRIS THAN TOTAL KNEE ARTHROPLASTY	Peter Wahl | Bernard Christen | Christian Brand	Revision PJI
P58	45S5 BIOGLASS GRAFT DECREASES SURGICAL SITE INFECTION AFTER POSTERIOR TLIF RECONSTRUCTION COMPARED TO ALTERNATIVE GRAFT MATERIALS	Kyle Cichos | Chad Evans | Derek Thomas | Jacob Taunton | Sohrab Vatsia | Gerald McGwin | Erik Westerlund	Revision PJI
P59	SILVER-COATED DISTAL FEMUR ARTICULATED MEGAPROSTHESIS IN CHRONIC INFECTIONS WITH SEVERE BONE LOSS. A MULTICENTRE CASE SERIES	Andrea Sambri | Michele Fiore | Marta Bortoli | Stefania Parisi | Domenico Alesi | Sara Tedeschi | Pierluigi Viale | Domanico Andrea Campanacci | Stefano Zaffagnini | Massimiliano De Paolis	Revision PJI
P60	IMPACT OF MICROTEACHING INCLUDED IN AN REGULAR INFECTIOUS DISEASES CONSULTANT SERVICE ON MANAGEMENT OF PROSTHETIC JOINT INFECTION	Falitsa Mandraka | Angela Nowag | Martin Platten | Klaus Schlüter-Brust | Yannik Hanusrichter | Hilmar Wisplinghoff	Revision PJI
P61	CUSTOMIZING TWO-STAGE REVISION ARTHROPLASTY WITH MULTIPLE HIGH-DOSE LOCAL ANTIBIOTICS FOR STAPHYLOCOCCAL PROSTHETIC JOINT INFECTION: NOVEL STRATEGIES WHEN RIFAMPICIN IS NOT AN OPTION	Lourdes Prats Peinado | Miguel Márquez gómez | Mar Sanchez-Somolinos | sofia de la villa martinez | Tanya Fernandez-Fernandez | Jose-Antonio Matas-Díaz | Pablo Sanz Ruiz	Revision PJI
P62	ARTICULATING SPACERS ARE SUPERIOR TO STATIC ONES IN TWO-STAGED REVISION OF HIP AND KNEE PROSTHETIC JOINT INFECTIONS - A CASE-CONTROL STUDY	Tanya Fernandez-Fernandez | Lourdes Prats Peinado | Miguel Márquez gómez | Jose Antonio Matas Díaz | Lydia Mediavilla-Santos | Pablo Sanz Ruiz	Revision PJI
P63	DEBRIDEMENT, ANTIBIOTICS, AND IMPLANT RETENTION USING CALCIUM SULPHATE BEADS TO DELIVER ANTIBIOTICS FOR PERIPROSTHETIC JOINT INFECTIONS OF THE HIP AND KNEE	Irene Katharina Sigmund | Antony Palmer | Andrew Hotchen | Martin McNally | Bernadette Young | Abtin Alvand | Adrian Taylor | Benjamin Kendrick	Revision PJI
P64	ACUTE PELVIC SUPPORT OSTEOTOMY IN PATIENTS OVER 70 YEARS. IN INFECTED FAILED HIP ARTHROPLASTIES	Leon Mora	Revision PJI
P65	SAFETY AND EFFICACY OF MICROPOROUS POLYSACCHARIDE HEMOSPHERES ON COMPLICATION RATES IN TOTAL HIP ARTHROPLASTY FOR FEMORAL NECK FRACTURES: A CONTROL-MATCHED RETROSPECTIVE COHORT STUDY	Olga Pidgaiska | Stavros Goumenos | Marcel Niemann | Andrej Trampuz | Ulrich Stöckle | Sebastian Meller	Revision PJI

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P66	MANAGEMENT OF PROSTHETIC JOINT INFECTION IN MEGAPROSTHESIS: SIZE DOES MATTER	Guilherme Madeira | Diogo Catelas | Joana Contente | Miguel Rocha | João Lucas | João Nelas | Vânia Oliveira | Pedro Cardoso | Ricardo Sousa	Revision PJI
P67	SALVAGE - RECONSTRUCTION OF ONLY REMAINING EXTREMITY DUE TO INFECTED PSEUDOARTHROSIS OF THE HUMERAL DIAPHYSIS WITH INTRAMEDULLARY NAIL AND CALCIUM PHOSPHATE - CURDLAN BONE SUBSTITUTE* IN A PATIENT WHO LOST BOTH LOWER EXTREMITIES AND RIGHT UPPER EXTREMITY	Ireneusz Babiak	Revision PJI
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P204	ROLE OF BONE TRANSPORT AND THEN NAILING IN THE SETTING OF BONE DEFECTS OF THE DIAPHYSIS OF THE TIBIA FOLLOWING A FRACTURE RELATED INFECTION	Crt Benulic | Iztok Gril	Treatment FRI
P205	ADVANCEMENTS IN BRUSHITE CEMENT FORMULATIONS FOR BONE REPAIR AND DRUG DELIVERY	Claudia Morilla Espino | Jeroen van den Beucken | Louise van der Weerd | Lioe-Fee De Geus-Oei	Treatment FRI
P206	NOBLE METAL COATED NAIL* USE FOR THE TREATMENT OF LONG BONE NON-UNION: A RETROSPECTIVE CASE SERIES STUDY	Lapo De Luca | D'Amato Salvatore | Luca Gasperotti | Luigi Branca Vergano	Treatment FRI
P207	INFECTIOUS COMPLICATIONS OF MODERN MILITARY WOUNDS OF THE EXTREMITIES	Mykola Grytsai | Gennadii Kolov | Vasil Tsokalo | Vasil Sabadosh | Andrii Hordii | Ivan Moisa | Roman Vyderko	Treatment FRI
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Poster walks

Chaired poster walks	There will be chaired poster walks during the coffee breaks and welcome reception on Thursday and Friday.

Thursday, 26 September at 10.35

During coffee break on Level 0

Group 1	P1-P12	Osteomyelitis/spondylitis
Group 2	P13-P25	Prognosis
Group 3	P26-P37	Prognosis

Thursday, 26 September at 15.55

During coffee break on Level 0

Group 4	P38-P47	Revision PJI
Group 5	P38-P47	Revision PJI
Group 6	P58-P67	Revision PJI
Group 7	P68-P77	Revision PJI

Thursday, 26 September at 18.45

During the welcome reception on Level 2

Group 8	P78-P92	Case reports
Group 9	P93-P107	Case reports
Group 10	P108-P122	Diabetic Foot infection & Diagnosis
Group 11	P123-P137	Diagnosis
Group 12	P138-P153	Diagnosis / Microbiology & Phage therapy/ models

Friday, 27 September at 10.35

During coffee break on Level 0

Group 13	P154-P163	Antibiotics
Group 14	P164-P172	Antibiotics
Group 15	P173-P181	Antibiotics

Friday, 27 September at 15.50

During coffee break on Level 0

Group 16	P182-P190	Treatment FRI
Group 17	P191-P199	Treatment FRI
Group 18	P200-P208	Treatment FRI

Oral abstracts

[FP A1] IS DAIR OR IMPLANT EXCHANGE BEST FOR FRACTURE-RELATED INFECTION?

Martin McNally[1], Florian Frank[1,2], Andrew Hotchen[1], Poonam Valand[1], David Stubbs[1], Jamie Ferguson[1]

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Aim: This is the first study to directly compare the clinical outcome of debridement, antimicrobials and implant retention (DAIR) with stabilization using new internal fixation after debridement, for patients with Fracture-related Infection (FRI).

Method: Consecutive patients with FRI Consensus confirmed FRI had single-stage surgery with tissue sampling, debridement, stabilization, antimicrobial therapy and skin closure. All cases had FRIs which were unhealed at surgery. When existing implants were stable, the implant was retained but loose implants or fractures with poor reduction had implant removal and refixation with new implants. All patients had the same empiric and definitive antibiotics, the same diagnostic criteria and outcome assessment at least one year after surgery. Failure was defined as infection recurrence, reoperation or lack of fracture consolidation at one year.

Results: Seventy-one patients were studied (40 DAIRs and 31 new implants, including 10 exchange nails). The two groups were well matched for age, duration of infection, BACH complexity, microbiology, bone involved and need for flap coverage. Ten patients died before the endpoint. Sixty-one patients were followed-up for a mean of 3.32 years (1.04-9.43).
Infection was eradicated in 23/34 (67.6%) DAIR patients and 24/27 (88.9%) with new metalware (p=0.049). Rates of infection-free union were similar in both groups (58.8% vs 77.8%; p=0.117). Table 1 summarizes the series and results.

Conclusion: Overall, implantation of new metalware had better eradication of infection and a strong trend towards better union rates. Treating FRI with retained or new metalware had a substantial mortality (13.7%). Choosing DAIR did not reduce this mortality and these patients more often required further surgery to treat residual infection and secure union.

Table 1. Demographics of the series and outcome of DAIR compared to implantation of new metalware.

	Retained Metal		New Metalware			
	DAIR		New Internal Fixation		Exchange Nail	Total (%)
	Plate	Nail	Plate	Nail		
Total Treated	30	10	13	8	10	71
Tibia	5	3		2	6	16
Femur	8	7	4	2	4	25
Humerus	7		5	1		13
Ankle	5		1	3		9
Ulna			3			3
Clavicle	2					2
Elbow	3					3
Died before Follow-up	2	4	1	1	2	10 (13.7)
Number with Outcome Available	28	6	12	7	8	61
Infection-free after Treatment (%)	19/28 (67.9)	4/6 (66.7)	12/12 (100)	4/7 (57.1)	8/8 (100)	47/61 (77.0)
	23/34 (67.6)		24/27 (88.9)			p=0.049
Union after Treatment (%)	20/28 (71.4)	5/6 (83.3)	11/12 (91.7)	6/7 (85.7)	6/8 (75.0)	48/61 (78.7)
	25/34 (73.5)		23/27 (85.2)			p=0.269
Infection-free Union after Treatment (%)	16/28 (57.1)	4/6 (66.7)	11/12 (91.7)	4/7 (57.1)	6/8 (75.0)	41/61 (67.2)
	20/34 (58.8)		21/27 (77.8)			p=0.117

[FP A2] INFECTIONS OF FOREIGN MATERIAL FOR LIGAMENT, MENISCUS, AND TENDON RECONSTRUCTIONS

Samo Roskar[1], Natasa Faganeli[2], Rene Mihalic[1], Rihard Trebse[1]

[1]Valdoltra Orthopaedic Hospital, Service for Bone Infections, Ankaran, Slovenia; [2]Valdoltra Orthopaedic Hospital, Ankaran, Slovenia

Aim: Arthroscopic interventions have revolutionized the treatment of joint pathologies. The appropriate diagnostics and treatment are required for infections after ligament reconstructions using non-resorbable material such as tendon grafts, anchors, and sutures, prone to biofilm formation. The infection rate is around 1% for knee and shoulder, while up to 4% for Achilles tendon reconstructions. Despite high number of these procedures worldwide, there is limited evidence about the best treatment protocol. Our study aimed to provide a general protocol for the treatment of small implants for soft tissue reconstruction.

Method: Between 2019 and 2023, we treated 48 infections of ligament, meniscus, and tendon reconstructions out of 7291 related procedures performed in the same time period. Early infection (<30 days) were treated with an arthroscopic debridement and implant retention (DAIR), except Achilles tendons had open DAIR, while those with delayed or chronic infection (>30 days) were treated with extensive debridement and lavage combined with one-stage exchange (OSE) or implant removal. During surgery, at least 5 microbiological s and samples for histopathology were obtained. The removed material was sonicated. After surgery, all patients were one week on iv. antibiotics, followed by oral antibiofilm antibiotics for 6 weeks including rifampicin and/or a quinolone. All patients were followed for at least 1 year. Failure was defined as the need for additional revision surgery after finished iv. antibiotic treatment.

Results: Among 48 patients, 38 were early and 10 were late acute or chronic infections. The incidence of infection for our cohort was 0.7%. We observed 27 infections after ligament reconstruction of the knee, 15 of the shoulder, 5 of the ankle, and 1 infection of the elbow joint. 40 patients were treated with DAIR, 5 with OSE, and 3 with implant removal. We had 11 ***C. acnes***, 10 ***S. aureus***, 6 ***S. epidermidis***, 2 ***P. aeruginosa***, 2 ***S. lugdunensis***, 10 mixed flora, and 3 culture-negative infections. 12 patients received antibiotics before surgery, and all culture-negative infections were related to this subgroup. We observed 2 failures, both in a combination of proximal tibial osteotomy and ligament reconstruction of the knee joint. The success rate of our protocol was 96%.

Conclusions: Prompt surgical treatment followed by 6 weeks of antibiotic treatment cured 96% of infections of small implants after reconstruction procedures of knee, shoulder, and ankle joints. Our study is the first to provide a treatment protocol for infections of small implants after ligament reconstruction procedures.

[FP A3] ANTIMICROBIAL BIOACTIVE GLASS FOR TREATMENT OF TRAUMATIC OR PATHOLOGICAL BONE DEFECTS

Bolaji John Samuel[1,2,3], Victoria Horbert[2], Zhaorui Jin[4], Delia S. Brauer[3,4], Georg Matziolis[1,2,3]

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Aim: Biomaterial-associated infections (BAI) present a formidable clinical challenge. Bioactive glasses (BG) have proven highly successful in diverse clinical applications, especially in dentistry and orthopaedics. In this study, we aimed to determine the effect of three commonly used BG composition and particle sizes on cell and bacterial attachment and growth. Our focus is on understanding the changes in pH and osmotic pressure in the surrounding environment during glass degradation.

Method: First, three different melt-derived glasses were characterized by analyzing particle size and glass network structure using Raman and NMR. The different glasses were then tested in vitro by seeding 4x 10^4 cells/well (SaOS Cell line) in a 48 well plate. After a pre-incubation period of 72 hours, the different BGs and particle sizes were added to the cells and the pH value, ion release and live/dead staining was measured every hour. The effect of BG against bacteria (***S. epidermidis***) was analyzed after 24 and 72 hours of treatment by using XTT viability assay and CFU counting by plating out the treated aliquot agar to estimate the viable bacteria cells.

Results: All three BG compositions tested showed a significant increase in pH, which was highest in BG composition 45S5 with a value of 11 compared to the other BG compositions 10 and 9 in S53P4 and 13-93 respectively. This strong increase in the pH in all BG samples tested results in a strongly reduced cell viability rate of more than 75% compared to the untreated control and 6-fold reduction in bacterial viability compared to the untreated control. The live/ dead assay also showed an increased cell viability with increasing glass particle size (i. e smallest glass particle < 25% viable cell and largest glass particle> 65% viable cell). The ion release concentration over 50 h showed an increase in sodium ions to 0.25 mol/L, calcium to 0.003 mol/L and a decrease in phosphorus.

Conclusions: These results show that the composition of the bioactive glass and the choice of particle size have a major influence on subsequent applications. In addition to the different compositions of the BG, particle size and additional medium change also influence the pH and ion release, and therefore also on cells or bacteria viability. The sizes of the bioactive glass particle are inversely proportional to it. Further tests are necessary to develop custom design BG compositions, which simultaneously stimulate osteoblasts proliferation and prevent microbial adhesion.

[FP A4] APPROACHES FOR THE TREATMENT OF COMPLICATIONS FOLLOWING WAR INJURIES IN UKRAINIAN PATIENTS

Olga Pidgaiska[1], Stavros Goumenos[1], Maria Virginia Dos Santos[1], Andrej Trampuz[1], Ulrich Stöckle[2], Sebastian Meller[1]

[1]Charité - Universitätsmedizin Berlin, Department für Hüftendoprothetik (CVK) und Septische Chirurgie, Berlin, Germany; [2]Charité - Universitätsmedizin Berlin, Geschäftsführender Direktor CMSC, Berlin, Germany

Introduction: Since the expanded war in Ukraine in 2022, explosives, mines, debris, blast waves, and other factors have predominantly caused injuries during artillery or rocket attacks. These injuries, such as those from shelling shrapnel, involve high-energy penetrating agents, resulting in extensive necrosis and notable characteristics like soft tissue defects and multiple fragmentary fractures with bone tissue defects and a high rate of infection complications caused by multiresistant gram-negative (MRGN) pathogens.

Material and Methods: We conducted a prospective study at our center between March 2022 and December 2023. Out of the 56 patients from Ukraine, 21 met the inclusion criteria who had severe war injuries were included in the study. Each of these patients presented with multiple injuries to both bones and soft tissues, having initially undergone treatment in Ukraine involving multiple surgeries. The diagnosis of infection was established based on the EBJIS criteria. Prior to our treatment patients had undergone multiple revision surgeries, including debridement, biopsies, implant and fixator replacement. Additionally, soft tissue management required previously VAC therapy and flap reconstruction for successful treatment.

Results: All 21 infections manifested as bone infections (11; 52%), followed by implant-associated infections (5; 24%), soft tissue infections (4; 19%), and septic arthritis (1; 5%). In all patients, the infection was polymicrobial, caused by 3- and 4-MRGN pathogens, as ***Klebsiella pneumonia*** 4MRGN, ***Proteus mirabilis*** 4MRGN, ***Enterobacter cloacae*** 4MRGN etc. Upon admission, all patients carried a diagnosis and exhibited signs indicative of chronic infection. 19 (90.5%) patients required complex antibiotic regimens combined with multiple wound revisions and debridements, changes of fixators and combination of systemic and local antibiotic therapy. In 6 patients (28%) high dosages of local antibiotics such as gentamycin, vancomycin and meropenem were incorporated into a carrier of bioabsorbable calcium sulfate, calcium sulfate/hydroxyapatite which were introduced into the hip joint, femoral canal or bone defect for dead space management during the surgery. When local antibiotics were administered at intervals, the microbiology results at implantation showed negative results. 2 (9%) patients had new infections (different site, different pathogens), 1 (4.8%) is still under the treatment. In 17 (81%) patients infection complications were treated successfully with no recurrence of infection.

Conclusion: War injuries result in complex bone and soft-tissue infections caused by 3-, 4-MRGN pathogens. Addressing this challenge necessitates multidisciplinary approach with multiple, thorough surgical debridements, effective local, and systemic antimicrobial therapy. As for the outlook we can see potential in local antibiotic carriers.

[FP A5] HIGH FAILURE RATES IN CONCOMITANT PERIPROSTHETIC JOINT INFECTION AND PERIPROSTHETIC FRACTURE TREATMENT – A STUDY OF 41 TOTAL HIP ARTHROPLASTIES

Markus Jaschke[1], Stavros Goumenos[1], Moritz-Guenther Mewes[1], Carsten Perka[1], Andrej Trampuz[1], Sebastian Meller[1]

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Aim: Periprosthetic joint infection (PJI) and periprosthetic fracture (PF) are one of the most devastating complications in arthroplasty. Each complication by itself is challenging to solve. Yet, simultaneously, both complications are inconceivably complex to deal with, while the treatment regimen of PJI and PF are contradictory. Chronic PJI most often requires implant removal, while PF requires stability, regularly achieved by stable osteosynthesis. This study aims to (1) analyse the success rate of PJI with following concomitant PF during the treatment course in total hip arthroplasties (THA) and (2) to determine the risk factors for reinfection and subsequent revision surgery after treatment of PJI and PF.

Method: This restrospective study analyzed 41 patients with concomitant PJI and PF during the PJI treatment period from 2013 to 2022 involving THA. Patients were divided in two cohorts termed success and failure and were statistically compared. The median follow-up time was 66 months (>12 months). All patients were considered individually and treated according to their individual needs in fracture and infection treatment. Re-arthroplasty survival was analyzed using the Kaplan-Meier method. Relevant risk factors were analyzed using the Mann-Whitney test or Chi-square, depending on the variable´s scale.

Results: The overall success rate of our cohort was 70,7%. Twelve patients required re-operation due to reinfection, resulting in a cumulative 12-month-reinfection rate of 19,5%. The estimated cumulative reinfection free survival rate was 68,3%. Significance in risk factors for failure were found in pathogen virulence grade, Difficult to treat pathogen and number of debridement during interval. On average the Harris Hip score was 66 in the group of reinfection compared to 77 in the group of success.

Conclusions: Reoperation and re-infection rate remains high in patients with simultaneous PJI and PF in THA. Due to the heterogeneity of the fractures, soft tissue conditions and pathogens found, treatment must be individualised to salvage the limb. However, small cohorts impact the statistical strength negatively due to instances of two rare complications.

[FP A6] TIBIAL OSTEOMYELITIS REQUIRING RECONSTRUCTION WITH A FREE FLAP: A SINGLE CENTRE REVIEW OF OUTCOMES

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Aim: To report outcomes of soft tissue reconstruction using free tissue transfer for the treatment of tibial osteomyelitis as part of a single-stage, ortho-plastic procedure.

Method: Patients who underwent ortho-plastic reconstructive surgery to excise tibial osteomyelitis in combination with free tissue transfer in one stage were included. Patients underwent surgery between 2015 and 2024 in a single specialist centre within the UK. Baseline patient information, demographics, and infection information was recorded. Adverse outcomes were defined as (i) flap salvage required, (ii) flap failure and (iii) recurrence of infection. Patient reported quality of life was measured using the EuroQol EQ-5D-5L index score. Pre-operative QoL was compared to QoL at 1 year with a control group of 53 similar patients who underwent surgical treatment for tibial osteomyelitis without a free flap (local flap or primary closure).

Results: Ninety-three patients were eligible for inclusion, with a mean age of 52 years (range 18–90). 77/93 (82.8%) had a free muscle flap with the remainder (17.2%) receiving a fasciocutaneous flap. The donor tissue was defined as 57 gracilis, 6 latissimus dorsi, 14 hemi-latissimus dorsi, and 16 anterolateral thigh. The recipient area of the tibia was distal 1/3 in 52 cases, middle 1/3 in 27 cases and proximal 1/3 in 12 cases. The average flap ischaemic time was 70 minutes (range 28 to 125).
Seven patients (7.5%) required urgent flap salvage at a median time of 1.0 day (range 0.5 – 4.0). Of these, 4 (4.3%) went on to have total flap failure, of which 2 patients underwent below knee amputation subsequently. Flap failure was due to either arterial (n=2) or venous (n=2) anastomotic thrombus. There were 3 (3.2%) episodes of confirmed infection recurrence within the first year after the index procedure.
EQ-index scores at 1-year post-operatively were significantly improved when compared to pre-operative scores (p=0.008). At 1-year post-operatively, EQ-index scores in patients who underwent free flap was similar compared to local flaps (p=0.410) and in those who underwent primary closure for tibial osteomyelitis (p=0.070).

Conclusions: Microsurgical single stage surgery can achieve high flap survival rate (95.7%). Free flaps fail early due to anastomotic thrombus with no late failures seen. Free tissue transfer does not appear to give inferior QoL compared to matched patients with local flaps or direct closure in tibial osteomyelitis.

[FP A7] A COMPARISON OF CAUSATIVE MICROBIAL PATHOGENS IN OSTEOMYELITIS AND PROSTHETIC JOINT INFECTION: A RETROSPECTIVE OBSERVATIONAL COHORT STUDY

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Aims: Bone and joint infections cause significant morbidity, often requiring combination medical and surgical treatment. The aim of this study was to assess whether there was a difference in the bacterial species identified on culture in osteomyelitis compared to prosthetic joint infection.

Method: This was a retrospective observational cohort study of patients that had surgical intervention for prosthetic joint infection or osteomyelitis with positive microbial culture between 2019 and 2022. Data including patient demographics, site of injury, JS-BACH score, organism classification and antibiotic resistance to vancomycin and gentamicin were extracted from the medical record. Logistic and multiple regressions were used to adjust for potential confounding variables.

Results: A total of 445 patients were included in the study; 267 patients with osteomyelitis or fracture-related infection (FRI) and 177 patients with prosthetic joint infection. The patients with prosthetic joint infection were older (Mean age 70 for PJI; IQR 60-77 vs 56 for OM/FRI; IQR 39-64), more likely to be female (55.6% vs 26.2%) and had a higher BMI and ASA compared to those with osteomyelitis. Symptom duration tended to be longer in osteomyelitis/FRI ($p<0.001$).

Staphylococcus aureus was the most common pathogen followed by Gram negative species. Multivariate analysis showed no difference in the rate of ***Staphylococcus aureus***, polymicrobial infection or antimicrobial resistance between the two groups. Table 1 summarizes the microbiological findings.

Conclusion: Causative pathogens are similar in these two common forms of bone and joint infection. There was no significant difference in the identification, presence of polymicrobial infection or gentamicin and vancomycin resistance in organisms isolated in osteomyelitis/FRI compared to prosthetic joint infection. This may have implications for empiric antibiotic choice and local antibiotic therapy in the management of bone and joint infection.

Table 1. The Microbiological Profile of the Patient Cohort

	Osteomyelitis and Fracture-related infection (n, %)	Prosthetic Joint infection (n, %)	*p value*	Multivariate Analysis p value
Organism classification				
Staphylococcus aureus	155 (58.1%)	85 (48.0%)	0.048	0.084
Coagulase negative staphylococcus	55 (20.6%)	37 (20.9%)	1	na
Streptococcus species including *enterococcus*	50 (18.7%)	44 (24.9%)	0.153	na
Pseudomonas species	20 (7.5%)	10 (5.6%)	0.573	na
Other Gram negatives	77 (28.8%)	48 (27.1%)	0.071	na
Other Gram positives	47 (17.6%)	31 (17.5%)	1	na
Candida species	1 (0.4%)	3 (1.7%)	0.306*	na
Gram positive organisms only	188 (70.4%)	135 (76.3%)	0.175	na
Gram negative organisms only	21 (7.9%)	16 (9%)	0.661	na
Polymicrobial	92 (34.5%)	42 (23.7%)	0.016	0.912
Confirmed gentamicin resistance	26 (9.7)	18 (10.2)	0.882	na
Confirmed vancomycin resistant gram positives	9 (3.4)	1 (0.6)	0.068	na

*Fisher's exact test as <5 outcomes/ cell. na not applicable

[FP A8] CLINICAL EVIDENCE OF BIOMATERIALS IN OSTEOMYELITIS TREATMENT. LITERATURE REVIEW AND DECISION-MAKING CONSIDERATIONS

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Introduction: Various biomaterials and bone graft substitute technologies for use in osteomyelitis treatment are currently used in clinal practice. They vary in mode of action (with or without antibiotics) and clinical application (one-stage or two-stage surgery). This systematic review aims to compare the clinical evidence of different synthetic antimicrobial bone graft substitutes and antibiotic-loaded carriers in eradicating infection and clinical outcome in patients with chronic osteomyelitis.

Methods: Systematic review according to PRISMA statement on publications 2002-2023. MESH terms: osteomyelitis and bone substitutes. FREE terms: chronic osteomyelitis, bone infection. A standardized data extraction form was be used to extract data from the included papers.

Results: Publications with increased methodological quality and clinical evidence for biomaterials in osteomyelitis treatment were published in the last decades. High 85-95% eradication rates of osteomyelitis were observed for various resorbable Ca-P and/or Ca-S biomaterials combined with antibiotics and S53P4 bioactive glass. Level of evidence varies significantly between products. Antibiotic pharmacokinetic release profiles vary between resorbable Ca-P and/or Ca-S biomaterials.

Conclusion: Given the high 85-95% eradication rates of osteomyelitis by various resorbable Ca-P and/or Ca-S biomaterials combined with antibiotics and S53P4 bioactive glass, one-stage treatment is preferred. Surgeons should be aware of variations in mechanical properties and antibiotic pharmacokinetic release profiles between Ca-P and CA-s products. Mechanical, biological and antimicrobial properties of bioactive glass are formulation dependent. Currently, only S53P4 bioactive glass has proven antimicrobial properties. Based on this systematic review antibiotic loaded fleeces should be used with caution and restraint.

[FP A9] NANOSCALE ZINC-SUBSTITUTED HYDROXYAPATITE: A BONE GRAFTING BIOMATERIAL WITH ENHANCED ANTIBACTERIAL PROPERTIES

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Introduction: In specific conditions, infection may lead to bone loss and is difficult to treat[1]. Current clinical approaches rely on the introduction of antibiotics. While these may be effective, there are concerns regarding the rise of antimicrobial resistance. There is therefore interest in the development of antimicrobial bone graft substitutes for dental and trauma surgery.

Aim & Objectives: The incorporation of zinc into biomaterials has been shown to confer broad spectrum antimicrobial activity, but this has not yet been applied to the development of a commercial bone graft substitute. The aim of this research was therefore to prepare and characterise a series of zinc-substituted nanoscale hydroxyapatite (nHA) materials, including evaluation of antimicrobial activity.

Method: Zinc (Zn) substituted nHA materials were prepared (0, 5, 10, 15 & 20 mol.% Zn) using a wet chemical precipitation method with a rapid mixing[(2)]. The reaction was carried out using zinc hydroxide at pH 10. The suspension formed was washed and dried into both powder & paste forms. The resultant powders were characterized using transmission electron microscopy (TEM) and X-ray diffraction (XRD). The antimicrobial activity was evaluated against ***Staphylococcus aureus*** (S8650 strain - isolated from an osteomyelitis case), by two techniques. The Miles and Misra method was applied to determine the number of colony-forming units (CFUs) in bacterial suspensions incubated with pastes. Secondly, a biofilm initialization method was used to evaluate the capacity of the materials to prevent biofilm formation. One-way analysis of variance (ANOVA) was used for the statistical analysis and results with p-value < 0.05 were considered statistically significant.

Results: XRD indicated the formation of pure hydroxyapatite with up to 10 mol.% Zn without any side products. However, when Zn was increased to 15 & 20 mol %, zinc oxide (ZnO) peaks were detected. The TEM showed nanoscale needle-like particles when Zn was increased compared to nHA particles. Regarding the antibacterial activity, ZnHA pastes at all concentrations caused a significant reduction in bacterial CFUs in a dose-dependent manner (50, 100 & 200 mg). Additionally, even the lowest zinc substitution (5 mol.%) significantly reduced biofilm formation.
Conclusion: The results demonstrated a novel method to produce a Zn-substituted nHA that showed antimicrobial activity against a pathogen isolated from a bone infection.

References:
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[2]Wilcock CJ et al. ***J. Vis. Exp***. (120), e55343, 2017

[FP A10] THE MANAGEMENT OF UNHEALED FRACTURE-RELATED INFECTIONS WITH A SINGLE-STAGE PROTOCOL AND WITHOUT BONE GRAFT

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Aim: This retrospective study evaluated the outcome of treatment for unhealed fracture-related infections (FRI).

Method: We identified a consecutive, single-centre cohort of patients having treatment for an FRI Consensus confirmed FRI. All fractures were unhealed at the time of treatment. Patients were followed up for at least one year. Successful outcome was a healed fracture without recurrent infection. Lack of union, persistent infection and/or unplanned reoperation defined failure.

Results: Demographics: 183 patients (184 FRIs) with mean age 52.1 years (range 17-96) were treated and followed up for a mean of 2.8 years (range 1-9.4). Mean duration of FRI was 1.1 years with 65 (35.5 %) presenting within 6 months of injury. 118 patients had established infected non-union. FRI was most frequent in the tibia (74), femur (48) and humerus (24). 171 patients were BACH Complex.
75.5% of FRIs were culture positive, with Staph. aureus being the most frequent organism. Polymicrobial infection and Gram negative cultures were common (25.5% and 33.6%).
Treatment: 98.3% of surgeries were performed in one stage with just 3 planned 2-stage procedures (2 endoprosthetic replacements and 1 free fibular flap). No bone graft was used in any surgery and all wounds were closed at first operation. 48 cases (26%) required flap coverage (29 free flaps and 19 local flaps). Local antibiotics were used in 124 cases (67.4%) of primary surgeries.
All patients had sampling, debridement, systemic antibiotics and wound closure. 40 (21.7%) had DAIR, 31 (16.8%) had new internal fixation and 105 (57.1%) had external fixation (including 79 Ilizarov fixators).

Outcomes: After primary surgery, 84.6% of all patients were infection-free and 77.2% had united. After further surgery, 98.8% were infection-free and 98.1% had united. External fixation techniques achieved infection eradication in 89.1% compared to 71.7% with any internal fixation (p=0.005). Primary internal fixation achieved union in 81.7% compared to 74.3% with external fixation (p=0.27). Secondary surgery after external fixation was mainly docking site fixation.

Conclusions: Unhealed FRIs present a difficult challenge for treatment. This large series demonstrated that single-stage treatment, without bone grafting, gave acceptable results with few re-operations. Primary external fixation gave more certainty of infection eradication but required more reoperations to secure union. However, this difference in reoperation was not statistically significant. We strongly advocate managing these patients with a multidisciplinary team which can treat all aspects of the condition.

[FP B1] ASSESSING THE EFFICACY OF A PRE-FORMULATED IRRIGATION SOLUTION FOR ACUTE PERIPROSTHETIC JOINT INFECTION: INITIAL FINDINGS FROM A RANDOMIZED CONTROLLED TRIAL

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Aim: This study aims to evaluate the effectiveness of a pre-formulated irrigation solution[1] (containing ethanol, acetic acid, sodium acetate, benzalkonium chloride, and sterile water) compared to saline solution in managing acute periprosthetic joint infections (A-PJI) during Debridement, Antibiotic, and Implant Retention (DAIR) surgeries. The primary objective is to assess the healing rate using this solution[1] versus saline in A-PJI patients, with "cure" defined by a set of criteria including no recurrence, wound issues, or need for ongoing suppressive antibiotics after 1 year. Principio del formularioFinal del formulario

Method: This single-center, randomized controlled trial will involve patients with acute periprosthetic infections undergoing standard DAIR surgery, divided into two groups: one receiving saline solution and the other receiving pre-formulated solution[1]. The study is single-blinded, with patients unaware of their group assignment. The study is registered at ISRCTN: https://doi.org/10.1186/ISRCTN10873696. Inclusion criteria include patients over 18 with hip or knee prostheses suffering from acute or hematogenous periprosthetic infections, while exclusion criteria include a history of prior debridement or multiple infected implants, among others.Principio del formularioFinal del formulario A total of 50 subjects are needed for statistical significance, with a 5% dropout rate anticipated. An interim safety analysis will assess early effectiveness and adverse effects, and the results are presented in this study. Data will be managed in online databases and analyzed using SPSS software, with a significance level of $p<0.05$

Results: Twenty-four patients were eligible for analysis, twelve in each group. The overall average age was 75 years, and the gender distribution was predominantly female (9 F and 3 M in each group). No significant differences were found at the baseline characteristics level between the two groups ($p>0.05$). The minimum follow-up of 1 year was achieved in all cases except three due to deaths not related to periprosthetic infection. Regarding efficacy, a non-statistically significant difference was observed ($p>0.05$), with 58% in the serum group and 42% in the pre-formulated irrigation solution[1] group ($X^2= 0.17$, $p=0.683$). The average hospital stay was 38.42 days (SD 26.32) in the pre-formulated irrigation solution group[1] and 24.42 days (SD 18.72) in the serum group, with this difference being not significant ($t=1.5$, $p=0.148$).

