Joint Event

11th International Conference on

OSTEOPOROSIS, ARTHRITIS & MUSCULOSKELETAL DISORDERS

&

10th INTERNATIONAL CONFERENCE ON ARTHROPLASTY

December 04-05, 2017 | Madrid, Spain

Scientific Tracks & Abstracts

Day 1

Sessions

Pelvic Fractures | Arthroplasty | Joint Replacement Surgery | Injuries Around the Hip | Arthritis and Related Diseases | Intervertebral Disc Disorders | Injuries to Leg, Ankle and Foot | Hand Injuries | Rheumatoid Arthritis | Novel Pharmacological Treatments

Session Chair
Fereidoon M Jaberi
Shiraz University of Medical Sciences | Iran

Session Co-Chair
Neil P Sheth
University of Pennsylvania | USA

Session Introduction

Title: Robotic arm assisted uni-compartmental knee replacement - The learning curve
Cathleen J O'Neill, Cork University Hospital, Ireland

Title: Circulation based classification of femoral neck fracture - New discoveries of intraosseous blood supply of proximal femur
Dewei Zhao, Affiliated Zhongshan Hospital of Dalian University, China

Title: An *in vivo* study of 3 artificial cervical discs: Are unconstrained designs susceptible to migration?
Jamie L Baisden, Medical College of Wisconsin, USA

Title: Infected total Knee replacement: Outcomes of alternative management options
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Title: The trigonometric algorithm defining the true three-dimensional acetabular cup orientation: Correlation between measured and calculated cup orientation angles
T E Snijders, Clinical Orthopedic Research Center, Netherlands

Title: Decision support tool for diagnosis of Rheumatoid Arthritis
Alireza Sadeghpour, Tabriz University of Medical Sciences, Iran

Title: Clinical experience in 10 patients implanted with a contralateral prophylactic medical device in case of first low-energy hip fracture due to osteoporosis
Szpalski Marek, Hôpitaux Iris Sud, Belgium

Title: Human type H vessels are a sensitive marker of bone mass
Liang Wang, The Second Affiliated Hospital of Soochow University, China

Title: Treatment of post-traumatic elbow stiffness - Our experiences
Cunyi Fan, Shanghai Sixth People's Hospital, China

Title: Metal on metal hip arthroplasty outcome ten years study
Ahmed Bakr, North Manchester General Hospital, UK

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Robotic arm assisted uni-compartmental knee replacement - The learning curve

Cathleen J O'Neill[1] and **Stephen A Brennan**[2]
[1]Cork University Hospital, Ireland
[2]Holy Spirit Northside Hospital, Australia

Introduction: Robotic technology is increasingly being employed in the orthopaedic operating theatre. The adoption of this new technology will have a significant impact on patients, surgeons and hospital resources. As with the advent of any new surgical technology, it is imperative that robotics is introduced in a responsible fashion and that patient safety and outcome is not compromised during the learning process. We describe our initial MAKOplasty experience.

Methods: Data was collected prospectively on the combined first 50 cases performed by 5 surgeons. Twenty-nine males and 21 females with a mean age of 63years (range 52-82) were analyzed. Times were recorded pertaining to set-up, surgical procedure, burring, tourniquet use and total theatre usage. Wound length and estimated blood loss were also recorded. Intra-operative surgical difficulties along with post-operative complications and length of stay were recorded. Pre- and post-operative Oxford scores were compared using a paired student's t- test.

Results: The set-up time averaged 36 mins and operative ("skin to skin") time 101 mins. The total theatre utilization was 143 mins for single and 255 mins for bilateral cases. The mean burr time was 18 mins and the mean tourniquet time 90 mins. Wound length was 106 mm and mean estimated blood loss 46 ml. Mean length of hospital stay was 1.4 days for single and 2.4 days for bilateral cases. The mean Oxford score improved from 24.5 pre-operatively to 38.3 post-operatively $p<0.0001$. No robotic procedures were abandoned. There was one deep venous thrombosis and no deep infections.

Conclusion: Our data confirms the safe introduction of robotic technology. No trend was observed in terms of reduction in operative times. This may indicate that the plateau for institutional learning has not yet been reached. Further analysis of individual surgeon learning curves may show a reduction in operative times as case load increases. No serious adverse events were recorded.