Conclusions: While the current analysis indicates no significant differences between both groups in terms of efficacy, the study's ongoing progress and the inclusion of a larger sample size could potentially yield more definitive results.

Principio del formulario

[1]Bactisure®, approved by the FDA in 2020, containing ethanol, acetic acid, sodium acetate, benzalkonium chloride, and sterile water.

[FP B2] INTRAVENOUS VERSUS INTRAOSSEOUS VANCOMYCIN IN TOTAL KNEE ARTHROPLASTY – A PROSPECTIVE SINGLE-BLINDED RANDOMIZED CONTROLLED TRAIL

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Aim: Literature shows that intraosseous (IO) infusions are capable of providing increased local concentrations compared to those administered via intravenous (IV) access. Successes while using the technique for antibiotic prophylaxis administration in trauma and hip surgeries prompted consideration for use in total knee arthroplasty (TKA) however; no study exists comparing the use of IO versus IV vancomycin in TKA.

Methods: This single-blinded randomized control trial was performed from January 2021 to December 2023. Sixty patients were randomized into 1 of 2 groups: IV vancomycin (15 mg/kg) given routinely, or IO vancomycin (500 mg/100cc of NS) injected in equal proportions into the distal femur and proximal tibia after incision. Serum vancomycin levels were collected at incision and closure. Soft tissue vancomycin levels were taken from the capsule (at start and end of case), and infrapatellar fat pad. Bone vancomycin levels were taken from the distal femoral, proximal tibial cuts, intramedullary tibia and femur bone. Adverse local/systemic reactions, 30-day complications, and 90-day complications were also tracked.

Results: A statistically significant reduction in serum vancomycin levels was seen when comparing IO to IV vancomycin at both the start and at the end of the procedure. All local tissue samples had higher concentrations of vancomycin in the IO group. Statistically significant increases were present within the intramedullary bone, and approached significance in femoral side.

Conclusion: This study demonstrates the utility of IO vancomycin in primary TKA with increased local tissue and decreased systemic concentrations. With positive findings in an area without tourniquet use, IO may be considered for antibiotic delivery for alternative procedures.

Keywords: complications; periprosthetic joint infection; prevention; technique; total hip arthroplasty.

[FP B3] TWO STAGE REVISION FOR LATE PROSTHETIC JOINT INFECTION IN MEGAPROSTHESIS FOLLOWING BONE SARCOMAS: A MULTICENTRIC EMSOS STUDY

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Aim: Treatment of megaprosthesis joint infections (MPJI) are similar to those for standard prosthesis (PJI) and include debridement and implant retention, one and two-stage revision. This multicentric EMSOS study aimed to identify predicting factors for the outcome of MPJI treated with a staged approach and to compare different reconstructions among different anatomical sites.

Method: Inclusion criteria included a late MPJI diagnosis (>6 weeks) and treatment with two-stage revision surgery. Patients with a follow-up <12 months and reconstructions other than megaprosthesis were excluded. Re-infection rate was recorded, along with patient characteristics, MPJI site, infection characteristics and time-related parameters.

Results: 177 cases were included from 15 different referral centers. The mean patient age was 38.6years. Most represented sites were distal femur (89 cases), proximal tibia (47 cases) and proximal femur (24 cases). 34% of MPJI were polymicrobial, with most of monomicrobial infections from gram-positive pathogens (S. Epidermidis 26.6%, S. Aureus 20.3%). However, in 13% of the cases microbiological exams were positive for Enterobacteriaceae, and this series also included included high virulence bacteria and fungi. On the other hand, no pathogen was isolated in 16.9% of the cases, despite of the PJI diagnosis being clinically confirmed. Recurrence of infection was observed in 40.7% of cases after a median of 20 months.

Conclusions: MPJI has a higher prevalence of high virulence bacteria such as S. aureus and Enterobacteriaceae compared with series involving standard PJI.
Even though a staged approach is the gold standard to treat chronic MPJI, its success rate is inferior compared to standard prosthesis.

[FP B4] LIPOSOMES-CONJUGATED ON THE BACTERIOPHAGE SURFACE FOR DELIVERING ANTIBIOTICS TO COMBAT MULTIDRUG-RESISTANT BACTERIAL INFECTIONS

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Aim: Treatment of prosthetic joint infection (PJI) by systemic administration of high doses of long-term antibiotics often proves ineffective, causing severe side effects. Thus, we presented the phage Sb-1, which coding extracellular polymeric substances (EPS) degradation depolymerases, conjugated with rifampicin-loaded liposomes (Lip-RIF@Phage) by bio-orthogonal functionalization strategy to target biofilm (Figure1).

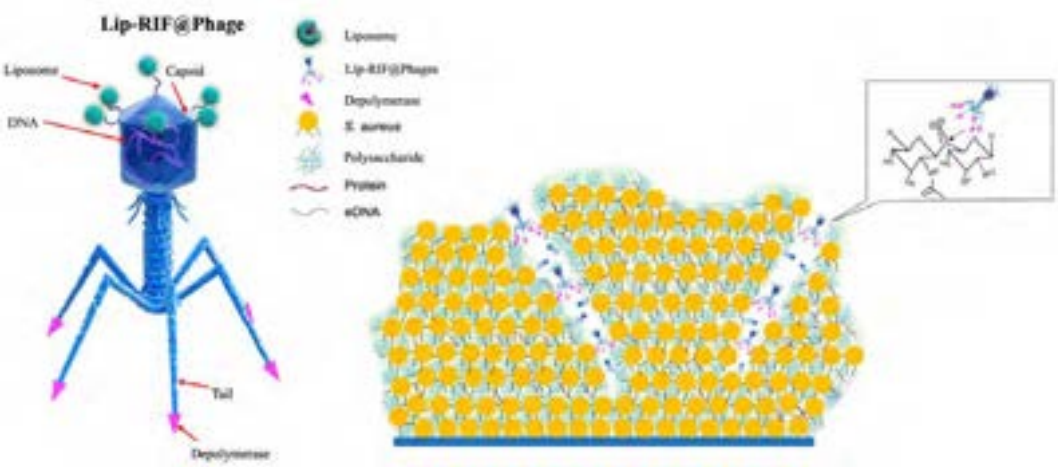

Figure 1. A schematic illustration of Lip-RIF@Phage degradation EPS and elimination biofilm

Method: Methicillin-resistant Staphylococcus aureus (MRSA) biofilm was grown on porous glass beads for 24 h ***in vitro***. After the biofilm formation, beads were exposed to 0.9% saline, then sonication. Quantitative and qualitative biofilm analyses were performed by colony counting, scanning electron microscopy and isothermal microcalorimetry. A rat model of total knee arthroplasty infected with the bioluminescent MRSA strain was developed as the PJI model to evaluate the efficacy of Lip-RIF@Phage anti-biofilm therapy ***in vivo***, then the creatinine, alanine transaminase, and aspartate transaminase values were evaluated throughout the entire treatment process.

Results: After treatment with Lip-RIF@Phage, no bacterial colonies were observed, consistent with findings from scanning electron microscopy. Similarly, isothermal microcalorimetry revealed no detectable heat following Lip-RIF@Phage treatment, aligning with these observations. ***In vivo*** experiments demonstrated a significant reduction in biofilm cell load compared to all other tested conditions, with no evidence of systemic toxicity on renal and liver functions attributed to Lip-RIF@Phage.

Conclusions: The innovative depolymerase-phagobot nanosystem (Lip-RIF@Phage) exhibits remarkable efficacy in completely eliminating biofilm cells ***in vitro***. It serves as an excellent carrier for antibiotic delivery, enhancing antibiotic penetration through biofilms and improving biofilm eradication efficacy. Furthermore, it enables personalized treatment strategies against biofilm-associated multidrug-resistant (MDR) infections by maximizing the effectiveness of any remaining sensitive antibiotics.

[FP B5] A CLINICAL EVALUATION OF THE SAFETY AND TOLERABILITY OF A NOVEL ANTIMICROBIAL PEPTIDE IN PROSTHETIC JOINT INFECTION OF THE KNEE, TREATED BY DEBRIDEMENT, ANTIMICROBIALS AND IMPLANT RETENTION (DAIR)

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Aim: Antimicrobial peptides occur naturally in our intrinsic immune system. PLG0206 is a novel, engineered, 24-amino acid peptide which has broad-spectrum antimicrobial activity, including in biofilm and against multi-drug resistant pathogens[1,2]. This is the first clinical study to evaluate the safety and tolerability of PLG0206 when administered via an irrigation solution in patients with periprosthetic joint infections (PJI) following total knee arthroplasty (TKA) during debridement, antibiotics, and implant retention (DAIR). Secondary objectives were to evaluate pharmacokinetics (PK), biomarkers and initial clinical efficacy at one year post-DAIR procedure.

Method: This prospective, multicenter, open-label, interventional study assessed two dose levels of PLG0206.
Fourteen patients underwent revision for PJI after TKA. At the end of debridement, they received a single intra-articular irrigation of PLG0206 into the wound cavity lasting 15 minutes at concentrations of 3 mg/mL (n=7) or 10 mg/mL (n=7). Patients received post-operative care and intravenous/oral antimicrobial therapy as per their institutional guidelines. Patients were monitored for safety and signs of relapse or persistent infection for 12 months post study drug administration and PK and blood biomarkers were assessed.

Results: All patients completed their final study assessment at Day 365. Over the 1-year follow-up, only one recurrence (7%) was noted at Day 169 in the low-dose cohort. Following dosing, nine patients (64.3%) had limited systemic exposure; maximum plasma concentration occurred 1-hour post-administration and declined rapidly to undetectable levels by 24 hours following treatment in all patients. The incidence of drug related treatment-emergent adverse events (TEAEs) was low. Two patients, both in the higher dose cohort, experienced a transient drug related TEAE; one of hypertransaminasaemia and one of neuralgia. Both events were moderate in severity and resolved within two weeks of onset.

Conclusions: A single 15-minute irrigation of PLG0206 into the wound cavity of patients undergoing a DAIR procedure for PJI following TKA, is safe and well tolerated by patients. This new antimicrobial peptide offers a promising therapeutic option in musculoskeletal infection. The initial clinical efficacy is encouraging but now needs to be investigated in a much larger clinical trial.
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[FP B6] IN VITRO STUDY ON CHEMICAL DEBRIDEMENT DURING PERIPROSTHETIC JOINT INFECTION SURGERY: WHAT IS THE BEST TREATMENT STRATEGY?

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Aim: Chemical debridement is a fundamental step during Periprosthetic joint infection (PJI) surgery. Antiseptic solutions are commonly used, but evidence on the optimal antiseptic, concentration, and irrigation time is lacking. The aim of this study is to analyze and compare the antibiofilm capacity of povidone iodine, H_2O_2, acetic acid and Bactisure™ after different exposure times, as well as their combinations.

Method: Surgical steel discs inoculated with methicillin susceptible (MSSA) and resistant ***S. aureus*** (MRSA), ***P. aeruginosa***, and ***S. epidermidis*** were exposed to the following antiseptic solutions: 0.3% (PI0.3) and 10% povidone iodine (PI10), H_2O_2, 3% Acetic acid (AA3) and Bactisure™. Combinations included AA3, H_2O_2, and PI10 in various orders. Exposure time for the antiseptics solutions was 1, 3 and 5 minutes, while combinations had a 9-minute total exposure, 3 minutes per antiseptic sequentially. All experiments were performed in triplicate and with a sterile saline control. nThe reduction in colony-forming units (CFU) was measured after sonication, and biofilm structure was analyzed via scanning electron microscopy.

Results: PI showed the highest antibiofilm activity. PI0.3 eradicated bacteria on the discs after 3 and 5 minutes of exposure, but only achieved a 77.1% reduction after 1 minute. After PI10 treatment, we did not recover any bacteria regardless of exposure time. H_2O_2, AA3, and Bactisure™ reached a significantly lower bacterial decrease at all exposure times compared to PI0.3 and PI10. AA3 was less effective against MSSA and ***S. epidermidis***. H_2O_2 showed less activity against MRSA than PI0.3, PI10, and Bactisure™. Combinations of antiseptics starting with AA3 showed the best results in terms of CFU reduction and cell viability.

Conclusions: We propose a sequential combination of AA3 + H_2O_2 + PI10 with an exposure time of 9 minutes for the chemical debridement in PJI surgery. First, AA3 performs debridement and disruption of the biofilm. Then, H_2O_2 has a bactericidal effect and increases the porosity of the cell wall, and PI10 has a final bactericidal effect. If combinations are unavailable, PI is a cost-effective alternative.

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[FP B7] GENOMIC CHARACTERIZATION AND CLINICAL EVALUATION OF PROSTHETIC JOINT INFECTIONS CAUSED BY CUTIBACTERIUM ACNES

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Aim: *Cutibacterium acnes* is a major skin commensal that may also act as an opportunistic pathogen. Findings of ***C. acnes*** in tissue cultures obtained during arthroplasty revision surgery are difficult to interpret, since they may represent true infection or contamination. This study investigated whether ***C. acnes*** isolates obtained from prosthetic joint infections (PJIs) were related and shared common genomic traits that might correlate with clinical courses and patient outcomes.

Method: *C. acnes* isolates from revision surgery of patients with PJIs of the hip, shoulder, and knee were characterized using molecular methods to determine sequence type (ST) and the presence of virulence determinants (CAMP factors, dermatan sulfate-binding adhesion 1, hyaluronidase lyase, and linear plasmid). A standardized review of the patients' medical charts was performed.

Results: The study included 37 patients with ***C. acnes*** culture-positive tissue samples where multiple isolates of ***C. acnes*** belonged to the same ST. Most of the isolates belonged to phylotype IA_1. Phylogenetic analysis of virulence determinants revealed no shared pattern among PJI isolates. Seven patients had a polymicrobial infection. Exchange revision was performed in 70% of the patients, and >50% of all patients received antibiotic treatment for ≥3 months. Failure was noted in seven patients, all of whom had shoulder PJIs.

Conclusions: No specific ST or any identifiable unique feature among virulence determinants were found among ***C. acnes*** isolated from PJIs of hips and shoulders. The majority of all included patients had low inflammatory markers and were treated successfully, even when the infection consisted of a polymicrobial infection.

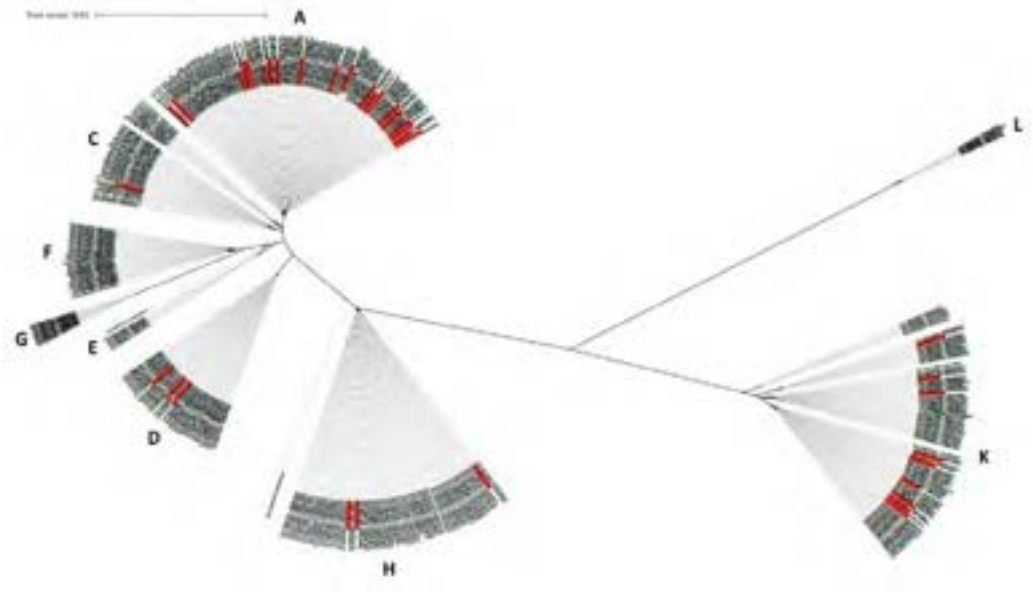

Figure 1. Phylogenetic tree based on core genome alignment of Cutibacterium acnes strains (n=37) from prosthetic joint infections included in the present study.
The 37 genomes were compared with other publicly available strains (n=438 as of March 2023), including strains from normal skin, acne lesions, and other foreign body infections. The different phylogenetic clades were clearly separated (SLST classes A–L).

[FP B8] REVISION FOR INFECTION AFTER PRIMARY TOTAL HIP ARTHROPLASTY – TIME TRENDS IN SURGICAL STRATEGY

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Background and purpose: Previous publications have reported an increased but levelling out risk of revision for infection after total hip arthroplasty (THA) in Norway. We assessed the changes in risk of major (cup and/or stem, 1- or 2-stage) and minor revisions (debridement, exchange of modular parts, antibiotics and implant retention (DAIR)) for infection after primary THAs reported to the Norwegian Arthroplasty Register (NAR) over the period 2005-2022.

Patients and methods: Primary THAs reported to the NAR from 2005 to 2022 were included. Time was stratified into time periods (2005-2009, 2010-2018, 2019-2022) based on a previous publication. Cox regression analyses, adjusted for sex, age and ASA-classification, with the first revision for infection were performed.

Results: 140,338 primary THAs met the inclusion criteria. 1.3% (1,785) were revised for infection during the study period. 0.5% (638) had major revisions, whereas 0.8% (1,147) had DAIRs for infection.
The risk of revision for infection was 1.2 (95%CI 1.1-1.4) for 2010-2018 and 1.0 (0.8-1.1) for 2019-2022 compared to 2005-2009. Compared to 2010-2018, the risk of revision for infection was 0.8 (0.7-0.9) for 2019-2022.
The risk of DAIR for infection was 1.5 (1.3-1.9) for 2010-2018 and 1.2 (1.0-1.4) for 2019-2022 compared to 2005-2009. Compared to 2010-2018, the risk of DAIR for infection was 0.8 (0.7-0.9) for 2019-2022.
The risk of major revision for infection was 0.8 (0.7-1.0) for 2010-2018 and 0.8 (0.6-1.0) for 2019-2022 compared to 2005-2009.

Interpretation: The overall risk of revision for infection after THA, in Norway, has decreased in the period 2019-2022. The risk for DAIR initially increased in the period 2005-2009, levelled out 2010-2018 before starting to decrease in 2019-2022. The risk of major revision for infection was reduced in the period 2005-2009 before levelling out. This shows changes in revision strategies, but may also reflect a true decrease in periprosthetic joint infection.

[FP B9] IS THE PRESENCE OF A POSITIVE BLOOD CULTURE A RISK FACTOR FOR DAIR FAILURE IN HAEMATOGENOUS TOTAL KNEE ARTHROPLASTY INFECTION?

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Aim: Haematogenous prosthetic joint infections account for 20-35% of total prosthetic infections. Debridement, antibiotics and implant retention (DAIR) is a well-accepted treatment for these infections and probably the most desired by surgeons, since it tries to maintain a functional and stable implant. However, the risk of DAIR failure is not negligible and some risk factors have been described, and also, different scores, such as CRIME80.
Nonetheless, less is known about the impact of positive blood cultures may have on DAIR treatment. The aim of our study is to analyze whether the presence of a positive culture is a risk factor for DAIR failure.

Method: A retrospective cohort study of 50 late acute haematogenous TKA infections was performed from 2015 to 2023. DAIR failure was defined as the need of a subsequent intervention either a new DAIR or a revision surgery. So, patients were divided into two groups depending on the surgical outcome: successful (SG) vs failure (FG).
Demographic variables including age, gender, affected side and body mass index were collected. Patient's comorbidities were also collected including chronic obstructive pulmonary disease (COPD), diabetes, rheumatoid arthritis (RA), cirrhosis and chronic renal failure, etc. Other variables, such as ones included in CRIME80 (C-reactive protein (CRP) >150mg/dl and polyethylene exchange), were also collected.

Results: 30 patients had a successful DAIR outcome (60%). Age and sex do not act as risk factors [OR 0.7 (0.2-2.6) and OR 0.4 (0.1-1.3)]. Neither do COPD [OR 3.3 (0.5-2.0), p=0.2]; RA [OR 0.8 (0.2-3.1), p=0.7]; CRP value [3.2 (0.9-11.2), p=0.06]; and polyethylene exchange [OR 0.4 (0.1-2.5), p= 0.3].
Thirty-five blood cultures (70%) were obtained before surgery (20 SG and 15 FG). Nine of the obtained blood cultures were positive (25.7%), being 7 from FG (46.7%) [OR 7.6 (1.3-4.8), p=0.02].
A logistic regression was performed where positive blood cultures were the only significant variable to predict DAIR failure (OR 12, 95% CI 1.1–18, p=0.049), after adjusting for all CRIME80 variables.
Skin and soft tissue origin was described in 5 of the nine positive blood cultures (55.6%). Cardiovascular system was the second most common spread (22.2%), and then followed by urogenital and digestive tract. The most common microorganism in FG was Staphylococcus aureus (57.1%) [OR 6.4 (0.2-18.0), p=0.2].

Conclusions: Positive blood cultures may be another risk factor for DAIR failure. This can be important in diagnosis and it may be taken into account in antibiotic and surgical treatment strategies.

[FP B10] DAIR FOR PERIPROSTHETIC JOINT INFECTIONS - ONE WEEK TO SAVE THE JOINT?

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Aim: Predicting success of a Debridement, Antibiotics and Implant Retention (DAIR) procedure for Periprosthetic Joint Infection (PJI) remains a challenge. A failed DAIR might adversely affect the outcome of any future revision surgery for PJI. Hence, the ability to identify and optimise factors predictive of DAIR success would help target the procedure to the appropriate patient cohort and avoid unnecessary surgery for patients where a DAIR is
unlikely to eradicate infection.

Method: A retrospective review of our prospective Bone Infection Group database was performed to identify all patients who underwent a DAIR of their hip or knee arthroplasty. Diagnosis of PJI was confirmed using the Musculoskeletal Infection Society (MSIS) 2013 and
the European Bone and Joint Infection Society (EBJIS) 2021 classification
systems. DAIR surgery was grouped into “successful” or “unsuccessful” outcomes (Table attached).

Results: Sixty-Four consecutive patients with an acute PJI underwent a DAIR procedure between 009 and 2020. Treatment was successful in 44 (69%). The chance of a successful DAIR was significantly greater if performed within one week of symptom onset compared to
greater than one week duration (adjusted odds ratio (OR 0.11; p=0.027; 95% CI [0.02-0.78]). The chances of a successful DAIR however was not influenced by whether the surgeon was an arthroplasty or non-arthroplasty surgeon (OR 0.28; p=0.13; 95% CI [0.05-1.48]). Isolated Streptococcus infection had a success rate of 100%; followed by Coagulase-negative Staphylococci 71% and Methicillin-susceptible Staphylococcus Aureus 65%. Polymicrobial infection had the worst outcome with a success rate of 47%.

Conclusions: In our experience DAIR surgery performed within one week of symptom onset, significantlyincreased chances of successful infection eradication.
Collaborative work is required to ensure arthroplasty patients access prompt appropriate surgical decision-making, remove barriers to early assessment and minimise delays to surgery.

SUCCESSFUL DAIR		UNSUCCESSFUL DAIR	
• Infection control with no continued antibiotic treatment	35	• Further septic revision	13
• Further aseptic revision	1	• Infection control with suppressive antibiotic treatment	3
• Death > 1 year from DAIR	8	• Death < 1 year from DAIR	4
Total	44	Total	20

Table: Outcome of DAIR Surgery, MSIS outcome reporting tool

[FP C1] RIFAMPICIN COMBINATION THERAPY VERSUS TARGETED ANTIMICROBIAL MONOTHERAPY IN THE ORAL ANTIMICROBIAL TREATMENT PHASE OF STAPHYLOCOCCAL PROSTHETIC JOINT INFECTION (RICOTTA-TRIAL): PROTOCOL FOR A RANDOMIZED, CONTROLLED, OPEN-LABEL, NON-INFERIORITY TRIAL

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Aim: Rifampicin and fluoroquinolone based therapy is generally considered as first-choice targeted oral antimicrobial therapy for staphylococcal prosthetic joint infections (PJI) treated with debridement, antibiotics and implant retention (DAIR). Alternative equally effective antimicrobial strategies are urgently needed due to toxicity and drug-drug interactions that frequently occur with this strategy. Data from recent clinical studies suggests equipoise for other antimicrobial treatment regimens. The objective of the ***Rifampicin Combination Therapy versus Targeted Antimicrobial Monotherapy in the Oral Antimicrobial Treatment Phase of Staphylococcal Prosthetic Joint Infection*** (RiCOTTA)-trial is to evaluate whether monotherapy with clindamycin is non-inferior to rifampicin/fluoroquinolone combination therapy in patients with staphylococcal PJI that are treated with DAIR.

Method: The RiCOTTA-trial is a multicenter, non-inferiority, open-label, randomized controlled trial evaluating clindamycin versus rifampicin/fluoroquinolone combination therapy in the oral treatment phase in patients with staphylococcal PJI managed with DAIR. The trial is performed in 16 hospitals in the Netherlands. Eligible patients are adults with staphylococcal knee or hip PJI managed by DAIR. Patients are included one to six days before antibiotic treatment is switched from intravenous to oral therapy. Patients with a contraindication for rifampicin, with a megaprosthesis or who receive intravenous antibiotics for more than three weeks after initial debridement are excluded. Primary outcome is treatment success one year after finishing antimicrobial treatment. Success is defined as the absence of: i. Infection related re-surgery, ii. New episode of antibiotic treatment for infection of the index joint after the initial treatment phase of 12 weeks, iii. Ongoing use of antibiotics for the index joint at the end of follow-up, iv. Death. The estimated treatment success of rifampicin combination therapy is 85% and the monotherapy strategy is considered not inferior when the difference in treatment success will be less than 10%. Enrolment of 158 patients per group (316 in total) is needed to confirm non-inferiority of monotherapy with a power of 80%. The trial is currently open for enrolment. The study is approved by the Medical Ethics Committee Leiden, the Hague, Delft, the Netherlands and registered under EU trial number 2022-501620-26-00 in Clinical Trial Information System.

Conclusions: Currently, the RiCOTTTA study is the largest randomised clinical trial that compares targeted oral monotherapy with rifampicin combination treatment for staphylococcal PJI. Noninferiority of monotherapy would result in a change in national PJI guidelines and enable clinicians to use a more patient-tailored approach when considering antibiotics for patients during the oral treatment phase of PJI.

[FP C2] TRANSITIONING FROM EMPIRIC TO CULTURE SPECIFIC ANTIBIOTIC THERAPY FOLLOWING SURGICAL DEBRIDEMENT IN BONE AND PROSTHETIC JOINT INFECTION HOW LONG DO WE NEED TO WAIT?

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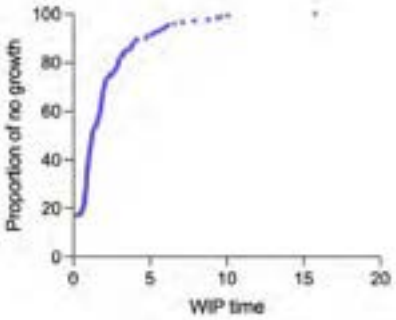
Aim: An instrumented blood culture system automatically flags when growth within the culture medium has been detected ('work in progress'), and subsequently when the organism has been identified.
We explore using this data to switch patients to oral therapy within 72 hours post-surgery, reducing costs and improving antimicrobial stewardship.

Method: This retrospective review focused on clinically significant culture-positive bone and joint infections over a 5-month period in 2022. Two cohorts were defined as either having positive intraoperative microbiology at <72 hours or at ≥72 hours.

Results:150 patients were included. 133/150(88%) exhibited microbial growth <72hours. Of these, 98/133(74%) had all organisms identified <72-hours, and 34/133(26%) had additional organisms ≥72 hours. 19/151(12%) patients had their first positive cultures ≥72hrs from sampling. The most common isolates identified within 72 hours were ***S. aureus***(30%), Enterobacteriaceae (26%), and Coagulase-negative ***Staphylococcus*** (CoNS)(19%). If no growth was observed by 48 hours, there was a 69.6% probability that subsequent growth wouldn't occur; this probability increases to 81.9% by 72 hours, 88.7% by 96 hours, 91.0% by 120 hours, and 95.0% by 144 hours (see figure 1). The most common isolates identified ≥72 hours were CoNS(28%), ***Cutibacterium acnes***(16%) and ***S. aureus***(12%). Assessing oral antibiotic regimes for isolates identified after 72 hours demonstrated that linezolid would cover isolates from 96% of patients, tetracyclines 92% of patients, clindamycin 85% of patients, and ciprofloxacin and rifampicin would cover 80% of patients. Vancomycin and meropenem, our standard empirical therapy, gave the best cover at 96% of patients.

Conclusions: This study suggests there is sufficient microbiological information at 72 hours for most patients to allow transition to a targeted regimen. If there has been no detection of growth when using an instrumented blood culture system by 72 hours, it is likely that there will be no growth.

Time taken for sample to be identified as 'work in progress' using an instrumented blood culture system (BD BACTEC™) based on their eventual organism identification.



The longer the time taken for an instrumented blood culture system (BD BACTEC™) to identify a sample as 'work in progress' (WIP) the higher the likelihood of no growth

[FP C3] A THERAPEUTIC DRUG MONITORING APPROACH FOR DALBAVANCIN (MONTALBANO)

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Aim: dalbavancin, a lipo-glycopeptide antibiotic effective against Gram-positive bacteria (including methicillin-resistant ***Staphylococcus aureus***), allows extended dosing interval due to its peculiar pharmacokinetics. Despite being registered for treatment of acute skin infections, off-label use has shown promise in various settings, particularly in osteo-articular infections. This study aims to assess dalbavancin's pharmacological efficacy and its safety and clinical success in patients treated according to personalized schedules guided by Therapeutic Drug Monitoring (TDM), particularly in long-term therapies.

Methods: non-interventional, retrospective, single-center pharmacological study. We included adult patients with at least one dalbavancin TDM determination from July 1, 2022 to February 1, 2024 and treated with outpatient parenteral antimicrobial therapy. We recorded dalbavancin trough concentration (Cmin) and its peak concentration (Cmax) and employed log-linear regression models to predict the timing of dalbavancin dosing, aiming to sustain Cmin levels above 4 or 8.04 mg/L, according to recent literature. Data regarding index infections, patients' characteristics, outcomes, and adverse events were also collected.

Results: we included 32 patients, whose clinical and microbiological characteristics are depicted in **Table 1**. Regarding the **primary outcome**, 132/134 (98.5%) trough concentration was >4 mg/L, while 112/134 (83.6%) was >8.04 mg/L. For the **secondary outcomes**, 2/32 patients experienced an adverse event correlated to dalbavancin: (i) exanthema one week after the start of therapy and (ii) exanthema, conjunctivitis, angioedema, and nausea one month after the start of therapy. Moreover, we observed 4/32 clinical unsuccess (one failure during treatment, one relapse after the end of therapy, one switch to another antibiotic, and one isolation of non-susceptible microorganism).

Conclusions: a TDM-based approach with the use of a log-linear regression model allows a more precise timing of dalbavancin administration by maintaining sufficient concentration of circulating drugs. This approach is promising for infections requiring a long-term treatment, such as orthopedic infection where source control is not possible.

Table 1.

	Total (n=32)
Age, median [Q1-Q3] (years)	72 [55.5-81]
Male, n (%)	20 (62.5)
Ethnicity, n (%)	
Caucasian	29 (90.6)
Other	3 (9.4)
BMI, median [Q1-Q3] (kg/m²)	24.2 [21.3-26.85]
Comorbidities, n (%)	
Cardiovascular disease	20 (62.5)
Diabetes mellitus	7 (21.9)
Chronic lung disease	5 (15.6)
Chronic kidney disease	4 (12.5)
Immunosuppression	4 (12.5)
Chronic liver disease	3 (9.4)
Pathogens, n (%)	
MRSA	10 (31.3)
MSSA	8 (25)
MRSE	4 (12.5)
Enterococcus spp.	3 (9.4)
MSSE	2 (6.2)
Streptococcus spp.	2 (6.2)
Mixed	2 (6.2)
S.capitis	1 (3.2)
Clinical conditions, n (%)	
Osteomyelitis with devices	14 (43.7)
Osteomyelitis without devices	16 (50)
Other	2 (6.3)
Treatment duration, median [range] (days)	107.5 [7-573]
Source control, n (%)	13 (40.6)
Concomitant antimicrobials, n (%)	4 (12.5)

[FP C4] TROUGH LEVELS OF DALBAVANCIN DURING LONG-TERM TREATMENT OF PROSTHETIC JOINT INFECTIONS

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Aim: Dalbavancin is a lipoglycopeptide with a broad antimicrobial spectrum against Gram-positive bacteria and effect against microorganisms in biofilm in vitro. Its pharmacokinetic properties, with an exceptionally long half-life of approximately 300 hours, allow for simplified administration that may be of value in the long-term treatment of bone and joint infections, such as prosthetic joint infections (PJIs). Several case reports and case series with "off-lable" treatment with dalbavancin of PJIs exist, but the optimal dosing regimen remains to be defined. Therapeutic drug monitoring (TDM) is recommended for treatment with >2 doses of dalbavancin. In the absence of TDM, the Swedish national guidelines for bone and joint infections (2023, www.infektion.net) recommends a loading dose of dalbavancin 1,500 mg on day 1 and 1,500 mg on days 8 – 14, after which from day 28 1,000 mg is given biweekly or 500 mg every week. The aim of the present study was to determine trough levels of dalbavancin in patients with long-term treatment of PJIs according to the national guidelines.

Method: Twelve patients with PJI were treated with at least 6 doses of dalbavancin, of which the first two doses were 1500 mg and the following doses were 1000 every second week, and prospectively sampled biweekly for determination of serum concentrations (trough levels) of dalbavancin which was measured by liquid chromatography coupled to electrospray tandem mass spectrometry (LC-MS/MS). The renal function was also examined.

Results: The median serum concentration 14 days after the first dose of dalbavancin 1500 mg was 36.3 mg/L (range 6.6 – 62.4 mg/L). The median value 14 days after the second dose of 1500 mg (day 27 – 28) was 48.2 mg/L (range 12.2 – 77.3 mg/L). The trough value after the last dose of a total of 6 – 7 doses was as median 43.1 mg/L (range 26.2 – 97.5 mg/L). Three patients showed a tendency towards successive accumulation of dalbavancin during treatment. None of the patients, including those three with increasing through levels during treatment, showed any significant alteration in creatinine nor glomerular filtration rate.

Conclusions: TDM during long-term treatment with dalbavancin is recommended to avoid the risk of accumulation and unnecessarily high trough values. With TDM, the dosing interval can be extended in several cases. In addition, with the support of TDM, subtherapeutic serum concentrations, with the risk of developing resistance, can be avoided.

[FP C5] COMBINATION THERAPY OF HIGH DOSE DAPTOMYCIN PLUS CONTINUOUS INFUSION (CI) FOSFOMYCIN MAY BE EQUALLY EFFECTIVE IN THE TREATMENT OF STAPHYLOCOCCAL OSTEOARTICULAR INFECTIONS EVEN IF THE CI FOSFOMYCIN DOSE IS REDUCED FROM 16G TO 8-12G DAILY

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Aim: Daptomycin plus fosfomycin combination therapy is a valuable strategy for treating staphylococcal osteoarticular infections. Considernig that each gram of fosfomycin contains 330 mg of sodium, electrolytic imbalance due to sodium overload could pose safety issues, especially in the cardiopatic patients and/or in the frail elderly. The aim of this study was to compare the efficacy of using reduced vs. standard daily dose fosfomycin in combination with daptomycin in a cohort of patients with osteoarticular infections.

Method: This analysis included adult patients with osteoarticular infections admitted to the Infectious Diseases Unit of our University hospital in the period Nov 2022 – Feb 2024 and who were treated with daptomycin (8-10 mg/kg/daily) plus 24h-continuous infusion (CI) fosfomycin at the standard-dose of 16 g daily (standard-dose group) or at the reduced-dose of 8-12 g daily (reduced-dose group). All the patients underwent therapeutic drug monitoring (TDM) of fosfomycin for granting a pharmacodynamic target attainment of 24h-area under the concentration-time curve over minimum inhibitory concentration (AUC24h/MIC) >95 against ***Staphylococcus aureus*** with an MIC value up to 32 mg/L and of 70%t>MIC. Estimated glomerular filtration rate (eGFR) was assessed at each TDM session. Patient clinical outcome was assessed.

Results: The standard- and the reduced-dose groups included 43 (29 males, 67.4%) and 21 (11 males, 52.4%) patients, respectively. No differences in median age (54 vs. 63 years, p=36), weight (80 vs. 76 kg, p=0.13) and type of diagnosis [prosthetic joint infections (16 vs. 29, p=0.38), osteomyelitis (2 vs. 9, p=0.72), septic arthritis (3 vs. 3, p=0.39) and spondilodiscitis (0 vs. 2, p=1.0)] were observed between the two groups. Median eGFR was similar in the standard vs. the reduced-dose group (109 vs. 98 mL/min/1.73m2, p=0.004). In the reduced-dose group, CI fosfomycin was administerd at 8 and 12 g/daily in 12 and 9 patients, respectively. There was no difference between the standard- and reduced-dose groups in attainment of the pharmacodynamic targets of AUC24h/MIC>95 (41/43 vs. 20/21, p=1.0), of 70%t>MIC (43/43 vs. 21/21 p=1.0) and of clinical cure (39/43 vs. 19/21, p=1.0).

Conclusions: Combination therapy of 8-10 mg/kg/daily daptomycin plus 8-12 g/daily CI fosfomycin may be as effective as that of 8-10 mg/kg/daily daptomycin plus 16 g/daily CI fosfomycin. The fosfomycin reduced-dose strategy allows to decrease the daily sodium load by 25-50% compared to the standard dose, thus reducing the risk of cardiac adverse events. TDM may be a valuable strategy for individualizing fosfomycin dose in patients with osteoarticular infections.

[FP C6] LONG-TERM DALBAVANCIN CONCENTRATIONS IN TARGET TISSUES RELEVANT FOR PJI TREATMENT: A 5-WEEK EXPERIMENTAL PORCINE SETUP UTILIZING MICRODIALYSIS

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Aim: Gram-positive bacteria remain the primary aetiology of prosthetic joint infections (PJI). Dalbavancin may be a valuable future antibiotic for treating PJI due to its uniquely long half-life and bactericidal activity against most Gram-positive bacteria, including methicillin-resistant ***Staphylococcus aureus*** (MRSA). Currently, no long-term target tissue pharmacokinetic data exists for PJI treatment settings. We aimed to investigate dalbavancin concentrations in a 5-week setup in tibial cancellous and cortical bone, subcutaneous tissue, and synovial fluid of the knee joint in pigs using microdialysis. We aimed to investigate dalbavancin concentrations in a 5-week setup in tibial cancellous and cortical bone, subcutaneous tissue, and synovial fluid of the knee joint in pigs using microdialysis.

Method: 21 female pigs (Danish landrace, weight 72-95 kg) were included. A bolus of 1.5 g of dalbavancin was administered intravenously over 30 minutes on day 1 and day 8. In groups of 3, the pigs were allocated to surgery on days 1, 3, 5, 7, 10, 26, and 35 followed by euthanasia. Microdialysis catheters were placed to sample dalbavancin concentrations in tibial cancellous and cortical bone, subcutaneous tissue, and synovial fluid of the knee joint. Microdialysis samples were obtained for 4 hours, and blood samples were taken for reference.

Results: All pigs completed the study. The full data-set analysis is incomplete upon the abstract deadline. Data based on the 5-week protocol in relation to dalbavancin minimal inhibitory concentrations (MIC) for three strains of ***Staphylococcus aureus***: 0.03 µg/mL (low), 0.06 µg/mL (intermediary), and 0.125 µg/mL (high) will be presented at the conference.

Conclusions: This study is the first to establish dalbavancin concentrations measured over a 5 week period. This much-needed insight can potentially guide and optimize future gram-positive PJI treatment regimens.

[FP D1] EXTENDED SURGICAL ANTIBIOTIC PROPHYLAXIS NOT SUPERIOR TO A SINGLE DOSE IN TOTAL HIP AND KNEE REVISION ARTHROPLASTY: A MULTICENTRE OPEN-LABEL RANDOMIZED CONTROLLED TRIAL

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Aim: Periprosthetic joint infection (PJI) is a severe complication after total joint arthroplasty. To prevent PJI, strict infection prevention measures are followed in combination with surgical antibiotic prophylaxis (SAP). To date, scientific reports concerning the optimal duration of SAP in revision arthroplasty are scarce. The aim of this multicenter open-label, randomized controlled trial in the Netherlands, is to investigate the superiority of 5 days (extended) versus a single dose of cefazolin to prevent PJI within the first year after revision arthroplasty of the hip and knee.

Method: Included patients with an assumed aseptic hip or knee revision procedure received a single dose of 2 or 3 gram cefazolin preoperatively. Patients were randomly assigned in a 1:1 ratio to receive extended prophylaxis of cefazolin during 5 days postoperatively versus no prophylaxis after wound closure. Patients were excluded if evidence of PJI at revision. The primary endpoint was the incidence of PJI within one year after revision arthroplasty. PJI was defined according to the 2018 Philadelphia consensus criteria. With a sample size of 746 patients, an alpha of 5% and a power of 80%, superiority of the extended regimen would be shown if the lower boundary of the 95% confidence interval (CI) of the absolute between-group difference of the percentage of PJI is below -4%.

Results: In total 751 patients were included for analysis: 379 in the single dose cefazolin group and 372 in the extended group. Within one year, PJI occurred in 2.6% (10/379) in the single dose group and 2.4% (9/372) in the extended group (risk difference, -0.2 percentage points; 95% CI, -2.5 to 2.0%), thus superiority was not shown. Adverse drug events were seen in 20 cases with extended and 7 cases with a single dose prophylaxis.

Conclusions: Extended prophylaxis is not significantly superior to a single dose of cefazolin to prevent PJI within the first year after revision arthroplasty of the hip or knee. This is the first randomized controlled trail in which the duration of SAP in the selected group of patients undergoing revision arthroplasty was studied. Extending SAP after closure of the wound could increase the selection or induction of antimicrobial resistance, has an increased risk for adverse drug events, and is therefore not in line with the primary goal of antimicrobial stewardship, comprising optimizing clinical outcomes and ensuring cost-effective therapy while minimizing unintended consequences of antimicrobial use.

[FP D2] WHAT DO WE REALLY KNOW ABOUT HAND-DISINFECTION-PERFORMANCE DURING PATIENT CARE ON SURGICAL WARDS?

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Aim: Hand-disinfection (HD) is the most effective infection-prevention-measure. HD-performance of health care professionals (HCP) is usually evaluated by compliance observations (CO). The Hawthorne effect (HE) (HCP behave differently under observation) is considered to systematically increase HD-compliance-rates during CO. However, little is known about the specifications of the HE in health care settings. We hypothesized that, due to hand-hygiene`s known impact on patient safety and infection-prevention, the HE does not affect HD performance during direct patient care in patient-rooms.

Method: We conducted a prospective observational trial on an 18-bed surgical intensive care unit (ICU), a 12-bed surgical intermediate care unit (IMC) and a 36-bed surgical normal ward (NW) in a university hospital in Germany. Dispensers of hand sanitizers were equipped with an electronic monitoring system (EMS) (GWA Hygiene, Germany), which recorded the number of HDs per patient hour (HD/PH) and time and location of hand-disinfections. Locations were categorized as follows: 1. Patient rooms (PR); 2. Utility- and waste-disposal-rooms (UWR) and 3. Other rooms (hallways, kitchen, toilets etc.) (OR). Additionally trained infection-control-staff performed hand-hygiene CO according to WHO's Five Moments. The HD/PH during CO was compared to the HD/PH during the same time-periods without CO. Additionally the ratio between HD/PD-change during CO and mean-HD/PD of each ward during the study-period was determined in percentages. Descriptive and analytical statistics were calculated using R. P-values ≤ 0.05 were regarded as significant.

Results: 587.128 HD were electronically recorded during the study-period (February 2022 to May 2023) and CO took place on 72 days. We recorded a significant increase of HD/PH during CO on all three wards in PRs (ICU: 21%, p<0.001; IMC: 11%, p=0.029; NW: 49%, p=0.047). Furthermore we detected a significant increase of HD/PH during CO on ICU (10%, p<0.001) and IMC (11%, p=0.033) in ORs. CO did not significantly affect HD/PH in ORs on NW and in UWR on all three wards.

Conclusions: In our setting, the number of hand-disinfections per patient-hour was significantly increased during compliance-observations especially in patient-rooms, where hand-hygiene is most crucial for infection-prevention. This indicates a lower everyday compliance to WHO`s hand-hygiene indications during patient care than determined by compliance-observations.
Acknowledgements: Paul-Hartmann AG financially supported this study.

[FP D3] INFECTION AFTER PRIMARY TOTAL HIP ARTHROPLASTY; A COMPARISON OF TIME TRENDS IN TWO NATIONAL HEALTH REGISTERS IN NORWAY FROM 2013-2022

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Aim: Two types of national registers surveil infections after primary total hip arthroplasty (THA) in Norway: The National surveillance system for surgical site infections (NOIS) that surveil all primary THAs 30 days postoperatively for surgical site infections (SSI), and the Norwegian Arthroplasty Register (NAR) that follow all THAs until any surgical reoperation/revision or the death of the patient. Since these registers report on the same THAs we assessed correspondence between and time trends for the two registers in period 2013 to 2022. All reported THAs were included.

Method: The THAs were matched on a group level according to sex, age and ASA-class. In addition to descriptive statistics, adjusted Cox regression analyses were performed with adjustment for sex, age group (<45, 45-54, 55-64, 65-74, 75-84, >85 years) and ASA-class (1, 2, 3, 4 and missing). Changes in annual incidence and adjusted hazard rate (aHR) was calculated. Endpoints in the NOIS were 30-Days SSI and 30-Days reoperation for SSI. Endpoints in the NAR were 30-Days and 1-Year reoperation for periprosthetic joint infection (PJI).

Results: The NOIS had registered 87,923 THAs with 1,393 (1.58%) SSIs and 765 (0.87%) reoperations for SSI within 30 postoperatively. The NAR had registered 91,194 THAs with 725 (0.80%) reoperations for infection after 30 days, and 1,019 (1.21%) reoperations for infections after one year. The distribution of sex, age and ASA-class was near identical in the two registers. There was a mean annual reduction in risk of both SSI (aHR 0.92 (95% CI 0.90-0.93)) and reoperation for SSI (0.95(0.92-0.97)) and PJI (30-Days: 0.96 (0.94-0.99), 1-Year: 0.95-0.99)) over the period 2013-2022.

Conclusions: The NOIS and the NAR have excellent completeness and the registrations in both registers may be considered representative for the Norwegian population. Not all SSI are reoperated. The incidence and risk of SSI (NOIS) and reoperation for PJI (NAR) is declining and may reflect a true reduction in incidence of PJI after primary THA.

[FP D4] HOW DOES SMOKING AFFECT QUALITY OF LIFE AFTER SURGERY FOR BONE AND JOINT INFECTION?

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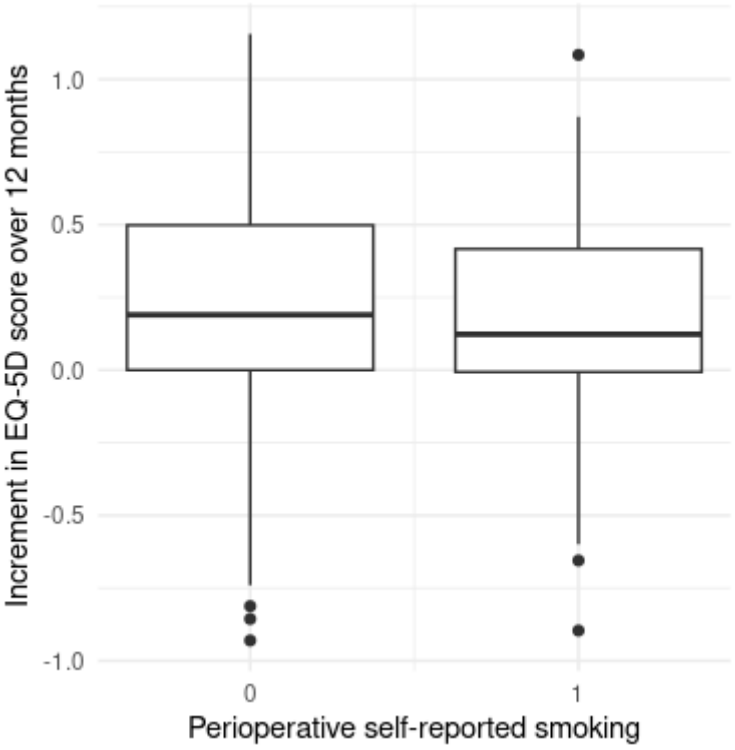
Aim: People awaiting surgery for bone and joint infection may be recommended to stop smoking to improve anaesthetic and surgical outcomes. However, restricting curative surgical treatment to non-smokers on the basis of potentially worse surgical outcomes is not validated for functional outcomes or quality of life differences between patients who do and do not smoke.
This study used secondary analysis of trial data to ask: do peri-operative non-smokers have a greater improvement in their quality of life 12 months after surgery for bone and joint infection, compared with non-smokers?

Method: Participants in the SOLARIO and OVIVA clinical trials who had complete baseline and 12 month EQ-5D-5L or EQ-5D-3L scores were included. Smoking status was ascertained at baseline study enrolment from participant self-report. Normalised quality of life scores were calculated for participants at baseline and 12 months, based on contemporaneous health state scores for England. Baseline and 12 month scores were compared to calculate a post-operative increment in quality of life.

Results: Mean quality of life increment over 12 months was +0.17 for people who reported smoking peri-operatively (95% confidence interval -0.55 to +0.89), compared to +0.23 for people who did not report smoking peri-operatively (95% confidence interval -0.48 to +0.94). Linear regression analysis found no significant difference between the improvement in quality of life for smokers and non-smokers ($p>0.1$). Mean increments for both groups were greater than estimates of Minimal Clinically Important Difference in quality of life in musculoskeletal conditions. [1,2]

Conclusions: People who smoke peri-operatively still experience an improvement in quality of life after surgery for orthopaedic infections, commensurate with the improvement experienced by non-smokers. Surgery should not be denied to people on the basis of reported smoking status alone.



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[FP D5] PREVENTING PERIPROSTHETIC JOINT INFECTION: A NOVEL ANTIMICROBIAL SOL-GEL APPROACH

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Aim: Periprosthetic joint infections follow 1-3% of arthroplasty surgeries, with the biofilm nature of these infections presenting a significant treatment challenge[1]. Prevention strategies include antibiotic-loaded bone cement; however, increases in cementless procedures means there is an urgent need for alternative local antimicrobial delivery methods[2].-A novel, ultrathin, silica-based sol-gel technology is evaluated in this research as an anti-infective coating for orthopaedic prosthetic devices, providing local antibiotic release following surgery.

Method: Reduction in clinically relevant microbial activity and biofilm reduction by antimicrobial sol-gel coatings, containing a selection of antibiotics, were assessed via disc diffusion and microdilution culture assays using the Calgary biofilm device[3]. Proliferation, morphology, collagen, and calcium production by primary bovine osteoblasts cultured upon antibiotic sol-gel surfaces were examined, and cytotoxicity evaluated using Alamar blue staining and lactate dehydrogenase assays. Concentrations of silica, calcium and phosphorus compounds within the cell layer cultured on sol-gel coatings and concentrations eluted into media, were quantified using ICP-OES. Furthermore, cellular phenotype was assessed using alkaline phosphatase activity with time in culture.

Results: Low antibiotic concentrations within sol-gel had an inhibitory effect on clinically relevant biofilm growth, for example 0.8 mg ml^{-1} tobramycin inhibited clinically isolated ***S. aureus*** (MRSA) growth with an 8-log reduction in viable colony forming units. There was no significant difference in metabolic activity between untreated and sol-gel exposed primary bovine osteoblasts in elution-based assays. Reduction (2-fold) in metabolic activity in direct contact assays after 48 hours exposure was likely to be due to increased osteoinduction, whereas no impact upon cell proliferation were observed (p=0.92 at 14 days culture). The morphology of primary osteoblasts was unaffected by culture on sol-gel coatings and collagen production was maintained. Calcium containing nodule production within bovine osteoblastic cells was increased 16-fold after 14 days culture upon sol-gel.

Conclusions: The ultrathin sol-gel coating showed low cytotoxicity, strong biofilm reducing activity and antimicrobial activity, which was comparable to antibiotics alone, demonstrating that sol-gel delivery of antibiotics could provide local antimicrobial effects to inhibit PJI growth without the need for bone cement. Future work will develop and evaluate sol-gel performance in an ***ex vivo*** explant bone infection model which will reduce the need for animal experimentation.

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[FP D6] THE IMPACT OF UNTOWARD EVENTS DURING PRIMARY OR REVISION TOTAL HIP OR KNEE ARTHROPLASTY SURGERY

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Aim: There is limited data of the frequency and impact of unwanted events such as glove perforation, contamination of the surgical field (drape perforation, laceration, detachment), unsterile object in the surgical field (hair, sweat droplet…), defecation, elevated air temperature...that my happen in the operating theatre. These events should influence the surgical site infection rate but it is not clear to what extent. We wanted to calculate the frequency and measure the impact of these events on the infection and general revision rate.

Method: In our institution, scrub nurses prospectively and diligently record untoward events in the theatres. We have an institutional implant registry with close to 100% data completion since 2001, and surgeons register complications before discharge. We analysed the respective databases and compared the revision and infection rate in the group with untoward effects with the outcome of all arthroplasty patients within the same time period. Two tailed Z statistical test was used for analysis.

Results: Between 1.1.2012 and 31.12.2018 we operated 8130 prosthetic joints: 3994 THR (Total hip replacement) and 3238 TKR (total knee replacement) including respectively 610 and 288 revisions. During this period, we recorded 234 events (2.9 %) including 13 (0.16 %) defecations, 19 (0.2 %) contaminations with hair, 48 (0.6%) field sterility violations, 34 (0,4 %) glove perforations, 19 (0.5 %) occasions with elevated air temperature. There were 8 (2.8%) infections and 10 (3.5%) revisions in the group with unwanted events. The infection rate for all TJR (total joint replacement) was 0.64% the revision rate for any reason was 2.37%. For all the THR the revision rate was 2.1% and infection rate 0.7% and for the TKR 2.72% and 0.56% respectively. The difference is significant at $p>0.05$ for infection rate.

Conclusions: The potentially serious sterility disruptive events in the operative rooms did result in increased infection rate but not an increase in revision rate. There is no data about the rate and the impact of these events besides for perforated surgical gloves with higher reported incidences than in our study influencing infection rate if perioperative antibiotic prophylaxis was not used. Ours is the first study reporting the impact of this unwanted events in the operating theatre.

[FP E1] WHAT IS THE BEST SURGICAL OPTION FOR PROSTHETIC JOINT INFECTION (PJI) DUE TO CANDIDA SPECIES?

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Aim: *Candida* species are uncommon pathogens causing prosthetic joint infection (PJI). This study evaluated the surgical management and outcome of *Candida* PJI.

Methods: Patients with EBJIS Definition confirmed PJI, due to *Candida* species, from 19 medical centres were assessed. Demographic, diagnostic, medical and surgical treatment and outcome data were collected.

Results: 269 patients were recruited with follow-up for at least one year. Mean age was 70.2 years (+/- 12.4) with 10.8% being immunocompromised. The most common fungal species were *C. albicans* (55.8%), *C. parapsilosis* (29.4%), *C. glabrata* (7.8%) and *C. tropicalis* (5.6%). Co-infection with bacteria occurred in 138 (51.3%) cases.
DAIR was performed in 96 (36.2%) cases, with 169 (63.8%) having implant exchange or removal (76 one-stage, 78 two-stage, 11 removal/Girdlestone arthroplasty, 2 amputation). Patient demographics and antifungal therapy were similar in all surgical groups.
Overall, treatment was successful in 156 (58%) cases. Failure was more likely in older patients (>70 years; p=0.008) and those who had DAIR (OR 1.945; 1.156-3.279; p=0.004). Failure was less likely with *C. parapsilosis* infection compared to *C. albicans* (31.6% vs 48%; p=0.037).
DAIR patients had more co-infection with bacteria (63.5% vs 47.4%; p=0.013) and more previous surgeries (median 4 vs 3; p=0.007), but multivariate analysis showed that these were not independent risk factors for failure. There was no difference in mortality between DAIR patients and those with other surgery (13.5% vs 17.7%; p=0.372).
DAIR was successful in 45/96 (46.9%) cases compared to 110/169 (65.1%) cases with other surgery (p<0.004). Early DAIR (surgery performed <I month from implantation/infection onset) was not more effective than late DAIR (surgery performed after 1 month)(early DAIR 44.4% cure vs 63.9% cure in late DAIR; p=0.004).
Two-stage revision was successful in 54/78 (69.2%), which was significantly better than DAIR (p=0.003). One-stage revision was successful in 51/76 (67.1%) patients; also significantly better than DAIR (p=0.002), but equivalent to two-stage revision (p=0.777).

Conclusion: DAIR was successful in less than half of patients with *Candida* PJI. We could not identify any subgroup which might have better outcomes with this surgical option. Interestingly, almost 90% of our patients with *Candida* PJI had no immunocompromise. One or two-stage revision offer a better option, if possible, and do not increase mortality.

[FP E2] PREDICTING PERIPROSTHETIC JOINT INFECTION: EXTERNAL VALIDATION OF PREOPERATIVE PREDICTION MODELS

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Aim: This study aimed to externally validate promising preoperative PJI prediction models in a recent, multinational European cohort.

Method: Three preoperative PJI prediction models (by Tan et al., Del Toro et al., and Bülow et al.) which previously demonstrated high levels of accuracy were selected for validation. A multicenter retrospective observational analysis was performed of patients undergoing total hip arthroplasty (THA) and total knee arthroplasty (TKA) between January 2020 and December 2021 and treated at centers in the Netherlands, Portugal, and Spain. Patient characteristics were compared between our cohort and those used to develop the prediction models. Model performance was assessed through discrimination and calibration.

Results: A total of 2684 patients were included of whom 60 developed a PJI (2.2%). Our patient cohort differed from the models' original cohorts in terms of demographic variables, procedural variables, and the prevalence of comorbidities. The c-statistics for the Tan, Del Toro, and Bülow models were 0.72, 0.69, and 0.72 respectively. Calibration was reasonable, but precise percentage estimates for PJI risk were most accurate for predicted risks up to 3-4%; the Tan model overestimated risks above 4%, while the Del Toro model underestimated risks above 3%.

Conclusions: In this multinational cohort study, the Tan, Del Toro, and Bülow PJI prediction models were found to be externally valid for classifying high risk patients for developing a PJI. These models hold promise for clinical application to enhance preoperative patient counseling and targeted prevention strategies.

Keywords: Periprosthetic Joint Infection (PJI), High Risk Groups, Prediction Models, Validation, Infection Prevention

[FP E3] POLYMORPHISMS IN THE IL-1B AND IL-10 GENES AFFECT THE RISK OF PERIPROSTHETIC JOINT INFECTION IN TOTAL HIP AND KNEE ARTHROPLASTY PATIENTS

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Aim. Periprosthetic joint infection (PJI) is one of the most serious and frequent complications in prosthetic surgery. Despite significant improvements in the criteria for diagnosis of PJI, the diagnostic workflow remains complex and, sometimes, inconclusive. Host immune factors hold great potential as diagnostic biomarkers in bone and joint infections. We have recently reported that the synovial concentration of the humoral pattern recognition molecule long pentraxin 3 (PTX3) is a sensitive and specific marker of PJI in total hip and knee arthroplasty patients (THA and TKA) undergoing revision surgery [1]. However, the contribution to risk and diagnosis of PJI of the genetic variation in ***PTX3*** and inflammatory genes that are known to affect its expression (***IL-1b***, ***IL-6***, ***IL-10,*** and ***IL-17A***) has not been addressed. Therefore, we assessed these relationships in a cohort of THA and TKA patients who underwent prosthesis revision by focusing on a panel of single nucleotide polymorphisms (SNPs) in the ***PTX3***, ***IL-1β***, ***IL-6***, ***IL-10*** and ***IL-17A*** genes.

Method. A case-control retrospective study was conducted on an historic cohort of patients that received THA or TKA revision and were diagnosed with PJI (cases) or aseptic complications (controls) [1]. Samples of saliva were collected from 93 subjects and used for extraction of genomic DNA to perform genotyping of the ***PTX3***, ***IL-1β***, ***IL-6***, ***IL-10*** and ***IL-17A*** polymorphisms. Moreover, whenever available, samples of synovial fluid and plasma [1] were used to measure the concentration of the IL-1β, IL-10, and IL-6 proteins by immunoassay. Uni-and multivariate analyses were performed to evaluate the relationships between genetic, biochemical, and clinical variables.

Results. The rs3024491 (***IL-10***) and rs2853550 (***IL-1b***) SNPs were found to be strongly associated with the risk of PJI. The synovial levels of PTX3, IL-1β, IL-10, and IL-6 were higher in cases than in controls, and a clear correlation emerged between the synovial concentration of PTX3 and IL-1b in cases only. Also, we identified a causal relationship between rs2853550, synovial concentration of IL-1b and that of PTX3 (that is induced by IL-1b).

Conclusions: Our findings suggest that SNPs in the ***IL-10*** and ***IL-1b*** genes could be used for early identification of THA and TKA patients with high risk of PJI. It is therefore conceivable that integrating genetic data into current diagnostic criteria would improve diagnosis of PJI.

[1] Loppini, M. ***J. Clin. Med***. **2023**, *12*, 1055.

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[FP E4] EXTERNAL VALIDATION OF THE JS-BACH CLASSIFICATION FOR PREDICTING OUTCOME IN PERIPROSTHETIC JOINT INFECTIONS: A COHORT OF 653 PATIENTS

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Aim: Periprosthetic Joint Infection (PJI) is a devastating complication in hip and knee joint arthroplasty. The "JS BACH" classification system was developed in 2021 to stratify the complexity of PJI, and more importantly, to act as a tool to guide referrals to specialist centers. The "JS BACH" classification has not been validated in an external cohort. This study aimed to do so using a large prospective cohort from Australia and New Zealand.

Method: We applied the JS-BACH classification to the Prosthetic Joint Infection in Australia and New Zealand Observational (PIANO) cohort. This prospective study of newly diagnosed PJI collected 2-year outcome data from 653 participants enrolled in 27 hospitals. The definition of PJI treatment failure at 24 months was any of the following: death, clinical or microbiological signs of infection, destination prosthesis removed, or ongoing antibiotic use.

Results: Individual cases were classified as per JS-BACH into "1 - uncomplicated" (n = 268), "2 - complex" (n = 330), and "3 - limited options" (n = 55). This cohort was similar to the original JS-BACH population in terms of baseline characteristics. However, there was a difference in complexity, with more DAIR procedures, fewer revision procedures, and a higher proportion of uncomplicated patients in the PIANO cohort.
The risk of treatment failure correlated strongly with the JS-BACH category, with odds ratios (95% CI [confidence interval]) for category 2 versus 1 of 1.75 (1.24 to 2.47) and for category 3 versus 1 of 7.12 (3.42 to 16.02).

Conclusions: Despite the PIANO study population being less complicated than the original derivation cohort, the JS-BACH classification showed a clear association with treatment failure in this large external cohort.

[FP E5] PROGNOSTIC VALUE OF THREE DIFFERENT CLASSIFICATIONS SYSTEMS FOR PERIPROSTHETIC JOINT INFECTIONS

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Aim: Determine therapeutic and prognostic value of three different prosthetic joint infections (PJI) staging systems – JS-Bach, McPherson and PJI-TNM.

Method: Retrospective analysis of patients who received surgery for PJI between 2011 and 2022 at one single institution, including DAIR, 1-stage revision and 2-stage revision. We applied three staging systems - JS-Bach, McPherson, PJI-TNM – and categorize the results into A (less severe), B (intermediate) and C (most severe). Demographic data and comorbidities, anatomic location, type of treatment, recurrency of infection, final outcome and antibiogram were analyzed.

Results: 186 patients were included, 112 (60%) were woman. Median age was 70 years old. 51% were submitted to DAIR, 10% to 1-stage revision and 39% to 2-stage revision. Recurrence of infection was found on 27% of patients after initial treatment. 10% died with complication related to PJI. Final status at last follow-up showed 96% of cases were ultimately free of infection at last follow-up. JS-BACH was associated with recurrence. All three staging systems were associated with final outcome.

Table 1. Patient distribution and outcomes according to the three staging systems

	A - Less severe % (n)	B -Intermediate % (n)	C - most severe % (n)
JS-BACH	41.6% (79)	51.1% (97)	7.4% (14)
PJI-TNM	25.3% (48)	46.3% (88)	28.4% (54)
McPherson	14.7% (28)	32.1% (61)	53.2% (101)
JS-BACH			
Recurrence			
	A - Less severe % (n)	B -Intermediate % (n)	C - most severe % (n)
Yes	8.4% (14)	18.0% (30)	3.6% (6)
No	38.3% (64)	29.3% (49)	2.4% (4)
p	**0.002**		
Final status			
Free infection	46.7% (78)	44.9% (75)	4.8% (8)
Active infection	0.0% (0)	2.4% (4)	1.2% (2)
p	**0,003**		
PJI-TNM			

Recurrence			
	A - Less severe % (n)	B -Intermediate % (n)	C - most severe % (n)
Yes	7.8% (13)	12.0% (20)	10.2% (17)
No	19.8% (33)	36.5% (61)	13.8% (23)
p	0.130		
Final status			
Free infection	27.5% (46)	47.9% (80)	21.0% (35)
Active infection	0.0% (0)	0.6% (1)	3.0% (5)
p	0.04		
McPherson			
Recurrence			
	A - Less severe % (n)	B -Intermediate % (n)	C - most severe % (n)
Yes	4.8% (8)	13.2% (22)	12.0% (20)
No	11.4% (19)	19.8% (33)	38.9% (65)
p	0.117		
Final status			
Free infection	16.2% (27)	32.9% (55)	50.9% (85)
Active infection	0.0% (0)	3.0% (5)	0.6% (1)
p	0.039		

Conclusions:
Despite all existing knowledge around risk factors for treatment failure of PJI, there is still a lack of a generally accepted classification system to accurately predict patient outcome.
JS-BACH, McPherson and PJI-TNM are three different proposed classifications developed to predict clinical outcomes. To the best of our knowledge there are no studies directly comparing their performance.
We retrospectively evaluated our cohort and found that all three correlated with final patient outcome but JS-BACH was the only who significantly correlated with infection recurrence after initial treatment.

[FP E6] AN ANALYSIS OF THE DEFINITION OF VARIABLES IN PERIPROSTHETIC JOINT INFECTION RESEARCH

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Aim: A substantial portion of periprosthetic joint infections (PJI) literature is comprised of observational studies. The Strengthening the Reporting of Observational Studies in Epidemiology guidelines emphasize the importance of clearly defining variables and providing diagnostic criteria. Well-defined variables in these studies play a crucial role in ensuring data consistency, fostering comparability among studies, and laying a robust foundation for evidence-based decision-making. We aimed to determine the definition of these variables and determine the objectivity of the definitions.

Method: We reviewed observational studies on hip or knee PJI that focused on variables and their association with treatment outcomes. The inclusion criteria comprised studies from Jan 2017 to Jan 2023. We focused on 13 variables that were possibly subjective. These were smoking, alcohol use, diabetes mellitus, hypertension, lung disease, rheumatoid arthritis, liver diseases, kidney diseases, cardiovascular diseases, malignancy, immunosuppression, use of antibiotics, and type of infection. The reviewers examined the text of the articles, along with any available online supplements or protocols, for definitions of the selected variables. We classified a definition as objective if there was the presence of time element, severity, staging, frequencies, laboratory cut-off, medication dependence, among others. Chart review was deemed subjective.

Results: We included 75 studies in the analysis. The most common factors studied were diabetes mellitus (79%), cardiovascular disease, smoking history, and rheumatoid arthritis (47% each). The variables that were objectively defined most often were antibiotic use (100%) and type of infection (95%). Smoking history (16%) and alcohol use (20%) were the least frequently objectively defined variables. Further analysis revealed that a considerable number of studies incorporated variables into their primary analyses without clear definitions. For instance, out of the 59 studies where diabetes was considered a variable, 41 studies (70%) included diabetes in their main analyses as a factor for PJI treatment outcomes, despite only 34 studies having defined this variable. Moreover, of the 34 provided definitions of diabetes mellitus, only 12 provided objective criteria for diagnosis. The rest of the provided definitions relied on “chart review” without further specification. Table 1 outlines the proportion of studies with variables defined and included in their analysis.

Conclusions: Study variables were not clearly defined in most of the observational studies raising concerns about the reproducibility and reliability of findings. Our study underscores the vital need for standardized variable definitions in PJI research. Professional societies may play a crucial role in setting standards for the definition of variables.