Recent Publications

1. Fives C, O'Neill C J, Murphy R, Corrigan M A, O'Sullivan M J, Feeley L, Bennett M W, O'Connell F and Browne T J (2016) When pathological and radiological correlation is achieved, excision of fibroadenoma with lobular neoplasia on core biopsy is not warranted. Breast 30:125-129.
2. Brennan SA, O'Neill CJ, Tarazi M and Moran R (2013) Bilateral neck of femur fractures secondary to seizure Practical Neurology doi: 10.1136/practneurol-2013-000754.
3. Brennan S A, Devitt B M, O'Neill C J and Nicholson P (2012) Periprosthetic fractures in the resurfaced hip-A case report and review of the literature. Injury 44(2):263-265.

Biography

Cathleen J O'Neill is currently employed as a Senior House Officer. She is Core Trainee in Year 1 in the Department of Orthopaedics, Cork University Hospital, Cork, Ireland. She has completed her BSc Physics in 2004. She did her MSc Medical Physics in 2005. She did her MRCS in 2017 and currently working as Senior House Officer in Cork University Hospital in Ireland.

cathleen.oneill@gmail.com

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Circulation based classification of femoral neck fracture - New discoveries of intraosseous blood supply of proximal femur

Dewei Zhao, Zihua Wang and **Benjie Wang**
Affiliated Zhongshan Hospital of Dalian University, China

Purposes: To explore the characteristics and interconnections of the intraosseous vessel system between different areas of the femoral head and the possible blood supply compensatory mechanism after femoral neck fracture (FNF).

Methods: The 3-D structures of the extra- and intraosseous arteries in 30 uninjured normal human femoral heads were reconstructed and quantified using angiography methods and micro CT scans, AMIRA and MIMICS. We also evaluated the residual blood supply of femoral heads in 27 patients with FNF before surgery by analyzing digital subtraction angiography (DSA) data. The number of affected and unaffected groups of retinacular arteries with different Garden types of fractures were recorded and analyzed to reflect the affected degrees of these three groups of retinacular arteries in patients after FNF.

Results: Epiphyseal arterial network is the most widely distributed and the primary network structure in the femoral head; the main stems of the epiphyseal arteries which were located on the periphery of the intraosseous vascular system have fewer anastomoses than the central region. The DSA of the 27 patients with hip fractures indicated that the inferior retinacular arterial system had a high likelihood of being unaffected after FNF.

Conclusions: The epiphyseal arterial network and inferior retinacular arterial system appear to be two important structures for maintaining the femoral head blood supply after FNF. Increased efforts to protect these key structures during surgery, such as drilling and placing internal implants closer to the central region of the femoral head, might be helpful to reduce the effect of iatrogenic injury of the intraosseous vascular system.

Recent Publications

1. Zhao D, Qiu X and Wang B, et al. (2017) Epiphyseal arterial network and inferior retinacular artery seem critical to femoral head perfusion in adults with femoral neck fractures. Clin Orthop Relat Res. 475(8):2011-2023.
2. Kamada T, Mashima N and Nakashima Y, et al. (2015) Mid-term clinical and radiographic outcomes of porous tantalum modular acetabular components for hip dysplasia. Journal of Arthroplasty 30(4):607-10.
3. Paton RW (2017) Screening in Developmental Dysplasia of the Hip (DDH). Surgeon 15(5):290-296.
4. Clohisy JC (2017) Developmental dysplasia of the hip: contemporary concepts and treatment innovations. Journal of Arthroplasty 32(9S): S18-S19.
5. Tarpada S P, Girdler S J and Morris M T (2017) Developmental dysplasia of the hip: a history of innovation. Journal of Pediatric Orthopaedics. Doi: 10.1097/BPB.0000000000000463.