Table 1. Description of Definitions of Variables in Periprosthetic Joint Infections and Assessment of Artificial Intelligence

Variable	No. of Studies with variable	Provided definitions n (%)	Objectively defined n (%)	Included in the main analysis n (%)
Diabetes mellitus	59	34 (57.6)	12 (35.3)	41 (69.5)
Cardiovascular disease	35	20 (57.1)	8 (40)	22 (62.9)
Smoking	35	19 (54.3)	3 (15.8)	25 (71.4)
Rheumatoid arthritis	35	17 (48.6)	7 (41.2)	21 (60)
Kidney disease	33	21 (63.6)	12 (57.1)	21 (63.6)
Antibiotic use	27	24 (88.9)	24 (100)	19 (70.3)
Liver disease	24	13 (54.2)	6 (46.2)	16 (66.7)
Type of infection	22	22 (100)	21 (95.5)	18 (81.8)
Malignancy	22	13 (59.1)	5 (38.5)	15 (68.2)
Lung disease	21	11 (52.4)	3 (27.3)	14 (66.7)
Immunosuppression	20	15 (75)	4 (26.7)	11 (55)
Alcohol use	18	10 (55.6)	2 (20)	13 (72.2)
Hypertension	18	9 (50)	4 (44.4)	11 (61.1)

[FP E7] THE IMPORTANCE OF BIOMECHANICAL RESTORATION ON DISLOCATION RATES AFTER TWO-STAGE SPACER-FREE TOTAL HIP ARTHROPLASTY REVISION: RISK FACTOR ANALYSIS AND FUNCTIONAL OUTCOMES

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Background: Postoperative dislocation is one of the main surgical complications and the primary cause for revision surgery after 2-stage implant exchange due to periprosthetic infection of a total hip arthroplasty.

Objective: The aims of our study were (1) to determine the incidence of dislocation after two-stage THA reimplantation without spacer placement, (2) to evaluate relevant risk factors for dislocation and (3) to assess the final functional outcome of those patients.
Methods: We prospectively analyzed 187 patients who underwent a two-stage total hip arthroplasty (THA) revision after being diagnosed with periprosthetic joint infection (PJI) from 2013 to 2019. The mean duration of follow-up was 54.2 ± 24.9 months (>36 months). The incidence of postoperative dislocation and subsequent revision was estimated through Kaplan-Meier curves and potential risk factors were identified using Cox hazard regression. The functional outcome of the patients was assessed using the modified Harris Hip Score (mHHS).

Results: The estimated cumulative dislocation-free survival was 87.2% (95% CI: 81.2%-91.3%) with an estimated 10% and 12% risk for dislocation within the first 6 and 12 months, respectively. The use of a dual-mobility construct had no significant impact on the dislocation rate. Increasing body mass index (BMI) (HR=1.11, 95% CI: 1.02-1.19, p=0.011), abductor mechanism impairment (HR=2.85, 95% CI: 1.01-8.01, p=0.047), the extent of elongation of the affected extremity between stages (HR=1.04, 95% CI: 1.01-1.07, p=0.017), the final leg length discrepancy (HR=1.04, 95% CI: 1.01-1.08, p=0.018) and PJI recurrence (HR=2.76, 95% CI: 1.00-7.62, p=0.049) were found to be significant risk factors for dislocation. Overall revision rates were 17% after THA reimplantation. Dislocated hips were 62% more likely to undergo re-revision surgery (p<0.001, Log-rank= 78.05). A significant average increase of 30 points in mHHS scores after second-stage reimplantation (p=0.001, Wilcoxon-rank) was recorded, but no difference was noted in the final HHS measurements between stable and dislocated hips.

Conclusion: Dislocation rates after 2-stage THA reimplantation for PJI remain high, especially regarding overweight or re-infected patients. Careful leg length restoration and an intact abductor mechanism seem critical to ensure stability in these complex patients.

[FP E8] SYSTEMIC INFLAMMATION RESPONSE INDEX (SIRI) AND MONOCYTE TO LYMPHOCYTE RATIO (MLR) ARE PREDICTORS OF GOOD OUTCOMES IN SURGICAL TREATMENT OF PERIPROSTHETIC JOINT INFECTIONS OF LOWER LIMBS: A SINGLE-CENTER RETROSPECTIVE ANALYSIS

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Aim: Periprosthetic joint infection (PJI) is a devastating complication that develops after total joint arthroplasty (TJA) whose incidence is expected to increase over the years. Traditionally, surgical treatment of PJI has been based on algorithms, where early infections are preferably treated with debridement, antibiotics, and implant retention (DAIR), while late infections with two-stage revision surgery. Two-stage revision is considered the "gold standard" for treatment of chronic PJI. In this observational retrospective study, we investigated the potential role of inflammatory blood markers (neutrophil-to- lymphocyte ratio (NLR), monocyte-to-lymphocyte ratio (MLR), platelet-to-lymphocyte ratio (PLR), systemic inflammatory index (SII)], systemic inflammatory response index (SIRI), and aggregate index of systemic inflammation (AISI)) as prognostic factors in two-stage exchange arthroplasty for PJI.

Method: A single-center retrospective analysis was conducted, collecting clinical data and laboratory parameters from patients submitted to prosthetic explantation for chronic PJI. Laboratory parameters (PCR, NLR, MLR, PLR, SIRI, SII and AISI) were evaluated at the explantation time, at 4, 6, 8 weeks after surgery and at reimplantation time. Correlation between laboratory parameters and surgery success was evaluated, defined as infection absence/resolution at the last follow up

Results: 57 patients with PJI were evaluated (62% males; average age 70 years, SD 12.14). Fifty-three patients with chronic PJI were included. Nineteen patients completed the two-stage revision process. Among them, none showed signs of re-infection or persistence of infection at the last available follow up. The other twenty-three patients did not replant due to persistent infection: among them, some (the most) underwent spacer retention; others were submitted to Girdlestone technique or chronic suppressive antibiotic therapy. Of the patients who concluded the two-stage revision, the ones with high SIRI values (mean 3.08 SD 1.7, p-value 0.04) and MLR values (mean 0.4 SD 0.2, p-value 0.02) at the explantation time were associated with a higher probability of infection resolution. Moreover, higher variation of SIRI and PCR, also defined respectively delta-SIRI (mean -2.3 SD 1.8, p-value 0.03) and delta-PCR (mean -46 SD 35.7, p-value 0.03), were associated with favorable outcomes

Conclusions: The results of our study suggest that, in patients with PJI undergoing two-stage, SIRI and MLR values and delta-SIRI and delta-PCR values could be predictive of favorable outcome. The evaluation of these laboratory indices, especially their determination at 4 weeks after removal, could therefore help to determine which patients could be successfully replanted and to identify the best time to replant.

[FP E9] ARE CURRENT DEFINITIONS RELIABLE IN THE PREOPERATIVE DIAGNOSIS OF SHOULDER PROSTHETIC JOINT INFECTION? –COMPARING THE EBJIS AND THE 2018 ICM SHOULDER DEFINITION

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Aim: Accurate diagnosis is key in correctly managing prosthetic joint infection(PJI). Shoulder PJI definition and diagnosis is challenging. Current PJI definitions, based overwhelmingly in hip/knee research, may not accurately diagnose shoulder PJI. Our aim is to compare the preoperative performance of two PJI definitions comparing it to definitive postoperative classification.

Method: This is a retrospective study of patients who have undergone total shoulder revision surgery for infection between 2005 and 2022.
Cases were classified using two different PJI definitions: a)the European Bone and Joint Infection Society (EBJIS) and; 2)the 2018 International Consensus Meeting(ICM) PJI specific shoulder definition.
Preoperative classification was based on clinical features, inflammatory markers and synovial fluid leukocyte count and definitive classification also considered microbiology and histology results.

Results: Preoperative and definitive PJI classification status of the 21 patients included were evaluated and is summarized in table 1. The shoulder specific 2018 ICM definition showed the highest agreement between preoperative and definitive classification (76.2%, k=0.153, p=0.006) compared to EBJIS (52.4%, k=0.205, p=0.006). In all cases, the classification was changed because of positive intraoperative microbiology (at least two identical isolates).

Microbiology findings showed coagulase negative staphylococci, Staphyloccocus aureus and Cutibacterium acnes to be the most frequent. Four patients had polymicrobial infections.

Conclusions: Both the EBJIS 2021 and 2018 ICM definitions have low accuracy in predicting shoulder PJI preoperatively. Clearly further studies with larger cohorts are in dire need focusing specifically on shoulder revision arthroplasty to improve on existing definitions. Caution is advised while extrapolating of criteria/thresholds recommended for hip/knee joints**.**

Preoperative versus Definitive Classification			
Preoperative		***Definitive***	
EBJIS 2021			
Unlikely	*3 (14%)*	**2** *(67%)*	*Unlikely*
		0 *(0%)*	*Likely*
		1 *(33%)*	*Confirmed*
Likely	*9 (43%)*	**0** *(0%)*	*Likely*
		9 *(100%)*	*Confirmed*
Confirmed	**9** *(43%)*	**9** *(100%)*	*Confirmed*
ICM 2018			

Not Infected	***0** (0%)*	**0** *(0%)*	*Not Infected*
		0 *(0%)*	*Inconclusive*
		0 *(0%)*	*Infected*
Inconclusive	***5** (0%)*	**1** *(20%)*	*Inconclusive*
		4 *(80%)*	*Infected*
Infected	***16** (76%)*	**16** *(100%)*	*Infected*

[FP E10] ARE KLIC AND CRIME 80 SCORES USEFUL TO ASSIST DECISION MAKING INITIALLY OR AT THE MOMENT OF REPEAT DAIR? - A RETROSPECTIVE STUDY

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Aim: Debridement, antibiotics and implant retention (DAIR) is recommended for acute postoperative and late acute prosthetic joint infection (PJI). There are two recommend scores to predict its outcome, KLIC and CRIME 80 scores respectively. They have not been widely adopted for decision making.
We aim to evaluate them in predicting DAIR failure in our cohort.

Method: All patients submitted to DAIR after total hip or knee PJI, between 2010 and 2021, with a minimum one-year follow-up, were retrospectively evaluated. We excluded tumoral total joint replacements. KLIC score was applied to acute PJIs and CRIME 80 to late acute (LA) PJI. LA PJI was defined as the development of acute symptoms occurring ≥ 3 months after implantation. Repeat DAIR was performed as needed. Failure was defined as the need for implant removal, amputation, infection related death and suppressive antibiotic therapy.

Results: We included 102 patients. The overall failure rate was 35.5% (36/102). There was no significant difference for the rate of failure in patients that had one DAIR and those who repeated DAIR - 32.5% (26/80) vs. 45.5% (10/22) (p=0.26). There were no significant correlations between KLIC or CRIME 80 scores and failure rates (p=0.54 and p=0.93 respectively, figure 1).
Focusing specifically on the cohort who underwent repeat DAIR (n=22), KLIC and CRIME-80 score were also not associated with failure (p= 0.44 and p=0.50 respectively, figure 1).
No host, pathogen or antibiotic treatment related factors were found to predict failure.

Conclusions: In our cohort KLIC- and CRIME-80 scores failed to be predictive of DAIR failure, even in the cohort that needed repeat DAIR. We were unable to find any independent failure risk factors.

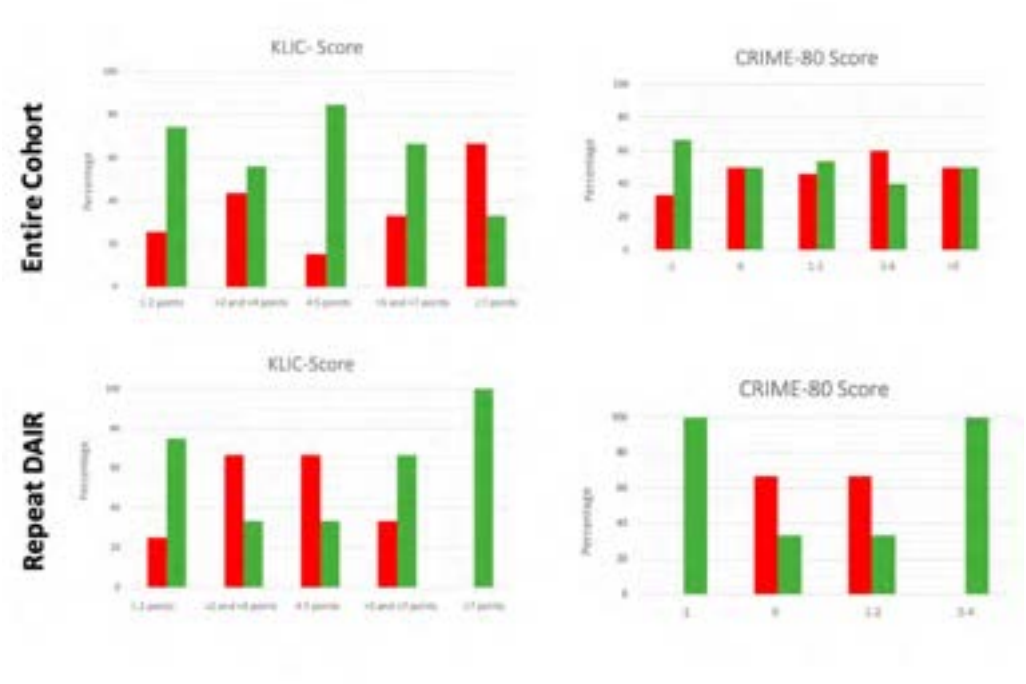

Figure 1 - KLIC and CRIME 80 score distribution in the entire cohort and in patients that needed to repeat DAIR. (green – patients with successful DAIR procedure; red – patients with failure DAIR procedure)

[FP F1] PRE-TREATING PJI WITH SYSTEMIC ANTIBIOTICS DECREASES TISSUE AND IMPLANT BACTERIAL COUNTS: RESULTS FROM AN IN VIVO MODEL

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Aim: Periprosthetic joint infection (PJI) is a complication of total joint arthroplasty that typically requires revision surgery for treatment. Systemic antibiotics are usually held prior to surgery to improve yield of intraoperative cultures. However, recent studies suggest that preoperative aspirations have a high concordance with intraoperative cultures, which may allow surgeons to initiate antibiotic treatment earlier. The purpose of the study was to investigate the effect of Pre-surgical systemic antibiotic therapy on the bacterial burden within the periprosthetic space and systemic immune reaction.

Method: PJI was induced with MSSA (Xen36) S. aureus in the right knee of 16-week old, female, C57BL6 mice using a previously validated murine model. Mice were randomized to three groups (n=8, each): control; Vanc, receiving systemic vancomycin (110mg/kg, SQ, twice daily); or VancRif receiving vancomycin same as in Vanc group, plus rifampin (12mg/kg dose, IV, once daily). Following 2 weeks of treatment, mice were euthanized and periprosthetic bone, soft tissue and the implant were harvested. Bacterial burden, colony forming units (CFUs), was quantified in soft tissue, tibial bone, and on the implant. Specifically, tissues were homogenized and serially plated for CFUs, while the implant was sonicated and then plated for CFUs. The host immune response was analysed through weighing inguinal and iliac lymph nodes and through measuring serum amyloid A (SAA). Non-parametric pairwise group comparisons of the three outcome measures were performed using a Mann-Whitney U test.

Results: VancRif, the combined treatment significantly reduced bacterial burden in the periprosthetic soft tissue, bone, and implant compared to control ($p<0.001$) and Vanc alone ($p<0.001$). While not significant, Vanc alone did reduce bacterial load as compared to control. The ipsilateral weight of the iliac lymph nodes was significantly reduced in Vanc and VancRif mice compared to controls ($p<0.001$), was well as in VancRif versus Vanc alone ($p<0.001$). Interestingly, SAA levels did not significantly differ among all groups. During tissue harvesting, minimal purulence was observed in antibiotic treatment groups, unlike controls.

Conclusions: Treating active PJI with vancomycin alone decreases periprosthetic bacterial loads and reduces the local immunological response. This effect is significantly enhanced with the combined rifampin use. These findings could suggest that when culture positive PJI is diagnosed, pre-surgical treatment with antibiotics may decrease immunosuppression and soft tissue infiltration, leading to a better chance of infection cure with subsequent surgical debridement. Histological investigations and repeat experiments involving subsequent surgical treatment are underway.

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[FP F2] DIAGNOSTIC VALUE OF PREOPERATIVE BIOPSIES AFTER DRY TAP JOINT ASPIRATION FOR DIAGNOSING PERIPROSTHETIC JOINT INFECTION; A RETROSPECTIVE STUDY

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Aim: Periprosthetic joint infection (PJI) is a devasting complication after total hip arthroplasty. Joint aspiration and preoperative biopsy can be helpful diagnostics for PJI. The aim of this study is to evaluate the diagnostic value of preoperative biopsies after inconclusive or dry tap aspiration of the hip in patients undergoing revision hip arthroplasty. Secondarily we will evaluate the diagnostic value of synovial fluid aspiration cultures and peroperative tissue cultures for diagnosing or ruling out PJI.

Methods: Patients who underwent diagnostic aspiration and subsequent preoperative biopsy and/or revision surgery between January 2015 and January 2024 were included in the study. Synovial fluid aspirations and tissue samples obtained from biopsy and revision surgery were interpreted using the European Bone and Joint Infection Society criteria for PJI and in close consultation with the microbiologist.

Results: 207 Patients were included with 231 synovial fluid aspirations. Sensitivity and specificity of synovial fluid aspiration cultures were 76% and 98%. In 62 patients tissue biopsies were performed, of which 40 after a dry tap. The tissue biopsies after a dry tap aspiration had a sensitivity of 50.0% and a specificity of 95.8%. In 21% tissue biopsies led to the confirmation of PJI in patient with a high suspicion of PJI after dry tap aspiration. In patients with an inconclusive synovial fluid aspiration result the addition of tissue biopsies led to a change in treatment in 14%. In 212 cases revision surgery was performed, intraoperative tissue cultures had a sensitivity and specificity of 83.3% and 99.3%.

Conclusions: Diagnosing PJI can be troublesome, especially if synovial fluid aspiration provides a dry tap. Tissue biopsy cultures in patients with a high suspicion of PJI after dry tap aspiration is a feasible way to confirm PJI, in 21% of patients PJI could be confirmed after dry tap aspiration. Ruling out PJI by means of a biopsy after a dry tap aspiration is less successful due to its low sensitivity. Tissue biopsies after an inconclusive aspiration leads to clinically important treatment changes.

[FP F3] OPTIMIZING PROSTHETIC JOINT INFECTION DIAGNOSTICS: THE IMPACT OF INTRAOPERATIVE DIRECT SONICATION ON TIME TO POSITIVITY

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Aim: This study aimed to evaluate the impact of intraoperative direct sonication on the yield of traditional culture and the time to positivity (TTP) of cultures obtained for periprosthetic joint infection (PJI), thereby assessing its potential to improve diagnostic efficiency and reduce contamination risk.

Method: A prospective cohort study was conducted at a tertiary care center, involving 190 patients undergoing revision surgery for PJI from August 2021 to January 2024. Patients were included based on the 2018 International Consensus Meeting definition of PJI. The study utilized a novel sonication protocol, which involved direct intraoperative sonication of the implant and tissue, followed by incubation in a BACT/ALERT 3D system. The primary outcomes measured were the number and percentage of positive culture samples, identified microorganisms, and the TTP of each culture. Statistical analysis was performed using R software, with various tests applied to assess the significance of findings.

Results: The study included 510 positive cultures from 190 patients, demonstrating that sonication significantly improved the positivity rate for both tissue and prosthesis specimens ($p < 0.05$). The median TTP for all samples was 3.13 days, with sonicated samples showing a significantly shorter TTP compared to non-sonicated samples ($p < 0.05$). Specifically, the shortest median TTP was observed in prosthesis post-sonication samples. Furthermore, the study found that Gram-positive organisms had a shorter TTP than gram-negative organisms, and specific microorganisms like Staphylococcus aureus and MRSE showed the fastest TTP. The analysis also revealed higher positivity rates in chronic PJIs compared to acute PJIs for sonicated tissue samples.

Conclusions: The study demonstrates that intraoperative direct sonication combined with the BACT/ALERT 3D system can significantly enhance the diagnostic yield of cultures and reduce the TTP for common PJI pathogens. This novel technique not only improves pathogen detection, facilitating the tailoring of antibiotic therapy, but also potentially reduces the risk of contamination associated with sonication. These findings suggest that direct intraoperative sonication could be a valuable addition to the current diagnostic protocols for PJI, contributing to more effective management and treatment of this complex condition. Further research is necessary to explore the clinical significance of TTP and its correlation with patient outcomes in PJI.

[FP F4] THE VALUE OF SYNOVIAL CALPROTECTIN IN THE DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTION AFTER HIP AND KNEE ARTHROPLASTY

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Aim: Periprosthetic joint infection (PJI) is one of the main reasons for revision surgery after primary unicompartmental knee arthroplasty (UKA), total knee arthroplasty (TKA) or total hip arthroplasty (THA). Currently the MSIS and EBJIS criteria sets are considered to be the gold standards in determining PJI. These criteria sets are complex and contain tests that are time-consuming and many are rather costly. Therefore, further research is indicated to find a simpler but equally reliable diagnostic test. In this study we evaluated the additional value of calprotectine measurement in synovial fluid in patients undergoing hip and knee (revision) arthroplasty following routine work-up.

Method: In a retrospective cohort study, we analyzed 182 synovial fluid samples from 143 patients with suspected PJI after UKA, TKA, THA or revision arthroplasty. Twenty-six of those cases were classified as PJI according to the MSIS and EBJIS criteria. Subsequently, synovial calprotectin was determined, using a lateral flow assay and two cut-off thresholds of ≥14 mg/L and ≥50 mg/L. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of synovial calprotectin was determined.

Results: When applying the MSIS and EBJIS criteria and a calprotectin level ≥14 mg/L, synovial calprotectin revealed an area under the curve of 0.96 (95% CI 0.90-1.00), with 92.3% sensitivity and 100% specificity. The PPV and NPV were 100% and 92.9% respectively. When applying the MSIS and EBJIS criteria and a calprotectin level ≥ 50 mg/L, synovial calprotectin revealed an area under the curve of 0.94 (95% CI 0.87-1.00), with 88.5% sensitivity and 100% specificity. The PPV and NPV were 100% and 89.7% respectively.

Conclusions: The value of calprotectin in synovial fluid gives valuable information with a single test result, resulting in high predictive value in the diagnosis of PJI after hip or knee arthroplasty and should seriously be considered as part of PJI diagnostics in an outpatient clinical setting. The high specificity can help rule in patients that are suspected of PJI. Therefor this test can be helpful in a preop diagnostic work-up to avoid unnecessary revisions in patients with well-placed and well-fixed arthroplasties with a suspected PJI. These conclusions are independent of which criteria set was used as a gold standard.

[FP F5] CAN THE USE OF A SYNTHETIC SYNOVIAL FLUID MEDIUM IN COMBINATION WITH ISOTHERMAL MICROCALORIMETRY IMPROVE ACCURACY AND REDUCE TIME TO DETECTION IN PERIPROSTHETIC JOINT INFECTIONS?

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Aim: Fast and accurate identification of pathogens causing periprosthetic joint infections (PJI) is essential to initiate effective antimicrobial treatment. Culture-based approaches frequently yield false negative results, despite clear signs of infection. This may be due to the use of general growth media, which do not mimic the conditions at site of infection. Possible alternative approaches include DNA-based techniques, the use of ***in vivo***-like media and isothermal microcalorimetry (ITC). We developed a synthetic synovial fluid (SSF) medium that closely resembles the ***in vivo*** microenvironment and allows to grow and study PJI pathogens in physiologically relevant conditions. In this study we investigated whether the use of ITC in combination with the SSF medium can improve accuracy and time to detection in the context of PJI.

Methods: In this study, 120 synovial fluid samples were included, aspirated from patients with clinical signs of PJI. For these samples microbiology data (obtained in the clinical microbiology lab using standard procedures) and next generation sequencing (NGS) data, were available. The samples were incubated in the SSF medium at different oxygen levels (21% O_2, 3% O_2 and 0% O_2) for 10 days. Every 24h, the presence of growth was checked. From positive samples, cultures were purified on Columbia blood agar and identified using MALDI-TOF. In parallel, heat produced by metabolically active microorganisms present in the samples was measured using ITC (calScreener, Symcel), (96h at 37°C, in SSF, BHI and thioglycolate). From the resulting thermograms the 'time to activity' could be derived. The accuracy and time to detection were compared between the different detection methods.

Results: So far, seven samples were investigated. Using conventional culture-based techniques only 14.3% of the samples resulted in positive cultures, whereas NGS indicated the presence of microorganisms in 57.1% of the samples (with 3/7 samples being polymicrobial). Strikingly, 100% of the samples resulted in positive cultures after incubation in the SSF medium, with time to detection varying from 1 to 9 days. MALDI-TOF revealed all samples to be polymicrobial after cultivation in SSF, identifying organisms not detected by conventional techniques or NGS. For the samples investigated so far, signals obtained with ITC were low, probably reflecting the low microbial load in the first set of samples.

Conclusion: These initial results highlight the potential of the SSF medium as an alternative culture medium to detect microorganisms in PJI context. Further studies with additional samples are ongoing; in addition, the microcalorimetry workflow is being optimized.

[FP F6] ULTRASOUND-GUIDED SYNOVIAL BIOPSY FOR THE PREOPERATIVE DIAGNOSIS OF PROSTHETIC JOINT INFECTION

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Aim: Prosthetic joint infection (PJI) is assessed using clinical history and examination, imaging studies and laboratory investigations which inform diagnostic tools such as that proposed by the European Bone and Joint Infection Society to determine the probability of infection. Infection is often confirmed by microbiology culture and histology from intraoperative samples, but ideally a diagnosis of infection is made preoperatively to guide management decisions.
At our institution, a tertiary referral centre for PJI, ultrasound (US)-guided synovial biopsy is routinely used as an adjunct to preoperative joint aspiration. Our aim was to evaluate the sensitivity and specificity of microbiology and histology results from US-guided synovial biopsy samples when compared to intraoperative samples.

Method: In this retrospective study we analysed all prosthetic hip and knee US-guided biopsies performed at our institution over a 5 year period between 2018 and 2022. Microbiology and histology results from preoperative biopsy samples were individually compared to microbiology and histology findings from intraoperative samples.

Results: 381 biopsies were performed; 281 knee, 100 hip. US-guided biopsy results showed strong positive predictive values (PPVs) in hip biopsies (microbiology PPV (79.3%), histology PPV (85.7%)) and knee biopsies (microbiology PPV (77%), histology PPV (85%)). Biopsies showed low sensitivity in predicting intraoperative findings (hip microbiology sensitivity (62%), hip histology sensitivity (31%), knee microbiology sensitivity (70%), knee histology sensitivity (21%). Biopsies showed high specificity for knee (microbiology specificity (89%), histology specificity (97%)) and hip (microbiology specificity (73%), histology specificity (91%)).

Conclusions: This study demonstrates that US-guided biopsy is a valuable diagnostic aid for PJI with high specificities and PPVs. Furthermore US-biopsy is valuable when there is limited fluid for aspiration.

[FP F7] SYNOVIAL FLUID NMR-BASED METABOLOMICS IN SEPTIC AND ASEPTIC REVISION TOTAL KNEE ARTHROPLASTY: IMPLICATIONS ON DIAGNOSIS AND TREATMENT

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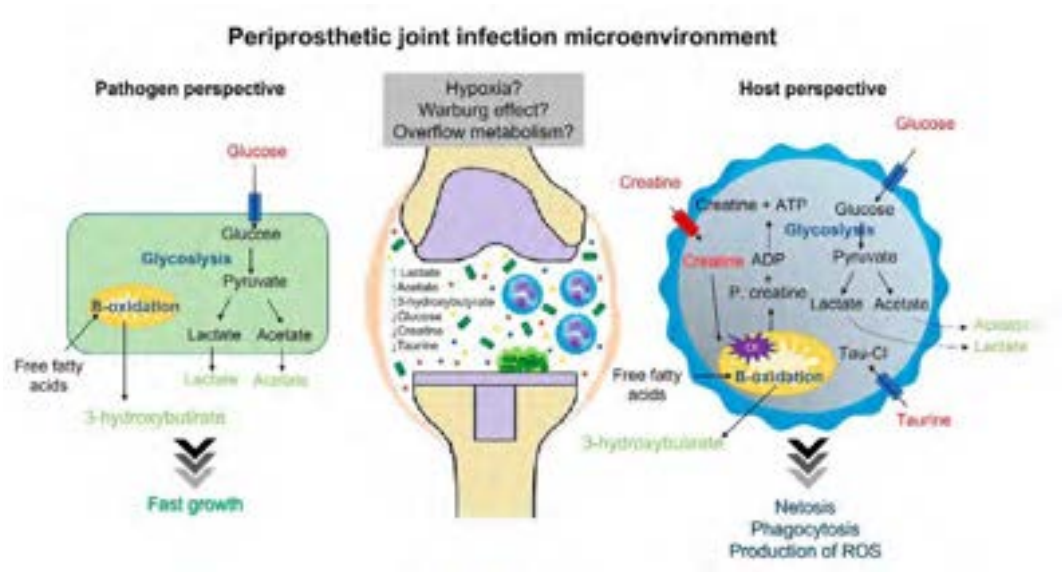
Aim: Evaluate the metabolites composition of the synovial fluid from patients with PJI or aseptic failure of total knee arthroplasties.

Method: The synovial fluids from 21 patients scheduled for revision total knee arthroplasty (11 with the diagnosis of PJI and 10 with aseptic failures) were analyzed using 1D 1H NMR spectroscopy. Univariate and multivariate statistical analyses were used to identify metabolites that were differentially abundant between those groups.

Results: A total of 28 metabolites were identified and five of them found to be differentially abundant between infected and non-infected synovial fluids. Lactate, acetate and 3-hydroxybutyrate were found to be in a higher concentration, and glucose and creatine were found reduced in the synovial fluid from PJI patients.

Conclusions: Synovial fluid from patients with PJI exhibit a distinct metabolic profile, possibly reflecting metabolic adaptation that occurs in the infected periprosthetic microenvironment. Further research and studies are warranted to gain a broader insight into the metabolic pathways engaged by both pathogen and immune cells in the context of a PJI.



[FP F8] THE VALUE OF SYNOVIAL CALPROTECTIN PRIOR TO SECOND-STAGE PROCEDURE IN PERIPROSTHETIC HIP AND KNEE JOINT INFECTIONS (PJI)

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Aim: Data on the value of preoperative synovial biomarkers prior to the second-stage of two-stage procedures for periprosthetic hip and knee joint infections (PJIs) is limited. The aim was to compare synovial calprotectin levels to alpha defensin and other established synovial markers prior to second-stage procedures and analyse the value of calprotectin regarding the re-revision rate.

Method: We retrospectively analysed 90 second-stages of a two-stage procedure from our prospectively maintained infection database. Overall, 13 septic (hip: 4, knee: 9) and 6 aseptic re-revision (hip: 2, knee: 4) following second-stage were compared to a successful reimplantation cohort. Synovial markers were measured preoperatively, including calprotectin, alpha defensin, C-reactive protein (CRP), white blood cell (WBC) counts, polymorphonuclear (PMN) cell count percentages and absolute PMN count. We performed correlations between synovial biomarker levels at time of reimplantation and analysed the area under the curve (AUC) by performing a receiver operating characteristic curve analysis (ROC). The microbiological spectrum between re-revision and the successful reimplantation group was assessed. The minimum follow-up period was 6 months.

Results: No significant differences were found in synovial markers between the re-revision and successful reimplantation group. Median values for cases with subsequent re-revisions versus successful second-stages were 111mg/L (7;312) vs 107mg/L (8; 379) for synovial calprotectin, 0.2 (0.1; 2.5) vs 0.1 (0.1; 4.3) for alpha defensin, 3.1mg/L (0.7; 18.7) vs 2.1mg/L (0.2;37.7) for synovial CRP, 680 cells/L (250; 16,230) vs 690 cells/L (10; 27,910) for WBC, 58.8% (17.9; 92.9) vs 51.3% (2.6; 996.3) for PMN and 0.3 (0.04; 15.1) vs 0.2 (0.00; 25.0) for absolute PMN count. The ROC analysis of synovial calprotectin for hips revealed an AUC of 0.5 (95%CI: 0.132, 0.868). The AUC for synovial calprotectin in knees was 0.604 (95%CI: 0.304; 0.904). Overall, 28 second-stage procedures 12 culture positive re-revisions and were found. The most prevalent microorganism identified at second-stage was Staphylococcus epidermidis (32.3%), at re-revision gram-negative microorganisms (30.8%). A persistent infection with the same microorganism was observed in 1/19 (5.3%) case. There was no higher re-revision rate in culture positive second-stage procedures.

Conclusions: Based on the AUC analysis there was no inflammatory synovial marker correlating with the probability of re-revision at the stage of reimplantation in patients undergoing two-stage procedures for hip and knee PJI. Combined assessment of clinical signs, intraoperative findings and microbiological analysis remains the gold-standard in assessing the outcome after second-stage procedures.

[FP F9] NEUTROPHIL EXTRACELLULAR TRAP-RELATED BIOMARKERS ARE INCREASED IN SYNOVIAL FLUID OF PATIENTS WITH PERIPROSTHETIC JOINT INFECTIONS

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Aim: Evaluate if Neutrophil Extracellular Traps related biomarkers (citrullinated histone H3 [H3Cit], cell-free DNA [cfDNA], and myeloperoxidase) are increased in synovial fluid of patients with PJI and investigate the diagnostic accuracy of NET formation biomarkers for PJI.

Method: Patients who underwent hip or knee revision total joint arthroplasty were categorised into two groups according to the Second International Consensus Meeting on Musculoskeletal Infection (2018) criteria. Sixteen patients were classified as infected and 16 as non-infected. cf-DNA, myeloperoxidase and H3Cit were measured in synovial fluid collected during surgery. Sensitivity, specificity, and receiver operating characteristic (ROC) curve were calculated.

Results: Patients with PJI presented significantly higher levels of synovial fluid cf-DNA (105.5 ng/ml ± 58.3 vs 1.9 ± 1.2, p>0.0001), myeloperoxidase (1575 pg/ml ± 826 vs 50.16 ± 100, p<0.0001) and citrullinated histone H3 (1.688 ± 1.214 vs 13.88 ± 24.4, p < 0.0001). In the ROC curve analyses, the area under the curve for cf-DNA, myeloperoxidase and H3cit were 1 [0.89 – 1], 0.98 [0.86 – 1], and 0.94 [0.8 – 0.99], respectively. The sensitivity for detecting PJI using synovial fluid was 100% for cf-DNA, 93,7% for myeloperoxidase, and 87,5% for H3cit. The sensitivity for cf-DNA and myeloperoxidase was 100%, and 87,5 % for H3cit.

Conclusions: Our results show that neutrophils within periprosthetic microenvironment release NETs as part of the bactericidal arsenal to fight infection. These results allow a better understanding of the cellular and molecular processes that occur in this microenvironment, enabling the design of more assertive strategies for the identification of new biomarkers and for a better use of the available ones. Furthermore, novel studies are needed to define whether and how NET-related biomarkers can be useful for the diagnosis of PJI.

[FP F10] INFECT ERADICATION AFTER PREFABRICATED OR INDIVIDUAL SPACERS IN TWO-STAGE REVISION: 10 YEARS EXPERIENCE AT A TERTIARY ACADEMIC CENTER

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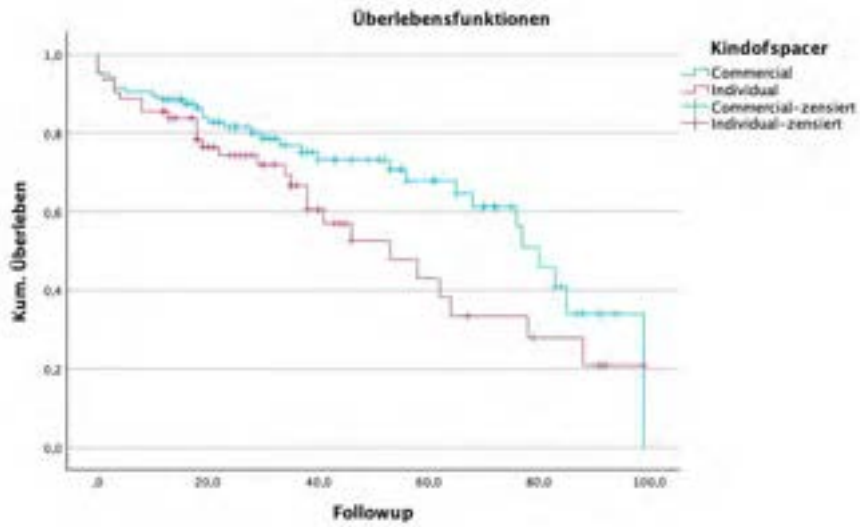
Aim: In Two-Stage Revision, utilizing temporary antibiotic spacers is widely accepted. These spacers are available prefabricated or can be individually moulded intraoperatively. In this study, we analysed the efficacy of prefabricated and individual spacers in infection eradication of periprosthetic joint infection in knee and hip arthroplasties.

Method: All spacers implanted at a tertiary academic center during two-stage exchanges between June 2010 and December 2019 were retrospectively analysed. Among 249 patients, 167 cases (minimum follow-up ≥ 12 months) were included. Commercial spacers contained vancomycin and gentamycin, while individual spacers contained vancomycin alone. Subgroup analysis by manufacturers was conducted using non-parametric methods including Mann-Whitney U and Kruskal-Wallis tests. Survival analysis utilized Kaplan-Meier curves, and categorical data were analyzed using the Chi^2 test. Statistical significance was defined as $p < 0.05$.

Results: Of the 167 patients included, a prefabricated spacer was implanted in 105 cases (62.9%) and an individual spacer was implanted in 62 cases (37.1%). In 106 cases, infection healing according to the Delphi consensus was achieved with a mean follow-up of 37.8 months [12;99]. Infection persistence was seen in 31.4% of the preformed spacers and in 45.2% of the individual spacers, with no statistically significant difference (p = 0.09). (Results are shown in the illustration). In the multivariate analysis, preoperative anemia (p = 0.02 OR 2.25 CI-95% 1.2-4.4 p = 0.01) and diagnosed paraneoplastic disease (p = 0.01 OR 3.0 CI-95% 1.4-6.7 p = 0.01) were found to be risk factors for failure.



Conclusions: Two-stage Revisions are successfully suitable options for the treatment of PJI. In this study, infection eradication was independent of the type of spacer. Anemia and paraneoplastic diseases were found to be risk factors of failure.

[FP G1] FIRST-TIME EVALUATION OF INTRA- AND POSTOPERATIVE CEFUROXIME TARGET SPINE TISSUE CONCENTRATIONS IN LONG-LASTING SPINE SURGERY FOLLOWING REPEATED WEIGHT-DOSED INTRAVENOUS ADMINISTRATIONS

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Aim: Antibiotic prophylaxis is central in preventing postoperative spine infections, yet knowledge of clinical spine tissue antibiotic concentrations remains limited. Pooled postoperative spine infection rates are constant (approximately 3%), resulting in severe patient morbidity, mortality, and prolonged hospitalization.
Current antibiotic dosing regimens often involve fixed doses based on empirical knowledge, surrogate measures (plasma samples), non-clinical evidence (experimental models), and inferior methodology (tissue specimens). Therefore, personalized antibiotic dosing may be the future of antibiotic prophylaxis to prevent postoperative infections, especially implant infections.
The aim was to continuously evaluate intra- and postoperative cefuroxime target spine tissue concentrations in long-lasting spine surgery after personalized dosing by repeated weight-dosed intravenous administrations.

Method: Twenty patients (15 female, 5 male) scheduled for long-lasting spine deformity surgery with hypotensive anaesthesia were included; median age (range): 17.5 years (12-74), mean BMI (range): 22.2 (16.2-37.7), and mean surgery time (range): 4h 49min (3h 57min-6h 9min).Weight-dosed cefuroxime (20 mg/kg) was administered intravenously to all patients on average 25 min before incision and repeated after 4 hours. Microdialysis catheters were placed for sampling of cefuroxime concentrations in vertebral bone (only intraoperative sampling), paravertebral muscle, and subcutaneous tissue as soon as possible after surgery start. Upon wound closure, two additional catheters were placed in the profound and superficial part of the wound. Microdialysis and plasma samples were obtained continuously intra- and postoperative for up to 12 hours. The primary endpoint was (based on cefuroxime time-dependent efficacy) the time with cefuroxime concentrations above the clinical breakpoint minimal inhibitory concentration for ***Staphylococcus aureus*** of 4 µg/mL in percentage (%***f***T>MIC4) of

(a) patients' individual surgery time,
(b) first dosing interval (0-4 hours),
(c) second dosing interval (4-12 hours).

Results: Mean cefuroxime %***f***T>MIC4 (range) of:
(a) patients' individual surgery time was 100% (100-100%) in all investigated tissues.
(b) the first dosing interval was 93% (93-93%) in vertebral bone, paravertebral muscle, subcutaneous tissue, and 99% (99-100%) in plasma.
(c) the second dosing interval was 87% (52-100%) in paravertebral muscle, 89% (52-100%) in subcutaneous tissue, 91% (71-100%) in the profound wound, 94% (72-100%) in the superficial wound, and 71% (42-100%) in plasma.

Conclusions: Personalized cefuroxime dosing by repeated weight-dosed (20 mg/kg) intravenous administrations provided homogenous and therapeutic spine tissue exposure across all investigated tissues and plasma in long-lasting spine surgery with hypotensive anaesthesia (up to 11 hours). Thus, personalized cefuroxime dosing may decrease the risk of postoperative spine infection, especially in cases with implant insertion.

[FP G2] DYNAMIC DISTRIBUTION OF SYSTEMICALLY ADMINISTERED ANTIBIOTICS IN ORTHOPEDICALLY RELEVANT TARGET TISSUES AND SETTINGS

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Aim: Efficacious antibiotic treatment is crucial for managing and preventing orthopedic infections due to their complexity and associated risk of treatment failure. Previous reviews on antibiotic target tissue concentrations have primarily focused on static measurements, which may not accurately reflect the dynamic pharmacokinetic/pharmacodynamic (PK/PD) changes encountered in clinical settings.
This review aimed to summarize the current literature on antibiotic distribution in orthopedically relevant tissues and settings using dynamic sampling methods.

Method: In accordance with PRISMA guidelines, a literature search was conducted with a scientific librarian's assistance. PubMed and Embase databases were systematically searched using relevant MeSH terms, entries, and keywords. English-published studies between 2004 and 2023 involving systemic antibiotic administration and dynamic measurements were included. 4467 titles were identified. After title and abstract screening, 77 eligible studies remained.

Results: The studies covered clinical and pre-clinical studies on both healthy and infected tissue. Dynamic measurements were obtained from various tissues including bone, intervertebral discs, joints, muscles, and subcutaneous tissue. Microdialysis was the predominant sampling method (98.70%, 76/77). Antibiotics like cefuroxime, linezolid, and vancomycin were extensively studied. Fluoroquinolones, tetracyclines, and most beta-lactams typically presented good tissue penetration in relation to relevant PK/PD-targets. In contrast, glycopeptides, macrolides, and flucloxacillin exhibited poorer penetration.

Conclusions: This review provides valuable insights of antibiotic distribution in orthopedically relevant target tissues and settings, which may help improve dosing recommendations and treatment outcomes. Our findings are limited to the investigated dosing regimens and administration methods and depend on the chosen PK/PD target. Many antibiotics still require further research to address the significant knowledge gaps, such as the lack of dynamic evaluations for certain antibiotic types and further investigation across various orthopedic settings and tissues.

[FP G3] BIOPOLYMER-ENCAPSULATED SILVER RESERVOIR: INVESTIGATING BIOCOMPATIBILITY IN AN IN VIVO STUDY OF A NOVEL ANTI-INFECTIVE IMPLANT COATING

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Aim: The utilization of silver as an anti-infective agent is a subject of debate within the scientific community, with recurring discussions surrounding its biocompatibility. Presently, galvanic silver coating finds widespread clinical application in mitigating infection risks associated with large joint arthroplasties. While some instances have linked this coating to sporadic cases of localized argyria, these occurrences have not exhibited systematic or functional limitations. To address concerns regarding biocompatibility, a novel approach has been devised for anti-infective implant coatings: encapsulating silver nitrate within a biopolymer reservoir for non-articulating surfaces. This poly-L-lactic acid layer releases silver ions gradually, thereby circumventing biocompatibility concerns.

Method: Female C57BL/6 mice were utilized as an experimental model, with 6x2 mm Ti6Al4V discs, coated with or without the biopolymer-protected silver coating, implanted subcutaneously on both sides of the vertebrae. Daily blood samples were collected, and serum was analyzed for C-reactive protein (CRP) and silver concentration. After three days, histopathological analyses were conducted on the surrounding soft tissue pouch.

Results: Maximum CRP levels in the silver group (4.80 mg/L; Median: 3.29 mg/L; IQR: 2.38 to 3.73) did not significantly differ from the control group (4.58 mg/L; Median: 2.93 mg/L; IQR: 1.91 to 3.78) over the study period. Silver levels in serum 24 hours post-implantation were 64 µg/L (IQR: 35 to 78) and decreased subsequently over three days to 23 µg/L (IQR: 13 to 28). Histopathological examinations revealed a similarly strong expression of inflammation signs in tissue samples from the two groups.

Conclusions: Despite evidence of local inflammation indicated by CRP and histopathological analysis, no significant difference was observed between the coated and uncoated groups. This suggests that any inflammation may be attributed to the implantation procedure rather than silver influence. Furthermore, silver levels remained below the toxic limit, indicating the efficacy of the biopolymer-protected reservoir in aiding biocompatibility. This study underlines the potential of biopolymer-protected silver reservoirs in enhancing the safety profile of anti-infective silver implant coatings, warranting further investigation into their clinical application.

[FP G4] RECONSIDER CLOXACILLIN DOSAGE GUIDELINES IN ORTHOPAEDIC JOINT SURGERY

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Aim: Swedish guidelines on antibiotic prophylaxis in arthroplasty surgery recommend cloxacillin in fixed doses that pay little attention to the patient's renal function and weight. Nevertheless, there are no studies on whether the resulting free prophylactic cloxacillin ***in vivo*** concentrations are optimal. We aimed to evaluate whether the current recommended prophylactic dosage of cloxacillin is adequate.

Method: We performed a prospective two-centre study, measuring the free (active) cloxacillin concentrations in plasma throughout surgery, in patients subject to primary hip and knee prosthetic joint replacements, aiming at 100 patients per centre. To account for plasma-bone exposure differences, concentrations were considered adequate if twice the epidemiological cut-off value for cloxacillin concerning wild type ***Staphylococcus aureus*** whereas two-three times were labelled threshold values. The two enrolling hospitals are acute care hospitals in central Sweden, also performing 600 - 1200 primary hip and knee joint arthroplasties annually. All patients scheduled for elective primary hip or knee replacements from January 2022 to April 2024 were eligible for participation. Exclusion criteria were allergy towards penicillins, cognitive disorders leading to inability to sign informed consent, and an absence of interpreter in case of a patient not speaking Swedish or English.

Results: We present results from the first 49 patients included. Four patients had free cloxacillin concentrations below cut-off (8.2%). These four cases had prolonged surgeries of 77-100 minutes. An additional 5/49 (10.2%) had threshold values. Conversely 5/49 (10.2%) cases had concentrations exceeding 15 times the needed. No cases with threshold or low cloxacillin concentrations were attributable to a lack of concerning timing and dosing of cloxacillin. All concentrations were above or equal to our cut-off at the start of surgery.
Eighteen percent of patients were of normal of weight (BMI 18.5- 25). Of the rest 4% were morbidly obese (BMI >40), 41% obese (BMI 30-40) and 37% overweight (BMI 25-30). Twenty seven percent (43/159) had diabetes and 45% suffered cardiac disease.

Conclusions: Some patients in our cohort had insufficient active cloxacillin levels at the end of prosthetic joint surgery. Previous studies indicate that insufficient prophylactic antibiotic concentrations might lead to an enhanced risk of prosthetic joint infections. Other patients were massively overdosed, leading to unnecessary ecological effects and potentially adverse reactions. As inadequate cloxacillin concentrations were not associated with a lack of compliance to current guidelines a change in practise might be needed. Our final results may help to determine how dosing should be adjusted.

[FP G5] CHRONIC SUPPRESSIVE ANTIBIOTIC TREATMENT FOR PROSTHETIC JOINT INFECTION

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Aim: The intention of suppressive antimicrobial therapy (SAT) for prosthetic joint infection (PJI) is to minimise symptoms, maintain function and prevent further surgery in patients who cannot undergo further attempts at curative treatment(1). There is little high-quality evidence examining the role and efficacy of SAT for patients with PJI(1,2). The objective of this study was to describe the use of and outcomes after SAT in a large prospective PJI cohort.

Methods: A pre-planned analysis of a prospective multi-centre cohort of patients with PJI. SAT was defined as antimicrobial therapy for PJI continuing 12-months after diagnosis or where there was an intention for chronic suppressive antibiotics. The primary outcome was treatment failure at 24 months, defined as any of the development of PJI symptoms, further surgery or death from PJI. Secondary outcomes included Oxford Hip and Knee Scores.

Results: SAT was prescribed for 223 (31.0%) of the PJI cohort. Patients prescribed SAT for PJI were more likely to be older, have comorbidities, chronic PJI, higher CRP, a sinus tract and be treated with retention of their prosthesis than those not prescribed SAT. At 24-months, treatment failure was more common in the SAT group 75/185(40.1%) compared with the non-SAT group 85/447(19.0%). Propensity score adjusted analysis did not demonstrate an association between SAT and treatment failure in patients with chronic PJI (OR[95% CI] 1.57[0.63-3.91), late-acute PJI(1.87[0.90-3.87]), a sinus tract (2.74[0.89-8.39]), ongoing symptoms at day 90 (1.19[0.43-3.23]), treatment with DAIR(1.61[0.87-2.99]) or Staphylococcus aureus PJI (1.25[0.62-2.54]). Factors associated with failure of SAT at 24 months can be seen in Table 1. There were similar improvements between SAT and non-SAT patients in functional joint scores (OHS median (IQR) +8.5(19.0) vs +7.0(22.0);p=0.78 and OKS +8.0(20.0) vs +7.0(22.0);p=0.53).

Conclusion: SAT use for PJI is common. The lack of demonstrated evidence in this study for its benefit in controlling infection across multiple subgroups of patients but with some improvements in functional scores, suggest that the advantages of SAT are at best complex.

Table 1. Factors associated with treatment failure at 24 months in patients prescribed SAT.

Variable	OR	95% CI	p value
Age	0.96	0.94-0.99	0.002
Male sex	1.03	0.57-1.85	0.94
Prosthesis location (knee)	1.53	0.83-2.83	0.18
Revision as indication for primary surgery	1.01	0.53-1.93	0.97
Positive blood cultures	1.52	0.79-2.93	0.21
Baseline serum Creatinine	1.00	0.99-1.01	0.19
Baseline C-reactive protein	1.003	1.001-1.006	0.004
Ischaemic heart disease	1.40	0.68-2.92	0.36
Malignancy	3.16	0.92-10.92	0.07
Any listed comorbidity	1.47	0.81-2.66	0.20
Staphylococcus aureus	1.13	0.63-2.04	0.68
Gram negative bacillus	1.32	0.64-2.73	0.46
Culture negative	0.12	0.02-0.96	0.046
Early PJI	0.70	0.30-1.66	0.42

[FP G6] A LONGER DURATION OF INTRAVENOUS ANTIBIOTIC TREATMENT FOR PATIENTS WITH EARLY PERIPROSTHETIC JOINT INFECTIONS DOES NOT IMPROVE IMPLANT SURVIVAL

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Introduction: In recent years, many studies demonstrated the efficacy of an early switch to oral antibiotics after surgical treatment in orthopaedic related infections. However, large analyses on periprosthetic joint infections (PJIs) are lacking.

Material and Methods: We conducted a retrospective observational multicenter study in patients diagnosed with an early postoperative PJI (i.e less than 3 months after the index arthroplasty) treated with debridement, antibiotics and implant retention (DAIR). Patients from Europe and the USA were included. These two cohorts served as a quasi-randomised trial since an early oral antibiotic switch is routine practice in Europe versus a long duration of intravenous (IV) antibiotic treatment in the USA. Failure was defined as the clinical need for: i) a second DAIR, ii) implant removal, iii) suppressive antibiotic treatment or iv) infection related death.

Results: A total of 668 patients were included. 277 received IV antibiotics for <14 days, 232 were given IV antibiotics between 14 - 27 days and 159 received IV antibiotics for >27 days. The overall 1-year failure rate within the 3 groups was 41.5%, 44.4% and 42.1%, respectively (P 0.80), and mainly comprised the need for a second DAIR. The results did not change when analyzing patients with or without obesity, the causative microorganism or the type of oral antibiotics.

Conclusion: In early postoperative PJIs, a longer duration of IV antibiotic treatment is not associated with a lower failure rate of a DAIR procedure.

[FP G7] INTERNATIONAL PRACTICE VARIATION OF SUPPRESSIVE ANTIMICROBIAL TREATMENT FOR PROSTHETIC JOINT INFECTIONS: A GLOBAL SURVEY STUDY

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Aim: Suppressive antimicrobial therapy (SAT) is used worldwide for patients with a prosthetic joint infection (PJI but clear definitions or guidelines regarding the indications, antimicrobial strategy or treatment duration are currently lacking in the literature. The aim of this study was to identify the global differences in the clinical practice of SAT for PJI.

Method: An online survey was designed to investigate the current opinion on indication and treatment goals, preferred antimicrobial drugs, dosing and treatment duration and follow-up of patients with PJI on suppression.The survey was distributed using e-mail lists of several international bone and joint infection societies and study groups. Recipients were asked to share the survey with colleagues who were not a member of one of the societies but who were involved in PJI care.

Results: The questionnaire was fully completed by 330 physicians from 43 different countries on six continents (Europe, n=134, 41%; Oceania n=112, 34%; North America, n=51, 16%; other, n=33, 10%; total response rate 14%). Antimicrobial treatment for PJI was discussed in a multidisciplinary team in Europe (90%), Oceania (42%) and North America (12%). In six of eight (75%) different clinical scenarios, respondents from North America would most often place a patient on SAT. In seven of eight (88%) scenarios, SAT was started least often by European respondents. The presence of a fistula was considered a contra-indication for suppression by 74 respondents (22%). First choices of SAT for staphylococcal PJI were: oral cephalosporins (39%) and tetracyclines (31%) in North America; anti-staphylococcal penicillins (55%) and oral cephalosporins (24%) in Oceania; tetracyclines (27%) and anti-staphylococcal penicillins (22%) in Europe. For streptococcal PJI, most clinicians preferred penicillins (91% in Oceania, 67% in Europe, and 53% in North America). Preferred SAT for gram negative PJI was: fluoroquinolones and a penicillin/betalactamase inhibitor in North America (26% and 18%, respectively) and Oceania (23% and 27%, respectively); fluoroquinolones (31%) and Cotrimoxazole (28%) in Europe. The dosage of SAT was never lowered (n=126, 38%), standardly lowered for all antibiotics (n=79, 24%) or only lowered for specific antibiotics (n=125, 38%). SAT was prescribed for an indefinite duration (n=43, 13%), as fixed duration between six months and three years (n=104, 32%) or for an undetermined prespecified duration (n=154, 47%).

Conclusions: Substantial variation in the practice of SAT for PJI exists between physicians worldwide and throughout the different continents. This reflects the paucity of data regarding the indication and treatment of PJI with SAT.

[FP H1] DISC PENETRATION SIGN:A DISTINCTIVE MRI SIGN INDICATING THE SEVERITY OF PYOGENIC SPONDYLITIS

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Aim: This study seeks to outline the clinical, laboratory, and imaging features of patients with pyogenic spondylitis. It aims to define a novel imaging sign that could indicate the severity of suppurative spondylitis, aiding in its early diagnosis and treatment.

Method: This retrospective study included 137 patients from 2013 to 2023.Through the analysis and summary of imaging characteristics among all patients, we identified a distinct MRI sign known as 'the Disc Penetration sign' (DP). This sign is defined as an image finding on sagittal MRI depicting the anterior and posterior penetration of an abscess through the intervertebral disc space, affecting both the anterior margin of the vertebrae and the structures within the spinal canal. Observational parameters included WBC, ESR, CRP, hemoglobin, and albumin levels.Documentation of the study included location and segment of the lesion, presence or absence of spinal cord compression, and paravertebral abscesses.

Results: 56 patients presented with the Disc Penetration sign(DP) and 81 did not. In both groups, there were no significant differences in gender ratio or age ($P > 0.05$).However, significant differences were observed in the presence of comorbid diabetes and chronic kidney disease ($p < 0.05$). The DP group had a significantly greater ESR level (74.30±33.79 mm/h vs. 51.46±30.46 mm/h, $P < 0.001$) and CRP level (47.28 mg/L vs. 26.18 mg/L, $P = 0.003$). Additionally, the DP group had a significantly lower Hb (100.66±19.82 g/L vs. 116.99±19.99g/L,$P < 0.001$) and the serum albumin level (28.81±6.59 g/L vs. 34.09±6.17 g/L,$P < 0.001$).Imaging results showed no significant differences in affected spinal segments or parts ($p>0.05$).Patients in the DP group showed a higher likelihood of developing paravertebral abscesses compared to those in the non-DP group (n = 54 [96.4%] vs. n = 33 [40.7%], $P < 0.001$), and also exhibited a higher incidence of spinal cord compression(n = 32 [57.1%] vs. n = 17 [21.0%], $P < 0.001$).

Conclusions: The study suggests that the Disc Penetration sign in pyogenic spondylitis patients correlates with more severe inflammation and higher incidence of paraspinal abscess, pointing to worse stability of the spine, longer bone restructuring time, and potentially poorer prognosis. These findings enable clinicians to rapidly assess the severity of the disease and prognosticate outcomes more effectively We emphasize the need for early, pathogen-specific diagnosis and treatment, particularly considering surgical intervention for patients demonstrating substantial paraspinal abscesses or spinal instability.

[FP H2] EMPIRICAL ANTIBIOTIC THERAPY REGIMEN IN NATIVE JOINT SEPTIC ARTHRITIS: INSIGHTS FROM CLINICAL PRACTICE

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Aim: Successful management of native Joint septic arthritis (SA) hinges on the timely initiation of appropriate antibiotic therapy coupled with thorough joint debridement. Since 2018 we have implemented a protocol for empirical antibiotic in patients with suspected SA recommending amoxicillin/clavulanate (and cotrimoxazole in cases of beta-lactams allergy) based on local flora. Nevertheless we have recently found that institutional compliance to the protocol is only about 50% and many physicians are still choosing alternative wider spectrum regimens.
The aim of this study is to assess whether current clinical and epidemiological characteristics of patients treated for this condition justify an update or whether previous recommendations are still valid.

Method: All adult patients admitted to our institution with suspected SA between 2018-2022 were retrospectively reviewed. Data was collected from electronic medical records and then compared to similar data previously collected concerning the 2009-2017 period (that served as a basis for the aforementioned protocol).

Results: A summary of available data from both time periods can be found in table 1 (see on next page).

Overall, among the 35 patients with positive microbiology treated between 2018-2022, amoxicillin/clavulanate is appropriate for 30 (86%) of isolates (vs 88% in historic control).
Analysing the whole cohort, we found that previous contact with healthcare services (hospital admission or prolonged ER stay) (p=0.0044) and antibiotic treatment for any infection (p= 0.0213) in the previous six months correlate with resistance to amoxicillin/clavulanate. In these patients, the proposed alternative cotrimoxazole is effective in 77% of cases.

Conclusions: The institutional guideline for empirical antibiotic therapy in native joint SA remains adequate and there seems to be no justification to deviate from protocol except in cases of patients admitted to the hospital or antibiotic treatment in the previous six months. In these cases methicillin-resistance coverage is probably appropriate. Pseudomonal coverage is seldom required in SA.

	Historic Control 2009-2017	Study Period 2018-2022	P value
Number of Patients	97	64	
Gender n (%)			0.7442
Male	39 (40,2)	28 (43,8)	
Female	58 (59,8)	36 (56,2)	
Age (mean)	60,98	58,4	0.3868
Length of Hospital Stay	17,6	25,7	0.0216
Comorbidities n (%)			
Diabetes Mellitus	20 (20,6)	6 (9,4)	0.0792
Renal Chronic Disease	6 (6,2)	7 (10,9)	0.3765
Rheumatoid arthritis	4 (4,1)	2 (3,1)	1.0000
VIH positive	7 (7,2)	0	0.0425
IV drugs users	5 (5,2)	0	0.1579
Immunosuppressive therapy	8 (8,2)	4 (6,3)	0.7646
Recent joint surgery	4 (4,1)	0	0.1521
Affected Joint n (%)			
Knee	68 (70,1)	39 (60,9)	0.2378
Shoulder	13 (13,4)	9 (14,1)	1.0000
Hip	4 (4,1)	4 (6,3)	0.7138
Ankle	3 (3,1)	4 (6,3)	0.4373
Wrist	2 (2,1)	2 (3,1)	0.6500
Other	8 (8,2)	6 (9,4)	
Positive Microbiology Culture n (%)	49 (50,5)	35 (54,7)	0.6316
Receiving antibiotic treatment at the time of arthrocentesis n (%)	12 (12,4)	13 (20,3)	0,1884
Previous antibiotic therapy n (%)			
Last 3 months	17 (17,5)	21 (32,8)	0.0363
Last 6 months	17 (17,5)	23 (35,9)	0.0096
Contact with health care services in the previous 6 months n (%)	20 (20,6)	31 (48,4)	0.0003
Isolated Microorganisms n (%)			
Staphylococcus aureus	25 (51,0)	20 (57,1)	0.6596
E.coli	5 (10,2)	1 (2,9)	0.3932
Strep. Pyogenes	4 (8,2)	1 (2,9)	0.3956
S. agalactae	1 (2,0)	3 (8,6)	0.3032
Enterococcus faecalis	1 (2,0)	1 (2,9)	1.0000
Staphylococcus epidermitis	2 (4,1)	0	0.5080
Pseudomonas aeruginosa	0	3 (8,6)	0.0687
Other	11 (22,4)	8 (22,9)	
Empirical Treatment n (%)			
Vancomicine plus Imipenem	29 (29,9)	0	< 0.0001
Vancomicine plus Piperacilin/Tazobactan	5 (5,2)	15 (23,4)	0.0010
Vancomicine	15 (15,5)	5 (7,8)	0.2218
Imipenem	9 (9,3)	0	0.0118
Vancomicine plus Ceftriaxone	5 (5,2)	2 (3,1)	0.7038
Ertapenem	8 (8,2)	0	0.0223
Amoxicillin/clavulanate	5 (5,2)	25 (39,0)	< 0.0001
Cotrimoxazol	0	3 (4,7)	0.0610
Other	18 (18,6)	9 (14,1)	
Without information	3 (3,1)	4 (6,3)	
Amoxicillin/clavulanate sensibility, %	88	86	0.8339
Cotrimoxazol sensibility, %	92	96	0.3727

[FP H3] INVESTIGATING OSTEOLYSIS IN OSTEOMYELITIS, WHAT TO BELIEVE?

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Aim: The osteolytic process of osteomyelitis is, according to textbooks, caused by increased osteoclast activity due to RANKL production by osteoblasts. However, recent findings contradict this theory. Therefore, the aim was to investigate, in a porcine osteomyelitis model, how osteolysis is affected by massive inflammation and RANKL blocking, respectively. In parallel, patients with chronic osteomyelitis, diabetes, foot osteomyelitis, and fracture related infections (FRI) were included for advanced histological analysis of osteolysis.

Methods: In pigs, a tibial implant cavity was created and inoculated with 10^4 CFU of ***Staphylococcus aureu***s: Group A (n=7). Group B (n=7); + 1cm^3 spongostan into the cavity. Group C (n=4); + systemic Denosumab treatment. Spongostan was used as an avascular material to support bacterial growth and thus increase the inflammatory response. Denosumab treatment was administrated to suppress osteoclast activity by RANKL inhibition (as in osteoporotic patients). The volume of osteolysis was accessed by CT scans. Immunohistochemistry with antibodies towards Cathepsin K was used to identify osteoclasts within the bone lesions. Briefly, the number of Cathepsin K positive cells, i.e., both precursors and bone resorbing osteoclasts, respectively, were counted in 10 high power fields (400x). In total, 50 bone infection patients were included (Herlev Hospital). From each patient five parried samples were taken for histology and microbiology, respectively. Histopathology, CT osteolysis volume estimation, and molecular expression of osteoclasts and inflammatory markers are ongoing. One FRI patient was osteoporotic and treated with Denosumab for 6 years.

Results: All pigs were confirmed infected in the implant cavity. The volume (2.41 ± 1.29cm^3) of osteolysis was significantly increased in the spongostan group in comparison to Group A (1.24 ± 0.59 cm^3) (p=0.04). Thereby, the spongostan group had bacteria deeper into the bone from the inoculation point. Sufficient Denosumab treatment, i.e. reduced serum Ca was seen in 3 pigs. None of the Denosumab treated pigs showed reduced osteolysis in comparison to Group A (1.42 ± 0.63 cm^3). The Cathepsin K score of Group C was 17 (15-23 IQR) of precursor osteoclasts and 2 (0-2 IQR) of osteoclasts in Howship lacunae. The Denosumab treated patient showed substantial osteolysis and histological analysis confirmed acute inflammatory.

Conclusions: Application of spongostan, i.e., bacterial host optimization and massive inflammation promotes osteolysis and local bacterial dissemination. Osteoclast blocking with Denosumab showed no impact on osteolysis. Elucidation of the pathophysiology causing bone loss in osteomyelitis is fundamental. However, the widely accepted osteoclast-based theory might not be the only relevant.

[FP H4] SOFT TISSUE COVERAGE WITH VASTUS LATERALIS FLAP IN GIRDLESTONE RESECTION ARTHROPLASTY FOR MANAGING CHRONIC HIP SEPTIC ARTHRITIS AND PROXIMAL FEMUR OSTEOMYELITIS IN PATIENTS WITH SPINAL CORD INJURIES: A CASE SERIES.

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Aim: Decubitus ulcers are found in approximately 4.7% of hospitalized patients, with a higher prevalence (up to 30%) among those with spinal cord injuries. These ulcers are often associated with hip septic arthritis and/or osteomyelitis involving the femur. Girdlestone resection arthroplasty is a surgical technique used to remove affected proximal femur and acetabular tissues, resulting in a substantial defect. The vastus lateralis flap has been employed as an effective option for managing this dead space. The aim of this study was to evaluate the long-term outcomes of this procedure in a consecutive series of patients.

Method: A retrospective single-center study was conducted from October 2012 to December 2022, involving 7 patients with spinal cord injuries affected by chronic severe septic hip arthritis and/or femoral head septic necrosis as a consequence of decubitus ulcers over trochanter area. All patients underwent treatment using a multidisciplinary approach by the same surgical team (orthopedic and plastic surgeons) along with infectious disease specialists. The treatment consisted of a one-stage procedure combining Girdlestone resection arthroplasty with unilateral vastus lateralis flap reconstruction, alongside targeted antibiotic therapy. Complications and postoperative outcomes were assessed and recorded. The mean follow-up period was 8 years (range 2-12).

Results: Of the 7 patients, 5 were male and 2 were female, with a mean age of 50.3 years at the time of surgery. Minor wound dehiscence occurred in 28.6% of the flap sites, and 2 patients required additional revisional procedures—one for hematoma and the other for bleeding. There were no instances of flap failure, and complete wound healing was achieved in an average of 32 days (range 20-41), with the ability to load over the hip area. No cases of infection recurrence or relapse were observed.

Conclusions: An aggressive surgical approach is strongly recommended for managing chronic hip septic arthritis or proximal femur osteomyelitis in patients with spinal cord injuries. A single-stage procedure combining Girdlestone resection arthroplasty with immediate vastus lateralis muscle flap reconstruction proves to be an effective strategy for dead space management and localized antibiotic delivery through the vastus muscle, giving reliable soft tissue coverage around the proximal femur to avoid the recurrence of pressure ulcers. The implementation of a standardized multidisciplinary protocol contributes significantly to the success of reconstruction efforts.

[FP H5] MICROPOROUS POLYSACCHARIDE HEMOSPHERE EFFICACY AND SAFETY IN HIP AND KNEE REVISION ARTHROPLASTY: A CONTROL-MATCHED PROSPECTIVE COHORT STUDY OF 89 PATIENTS

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Aim: As the number of performed total hip arthroplasties (THA) and total knee arthroplasties (TKA) has increased over the years, revision surgeries are expected to increase as well. Revision surgeries are associated with a longer operating room time, prolonged length of stay (LOS), and more frequent complications. Postoperative hematomas are a major reason for wound healing disturbances and periprosthetic joint infections (PJI). We aimed to systematically assess the use and safety of a microporous polysaccharide hemosphere (MPH) in revision THA and TKA. We focused on the risk reduction of further revision surgeries in case of wound healing disorders and hematoma, transfusion of packed red blood cells (PRBC), loss of hemoglobin (hb) and mean LOS following the use of MPH.

Method: Our prospective study includes 89 patients who underwent revision surgery after THA and TKA with application of MPH and were compared to 102 patients who did not receive MPH and underwent revision surgery after THA and TKA. Five grams of MPH[1] were applied periarticular before fascia closure and to the subcutaneous soft tissue. The follow-up was conducted in daily clinical visits during the inpatient stay and three months postoperatively in our outpatient clinic. Repeated revision surgery was performed in case of prolonged secretion (>10 days) or clinical suspicion of infection. After matching the cohorts the outcomes were statistically analyzed using paired methods.