Biography

Dewei Zhao is a President of Affiliated Zhongshan Hospital of Dalian University, and President of Chinese Association of Microsurgery Surgeons. He dedicates in the treatment of osteonecrosis of femoral head (ONFH) for nearly three decades. Based on anatomical and clinical study, he has made original series surgical techniques for reconstruction of the necrotic femoral head, and these techniques can be applied in every stage of ONFH. He is the editor of nine academic journals. He has published more than 200 papers in basic and clinical research of ONFH, the new finding of circulation of femoral head, new metal biomaterials and their clinical application. His work is especially important for younger patients with symptomatic ONFH.

zhaodewei2000@163.com

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An *in vivo* study of three artificial cervical discs: Are unconstrained designs susceptible to migration?

Jamie L Baisden, Hoon Choi and **Narayan Oganandan**
Medical College of Wisconsin, USA

Statement of the Problem: Artificial cervical discs (ACDs) have been used, instead of the conventional ACDF in the military. ACDs have potential advantages of motion preservation and reduction of adjacent segment degeneration. Disc implants are classified as constrained, semi-constrained, and unconstrained device types. There have been independent reports of anterior migration and, sometimes disintegration, of non-constrained artificial discs. *In vivo* studies investigating the potential migration of the artificial disc are limited.

Purpose: The objective of this study is to examine the migration aspects in cervical discs using an *in vivo* model capable of simulating the axial load on the neck, and this mimics the human.

Methods: C3-C4 ACD was performed with commercial implants in twelve adult alpine caprines. There were three groups: Group A received constrained; group B received semi-constrained; group C received unconstrained ACD. Intra- and postoperative radiographs were performed to confirm hardware position. Goats were monitored for six months postoperatively. All goats tolerated cervical arthroplasty well and had satisfactory placement of the ACD implant on intra-operative radiography. There was no migration of the implants in Groups A and B. Complete anterior extrusion of the inferior plate out of the disc space and disintegration of the implant occurred within one week after surgery in three goats in Group C. The fourth goat had anterior extrusion at five weeks.

Conclusions & Significance: Biomechanical responses under flexion/extension loading depend on the type of the ACD. Unconstrained ACD implants rely on axial loading and limited range of motion of the disc segment to preserve integrity. Unconstrained ACD implants may not be the most efficacious in individuals with a hypermobile neck and/or occupation involving head supported mass/helmets resulting in additional axial loads and repetitive motions of the cervical spinal column regions.

Recent Publications

1. Alvin MD, et al. (2014) Cervical arthroplasty: a critical review of the literature. The Spine Journal 14 (9):2231-2245.
2. Ozbek Z, et al. (2017) Implant migration in cervical disk arthroplasty. World Neurosurgery 97:390-397.
3. Tsermoulas G and Bhattathiri PS (2013) Anterior migration of prosthesis following cervical arthroplasty. British Journal of Neurosurgery 27(1):132-133.
4. Wagner S C, et al. (2014) Implant migration after Bryan cervical disc arthroplasty. The Spine Journal 14(10):2513-2514.
5. Wagner S C, et al. (2016) Traumatic migration of the bryan cervical disc arthroplasty. Global Spine Journal 6(1): e15-20.

Biography

Jamie L Baisden is a Professor of Neurosurgery at the Medical College of Wisconsin specializing in Complex Spine. She has completed fellowships in Complex Spinal Surgery and Spinal Cord Medicine and has a Master's in Medical Management from USC. Her research interests include spinal biomechanics, spinal trauma, and evidence based medicine guideline development for spinal disorders.

jbaisden@mcw.edu

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Infected total knee replacement: Outcomes of alternative management options

Mohammed A Almustafa, Simon Barton and **David S Johnson**
Stockport NHS Foundation Trust, UK

Background: Prosthetic joint infection (PJI) is a catastrophic complication following knee arthroplasty. Appropriate diagnosis and management are crucial to maintain a patient's function and reduce morbidity.

Aim: Assess the outcome of three management strategies: revision of implant (1 or 2 stage); debridement and implant retention (DAIR); long-term suppressive therapy (including initial aspiration/washout).

Methods: 72 patients were identified as having a PJI within a knee replacement presenting to a single centre between January 2000 and October 2014. Case records were reviewed to assess management and outcome of treatment, including success determined by avoidance of further surgery/relapse.

Results: Two patients underwent only the first of a two-stage revision; one ankylosed without symptoms; one declined the second stage due to satisfactory function with a cement spacer still functioning well at four years.