Results: A significantly lower odds ratio for repeat revisions was found for the MPH cohort (OR=0.312; 95%-CI 0.090, 0.893; p=0.027). Differences between pre- and postoperative hb levels, LOS and transfusions of PRBC did not reach significance. No intra- or postoperative complications to MPH occurred. Moreover, no infection relapse occurred after applying MPH.

Conclusions: Routine use of MPH in revision arthroplasty management after TKA and THA appears to be safe and an effective way to support hemostasis, with no observed adverse events related to MPH use. There were noticeably less hematomas and revision surgeries in the MPH group.
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[FP H6] ULTRATHIN SILVER-POLYSILOXANE-COATED PLATES FOR REVISION OF INFECTED FEMORAL NON-UNION - FIRST RESULTS

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Aim: Aim of this study was to establish the first clinical results after implantation of ultrathin silver-polysiloxane-coated$_1$ plates in the treatment of infected non-union of the femoral shaft.

Method: As part of the REFECT study, a prospective, non-interventional analysis was conducted encompassing all patients who received internal stabilization with a silver-coated$_1$ plate from 01/2023 to 09/2024 as part of the treatment for infected non-union of the femur. Standardized clinical follow-ups including PROMs (WOMAC-Index, LEF-S, EQ-5D, VAS) and X-rays were performed 3, 6, 12 (and 24) months postoperatively.
For comparison, a retrospective analysis of 76 patients with infected femoral non-union, who had received a stabilization with an uncoated plate in the past 10 years, was performed.

Results: The mean follow-up of the 8 included patients (mean bone defect: 3.6 cm) was 9 months (as of 04/24). Multiresistant bacteria were found in the intraoperative samples of 5 patients. The concentration of silver ions in blood serum reached a maximum of 0.014 mg/l in the laboratory controls. All patients showed a positive healing process with no sign of re-infection and no adverse procedure-associated events. Full weight bearing was achieved after an average of 4 months (n=6) with improved WOMAC-, LEF-S-, EQ-5D and VAS-score at 1-year FU. In the reference group (uncoated, mean FU: 3.5 years), there was a re-infection rate of 25 %, mostly in the first 2 years (Fig. 1). Difficult-to-treat bacteria were detected in 22%, multiresistant Staph. epidermidis in 28% of cases.

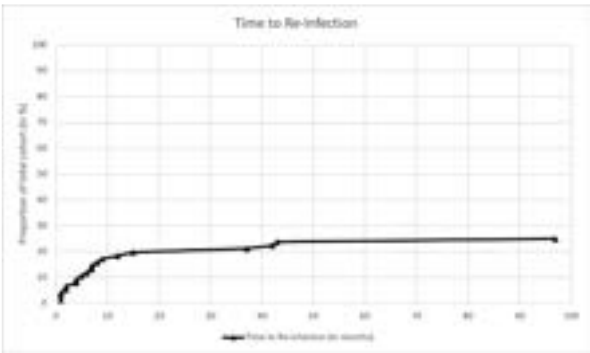

Fig. 1 Time to re-infection after stabilization with uncoated implants

Conclusions: - The silver-coated$_1$ implants showed good biocompatibility with no evidence of procedure-associated complications.
- The use of silver-coated$_1$ implants could reduce the risk of re-infection.
- Further clinical data with longer follow-up are needed to assess the long-term value of the procedure.
Ref: 1 HyProtect™, Bio-Gate AG, Nuremberg

[FP H7] PROPHYLAXIS OF PROSTHETIC JOINT INFECTION IN MEGAPROSTHESIS, IS THE USE OF ANTIBIOTIC LOADED CALCIUM SULPHATE BEADS BENEFICIAL?

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Aim: Megaprosthesis have become a standard option in limb preserving surgery after bone resection in musculoskeletal tumors. Recently they have also been used in complex revision arthroplasty in cases with massive bone loss. The aim of this study was to analyze the incidence of periprosthetic joint infection (PJI) both in primary oncology cases and aseptic revision cases and analyze which are the significant risk factors for PJI with a special interest on the use of prophylactic antibiotic loaded calcium sulfate beads

Method: All patients undergoing surgery with the use of megaprosthesis in our institution between January/2012 and December/2022 were retrospectively reviewed. Data was collected from electronic medical records. We identified 108 procedures involving megaprosthesis in 90 patients with an average follow-up of 37 months. Indications were 79 primary musculoskeletal tumors and 29 aseptic complex revision arthroplasty.

Results: Table 1 shows relevant clinical information. No significant risk factor was found either in uni or multivariate analysis. PJI rate was 15% (12/79) for primary musculoskeletal surgery and 31% (9/29) for complex revision surgery. The use of antibiotic loaded calcium sulfate beads did not show an advantage – 22% (9/41) with vs. 18% (12/67) without.

	Infected n=21	Non-infected n=87	p	OR	95% CI
Age	43.8 (8-81)	47.1 (16-80)	-	-	-
Female	7	45	0.135	0.47	(0.17-1.27)
Aseptic Revision	9	20	0.0705	2.51	(0.93-6.82)
ASA >=3	11	35	.315	1.634	(0.63-4.26)
NeoQT	9	36	.784	1.150	(0.42-3.13)
AdjQT	7	35	.642	0.783	(0.28-2.19)
NeoRT	NA	2	-	-	-
AdjRT	1	5	.890	.856	(0.09-7.78)
Malignant Tumour	17	78	0.279	0.490	(0.14-1.78)
Antibiotic loaded beads	9	32	0.607	1.289	(0.49-3.39)
Knee	12	32	0.09	2.29	(0.87-6.03)

Conclusions: In this relatively small series it was not possible to show a significal association between PJI and certain known risk factors such as gender, ASA score, site of surgery (knee) and revision surgery. The use of antibiotic loaded calcium sulfate beads as prophylaxis was not beneficial in reducing PJI rates in our cohort. We acknowledge the limitations of our study: a small sample group, in a single institution with heterogeneity in terms of diagnosis and surgical site. We recognize the need for a multicentric study with a larger cohort to validate these findings.

[FP I1] ENHANCED EFFICACY AGAINST MRSA BIOFILMS: EVALUATION OF ENZYMATIC COCKTAIL ADJUVANT WITH RIFAMPICIN AND VANCOMYCIN DUAL THERAPY

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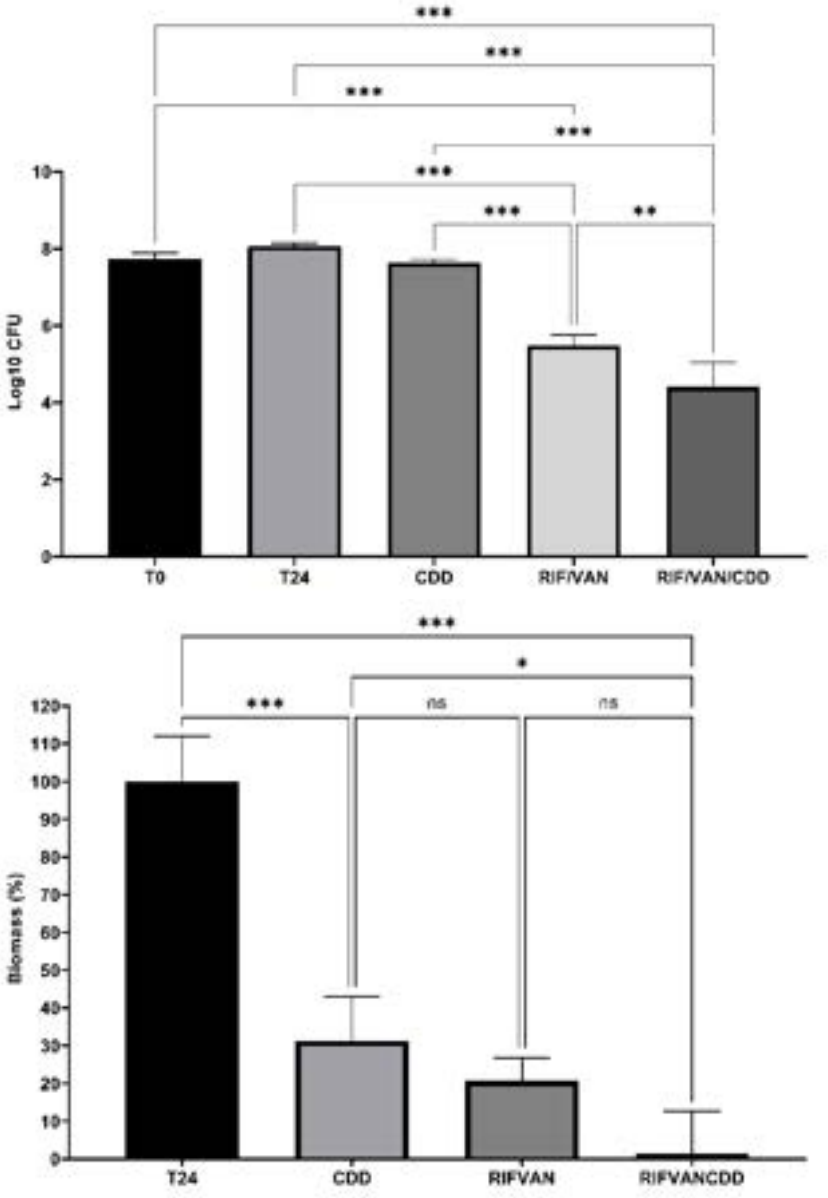
Aim: The management of PJIs is slowed down by the presence of bacteria forming biofilms where they may withstand antibiotic therapy. The use of adjuvant strategies, such as hydrolytic enzymes cocktail targeting biofilm matrices and facilitating their dispersion, is a promising option to limit impact of biofilms. Our aim was to evaluate the effect of enzymes cocktail combined with antibiotic dual therapy of rifampicin and vancomycin
in a relevant in-vitro model.

Method: Mature *methicillin-resistant Staphylococcus aureus* biofilms were grown on Ti-6Al-4V coupons by adding 1mL of a 8Log10 ATCC 33591 suspension in TGN (TSB + 1% glucose + 2% NaCl) to 24-wells plates containing the coupons and incubating the plates for 24h at 37°C with a continuous 50rpm agitation. The samples were rinsed and placed in 6 wells plates containing 1ml of the enzymatic cocktail (C.D.D.) solution (tris-buffered (pH 7.0) solution of 400 U/ml of aspecific DNA/RNA endonuclease, 50 U/ml of endo-1,4-b-D-glucanase, and 0.06 U/ml of β-N-acetylhexosaminidase). 9ml of TGN or TGN containing antibiotics RIF/VAN (rifampicin 5µg/mL + vancomycin 8µg/mL) at clinically relevant concentrations found locally in bone or joints, was then added and the samples were incubated in identical conditions for 24h. The samples were then recovered and rinsed. CFU counts were obtained by recovering the bacteria with sonication, serial dilutions, and TSA plating. Biomass was determined via crystal violet staining, followed by dye solubilization in acetic acid, and absorbance measurement using a spectrophotometer.

Results: Significant reductions in bacterial counts were observed in biofilms exposed to either RIF/VAN or RIF/VAN+CDD, by respectively 2,6 and 3,7Log10 when compared to samples reincubated with TGN alone ($p < 0.05$). Additionally, CFU counts in samples exposed to RIF/VAN+CDD were reduced by 1,1Log10 when compared to those exposed to RIF/VAN ($p<0,05$). Significant reduction in biomass (-29,8%, $p<0.05$) was observed for coupons exposed to RIF/VAN+CDD when compared to C.D.D alone (figure 1).



Conclusions: The concurrent utilization of enzymes with rifampicin and vancomycin, holds promise as a feasible method to address periprosthetic joint infections (PJIs).

Figure 1 : Effect of co-incubation of mature MRSA biofilm with C.D.D. and/or rifampicin 5 µg/mL and vancomycin 8 µg/mL. CFU bacteria count (left). Biomass (right). Mean (+- standard error). Statistical analysis, one-way ANOVA followed by Tukey HSD multiple comparison. ns: not significant; significant : ***p<0.001, **p<0.01, *p<0.05

[FP I2] IN VITRO EFFICACY OF DIFFERENT IRRIGATION SOLUTIONS AGAINST BIOFILM IN ORTHOPAEDIC SURGERY. A SYSTEMATIC REVIEW AND NETWORK META-ANALYSIS

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Aim: Irrigation and debridement with an irrigation solution are essential components of the surgical management of acute and chronic periprosthetic joint infection (PJI). Nevertheless, there is a lack of agreement regarding the most effective solution to use. The aim of the study was to perform a systematic review and meta-analysis of the current literature concerning the efficacy of different irrigation solutions over bacterial biofilm.

Method: This study was conducted in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analysis extension for Network meta-analysis (PRISMA-NMA) checklist for systematic reviews and meta-analyses. A comprehensive literature search of PubMed, Cochrane Library, Web of Science and Scopus databases from inception to September 1, 2023. We combined terms related to PJI, biofilm and irrigation solutions studied in vitro. We performed a network meta-analysis to analyze which irrigation solution achieved a higher reduction of colony forming units (CFU) after specific exposure times, always with a maximum of five minutes, replicating intraoperative conditions. Effect-size was summarized with logarithmic response ratio (logRR) and 95% confidence intervals (95% CI). The rank probability for each treatment was calculated using the p-scores.

Results: We screened 233 potential sources. Following deduplication, screening and full-text review, four studies with ten irrigation solutions for different duration of exposures were included, always less than five minutes, replicating intraoperative conditions. Solutions were studied over mature biofilms of most frequent bacteria grown over metal, bone cement or polyethylene surfaces. The highest effect was achieved with povidone iodine 10% during 5 minutes (logRR: -12.02; 95% CI: -14.04, -9.99). The best ranked solutions were povidone iodine 10% during five, three and one minute (respective p-scores: 0.977, 0.932, 0.887) and its combination with hydrogen peroxide for 3 minutes (p-score: 0.836). Povidone iodine 0.3% acting for 5 minutes completed the top 5 best ranked solutions in this study (p-score: 0.761). We assumed that there were no inconsistencies in our network because after examining both scenarios, with and without inconsistencies, the results were not significantly different.

Conclusions: Our results show that 10% povidone-iodine is the best antiseptic solution when studied in vitro in the context of prosthetic joint infection. However, the included studies did not evaluate the possible cytotoxic effects of these solutions. This should also be taken into account before choosing the most appropriate antiseptic solution.

[FP I3] RADIOIMMUNOTHERAPY COMBATING METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS AND ITS BIOFILM IN VITRO

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Aim: Prosthetic joint infections (PJI) remain a great challenge in orthopedic surgery with a high mortality rate. It is particularly complicated by biofilms and infections caused by Methicillin-resistant ***Staphylococcus aureus*** (MRSA). It concurrently shields bacteria from host immune responses and confers resistance to antibiotics. This study aims to investigate the efficacy of radioimmunotherapy as an innovative therapeutic modality to address the challenges posed by MRSA and its biofilm.

Method: We induced specific monoclonal antibodies 4497-IgG1 as carriers, which target wall teichoic acids (WTA) existing on MRSA and its biofilm. Radionuclides actinium-225 (^{225}Ac, α-emitter) and lutetium-177 (^{177}Lu, β-emitter) were conjugated with mAbs using DOTA as chelator. Quality control was assessed using thin layer chromatography and immunoreactivity assays. ^{225}Ac- and ^{177}Lu-labelled 4497-IgG1 were employed to evaluate the susceptibility of MRSA and its biofilm to the radioimmunotherapy in vitro. Planktonic MRSA and biofilms, at concentrations of 10^8 and 10^7 CFU/mL, were incubated at 37°C for 60 minutes in PBS containing either ^{225}Ac-mAb (0 - 14.8 kBq) or ^{177}Lu-mAb (0 - 14.8 MBq). Radiolabelled dunituximab and free radionuclides serve as isotype-matched negative control. The bacterial viability and metabolic activity were subsequently quantified using CFU and XTT assays.

Results: The radiochemical purity of the ^{225}Ac-mAbs and ^{177}Lu-mAbs complex were determined to be 95.4% and 96.16%. Immunoreactivity fractions of them were measured at 81.8% and 80.8%. ^{225}Ac-mAbs and ^{177}Lu-mAbs exhibited significant and dose-dependent antimicrobial effects on both planktonic MRSA and biofilm. ^{225}Ac- and ^{177}Lu-4497IgG1 at doses of 7.4 kBq and 7.4 MBq resulted in more than 4-log reduction in bacterial counts. In biofilms, 2-log reduction at the highest ^{225}Ac radioactivity of 14,8kBq. The ^{177}Lu complex showed a strong dose-dependent effect, with a reduction of up to 4-log. The XTT assay confirmed these findings, showing a decrease in metabolic activity corresponding to a decrease in bacterial counts, and a slight increase in metabolic activity at the lower dose.

Conclusions: Our study demonstrates the efficacy of ^{225}Ac and ^{177}Lu-labelled 4497-IgG1 antibodies in mediating dose-dependent bactericidal effects against planktonic MRSA and biofilms in vitro. This indicates that radioimmunotherapy could be a potential targeted therapeutic strategy against MRSA and its biofilm. Further research in preclinical and clinical settings is warranted to validate and refine these findings on biofilm-associated implant infections.

[FP I4] GALLERIA MELLONELLA LARVAE: A PROMISING ANIMAL MODEL TO STUDY BIOFILM MATURATION IN ORTHOPAEDIC INFECTIONS

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Aim: In trauma surgery, the development of biomaterial-associated infections (BAI) is one of the most common complications affecting trauma patients, requiring prolonged hospitalization and the intensive use of antibiotics. Following the attachment of bacteria on the surface of the biomaterial, the biofilm-forming bacteria could initiate a chronic implant-related infection. Despite the use of conventional local and systemic antibiotic therapies, persistent biofilms involve various resistance mechanisms that contribute to therapeutic failures. The development of ***in vivo*** chronic BAI models to optimize antibiofilm treatments is a major challenge. Indeed, the biofilm pathogenicity and the host response need to be finely regulated, and compatible with the animal lifestyle. Previously, a ***Galleria mellonella*** larvae model for the formation of an early-stage biofilm on the surface of a Kirschner (K)-wire was established. In the present study, two models of mature biofilm using clinical ***Staphylococcus aureus*** strains were assessed: one related to contaminated K-wires (***in vitro*** biofilm maturation) and the second to hematogenous infections (***in vivo*** biofilm maturation). Rifampicin was used as a standard drug for antibiofilm treatment.

Method: In the first model, biofilms were formed following an incubation period (up to 7 days) in the CDC Biofilm Reactor (CBR, BioSurface Technologies). Then, after implantation of the pre-incubated K-wire in the larvae, rifampicin (80 mg/kg) was injected and the survival of the larvae was monitored. In the second model, biofilm formation was achieved after an incubation period (up to 7 days) inside the larvae and then, after removing the K-wires from the host, ***in vitro*** rifampicin susceptibility assays were performed (according to EUCAST).

Results: The first model indicate that ***in vitro*** biofilm maturation affects the bacterial pathogenicity in the host, depending on the ***S. aureus*** strain used. Furthermore, the more the biofilm is matured, the more the rifampicin treatment efficiency is compromised. The second model shows that, despite the fast ***in vivo*** biofilm formation in the host, the number of bacteria, either attached to the surface of the K-wire surface or in surrounding tissue of the larvae, was not increased over time.

Conclusions: Altogether, these results allow the establishment of biofilm models using ***G. mellonella*** larvae in order to understand the impact of biofilm maturation on both the bacterial pathogenicity and the efficiency of antibiofilm treatments.

[FP I5] ANTIBACTERIAL PROPERTIES OF NISIN LAYER-BY-LAYER BASED COATING ON TITANIUM K-WIRES IN GALLERIA MELLONELLA IMPLANT-ASSOCIATED INFECTION MODEL

Gopala Mannala[1], Beatrice Labat[2], Guy Ladam[2], Thebault Pascal[2], Nike Walter[1], Dominik Szymski[1], Martijn Riool[1], Volker Alt[1], Markus Rupp[1]

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Aim: Orthopedic implants play a tremendous role in fixing bone damages due to aging as well as fractures. However, these implants tend to get colonized by bacteria on the surface, leading to infections and subsequently prevention of healing and osteointegration. Recently, Roupie et al. showed that a nisin layer-by-layer based coating applied on biomaterials has both osteogenic and antibacterial properties. The ***Galleria mellonella*** larva is a well-known insect infection model that has been used to test the virulence of bacterial and fungal strains as well as for the high throughput screening of antimicrobial compounds against infections. Recently, we have developed an insect infection model with ***G. mellonella*** larvae to study implant-associated biofilm infections using Kirschner (K)-wires as implant material. Here, we would like to test the antibacterial capacity of nisin layer-by-layer based coatings on K-wires against ***Staphylococcus aureus*** in the ***G. mellonella*** larva implant infection model.

Method: Prior to the implantation procedure, ***G. mellonella*** larvae are maintained at room temperature on wheat germ in an incubator. The larvae received bare titanium K-wires (uncoated), or either control-coated or nisin-coated K-wires. After one hour, the larvae were injected with 5×10^5 ***S. aureus*** bacteria per larva (i.e., hematogenous implant infection model). Next, the larvae were incubated at 37°C in an incubator and the survival of the larvae was monitored for five days. Moreover, the number of bacteria on the implant surface and in the surrounding tissue was determined after 24h of incubation. Further, scanning electron microscopy (SEM) analyses were performed to study the effect of nisin on biofilm formation.

Results: The larvae receiving the nisin-coated K-wires showed significantly higher survival rates compared to uncoated titanium K-wires, although not when compared to control-coated K-wires. A more than 1-log reduction in number of bacteria on the implant surface and in the surrounding tissue was observed in larvae receiving the nisin-coated K-wires, when compared to uncoated titanium K-wires SEM analysis showed reduced colonization of the bacteria nisin-coated K-wires compared to the controls

Conclusions: In conclusion, the antimicrobial nisin layer-by-layer based coating applied on titanium surfaces is able to prevent implant-related ***S. aureus*** biofilm infection in ***G. mellonella*** and is a promising antimicrobial strategy to prevent implant-related infections.

[FP I6] COMBINATION OF SONICATION WITH DITHIOTHREITOL TREATMENT DOES NOT IMPROVE BACTERIAL DISLODGING FROM BIOFILM IN AN IN-VITRO MODEL

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Aim: Diagnosis of prosthetic joint infection are often complicated by the presence of biofilm, which hampers bacteria dislodging from the implants, thus affecting sensitivity of cultures. In the last 20 years several studies have evidenced the usefulness of implant sonication to improve microbial recovery from biofilm formed on inert substrates. More recently, treatment of prosthetic joints and tissues with Dithiothreitol, a sulphur compound already used in routine diagnostic workflow for fluidification of respiratory samples, has proved to be not inferior to sonication in microbiological diagnosis of prosthetic joint infections.
This study aimed to evaluate if the combination of the two treatments could further improve microbial retrieval from biofilm in an in vitro model.

Method: Three isolates of ***Staphylococcus aureus, Staphylococcus epidermidis, Staphylococcus lugdunensis, Eschericha coli*** and ***Pseudomonas aeruginosa*** responsible of prosthetic joint infections were used. They were grown onto 3 titanium discs (20 mm diameter) and incubated in 3 sterile plastic containers with 15 mL of Triptyc Soy Broth. After overnight incubation, not adhered cells were removed and fresh broth was added to each sample. After 48 hours incubation, the exausted broth was removed and one sample was used for sonication, one for treatment with 0,1% (v:v) Dithiothreitol and one treated with Dithiothreitol followed by sonication. Treated fluids were plated on Muller Hinton Agar plates for colony count.
One-way ANOVA analysis was performed to evidence statistical differences between treatments.

Results: Similar colony counts were observed for the 3 treatments: 10.1± 0.77 log CFU/mL for Dithiothreitol, 10.0 ± 0.75 for sonication and 10.1 ±0.73 for dithiothreitol + sonication.
No statistical differences between the 3 treatments were evidenced by ANOVA analysis.

Conclusions: Results seems to confirm that treatment with dithiothreitol is equivalent to sonication in recovering bacteria from biofilm grown on inert surface. Combining dithiotreitol treatment with sonication does not significantly improve bacterial recovery in respect to each treatment alone.

[FP J1] INOCULATION OF HOMOGENIZED TISSUE AND BONE BIOPSIES IN BLOOD CULTURE BOTTLES FOR DIAGNOSING ORTHOPAEDIC DEVICE-RELATED INFECTIONS: PRELIMINARY RESULTS FROM AN ONGOING STUDY

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Aim: The primary objective is to evaluate the diagnostic performance of inoculating homogenized tissue and bone biopsies in blood culture bottles (BCB) for patients with (suspected) orthopaedic device-related infections. As secondary objective the time to positivity (TTP) of BCB and Wilkins-Chalgren broth (conventional method) will be evaluated.

Method: Patients undergoing revision surgery due to suspected or proven fracture-related infection (FRI) or periprosthetic joint infection (PJI) according to respectively Consensus definition and EBJIS definition are included.[1,2] A minimal of three macroscopic infected/inflamed tissue/bone samples are collected in a container with saline and glass beads. 1.5 mL of the homogenized suspension is inoculated in BacT/ALERT FA and FN Plus bottles for 14 days. The remaining suspension is inoculated in Wilkins-Chalgren broth for 10 days and subcultured when cloudy or after 10 days. TTP is defined as the time until definite identification of the pathogen in the Laboratory Information System.

Results: Up to now, 25 patients have been included, 11 (44%) had concordant results in BCB and the CM. In 11 patients cultures showed negative results for both methods. Three patients tested positive with BCB but remained negative with the same pathogen in CM. In the first patient, the CM failed to identify anaerobic bacteria (i.e. ***Fusobacterium nucleatum***). In the second patient, three BCB were positive with ***Staphylococcus capitis***. The third patient showed an infection with ***Escherichia coli***, which was detected in all samples from the BCB, while all cultures obtained with the CM remained negative. A possible explanation for this discrepancy could be that this patient already received antibiotic therapy. BCB contain resins, which are capable of neutralizing antibiotic activity. Another case illustrating superiority of BCB involved an infection with ***Cutibacterium acnes***, which showed positivity in six BCB, while only three were positive using the CM. We observed the shortest TTP with BCB. The median TTP of BCB was 32.0 hours (IQR 29.8) compared to a median TTP of 77.5 hours (IQR 107.6) when culturing with the CM.
Contamination was seen in three patients with both methods, in eight patients contamination was only seen with the CM. For the remaining 14 patients no contamination was found.

Conclusions: The results in this ongoing study indicate that the recovery of pathogens and TTP is better using BCB compared to CM. In addition, contamination occurs less frequently with the BCB method. Culturing tissue or bone biopsies in BCB seems a promising and faster detection method.

[FP J2] EVALUATION OF A NEW POINT-OF-CARE APPROACH FOR SYNOVIAL FLUID CELL-FREE DNA QUANTIFICATION FOR PERIPROSTHETIC JOINT INFECTION DIAGNOSIS

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Aim: Periprosthetic joint infection (PJI) is one of the most frequent and devastating complications of total knee arthroplasty (TKA). Accurate diagnosis and proper treatment are essential to prevent functional loss and progression to systemic infection. However, the correct diagnosis of PJI is still a challenge since there is no accurate diagnostic method and the existing diagnostic criteria are based on serological, histological and microbiological tests that are imprecise and time-consuming. Recently, it was demonstrated that cell-free DNA is increased in the synovial fluid of patients with PJI. Therefore, this study aims to evaluate a new point-of-care methodology for quantifying free DNA in synovial fluid.

Method: A prospective study was carried out with patients undergoing TKA revision surgery, from whom it was possible to collect synovial fluid (SF) during the surgical procedure. Cell-free DNA quantification was performed directly from the SF, using a portable fluorimeter. Sensitivity, specificity and receiver operating characteristic (ROC) curve were calculated.

Results: Fifty-four patients were included in the study, of which 25 were diagnosed with PJI. Cell-free DNA levels measured immediately after collection were increased in the synovial fluid of patients with PJI (26.3 ± 14.8) in comparison with the uninfected group (4.6 ng/ml ± 3.8, $p < 0.0001$). The area under the receiver operating characteristic curve (AUC ROC) was 0.981 (95% CI 0.914 to 0.999).

Conclusions: From the results presented, we can conclude that the quantification of free DNA with a portable fluorimeter proved to be a test with high sensitivity and specificity for the diagnosis of PJI.

[FP J3] ROUTINE SONICATION LEADS TO CLINICALLY RELEVANT IMPROVEMENT OF PERIPROSTHETIC JOINT INFECTION DIAGNOSIS

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Aim: Periprosthetic joint infection (PJI) is a serious complication after joint arthroplasty. Diagnosing PJI can be challenging as preoperative screening and conventional cultures may be inconclusive. Sonication fluid culturing stands out as a valuable adjunct technique to improve microbiological PJI diagnosis. This study aims to determine the clinical relevance of routinely using sonication for all septic and aseptic revisions.

Method: All patients who underwent (partial) hip or knee revision arthroplasty for all causes between 2012 and 2021 at our institution were retrospectively reviewed. Based on the European Bone and Joint Society PJI criteria, we categorized them into three groups: infection confirmed, infection likely, and infection unlikely. We analyzed the clinical, laboratory, and radiological screening that could confirm or refute suspicion of PJI. We analyzed microbiology cultures and the most frequently detected microorganisms. Sensitivity and specificity were calculated for synovial fluid cultures (preoperative), tissue cultures, and sonication fluid cultures. We determined the clinical relevance of sonication as the percentage of patients for whom sonication confirmed (microbiological) PJI diagnosis.

Results: 429 patients who underwent (partial) revision of hip (246 patients) or knee (183 patients) arthroplasty were included. Sensitivity and specificity were 69% and 99% for preoperative synovial fluid cultures, 76% and 92% for intraoperative tissue cultures, and 80% and 89% for sonication fluid cultures, respectively. Sonication fluid cultures improved tissue culture sensitivity and specificity to 83% and 99%, respectively. In 12 (11%) out of 110 PJIs, sonication fluid cultures were decisive for confirming the causative pathogen. This was applicable to acute and chronic infections. In 29 (9%) out of 319 aseptic cases, a negative sonication fluid culture could confirm contamination of tissue cultures.

Conclusions: Routine sonication fluid cultures enhanced the sensitivity and specificity of PJI diagnostics. In 11% of PJI cases, causative pathogens were confirmed by sonication fluid culture results. Routine sonication may be helpful in confirming contamination of synovial fluid cultures and tissue cultures. Routine sonication fluid culture should be performed in all revision arthroplasties.

[FP J4] DEVELOPMENT AND VALIDATION OF A MULTIPLEX PCR FOR THE DETECTION OF THE MOST COMMON PATHOGENS IN PROSTHETIC JOINT INFECTIONS

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Aim: The aim of this study was to develop an in-house multiplex PCR real-time assay on the LightCycler 480 system (Roche, Basel, Switzerland) with the aim of rapid detection of common pathogens in prosthetic joint infections (PJI), followed by validation on clinical samples (sonication fluid and tissue biopsies) routinely collected for PJI diagnosis.

Methods: Using the PrimerQuest and CLC WorkBench tool, we designed six primer sets with specific fluorescently labelled TaqMan probes for the nuc gene in different ***Staphylococcus*** species ***(S. aureus, S. epidermidis, S. capitis, S. lugdunensis, S. hominis, S. haemolyticus***). In addition, primers previously developed by Renz et al. (2022) for ***C. acnes*** were integrated into our assay with internal control of isolation, leading to the development of specific mPCR assay with seven included targets. Analytical sensitivity and specificity were evaluated using reference bacterial strains. To determine the assay's limit of detection (LOD), we conducted serial dilutions of eluates containing known concentrations of bacterial DNA copies/µl. The overall LOD in spiked clinical samples, including sample preparation and DNA isolation on MagnaPure24, was measured through 10-fold serial dilutions (from 10^9 to 10^{-1} CFU/ml) including additional dilutions of 5000, 500, 50 and 5 CFU/ml.

Results: The results with LOD in serial dilutions of eluates and spiked clinical samples, together with analytical sensitivity and specificity, are shown in Table 1.

Conclusion: The mPCR assay showed excellent analytical sensitivity and specificity, but with considerably lower LOD after sample preparation and further DNA isolation in spiked clinical samples. Although still promising in diagnostics of acute infections, the use of mPCR could be challenging in chronic, low-grade infections with lower microbial burden. Nevertheless, PCR offers significant advantages in terms of speed and can shorten the time to result, especially for *C. acnes* infections. Additionally, it represents a promising complementary approach in patients with suspected PJI on antibiotic therapy with negative culture results.

Table 1: Summary of LOD, Analytical Sensitivity and Specificity.

	LOD (copies/ µl)	LOD sonication fluid (CFU/ml)	LOD homogenized tissue samples (CFU/ml)	Analytical sensitivity (%)	Analytical specificity (%)
S. aureus	5	500	10^3	100	100
S. capitis	10	10^3	500	100	100
S. haemolyticus	10	10^3	10^4	100	100
S. epidermidis	10	10^2	10^3	96	100
S. hominis	10	10^3	10^3	96	100
S. lugdunensis	5	500	500	100	100
C. acnes	10	10^2	10^3	100	100

[FP J5] 16S RRNA V3-V4 AMPLICON NEXT-GENERATION SEQUENCING IN THE DIAGNOSIS OF PROSTHETIC JOINT INFECTIONS

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Aim: To date, no ultimate diagnostic gold standard for prosthetic joint infections (PJI) has been established. In recent years, next generation sequencing (NGS) has emerged as a promising new tool, especially in culture-negative samples. In this prospective study, we performed metagenomic analysis using 16S rRNA V3-V4 amplicon NGS in samples from patients with suspected PJI.

Methods: A total of 257 (187 culture-negative (CN) and 70 culture-positive (CP)) prospectively collected tissues and sonication fluid from 32 patients (56 revisions) were included. 16S rRNA V3-V4 amplicons were sequenced using Illumina's MiSeq (California, USA) followed by bioinformatic analysis using nf-core/ampliseq pipeline.

Results: We successfully sequenced 255 samples and detected a total of 105 microorganisms. These were mainly environmental microorganisms present in a small number of reads (≤100), indicating possible contamination. Pseudomonas spp. (non-aeruginosa species) was detected most frequently in 73% (187/255) of samples. The test showed limitations in species classification and identified microorganisms mainly at genus level. Significant differences in the number of reads were observed when comparing CN (≤100) and CP (≥1000) samples. In two CP, no bacteria were identified with sequencing, which is probably due to low bacterial load or contamination (1 CFU). Haemophilus spp. was detected with a significant number of reads (≥10000) in five samples from a single patient, in whom infection was considered likely according to EBJIS criteria, changing it to confirmed infection. Staphylococcus spp. was identified with ≥10000 reads in two CNs from an individual who was receiving antibiotic treatment at the time, had clinical signs of infection, and had a confirmed infection with S. lugdunensis one month earlier. Cutibacterium spp. with 36% (93/257) and Staphylococcus spp. with 34% (87/257) were detected with a minimal number of reads (≤100) in several CN, indicating possible contamination with normal skin microbiota. In one patient, Facklamia spp., an opportunistic pathogen, was detected in two samples by sequencing, but not by culture.

Conclusion: We consider 16S rRNA V3-V4 amplicon sequencing to be a promising tool; however, further studies are needed to clarify uncertainties regarding the interpretation of the results in combination with other criteria. Using this method, we were able to successfully confirm infection in two patients whose microbiological results were initially negative, leading to a change from likely to confirmed infection in one case. The thresholds and interpretation of the results are currently unclear, therefore the method is being used experimentally rather than diagnostically at the time of writing.

[FP J6] CAN MOLECULAR TECHNIQUES BECOME THE NEW "GOLD STANDARD" IN DIAGNOSTICS OF PROSTHETIC JOINT INFECTIONS?

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Aim: We prospectively evaluated four different microbiological tools for diagnostics of prosthetic joint infections (PJI), and assessed their impact on the categorization of infection according to EBJIS guidelines. We compared culture, in-house real-time mPCR for ***S. aureus, S. lugdunensis, S. hominis, S. epidermidis, S. capitis, S. haemolyticus, C. acnes*** (mPCR), broad-spectrum PCR (Molzym) with 16S rRNA V3-V4 amplicon Sanger sequencing (16S PCR), and 16S rRNA V3-V4 amplicon next-generation sequencing (16S NGS) on MiSeq (Ilumina).

Methods: A total of 341 samples (sonication fluid, tissue biopsy, synovial fluid) were collected from 32 patients with suspected PJI who underwent 56 revision surgeries at the Orthopaedic Centre University Hospital Ljubljana, between 2022 and 2024. Samples were processed using standard protocols for routine culture, followed by DNA isolation using the MagnaPure24 (Roche). All samples were tested with mPCR, and an additional ≥4 samples from each revision (244 in total) were subjected to further metagenomic analysis. Culture results were considered positive if the same microorganism was detected in ≥2 samples, ≥50 CFU/ml were present in the sonication fluid, or ≥1 sample was positive for a more virulent microorganism or if the patient had received antibiotic treatment.

Results: Each tool demonstrated high sensitivity for correct EBJIS categorization (100% culture and 16S NGS, 96.88% mPCR and 16S PCR). The highest specificity was observed with mPCR and 16S PCR (87.5%), while culture (79.17%) and NGS (37.5%) showed lower specificity. In 27% (15/56) of revisions, all microbiological tests were negative, although infection was confirmed with histology in one case, and four cases were classified as ***infection-likely*** based on clinical signs. In 20% (11/56) of cases, all microbiological tests were positive; in three cases a combination of other EBJIS criteria (without microbiology) categorized the episodes as ***infection-likely*** and one as ***infection-unlikely***, emphasizing the importance of microbiological tests in diagnostic criteria. In 43% (24/56) of revisions categorized as ***infection-unlikely*** using a combination of other EBJIS criteria, five had positive culture, and three had positive mPCR and 16S PCR. Fifteen (62%) had positive 16S NGS, 12 due to a low number of reads, which may indicate low-grade infection or possible contamination.

Conclusion: To date, no test can be established as the ultimate gold standard. The lack of interpretation criteria can result in low specificity of some methods, as the threshold is difficult to determine. A multidisciplinary approach with combination of microbiological tools is still considered the most efficient.

[FP J7] NOVEL MOLECULAR APPROACH IS USEFUL IN CULTURE-NEGATIVE PERIPROSTHETIC HIP AND KNEE JOINT INFECTIONS

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Aim: Unexpected negative-cultures (UNC) are a common diagnostic problem in periprosthetic joint infection (PJI) of the hip and knee when using culture-based methods. A novel molecular approach (MC)[1] based on the identification of the vast majority of bacterial species in a single assay using species-specific bacterial interspacing region length polymorphisms and phylum-specific 16S rDNA sequence polymorphisms has demonstrated clinical utility in PJI diagnostics (1). In addition, MC provides an estimate of the leukocyte concentration in the specimen analysed. The aim of this retrospective, blinded study was to evaluate the performance of MC in identifying the microbiological content and determining the leukocyte count in synovial fluid (SF) collected from hip and knee revision arthroplasty cases with UNC. It was also assessed whether antibiotic treatment would have been changed if the result from MC had been known.

Method: A total of 89 SF samples from 70 patients (43 female; 27 male) who underwent revision arthroplasty (14 hip; 75 knee) were included. Using European and Bone Joint Infection Society (EBJIS) criteria, 82 cases were classified as infected (77 UNC and 5 septic culture-positive controls), five as non-infected (aseptic culture-negative controls), and two as likely infected, but infected by clinical observation. MC was performed and evaluated together with SF parameters. Antibiotic treatment, clinical outcome, patient demographics and surgical details were analysed.

Results: Overall, 29.1% (23/79) of UNC had a positive yield by MC, of which 2/23 (8.7%) had two microorganisms detected simultaneously. Of the 25 microorganisms identified by MC, 12/25 (48%) were clinically relevant after re-evaluation of the patients' microbiological history. The microorganisms detected were 5/25 (20%) ***Streptococcus pneumoniae/mitis***, 4/25 (16%) ***Staphylococcus epidermidis***, 3/25 (12%) ***Cutibacterium acnes***, 3/25 (12%) ***Streptococcus agalactiae***, 2/25 (8%) ***Streptococcus bovis***, 2/25 (8%) ***Staphylococcus aureus***, and 2/25 (8%) ***Haemophilus parainfluenzae***. The prevalence of ***Enterococcus faecalis***, ***Bacteroides fragillis***, ***Staphylococcus lugdunensis***, ***Corynebacterium striatum*** among all MC results was 1/25 (4%) each species. In total, 13/23 (56%) cases were associated with patients receiving antibiotic therapy at the time of SF collection. The yield for leukocyte counts provided the molecular technique was consistently much higher in the UNC and clearly septic groups than in the clearly aseptic group. Overall, 20/61 (32.8%) patients with UNC could have been managed differently and more accurately after MC assessment.

Conclusions: MC shows clinical value in the diagnosis and management of PJI with UNC. The included leukocyte count shows promising results.

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References:

*****MC: MOLECULAR CULTURE® KIT

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[FP J8] QUANTIFICATION OF SONICATED IMPLANTS FROM PATIENTS WITH OSTEOARTICULAR IMPLANT INFECTIONS

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Aim: To evaluate the bacterial counts of sonicatied implants in patients with osteoarticular infections. Various studies have demostrated the usefulness of sonication of retrieved implants in order to provide an accurate microbiological diagnosis. Although cutoff values for original sonicate counts have been established, the use of centrifugation may influence these values

Method: A retrospective, single-center study, including sonication fluid samples from implants removed between January 2011 and October 2023, was performed. Patients were diagnosed with implant-associated infection based on the criteria available at the time of diagnosis. Osteoarticular implants were sonicated following the protocol described by Esteban et al. Sonicated fluid was centrifuged for 20 minutes at 3000 x g, and the sediment was resuspended in 5 mL of phosphate buffer solution. Ten µl of the sample were streaked onto each medium for quantitative culture. Bacterial counts exceeding 100,000 CFU/mL were considered as 100,000 CFU/mL for statistical analysis.

Results: The study included 457 sonication fluid samples. Of these, 316 samples were from patients with prosthetic joint infection (PJI), with 26.3 % diagnosed with acute PJI and 73.7 % with chronic PJI. Additionally, 141 samples were from patients with osteosynthesis infection. The median CFU/ml in the sonication fluid was 40,000 CFU/mL (IQR 1,000 CFU/mL-100,000 CFU/mL). No statistically significant difference was observed between the different types of implants (prosthesis vs. osteosynthesis, p=0.218). A trend of higher counts was noted for acute PJI compared to chronic PJI (p=0.052). Most infections were monomicrobial, but 16.2% were polymicrobial. Statistically significant higher bacterial counts were observed in polymicrobial infections compared to monomicrobial infections (p<0.005). Among monomicrobial infections, no differences were found between Gram-negative and Gram-positive microorganisms (p=0.416). No differences were also found between joints (knee vs. hip) (p=0.353).

Conclusions: Significant variability was observed in the number of colonies detected in all samples, regardless of the type of implant, the number of microorganisms or the species identified. Higher counts were detected in polymicrobial infections, and a trend was also noted for higher counts in acute infections.

[BP1] IS ONE DOSE NON-INFERIOR TO FOUR DOSES OF SYSTEMIC ANTIBIOTIC PROPHYLAXIS AGAINST PERIPROSTHETIC JOINT INFECTION IN PRIMARY ARTHROPLASTY?

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Aim: The current recommendation in Norway is to use four doses of a first-generation cephalosporin (cefazolin or cephalotin) as systemic antibiotic prophylaxis (SAP) the day of surgery in primary joint arthroplasty. Due to shortage of supply, scientific development, changed courses of treatment and improved antibiotic stewardship, this recommendation has been disputed. We therefore wanted to assess if one dose of SAP was non-inferior to four doses in preventing periprosthetic joint infection (PJI) in primary joint arthroplasty.

Method: We included patients with primary hip- and knee arthroplasties from the Norwegian Arthroplasty Register and the Norwegian Hip Fracture Register for the period 2005-2023. We included the most used SAPs (cephalotin, cefazolin, cefuroxime, cloxacillin and clindamycin), administered as the only SAP in 1-4 doses, starting preoperatively. Risk of revision (Hazard rate ratio; HRR) for PJI was estimated by Cox regression analyses with adjustment for sex, age, ASA class, duration of surgery, reason for- and type of arthroplasty, and year of primary arthroplasty. The outcome was 1-year reoperation or revision for PJI. Non-inferiority margins were calculated for 1, 2 and 3 doses versus reference of 4 doses of SAP at the day of surgery, against a predetermined limit of 15% increased risk of PJI.

Results: In total 274,188 primary arthroplasties (total hip 133,985, hemi hip 51,442, and total knee 88,761) were included. Of these primary arthroplasties, 2,996 (1.1%) had subsequent revisions for PJI during the first postoperative year. One dose of SAP was given in 9,603 arthroplasties, two doses in 10,068, three doses in 18,351, and four doses in 236,166 arthroplasties. With the recommended four doses as reference, the HRR (95% CI) for 1-year revision for infection was 0.9 (0.7-1.1) for one dose, 1.0 (0.8-1.2) for two doses, and 0.9 (0.8-1.1) for three doses. The corresponding adjusted 1-year revision incidences for PJI was 0.9 (0.7-1.1), 1.0 (0.8-1.2), 0.9 (0. 8-1.1) and 1.0 (1.0-1.1) for one, two, three and four doses respectively, and less than four doses was found to be non-inferior.

Conclusions: One preoperative dose of SAP in primary joint arthroplasty surgery seems to be non-inferior to the current recommendation of four doses of a first-generation cephalosporin as PJI-prophylaxis. This finding may simplify the course of treatment for arthroplasty patients, save costs, and improve antibiotic stewardship.

[BP2] ACCURACY OF DIFFERENT TEST METHODS FOR DIAGNOSING LOW-GRADE PERIPROSTHETIC JOINT INFECTIONS

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Aim: Diagnosing low-grade periprosthetic joint infections (PJI) can be very challenging due to low-virulent microorganisms capable of forming biofilm. Clinical signs can be subtle and may be similar to those of aseptic failure. To minimize morbidity and mortality and to preserve quality of life, accurate diagnosis is essential. The aim of this study was to assess the performance of various diagnostic tests in diagnosing low-grade PJI.

Methods: Patients undergoing revision surgery after total hip and knee arthroplasty were included in this retrospective cohort study. A standardized diagnostic workup was performed using the components of the 2021 European Bone and Joint Infection Society (EBJIS) definition of PJI. For statistical analyses, the respective test was excluded from the infection definition to eliminate incorporation bias. Receiver-operating-characteristic curves were used to calculate the diagnostic performance of each test, and their area-under-the-curves (AUC) were compared using the z-test.

Results: 422 patients undergoing revision surgery after total hip and knee arthroplasty were included in this study. 208 cases (49.3%) were diagnosed as septic. Of those, 60 infections (28.8%) were defined as low-grade PJI (symptoms >4 weeks and caused by low-virulent microorganisms (e. g. coagulase-negative staphylococci, ***Cutibacterium spp.***, enterococci and ***Actinomyces***)). Performances of the different test methods are listed in Table 1. Synovial fluid (SF) - WBC (white blood cell count) >3000G/L (0.902), SF - %PMN (percentage of polymorphonuclear neutrophils) > 65% (0.959), histology (0.948), and frozen section (0.925) showed the best AUCs.

Conclusion: The confirmatory criteria according to the EBJIS definition showed almost ideal performances in ruling-in PJI (>99% specificity). Histology and synovial fluid cell count (SF-WBC and SF-%PMN) showed excellent accuracies for diagnosing low-grade PJI. However, a reduced immune reaction in these cases may necessitate lower cut-off values. Intraoperative frozen section may be valuable in cases with inconclusive preoperative diagnosis.

Parameter	Sensitivity (%)	Specificity (%)	PPV	NPV	AUC
Sinus tract	20.0 (11.7–32.0)	100 (97.8–100)	1.000 (1.000–1.000)	0.815 (0.768–0.863)	0.600 (0.549–0.651)
Pus	13.7 (6.6–26.1)	100 (97.0–100)	1.000 (1.000–1.000)	0.779 (0.723–0.837)	0.569 (0.521–0.616)
CRP (> 10 mg/L)	76.7 (64.4–85.6)	83.6 (77.9–88.0)	0.575 (0.487–0.683)	0.925 (0.887–0.963)	0.801 (0.742–0.861)
SF-WBC (>1500 G/L)	90.2 (78.7–96.6)	88.0 (79.0–93.5)	0.787 (0.670–0.904)	0.948 (0.898–0.998)	0.891 (0.833–0.949)
SF-WBC (>3000 G/L)	80.5 (65.6–89.9)	100 (94.6–100)	1.000 (1.000–1.000)	0.912 (0.854–0.970)	0.902 (0.841–0.964)
SF-%PMN (>65)	97.2 (84.3–100)	94.6 (81.2–99.3)	0.946 (0.873–1.000)	0.972 (0.919–1.000)	0.959 (0.913–1.000)
SF-%PMN (>90)	80.6 (64.6–90.4)	100 (88.3–100)	1.000 (1.000–1.000)	0.841 (0.733–0.949)	0.903 (0.837–0.968)
SF-culture	53.8 (40.5–66.6)	97.9 (93.6–99.5)	0.903 (0.799–1.000)	0.852 (0.797–0.907)	0.759 (0.689–0.828)
Alpha-Defensin	61.9 (40.8–79.2)	99.1 (94.4–100)	0.929 (0.794–1.000)	0.932 (0.886–0.977)	0.805 (0.698–0.912)
Tissue-culture (single)	77.2 (64.6–86.2)	93.5 (88.6–96.4)	0.800 (0.694–0.906)	0.924 (0.884–0.964)	0.853 (0.795–0.911)
Tissue-culture (two concordant)	54.4 (41.6–66.6)	99.4 (96.3–100)	0.969 (0.908–1.000)	0.867 (0.819–0.914)	0.769 (0.704–0.834)
Sonication (>1 CFU)	87.7 (76.3–94.1)	88.8 (83.5–92.5)	0.694 (0.588–0.801)	0.961 (0.933–0.989)	0.882 (0.834–0.931)
Sonication (>50 CFU)	57.9 (45.0–69.8)	100 (97.6–100)	1.000 (1.000–1.000)	0.891 (0.850–0.932)	0.789 (0.725–0.854)
Any culture (single)	98.3 (90.1–100)	84.5 (78.9–88.8)	0.648 (0.550–0.746)	0.994 (0.983–1.000)	0.914 (0.885–0.944)
Any culture (two condordant)	76.7 (64.4–85.6)	100 (97.7–100)	1.000 (1.000–1.000)	0.937 (0.905–0.969)	0.883 (0.829–0.937)
Histology	89.7 (78.8–95.4)	100 (97.7–100)	1.000 (1.000–1.000)	0.971 (0.948–0.994)	0.948 (0.909–0.988)
Frozen section	85.7 (67.7–94.8)	99.2 (95.1–100)	0.960 (0.883–1.000)	0.969 (0.939–0.999)	0.925 (0.858–0.991)

Table 1. Performance of diagnostic tests for diagnosing low-grade PJI.

Note. PPV: positive predictive value; NPV: negative predictive value; AUC: area-under-the-curve; CRP: C-reactive protein; SF: synovial fluid; WBC: white blood cell count; %PMN: percentage of polymorphonuclear neutrophil granulocytes; CFU: colony-forming units

[BP3] POSTOPERATIVE ANTIBIOTIC TREATMENT DOES NOT LOWER RE-REVISIONRATE IN PRESUMED ASEPTIC HIP AND KNEE REVISION ARTHROPLASTIES WITH UNEXPECTED POSITIVE INTRAOPERATIVE CULTURES - A PROPENSITY SCORE MATCHED COHORT STUDY

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Aim: It still remains unclear whether postoperative antibiotic treatment is advantageous in presumed aseptic revision-arthroplasties of the hip (rTHA) and knee (rTKA) with unexpected-positive-intraoperative-cultures (UPIC). The aim of this study was to evaluate if there is a difference in the septic and/or aseptic re-revision rate in patients with or without postoperative antibiotics.

Method: In this retrospective propensity-score (PS) matched cohort-study we compared the re-revision rate and the microbiological spectrum in rTHA and rTKA treated with (AB-Group; n=70) and without (non-AB-Group; n=70) antibiotic treatment in patients with UPIC. Baseline covariates for PS-matching were type of revision, sex, Body-Mass-Index, age, Surgical-Site-Infection-Score, American-Society-of-Anesthesiologists-Classification, serum C-reactive-protein.
All patients received routine antibiotic prophylaxis, but empiric AB treatment was started only in patients in the AB-Group. Post-operative treatment was decided on an individual basis according to the preference of the surgeon and the infectious disease specialist for a minimum duration of two weeks. In total, 90 rTHA (45 AB-Group, 45 in non-AB-Group) patients with UPICs and 50 rTKA (25 AB-Group, 25 in non-AB-Group) were included in the study. There was no significant variation in patient demographics.

Results: After a median follow-up of 4.1 (IQR: 2.9-5.5) years after rTHA and rTKA, there was no higher re-revision rate (p=0.813) between the AB-group 10/70 (14.3%), and the non-AB-group 11/70 (15.7%). In the AB group, 4.3% (3/70) of patients underwent revision due to septic complications compared to 5.7% (4/70) in the non-AB group (survival log-rank: p=0.691).
In total, 30/70 (42.9%) of patients in the AB-group and 23/70 (32.9%) of patients in the non-AB group were diagnosed as having an “infection likely” according to the PJI diagnostic criteria of EBJIS (p=0.223). All UPICs comprised low virulent microorganisms and were considered as a contaminant. In total, 68/70 (97.1%) of the patients in the AB-group received a dual antibiotic treatment for a mean duration of 41 (IQR: 23.5-56.5) days.

Conclusion: Postoperative antibiotic treatment did not result in a decreased re-revision rate compared to non-antibiotic treatment in patients with UPIC in presumed aseptic rTHA and rTKA. UPICs with pathogens are likely to be a containment and therefore the classification of “infection likely” according to the EBJIS definition can be safely ignored.

[BP4] SETTING THE STAGE FOR TAILORING CEFUROXIME DOSING AS PROPHYLAXIS AND TREATMENT OF PROSTHETIC JOINT INFECTIONS USING PHARMACOKINETIC MODELING

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Aim: Prosthetic joint infections (PJI) are a common reason for revisions in patients that underwent total arthroplasty of the hip (THA) or knee (TKA). Extensive antibiotic treatment follows while a clear understanding of target site concentrations is lacking. The aim is to investigate the target site concentrations, like bone and synovial tissue concentrations, which consequently may lead to an optimisation of the dosing regiments of cefuroxime of PJI patients suffering from pain and immobility. Dosing optimisation may lead to a reduced risk of (re-)infection and adverse effects like renal-insufficiency and therefore lower health-care costs.

Method: Patients (n=26) with PJI of hip or knee undergoing a one- or two-stage revision treated with cefuroxime were included as part of the ASTERICS study. During implant removal two samples were collected 15-30 and 60-120 minutes after IV infusion of plasma, bone tissue and synovial tissue and one synovial fluid sample. Samples were analysed using a UltraPerformance Convergence Chromotography – quadruple mass spectrometry system (UPC^2-MS/MS). Bone tissue and synovial tissue were pulverized before analysis acquiring for bone tissue a homogenate of cortical and cancellous bone. Using nonlinear mixed effect modelling (NONMEM) a base model was developed to analyse the bone to plasma ratio of cefuroxime in osteomyelitis patients.

Results: Mean bone concentrations (mg/L) of cefuroxime at 30-60 min after IV administration in the knee and hip are 21.29 (SD:11.86) and 19.06 (SD: 11.79) respectively and 8.23 (SD:4.90) and 9.67 (SD:9.75) respectively at 90-120 min after IV administration. The penetration of cefuroxime described by the bone:plasma ratio into knee and hip affected by osteomyelitis is 0.3 and 0.4 respectively within 1 hour and 0.1 for both joints within 2 hours. The results mentioned here were collected during knee operations without blood void conditions. Concentration data was used to develop a base pharmacokinetic model using NONMEM and was best described by a two-compartment model.

Conclusions: Cefuroxime penetrates osteomyelitis affected bone tissue within the hour proving the usefulness of cefuroxime as prophylaxis of orthopaedic surgery and as treatment option for PJI. However, PK modelling and further simulations need to prove whether repeated cefuroxime dosing in this population is required to reach minimal inhibitory concentrations in target tissue.

[BP5] SONICATION FLUID INCUBATION IN BLOOD CULTURE BOTTLES IS MORE SENSITIVE FOR PERIPROSTHETIC JOINT INFECTION THAN CLASSICAL CULTIVATION OF SONICATION FLUID

Samo Roskar[1], Mitja Rak[2], Rene Mihalic[1], Rihard Trebse[1]

[1]Valdoltra Orthopaedic Hospital, Service for Bone Infections, Ankaran, Slovenia; [2]Centre for Medicinal Microbiology, National Laboratory of Health, Environment and Food, Koper, Slovenia

Aim: Periprosthetic joint infection (PJI) is one of the most devastating complications after joint replacement. It is associated with high morbidity and economic burden when misdiagnosed as an aseptic failure. Among all cases of PJI, up to 25% could yield negative cultures. Conversely, among cases of aseptic failures, up to 30% may actually be undiagnosed PJIs. In PJIs microbiological diagnosis is a key step for successful treatment. Sonication of the removed prosthesis is more sensitive than conventional periprosthetic-tissue culture, especially in patients who received antimicrobial therapy before surgery. This study aimed to compare the diagnostic value of classic sonication fluid cultures (SF-C) and sonication fluid incubation in blood culture bottle (SF-BCB).

Method: Between 2016 and 2018 we analysed 160 revision procedures of joint arthroplasties. For each procedure, at least 5 microbiological and multiple histopathological samples were harvested, and explant sonication was performed which was further analysed by SF-C and SF-BCB. For SF-C classical cultivation of sonication fluid was performed. While for SF-BCB, 10 mL of sonication fluid was inoculated into aerobic and anaerobic lytic blood culture bottles. The definite diagnosis of PJI was based on the EBJIS definition.

Results: Among 160 revisions, 59 PJIs were identified, 15 patients were treated with the debridement and implant retention, 7 patients with the one-stage and 35 with the two-stage exchange, remaining 2 were partial revisions. The sensitivity of SF-C and SF-BCB were 81.5% and 94.9%, respectively. The mismatch of microbe identification was observed in 5 cases. We observed positive SF-C while negative SF-BCB in 4 cases, among them having 2 positive histology. While 12 patients have negative SF-C and positive SF-BCB, among them 3 have positive and 6 negative histology. Among these 12 patients, typical low-grade microbes were identified in 9 cases (5 cases of ***C. acnes***, 3 cases of ***S. epidermidis***, and 1 case of ***S. capitis***).

Conclusions: The weakest point in all PJI diagnostic criteria is their sensitivity. SF-BCB demonstrates higher sensitivity in diagnosing PJI compared to SF-C. Therefore, it appears prudent to incorporate SF-BCB into the diagnostic protocol for all patients exhibiting either low-grade PJI symptoms or experiencing undiagnosed, presumably aseptic failures, where the likelihood of misdiagnosing infection is greatest.

[BP6] THE BURDEN OF BROAD-SPECTRUM ANTIBIOTIC USE IN ORTHOPAEDIC INFECTION: SYSTEMIC ANTIBIOTIC PRESCRIBING IN THE SOLARIO TRIAL

Maria Dudareva[1], Shristi Lama[1], Keiko Miyazaki[1], Claire Scarborough[1], Asanka Wijendra[1], Elizabeth Tissingh[1], Michelle Kumin[1], Matthew Scarborough[1], Martin McNally[1]

[1]Oxford University Hospitals, Bone Infection Unit, Oxford, United Kingdom

Aim: The SOLARIO trial is a randomised controlled non-inferiority trial of antibiotic strategy for bone and joint infection. SOLARIO compares short or long post-operative systemic antibiotic duration, for patients with confirmed infections, who had local antibiotics implanted and no infected metalwork retained when undergoing surgery.
This analysis compared systemic antibiotic use in the short (intervention) and long (standard of care) arms of the trial, in the 12 months after index surgery.

Method: Data was collected prospectively from study randomisation, within 7 days of index surgery. All systemic antibiotics prescribed for the index infection were recorded, from health records and patient recall, at randomisation, 6 weeks, 3-6 months and 12 months after study entry. Start and end dates for each antibiotic were recorded.

Results: 251 patients were randomised to short systemic antibiotics (up to 7 post-operative days) and 249 patients, to long systemic antibiotics. 5 participants in the short group and 2 participants in the long group withdrew from study follow-up.
Complete data for all systemic antibiotics taken in the 12 months following surgery, were available for 237 participants in the short group and 236 participants in the long group. 80 participants across both groups were noted as having deviated from their assigned treatment strategy. Both groups received empiric antibiotics, predominantly vancomycin and meropenem, for up to 7 days after surgery.
Considering each prescribed antibiotic as a separate duration (even when administered concurrently), participants assigned to standard care received a mean of 74.9 antibiotic-days. Participants assigned to short systemic antibiotics received a mean of 27.5 antibiotic-days in the 12 months after surgery. The most commonly prescribed antibiotics in both treatment groups were vancomycin and meropenem: these antibiotics accounted for 7.1 days prescribed per participant in the long group, and 6.3 days in the short group (p=0.37). Reasons for post-randomisation antibiotic prescribing in the short treatment group included later planned surgery, identification of bacteria requiring additional systemic antibiotics, and treatment of superficial wound infections.
WHO AWaRe classification 'watch' and 'reserve' group antibiotics, such as ciprofloxacin, rifampicin, vancomycin and meropenem, accounted for 39.4 antibiotic-days per long group participant, and 16.5 antibiotic-days per short group participant.

Conclusions: Considering the combined duration of all systemic antibiotics prescribed over 12 months, including those co-administered, participants in the short arm of the SOLARIO trial received considerably fewer days of all antibiotic classes, and particularly those antibiotics restricted in the WHO AWaRe classification (2021).

[BP7] LOCAL ANTIBIOTIC THERAPY WITH AMINOGLYCOSIDE ALONE OR IN COMBINATION WITH VANCOMYCIN IN THE MANAGEMENT OF BONE INFECTION

Annalise Unsworth[1,2], Martin McNally[1], Matthew Scarborough[1], Bernadette Young[1]

[1]The Bone Infection Unit, Oxford University Hospitals, Oxford, United Kingdom; [2]St. Vincent's Hospital Clinical School, University of New South Wales, Sydney, Australia

Aim: Local antibiotics, delivered to the site of infection, achieve high tissue concentrations and are used as an adjunct to systemic therapy. Local gentamicin provides levels well above the minimum inhibitory concentration and may be sufficient on its own, however, the efficacy of single or combination local antibiotics has not been studied. This retrospective study evaluated the effect of combination aminoglycoside and vancomycin local antibiotic treatment compared to aminoglycoside alone in the surgical management of bone infection.

Method: We studied patients with microbiologically confirmed osteomyelitis and fracture-related infection, who had implantation of antibiotic carriers as part of their surgical management. Data including patient demographics, type of surgery, microbiological characteristics, BACH score, duration of antibiotic treatment and clinical outcomes were collected. Failure of therapy was a composite of recurrence of infection, continued or new antimicrobial therapy, or reoperation with suspected or confirmed infection at one year after index surgery.

Results: There were 266 patients who met the inclusion criteria. Nine patients died before the outcome endpoint at 12 months and five patients were lost to follow up so were excluded. 252 patients were included in the final analysis and were well matched with regard to demographics, BACH score and microbiology. 113 patients had treatment with aminoglycoside alone and 139 patients had combination aminoglycoside and vancomycin.
There was no difference in the failure rate between groups; 10/113 (8.8%) in the aminoglycoside alone and 12/139 (8.6%) in the combination group, p = 0.934. There was no difference for reoperation, ongoing suppressive antibiotic use, or clinical suspicion of infection. Multivariate analysis showed that there was no added benefit of combination therapy (OR 1.54: 95%CI 0.59-4.04, p=0.38). BACH score and low BMI were associated with increased risk of failure (BACH OR 3.49: 95%CI 1.13-10.76, p=0.03; Low BMI OR 0.91: 95%CI 0.84-0.99, p-0.037).
The form of the carrier material (pellets or injectable paste) had no effect on failure rate (p=0.434). Aminoglycoside resistance (confirmed and presumed) occurred in 39/113 (34.5%) of the aminoglycoside only group and 36/139 (25.9%) of the combination group (p=0.137). The presence of aminoglycoside resistance had no effect on failure rate (OR 0.39: 95%CI 0.05-3.01, p=0.37).

Conclusions: Clinical outcome was not improved by the addition of vancomycin to aminoglycoside alone as local therapy for the management of osteomyelitis and FRI. Laboratory measured resistance, using currently accepted breakpoints, may not be relevant in local therapy.

[BP8] DOES ANTIBIOTIC-LOADED CEMENT REDUCE THE RISK OF PROSTHETIC INFECTION IN PRIMARY TOTAL KNEE ARTHROPLASTY? ANALYSIS OF THE CATALAN ARTHROPLASTY REGISTRY

Roger Rojas Sayol[1], Xavi Pelfort Lopez[1], Borja Velasco Regulez[2], Jesus Cerquides Bueno[3], Joan Carles Monllau Garcia[4], Joan Murias Álvarez[1], Joel Sánchez Fernández[1], Sergi Gil Gonzalez[1]

[1]Parc Taulí Hospital Universitari. Institut d'Investigació i Innovació Parc taulí. Universitat Autònoma de Barcelona (I3PT-CERCA), Sabadell , Spain; [2]Agència de Qualitat i Avaluació Sanitàries de Catalunya, Barcelona, Spain; [3]Institut d'Investigació en Intel·ligència Artificial, Universitat Autònoma de Barcelona, Barcelona, Spain; [4]Parc de Salut Mar, Barcelona, Spain

Aim: There is controversy regarding the use of Antibiotic-loaded cement (ALBC) as compared to non-antibiotic-loaded cement (NALBC) to reduce the overall infection rate without affecting implant survival or adding additional risks on fixation for primary total knee arthroplasty (TKA).

Method: To conduct the analysis, we utilized the Catalan Arthroplasty Registry (RACat) for the TKAs implanted between 2005 and 2017. The primary variable recorded was the use of cement with or without antibiotics. Other recorded variables included were age, sex, diabetes mellitus, obesity, Charlson index and type of hospital. We analyzed the effect of ALBC vs. NALBC in reducing the risk of prosthetic infection at 3, 6, 12, and 24 months as well as prosthetic survival due to mechanical causes at 1, 5, and 10 years. Univariate and multivariable analyses of risk factors were conducted. Thereby, an interactive predictive model that determines the risk of prosthetic infection based on each patient's characteristics was created.

Results: A total of 28,287 TKAs from the RACat were analyzed. In that total, there were 19,788 NALBC and 8,499 ALBC. The infection rates for TKAs with NALBC vs. those with ALBC at 3, 6, 12, and 24 months were respectively: 1.69% vs. 1.39% (p=0.132); 1.81% vs. 1.56% (p=0.147); 2.14% vs. 1.73% (p=0.030); 2.51% vs. 1.86% (p=0.001). A statistically significant reduction in periprosthetic infection rate was observed in the ALBC group at 12 and 24 months. No differences were observed between the two groups in terms of prosthetic mechanical survival. Being younger, male and having had previous knee surgery or having a high comorbidity index all led to a higher risk of prosthetic revision due to infection.

Conclusions: The use of ALBC as a fixation method for TKA leads to a reduction in the risk of prosthetic infection without altering the mechanical survival of the implant. The creation of a predictive model helps determine the individualized risk of prosthetic infection based on the patient's characteristics.

[BP9] SEPTIC ORTHO-PLASTIC RECONSTRUCTION SURGERY: OUTCOMES FROM A 6-YEAR COLLABORATIVE STUDY

Audrey Lentini[1], Joseph Djoko[1], Dan Putineanu[1], Karim Tribak[1], Maude Coyette[1], Jean-Cyr Yombi[1], Olivier Cornu[1]

[1]*Cliniques Universitaires Saint-Luc (UCLouvain), Bruxelles, Belgium*

Aim: Bone infections often manifest with soft tissue complications such as severe scarring, fistulas, or ulcerations. Ideally, their management involves thorough debridement of infected bone and associated soft tissues, along with achieving stable bone structure, substantial tissue coverage, and long-term antibiotic therapy. The formation of a multidisciplinary team comprising orthopedic surgeons, plastic surgeons, and infectious disease specialists is essential in addressing the most complex cases.

Method: We conducted a retrospective study during six years (2018-2023) at our university center. Focusing on the most challenging cases, we included patients with bone infections in the leg and/or foot requiring free flap reconstruction. Each patient underwent simultaneous bone debridement and reconstruction by the orthopedic team, alongside soft tissue debridement and free flap reconstruction by the plastic surgery team. Targeted antibiotic therapy for either 6 weeks (acute) or 12 weeks (chronic osteitis) was initiated based on intraoperative cultures. Additional procedures such as allografts, arthrodesis, or autografts were performed if necessary. We analyzed the rates of bone union, infection resolution, and limb preservation.

Results: Forty-five patients were enrolled. Twenty-four patients (53.3%) had urgent indications (e.g., open infected fractures, osteitis, acute osteoarthritis, or wound dehiscence), while 21 (46.7%) underwent elective surgery (e.g., septic pseudarthrosis or chronic osteitis). Two patients underwent amputation due to flap failure (4.4%), and one patient was lost to follow-up. Follow-up of the remaining 42 patients averaged 28 months (range: 6–60 months). During this period, 35 patients (83.4%) experienced no recurrence of infection. Similarly, 35 patients (83.4%) achieved bone union. Overall, the rate of lower limb preservation was 93.3%.