Conclusion: Revision (1 or 2 stage) of all implants remains the gold standard of care for PJI following knee replacement. Long-term suppressive therapy provided acceptable rates of infection control in patients unfit for revision surgery and was more effective than DAIR in our cohort. Patients unfit for surgical management of their PJI have an extremely high one-year mortality rate.

Implications: Suppressive therapy is an acceptable treatment strategy for the surgical unfit patient with PJI of a knee replacement.

Recent Publications

1. N C Sciberras, M Almustafa, B R K Smith, A H Deakin, D J Allen and F Picard (2016) A randomized controlled trial to compare component placement in navigated total knee arthroplasty using original and streamlined registration processes. Arthroplasty Today 3(2):111-117
2. A M Ewen, M Almustafa, J V Clarke and F Picard (2015) Infection rate and risk factors following primary total hip arthroplasty. The Bone and Joint Journal 97-B (SUPP 12) 50.
3. M Almustafa, A M Ewen, A H Deakin and F Picard. Risk Factors and Infection Rates Following Total Knee Replacement at the Golden Jubilee National Hospital 2009 – 2010.

Biography

Mohammed A Almustafa has his expertise evaluation in Orthopedics and Trauma Surgery. He had his training in Trauma and Orthopaedics in the East of England Deanery. Presently, he is working at the Department of Trauma and Orthopedics, Stockport NHS Foundation Trust, Stockport.

almagly@hotmail.com

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Fracture calcaneus early weight bearing

Yasser Allam
Jeddah Clinic Hospital, Saudi Arabia

Introduction: Fracture of the heel bone is one if challenging injury whatever its type closed or open. There are many ways and studies for the treatment of this fracture either open reduction and internal fixation with plate and screws or with screws only or closed reduction and casting or percutaneous Pinning or external fixation either uniplanar or multiple planers or even with Ilizarov fixator. In all the above methods of treatment, the patient is not allowed to walk or to do weight bearing over affected limb until the fracture is healed completely and this may take about 12 to16 weeks.

Aim: The aim of this study is how to make the patient with fracture calcaneus (heel bone) able to walk and to do weight bearing not only as early as possible but even directly in the next day after surgery.

Method: Ilizarov frame was designed especially for this fracture composed if tow complete rings at the tibia and foot U-shape ring to the heel and foot and one distal flying complete ring. The complete rings of the tibia are fixed to it with two wires for each ring, the proximal ring is fixed to the upper third of the tibia about 8 centimeters distal to tibial tuberosity and the distal ring is fixed to the distal third of the tibia about 8 centimeters above the ankle joint and the heel U shape ring is fixed to the calcaneus with multiple olive wires which enable us to do reduction of all the fracture fragments in all directions and the two limbs of U shape ring is fixed with one or two wires to the distal third of metatarsal bones by this we did foot frame and fracture had been reduced and fixed but still the patient cannot walk or stand on the fractured limb and this is the aim of this study. So, we add the flying distal ring to the frame to act as a metallic heel instead of the fractured one. And to avoid fracture mechanical loading to fracture fragments which will lead to displacement we connect the flying ring with rods to the tibial rings by passing the heel ring this mean that all mechanical loads and stresses of weight bearing will be transmitted directly to the tibia and will not disturb the fracture reduction and healing.

Results: 23 fractures if the calcaneus treated with this method, 15 were unilateral and four patients were the bilateral calcaneal fracture. Tow from the bilateral calcaneal fracture had fracture spine which treated with spine team by fixation. All the patients including those with fracture spine and bilateral fracture calcaneus could move and ambulate in the next day of surgery. The healing time range is from 12 to 16 weeks. Follow up from five years to one year, No osteoarthritis noticed at ankle or subtalar 3D computed tomography post healing revealed healing in excellent anatomical position.