Conclusions: Managing bone infection coupled with soft tissue defects brings significant challenges. Although the majority of patients treated here belong to a complex framework based on the BACH classification, the outcomes achieved here appear to align with those of the simpler cases, thanks to optimal care with a dedicated septic ortho-plastic team. Our study demonstrates a notable success rate in treating infection, achieving bone consolidation, and preserving lower limb function.

[BP10] VANCOMYCIN ELUTION KINETICS FROM ANTIBIOTIC AUGMENTED ALLOGRAFT AND RESORBABLE SYNTHETIC BONE FILLER SUPERIOR TO ANTIBIOTIC AUGMENTED BONECEMENT. AN IN-VITRO STUDY OVER 42 DAYS

Mathias Glehr[1], Maria Smolle[1], Hana Murtezai[1], Florian Amerstorfer[1], Nina Hörlesberger[1], Lukas Leitner[1], Sebastian Klim[1], Georg Hauer[1], Andreas Leithner[1]

[1]*Medical University of Graz, Department of Orthopaedics and Trauma, Graz, Austria*

Abstract Background: The aim of the present experimental study was to analyse vancomycin elution kinetics of nine bone fillers used in orthopaedic and trauma surgery over 42 consecutive days.

Methods: Two allograft bone chips (carriers 1 and 2), a calcium-sulfate matrix (carrier 3), a hydroxyapatite/calcium-sulphate composite (carrier 4), four bone cements (carriers 5-8) and a pure tricalcium phosphate matrix (carrier 9), either already contained vancomycin, or were mixed with it following manufacturer's recommendations. Over 42 days, half of elution medium was substituted by the same amount of PBS at 9 distinct time points. Vancomycin concentration in obtained samples were measured with a kinetic microparticle immunoassay, and masses consecutively calculated. To enhance comparability between carriers analysed, vancomycin mass released related to overall mass within each probe was determined. Notably, elution kinetics of carriers 1 to 4 have been published previously.

Results: All carriers initially released high vancomycin masses, followed by constant reduction later into the experiment. Mean initial vancomycin masses released after 4 hours were highest for carriers 1 (337.7 ± 76.2 mg), 9 (68.4 ± 4.9 mg), and 2 (49.0 ± 54.6 mg). From prefinal (35 days) to last measurement (42 days) carriers 2 (8.6 ± 4.8 mg), 1 (2.4 ± 1.0 mg), and 5 (0.1 ± 0.1 mg) had released highest vancomycin masses. Notably, all five bone cements tested only released a small percental amount of their total mass up to the last measurement (42 days; 2.1% – 9.3%), whilst allografts and resorbable synthetic bone fillers discarded high percental values (22.5% – 79.2%).

Conclusions: Elution kinetics differ between 9 antibiotic-loaded bone fillers, with high vancomycin masses released by allografts and resorbable bone fillers over time. Transferred to clinical practice, these may be favoured over bone cements in case prolonged and high antibiotic release is warranted rather than mechanical stability.

Notes

Author index

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Industry

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Industry Symposium A

Lunch boxes provided

ZIMMER BIOMET Institute®

Thursday, 26 September 2024, 12:45 - 13:45 **Room: 5**

Cutting Edge Infection Management
Surgical & Diagnostics

Agenda

- Patient related risk factors and optimisation strategies
- Intra-operative technologies for prevention, diagnosis and treatment of infection
- Reimplantation - what is the gold standard?"

Speakers

Dr. Pablo Corona	Hospital Universitario Vall d'Hebrón, Barcelona, Spain
Dr. Daniel Pérez-Prieto	Hospital del Mar - Parc de Salut Mar, Barcelona, Spain

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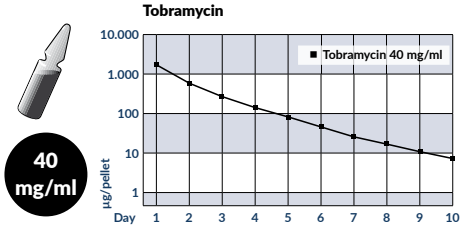

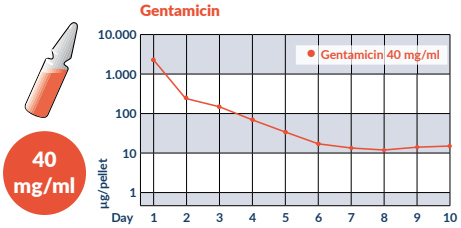

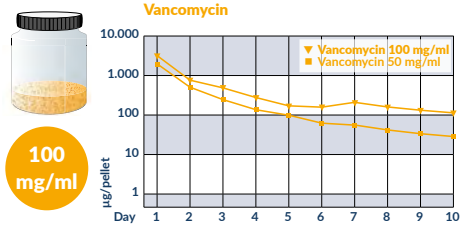

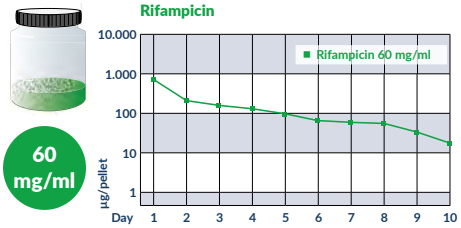

* recommended dosage based on in vitro results. The treating physician is responsible for the decision regarding the type and quantity of the corresponding antibiotic. The contraindications of the applied antibiotic have to be considered.

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Industry Symposium B

Lunch boxes provided

OSARTIS®

Thursday, 26 September 2024, 12:45 - 13:45 **Room: 6**

The use of PerOssal® in complex bone and spinal infections

Agenda

- PerOssal®: An additional weapon to fight chronic osteomyelitis
- Compassionate use of bacteriophages in bone and joint infections – First experience with PerOssal® as carrier material
- Experience using local antibiotic therapy in spondylodiscitis and postoperative spinal infections
- Case discussions – Treatment of bone and implant infections

Speakers

Univ.-Prof. Dr. Dr. Volker Alt Moderator	University Hospital Regensburg, Germany
Dr. Andrea Sambri	IRCCS azienda ospedaliera universitaria di Bologna, Italy
Prof. Dr. med. Markus Rupp	University Hospital Regensburg, Germany
Prof. Dr. med. Michael Rauschmann	Sana Clinic Offenbach, Germany
Prof. Dr. med. Dr. h.c Christian Heiß	University Hospital Gießen, Germany

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- **Trauma (FNOF)[4]**
- **Aseptic revision TKA[5]**

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Industry Symposium C

Heraeus
Medical

Thursday, 26 September 2024, 17:25 - 18:25 **Room: 5**

Better safe than sorry – ways to support infection prevention with antibiotic-loaded bone cement

Agenda

- Which patients are at risk for infection?
- Infection prevention with dual antibiotic-loaded bone cement in patients with a neck femur fracture
- Use of antibiotic-loaded bone cement in special clinical situations

Speakers

Tristan Ferry	Hospices Civils de Lyon Centre Hospitalier Universitaire de Lyon, France
Mike Reed	Wansbeck General Hospital, Northumbria Healthcare NHS Foundation Trust, United Kingdom
Volker Alt	University Hospital Regensburg, Germany

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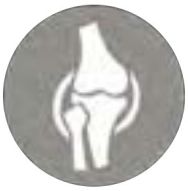

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Peptoniphilus
Peptostreptococcus anaerobius
Staphylococcus aureus
Staphylococcus lugdunensis
Streptococcus spp.
- *Streptococcus agalactiae*
- *Streptococcus pneumoniae*
- *Streptococcus pyogenes*

GRAM-NEGATIVE BACTERIA

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Citrobacter
Enterobacter cloacae complex
Escherichia coli
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Kingella kingae
Klebsiella aerogenes
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[1]Pons B, et al. Identification of Pathogens in Synovial Fluid Samples with an Automated Multiplexed Molecular Detection System. (Poster 2290) IDWEEK 2018; San Francisco, CA, USA.
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PIONEERING DIAGNOSTICS

Industry Symposium D
Joint Symposium

Thursday, 26 September 2024, 17:25 - 18:25 **Room: 6**

Is there still room for improvement within the inter-disciplinary infection management in the diagnosis, treatment and prevention of patients with bone & joint infections?

Agenda

- Introduction by the Moderator
- State of the art dianostics for patients with bone & joint infections
- Understanding of antibiotic (bone) tissue pharmacokinetics
- Treatment concepts of systemic antibiotic therapy in bone & joint infections with a focus on implant-associated infections
- Overall discussion and closing remarks

Speakers

Martin Clauss Moderator	University Hospital Basel, Switzerland
Jaime Esteban	Hôpital Universitario Fundación Jiménez Díaz, Spain
Mats Bue	Aarhus University Hospital, Denmark
Efthymia Giannitsioti	Laiko General Hospital, National and Kapodistrian University of Athens, Greece

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- Bacteraemia[I]

Name and active ingredients: Fomicyt 40 mg/ml powder for solution for infusion. One ml of reconstituted solution contains 40 mg fosfomycin. 2 g presentation: Each bottle with 2.69 g of powder contains 2.64 g disodium fosfomycin, corresponding to 2 g fosfomycin and 0.64 g sodium, for reconstitution in 50 ml of solvent. Fomicyt 4 g presentation: Each bottle with 5.38 g of powder contains 5.28 g disodium fosfomycin, corresponding to 4 g fosfomycin and 1.28 g sodium, for reconstitution in 100 ml of solvent. Fomicyt 8 g presentation: Each bottle with 10.76 g of powder contains 10.56 g disodium fosfomycin, corresponding to 8 g fosfomycin and 2.56 g sodium, for reconstitution in 200 ml of solvent **Indications:** Treatment of the following infections in all age groups when it is considered inappropriate to use antibacterial agents that are commonly recommended for their initial treatment: complicated urinary tract infections, infective endocarditis, bone and joint infections, hospital-acquired pneumonia, including ventilator-associated pneumonia, complicated skin and soft tissue infections, bacterial meningitis, complicated intra-abdominal infections, bacteraemia that occurs in association with, or is suspected to be associated with, any of the infections listed above. Consideration should be given to official guidance on the appropriate use of antibacterial agents. **Dosage and administration:** Adults and adolescents 12 years, > 40 kg and with normal renal function (creatinine clearance > 80 ml/min): complicated urinary tract infection 12–24 g in 2–3 divided doses, bone and joint infections 12–24 g in 2–3 divided doses, infective endocarditis 12-24 g in 2–3 divided doses, hospital-acquired pneumonia including ventilator-associated pneumonia 12–24 g in 2–3 divided doses; complicated skin and soft tissue infections 12–24 g in 2–3 divided doses; bacterial meningitis 16–24 g in 3–4 divided doses; complicated intra-abdominal infections 12–24 g in 2–3 divided doses; bacteraemia that occurs in association with, or is suspected to be associated with, any of the infections listed above 12–24 g in 2–3 divided doses. Individual doses must not exceed 8 g. Dose reductions in patients with renal impairment are required (please refer to the SmPC for further information). Paediatric population: for neonates, infants and children <12 years of age (<40 kg) the dosage should be based on age and body weight (please refer to the SmPC for further information). Method of administration: intravenous infusion only. The solvent must be water for injections, 5% or 10% glucose infusion. The duration of infusion should be at least 15 minutes for the 2 g pack size, at least 30 minutes for the 4 g pack size and at least 60 minutes for the 8 g pack size. Please refer to the SmPC for further information. **Contraindications:** Hypersensitivity to the active substance or to any of the excipients. **Special warnings and precautions:** It is recommended that fosfomycin is administered as part of a combination antibacterial drug regimen to reduce the risk of selecting for resistance. It is recommended that fosfomycin is selected to treat the listed indications only when it is considered inappropriate to use antibacterial agents that are commonly recommended for their initial treatment. Serious and occasionally fatal hypersensitivity reactions, including anaphylaxis and anaphylactic shock, may occur during fosfomycin treatment. If such reactions occur, treatment with fosfomycin must be discontinued immediately and adequate emergency measures must be initiated.. Antibacterial agent-associated colitis and pseudo-membranous colitis have been reported. It is important to consider this diagnosis in patients presenting with diarrhoea during or subsequent to administration of Fomicyt. Sodium and potassium levels should be monitored regularly in patients receiving fosfomycin, in particular during prolonged treatment. Given the high content of sodium (0.32 grams) per gram of fosfomycin, the risk of hypernatraemia and fluid overload should be assessed before starting treatment, especially in patients with a history of congestive heart failure or underlying comorbidities such as nephrotic syndrome, liver cirrhosis, hypertension, pulmonary oedema or hypoalbuminemia as well as in neonates under sodium restriction. A low-sodium diet is recommended during treatment. An increase in the infusion length and/or a reduction to the individual dose (with more frequent administration) could also be considered. Fosfomycin may decrease potassium levels in serum or plasma, therefore potassium supplementation should be always considered. In patients receiving fosfomycin intravenously haematological reactions including neutropenia or agranulocytosis have occurred. Please refer to the SmPC for further information. **Interactions:** Numerous cases of increased oral anticoagulant activity have been reported in patients receiving antibiotic therapy. The severity of the infection or inflammation, patient age and general state of health appear to be risk factors. Under these circumstances, it is difficult to determine to what extent the infection itself or its treatment play a role in the INR imbalance. However, certain classes of antibiotics are more involved, particularly: fluoroquinolones, macrolides, cyclins, cotrimoxazole, and certain cephalosporins. **Undesirable effects (see SmPC for full details):** Common: dysgeusia, hypernatraemia, hypokalemia, erythematous eruption, injection site phlebitis. Uncommon: headache, nausea, vomiting, diarrhea, blood alkaline phosphatase increased (transient), transaminases increased (ALAT, ASAT), gamma-GT increased, rash, asthenia. Very rare: anaphylactic reactions including anaphylatic shock and hypersensitivity, Unknown frequency: agranulocytosis (transient), leucopenia, thrombocytopenia, neutropenia, antibiotic-associated colitis, hepatitis, pruritus, urticaria, angioedema. Please refer to the SmPC for further information. **Pack size:** 30/50/100 ml clear glass bottle with rubber stopper and pull off cap containing 2 g, 4 g, or 8 g. **Date of preparation:** October 2020

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[I] available by InfectoPharm and its local distribution partners as:

INFECTOFOS®
Germany, Italy, Poland

FOMICYT®
Austria, France, Greece, Ireland, Netherlands, United Kingdom , Czech Republic, Slovakia and Romania

Fomicyt
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Enquire for availability in your country: https://en.infectopharm.com/contact/, or international@infectopharm.com

[1] Hospital acquired pneumonia, including ventilator associated pneumonia
[I] Bacteraemia that occurs in association with, or is suspected to be associated with, any of the infections listed above

InfectoPharm Arzneimittel und Consilium GmbH
Von-Humboldt-Straße 1, 64646 Heppenheim, Germany · Phone: +49 6252 95-7000 · Fax: +49 6252 95-8844 · E-Mail: kontakt@infectopharm.com · Web: www.infectopharm.com

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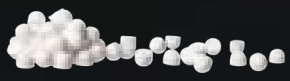
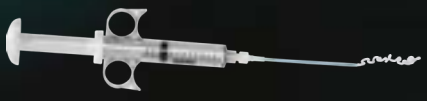
Pioneering products for use in bone and soft tissue infection



STIMULAN®

The only calcium matrix antibiotic carrier for use in bone and soft tissue



genex®

An innovative, versatile calcium compound that supports natural healing, then vanishes without a trace.

SYNICEM™

Preformed, antibiotic loaded hip, knee and shoulder spacers to maintain space and aid treatment of infection.

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Patents granted: GB2367552, EP 1204599 B1, US 6780391, EP 2594231 B1, US 8883063, CN ZL201210466117.X, GB2496710, EP 3058899 B1, US 10390954, US 10,588,748, CN ZL201610089710.5, EP 1390086 B1, US 8632796, CN ZL02809194.9, US 8496955
Patents pending: GB1502655.2, GB1704688.9, EP 18275044.8, US 15/933936, CN 108619579A

MA0418R1

Biocomposites®

Industry Symposium E

Lunch boxes provided

Biocomposites®

Friday, 27 September, 12:35 - 13:35 **Room: 5**

Improving outcomes in complex PJI cases

Agenda

- **Aggregation of marginal gains in periprosthetic joint infections**
- **Optimising Intraoperative Protocols during Periprosthetic Joint Infection Surgery**

Speakers

Mr. Pedro Foguet Moderator	Consultant Orthopaedic & Trauma Surgeon, Coventry, UK
Prof. Lee Jeys	Consultant Orthopaedic Surgeon, Birmingham, UK
Mr. Abtin Alvand	Consultant Orthopaedic Knee Surgeon, Oxford, UK

BONESUPPORT™

CERAMENT® G and CERAMENT® V
- Grow Your Limb Salvage Repertoire

Evidence-based bone healing

- Large amount of pre-clinical and clinical data (240+ publications and counting)
- Randomized controlled trial - the CERTIFY study involves 135 patients and shows that CERAMENT Bone Void Filler is as good as autograft in bone remodeling[1]
- One and only orthobiologic product with robust long-term evidence: 94% infection-free after 6 year follow-up[2]

Clinical outcomes of single-stage protocol

The Oxford Protocol[2]
Chronic osteomyelitis
100 patients
mean follow-up time:
6.05 years

94%
remained
infection-free

97%
did not develop
a fracture

The Fix and Flap[3]
Fracture-related infections
81 patients
mean follow-up time:
4.65 years

96.3%
deep
infection-free

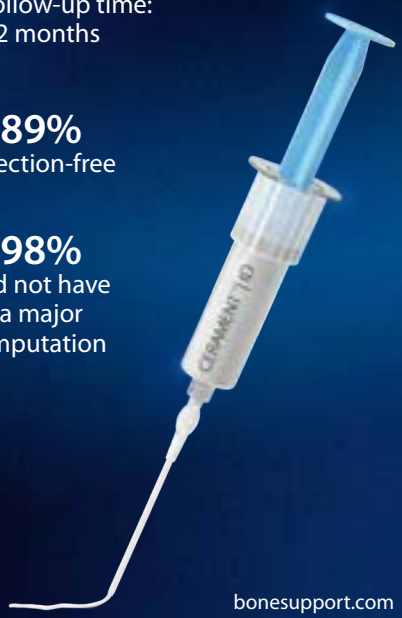
96.3%
limb
salvage rate

96%
bony union rate

Single-stage procedure[4]
Diabetic foot osteomyelitis
103 patients
min. follow-up time:
12 months

89%
infection-free

98%
did not have
a major
amputation



[1]Hofmann, A., Gorbulev, S., Guehring, T., Schulz, A.P., Schupfner, R., Raschke, M., et al., 'Autologous Iliac Bone Graft Compared with Biphasic Hydroxyapatite and Calcium Sulfate Cement for the Treatment of Bone Defects in Tibial Plateau Fractures: A Prospective, Randomized, Open-Label, Multicenter Study', The Journal of Bone and Joint Surgery. American Volume, 102.3 (2020), 179–93
[2]McNally, M.A., Ferguson, J.Y., Scarborough, M., Ramsden, A., Stubbs, D.A., Atkins, B.L., 'Mid- to Long-Term Results of Single-Stage Surgery for Patients with Chronic Osteomyelitis Using a Bioabsorbable Gentamicin-Loaded Ceramic Carrier', The Bone & Joint Journal, 104-B.9 (2022), 1095–1100
[3]Henry, J.A., Ali, A., Elkhidir, I.H., Reid, A., Wong, J., Pillai, A., 'Long-Term Follow-Up of Open Gustilo-Anderson IIIB Fractures Treated With an Adjuvant Local Antibiotic Hydroxyapatite Bio-Composite', Cureus, 15.Mic (2023)
[4]Chow et al. 'Definitive single-stage surgery for treating diabetic foot osteomyelitis: a protocolized pathway including antibiotic bone graft substitute use.' ANZ J Surg. 2024 May 17. doi: 10.1111/ans.19032. Epub ahead of print. PMID: 38760999

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PR 01397-02 en EU 08-2024

Industry Symposium F

Lunch boxes provided

BONESUPPORT™

Friday, 27 September, 12:35 - 13:35 **Room: 6**

CERAMENT® G and CERAMENT® V in FRI and PJI – Definitions and surgical techniques

Agenda

- Welcome and Introduction
- FRI and PJI – Using the definitions
- The rational of local antibiotics in FRI and PJI
- CERAMENT® G and CERAMENT® V in FRI, surgical technique
- CERAMENT® G and CERAMENT® V in PJI, surgical technique
- Panel discussion and Q&A
- Take-home messages

Speakers

Ass. Prof. Dr. Daniel Pérez Prieto Chair	Orthopaedic Surgeon, Hospital del Mar/Hospital de l'Esperança, Barcelona, Spain
Prof. Martin McNally	Honorary Consultant in Limb Reconstruction Surgery, Oxford Bone Infection Unit, Nuffield Orthopaedic Centre, Oxford, UK
Dr. Matt Scarborough	Consultant, Infectious Diseases, Microbiology and General Medicine, Oxford Bone Infection Unit, Nuffield Orthopaedic Centre, Oxford, UK
Mr. Jamie Ferguson	Consultant in Limb Reconstruction Surgery and Trauma, Oxford Bone Infection Unit, Nuffield Orthopaedic Centre, Oxford, UK
Dr. Sebastian Meller	Senior Orthopaedic Surgeon, Head of Department for Hip Surgery and Implant Related Infections, Charité Universitätsmedizin, Berlin, Germany

Exhibitor directory

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Biocomposites
www.biocomposites.com
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At Biocomposites, we are distinct in that our team of specialists is singularly focused on the development of innovative calcium compounds for surgical use. With over 30 years' experience and an unrivalled dedication to quality, the products we research, engineer and manufacture are at the forefront of calcium technology. We are proud to be driving improved outcomes across a wide range of clinical applications, in musculoskeletal infection, trauma, spine and sports injuries, for surgeons and patients alike.

BONESUPPORT
www.bonesupport.com
Booth 2

BONESUPPORT™ sells CERAMENT, synthetic bone substitutes that promote and protect bone healing. There are three CERAMENT products; CERAMENT BONE VOID FILLER, CERAMENT G with gentamicin and CERAMENT V with vancomycin. All three products remodel into bone within 6-12 months, and CERAMENT G and V also elute either gentamicin or vancomycin to provide a high local concentration of antibiotic that protects bone healing. Our products are used when bone defects cannot heal by themselves, for example in trauma, fracture-related infection, chronic osteomyelitis and diabetic foot osteomyelitis.

Heraeus Medical
www.heraeus.com
Booth 12

Heraeus Medical stands for delivering value to the patient, the healthcare professional and the healthcare system through innovation and evidence based medicine in Implant Fixation, Infection Management and regenerative treatments for bone, cartilage and soft tissue. Over the years the company built up extensive experience in the field of therapeutic support for PJI with local antibiotics and is a reliable and committed partner in all aspects that deal with the management of musculoskeletal infections.

Gold Sponsors

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A world leader in in vitro diagnostics for 60 years, bioMérieux provides solutions that determine the origin of a disease. World leader in microbiology, specialized in immunoassays, and leading pioneer in the syndromic molecular approach, the Company is committed on major public health issues, such as antimicrobial resistance, sepsis, and respiratory infections. Our BioFire® Joint Infection Panel detects multiple bacteria, fungi, and antimicrobial resistance genes directly from a single patient sample with results available in about 1 hour.

InfectoPharm
www.en.infectopharm.com/international-partners
Booth 4

InfectoPharm is a family-owned company located in Germany. With IV FOSFOMYCIN (product names Fomicyt®, InfectoFos® and Fosfomycin InfectoPharm), InfectoPharm offers a therapeutic option to fight severe infections in a broad indication spectrum. It is an antibiotic of it´s own class with unique product characteristics: unique mode of action, a tissue penetration champion, capable of penetrating tissue with poor accessibility with high bactericidal levels with broad spectrum against Gram positive and – negative pathogens including MDR bacteria.

Zimmer Biomet
www.zimmerbiomet.eu
Booth 11

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EUROPEAN CELL AND TISSUE BANK
www.ectb.eu
Booth 5

EUROPEAN CELL AND TISSUE BANK (ECTB), a non-profit association, based in Austria. In compliance with the EU directives, we procure, store, processes and distribute tissue, and offer with OSmycin™, a human bone allograft, impregnated with antibiotics (Vancomycin or Tobramycin). OSmycin™ for simultaneously preventing infection and biofilm while reconstructing of bone defects.

Exhibitor directory

Bronze Sponsors

Company	Booth

Bonalive Biomaterials
www.bonalive.com
Booth 23

At the intersection of technology and human biology, Bonalive® granules reduces the need for antibiotics in the resolution of chronic bone infections. Bonalive Biomaterials provides patients and surgeons with well-proven and safe bone regenerative products in orthopedics, trauma, spine and septic bone surgery. It's time to heal smarter. #SmartHealing

G-21
www.g21.it
Booth 18

G-21 is an innovator in the bone cement market for orthopedics and minimally invasive spine surgery bringing strenght to life for every patient. Commitment, dedication and drive to find modern solutions combined with proprietary patents make the G-21 portfolio unique in the industry. The entire product portfolio has been developed in-house and tested through research programs with renowned institutions and universities worldwide. Located outside Modena, Italy, quality and manufacturing are critical to consistently delivering high-performing cement and accessories to the market in over 45 countries.

Inbiome
www.inbiome.com
Booth 24

InBiome specializes in advanced molecular technology aimed at improving health and longevity. Our Molecular Culture® technology enables rapid and precise detection of bacteria in clinical samples, with assays that are CE/IVD marked. The technology not only identifies individual bacteria but also complex microbiotas at the species level. InBiome collaborates with universities and hospitals to advance bacterial diagnostics and preventive healthcare. Our main products include Molecular Culture® and Molecular Culture® Microbiota.

Lyfstone
www.lyfstone.com
Booth 22

Dedicated to PJI diagnostics, Lyfstone provides advanced, accurate, CE-IVD compliant rapid testing that enables healthcare professionals to improve patient outcomes.

MicroGenDX
www.microgendx.com
Booth 13

MicroGenDX is the leader of microbial infection diagnostics through Next-Generation Sequencing (NGS), with more than 1,5 million patient samples processed, the most comprehensive bioinformatics pipeline and over 70 clinical studies published, of which 23 in orthopedics. Our highly sensitive, fast and affordable molecular diagnostics will be available in Europe soon.

Bronze Sponsors

Company	Booth

Molzym
www.molzym.com
Booth 17

Molzym produces and markets high-quality products for the culture-independent molecular detection of pathogens. Products range from CE-IVD-marked diagnostic solutions, host DNA depletion kits (MolYsis™) to ultra-clean PCR assays.

OSARTIS GmbH
www.osartis.de/en
Booth 15

OSARTIS GmbH is a medical device company located in Germany focusing on the development, registration, production and distribution of medical biomaterials and PMMA bone cements.

Pfizer
www.pfizer.com
Booth 16

Pfizer's mission and vision is better known as Pfizer's purpose, which is Breakthroughs That Change Patients' Lives. Pfizer culture is driven by four core values: courage, excellence, equity, and joy.

Resorba Medical GmbH
www.resorba.com
Booth 19

RESORBA Medical GmbH is an Advanced Medical Solutions Group company. Advanced Medical Solutions Group is a world-leading independent developer and manufacturer of innovative tissue healing technologies, focused on value for customers and quality outcomes for patients. Our GENTA-COLL® resorb sponges combine the haemostatic properties of collagen with effective protection from the antibiotic gentamicin.

Tecres
www.tecres.it
Booth 14

For over 40 years Tecres has developed and manufactured PMMA bone cements for orthopaedics and devices for supporting the treatment of PJI. Cemex bone cements and Spacer, the unique temporary antibiotics-loaded prostheses for two-stage septic revision, are successfully sold worldwide. These products are available also in the combination Vancomycin-Gentamicin. We are active also in the field of spinal surgery and neurosurgery.

From Casa Milà la Pedrera Barcelona

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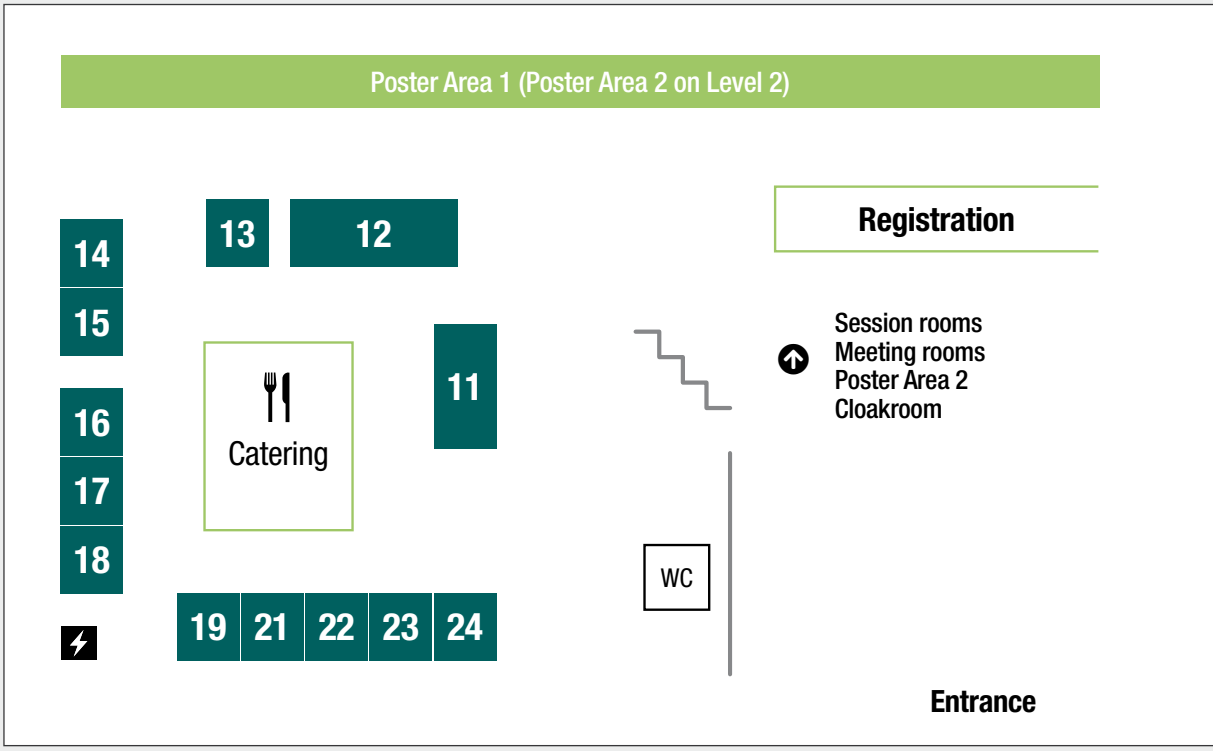
	**Teknimed** www.teknimed.com	Booth 9

Floor plan



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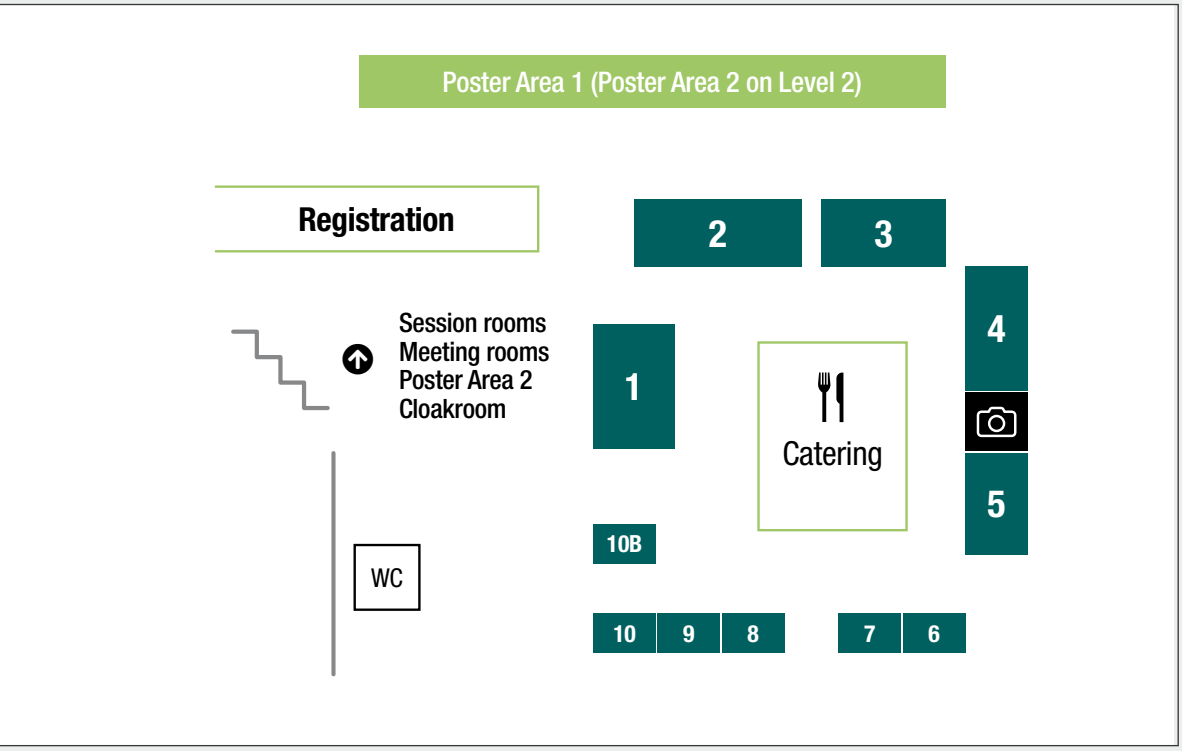
1	Biocomposites	Biocomposites	8	Globus Medical/ NuVasive	GLOBUS MEDICAL | NUVASIVE
2	BONESUPPORT	BONESUPPORT	9	Teknimed	Teknimed
3	bioMérieux		10	Axonlab	Axonlab
4	InfectoPharm	INFECTOPHARM Knowledge is Health	10B	FORTE	FORTE
5	ECTB	ECTB	11	Zimmer Biomet	ZIMMER BIOMET Moving You Forward.
6	M dialysis	μ dialysis	12	Heraeus Medical	Heraeus Medical
7	Diagante	Diagante	13	MicroGenDX	MicroGenDX



14	Tecres	TECRES	19	RESORBA	RESORBA BIOSURGICALS
15	OSARTIS Gmbh	OSARTIS	21	Silver Bullet Therapeutics	Silver Bullet Therapeutics
16	Pfizer	Pfizer	22	Lyfstone	LYFSTONE
17	Molzym	molzym reveal DNA	23	Bonalive Biomaterials	bonalive
18	G-21	G21	24	Inbiome	inbiome.

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