Recent Publications

1. Karasick D (2004) Nursemaid elbow revisited and a review of congenital radioulnar synostosis. Radiographics. 24(6):1068–1610.
2. Salter R B and Zaltz C (1971) Anatomic investigations of the mechanism of injury and pathologic anatomy of "pulled elbow" in young children. Clinical Orthopaedics and Related Research 77:134–143.
3. Macias C G, Bothner J and Wiebe R (1998) A comparison of supination/flexion to hyperpronation in the reduction of radial head subluxations. Pediatrics 102(1): e10.
4. Kaplan R E and Lillis K A (2002) Recurrent nursemaid's elbow (annular ligament displacement) treatment via telephone. Pediatrics 110(1 Pt 1):171–174.
5. Krul M, van der Wouden J C, Koes B W, Schellevis F G, van Suijlekom-Smit LWA (2010) Nursemaid's elbow: its diagnostic clues and preferred means of reduction. Journal of Family Practice 59(1): E5–E7.

Biography

Yasser Allam has his expertise evaluation in Orthopedic Surgery. His open and contextual evaluation model based on responsive constructivists creates new pathways for improving healthcare. He has built this model after years of experience in research, evaluation, teaching and administration both in hospital and education institutions. He started his experience with a case of infected non-united femoral shaft fracture and he got a job as a Scientific Office Director for the agent of Russian Ilizarov Scientific Center, Kurgan in Egypt.

allam.yaser@yahoo.com

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Long-term results of hemiarthroplasty compared to arthrodesis for osteoarthritis of the first metatarsophalangeal joint

Stefan Beekhuizen and **R Onstenk**
Green Heart Hospital, The Netherlands

If operative treatment is opted for grade III and IV osteoarthritis of the first metatarsophalangeal joint, arthrodesis is considered standard care. However, if preservation of joint mobility is preferred, implant arthroplasty could be favored. Previous studies suggest hemiarthroplasty might result in less pain, better function and higher patient satisfaction compared to arthrodesis. However, these studies only evaluated short-term (range 2.2-6.6 years) results. The aim of our study was to determine whether patients treated with hemiarthroplasty showed better postoperative outcomes compared to those treated with arthrodesis after a period of at least 5 years after surgery. The American Orthopaedic Foot and Ankle Society Hallux Metatarsophalangeal Interphalangeal (AOFAS-HMI) scale score was measured as primary outcome. Secondary outcomes addressed satisfaction rates, recommendation of the performed procedure and number of unplanned surgical repeat procedures. We also addressed influence of the procedures on daily activities (work as well as sports), influence of smoking on postoperative results and costs for both procedures. A total of 47 primary arthrodesis and 31 hemiarthroplasties performed between January 2005 and December 2011 were evaluated. After a mean follow-up of 8.3 years (range 5-11.8) the mean AOFAS-HMI scale score after arthrodesis and after hemiarthroplasty were 72.8±14.5 and 89.7±6.6, respectively ($p=0.001$). Patients were significantly more pleased after hemiarthroplasty ($p<0.001$) and this procedure was better recommended ($p<0.001$). The number of unplanned repeat surgical procedures did not differ between the two groups. Patients resumed sports activities significantly sooner after hemiarthroplasty ($p=0.002$). Overall costs were similar for both procedures. Our study shows more favorable post-operative results for hemiarthroplasty compared to arthrodesis as operative treatment for osteoarthritis of the first metatarsophalangeal joint after a mean follow-up of 8.3 years.

Recent Publications

1. Voskuijl T and Onstenk R (2015) Operative Treatment for Osteoarthritis of the First Metatarsophalangeal Joint: Arthrodesis Versus Hemiarthroplasty. Journal of Foot and Ankle Surgery 54(6):1085-1088.
2. Simons K H, van der Woude P, Faber FWM, van Kampen PM and Thomassen BJ (2015) Short-term Clinical Outcome of Hemiarthroplasty Versus Arthrodesis for End-Stage Hallux Rigidus. Journal of Foot and Ankle Surgery 54(5):848-851.
3. Kim P J, Hatch D, Didomenico L A, Lee M S, Kaczander B, Count G and Kravette M (2012) A multicenter retrospective review of outcomes for arthrodesis, hemi-metallic joint implant, and resectional arthroplasty in the surgical treatment of end-stage hallux rigidus Journal of Foot and Ankle Surgery 51(1):50-56.
4. Taranow W S, Moutsatson M J and Cooper J M (2012) Contemporary Approaches to Stage II and III Hallux Rigidus: The role of Metallic Hemiarthroplasty of the Proximal Phalanx. Foot and Ankle Clinics 10(4):713-728.
5. Clement N D, MacDonald D, Dall G F, Ahmed I, Duckworth A D, Shalaby H S and McKinley J (2016) Metallic hemiarthroplasty fort the treatment of end-stage hallux rigidus. Bone and Joint Journal 98:945-951.

Biography

Stefan Beekhuizen is a Resident in Orthopaedic Surgery. His first study was "Long-term results of hemiarthroplasty compared to arthrodesis for osteoarthritis of the first metatarsophalangeal joint". In future, he would like to dedicate himself for orthopaedic care in the Third World.

stefanbeekhuizen@me.com

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The trigonometric algorithm defining the true three-dimensional acetabular cup orientation: Correlation between measured and calculated cup orientation angles

T E Snijders, T P C Schlösser, S M van Gaalen, R M Castelein, H Weinans and **A de Gast**
Clinical Orthopedic Research Center, The Netherlands

Background: Acetabular cup orientation plays a key role in implant stability and success rate of total hip arthroplasty (THA). To date, the orientation is measured with different imaging modalities and definitions, leading to lack of consensus on optimal orientation. A three-dimensional (3-D) concept, which measures orientation in the three anatomical perpendicular planes and describes their mathematical relationship, enables universal definitions and quantifies cup orientation around the transverse axis in the sagittal plane. The latter is important, because high-risk movements for dislocation are mainly around the transverse axis in the sagittal plane. Purpose: To test the legitimacy and reliability of a 3-D concept to establish acetabular cup orientation.

Material & Methods: Twenty computed tomographic scans of patients with twenty-two primary THA in situ were systematically collected. On multiplanar reconstructions, three observers independently measured cup orientation in terms of coronal inclination, sagittal tilt and transverse version. The angles measured in two anatomical planes were used to calculate the angle in the third plane via a trigonometric algorithm. For correlation and reliability analyses, intra- and interobserver differences between measured and calculated angles were evaluated using the intra-class correlation coefficient (ICC).

Results: Measured and calculated angles had an ICC of 0.974 for coronal inclination, 0.993 for sagittal tilt and 0.993 for transverse version. Intra- and interobserver reliability had an ICC of 0.987 and 0.987 for coronal inclination, 0.979 and 0.981 for sagittal tilt and 0.992 and 0.978 for transverse version, respectively.

Conclusion: The 3-D concept with its trigonometric algorithm is a legitimate and reliable measurement tool. This 3-D concept can be used to determine the transverse version of acetabular cups from coronal inclination and sagittal tilt measurements. This offers the opportunity to have universal definitions whatever imaging modality is used and introduces the sagittal tilt, that comprehends the orientation of the cup around the transverse axis. Therefore, this straightforward 3-D concept can provide improved insight in optimal cup orientation.

Recent Publications

1. Snijders T, van Gaalen S M and de Gast A (2017) Precision and accuracy of imageless navigation versus freehand implantation of total hip arthroplasty: A systematic review and meta-analysis. International Journal of Medical Robotics and Computer Assisted Surgery doi: 10.1002/rcs.1843.
2. Alessandro Liberati et al., (2009) The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. PLoS Med6(7): e1000100

Biography

T E Snijders is a Researcher working in Department of Orthopedics at Clinical Orthopedic Research Center – (CORC-mN). He is a Professor in Diakonessenhuis Zeist in Netherlands. His research interests are Orthopedics and Trauma.

tsnijders@diakhuis.nl

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Clinical experience in 10 patients implanted with a contralateral prophylactic medical device in case of first low-energy hip fracture due to osteoporosis

Szpalski Marek[1], **Le Huec Jean Charles**[2], **Jayankura Mark**[3] and **Reynders Pieter**[4]
[1]Hôpitaux Iris Sud, Belgium
[2]Pellegrin Hospital, France
[3]Erasme Hospital, Belgium
[4]University Hospital of Brugmann, Belgium

An innovative implant, Y-STRUT® (Hyprevention, France), was developed to provide prophylactic reinforcement of the proximal femur in patients suffering from a first hip fracture due to osteoporosis. We present our clinical experience on the first 10 patients implanted between February 2013 and December 2016. Prophylactic consolidations were performed under the same anesthesia of a hip fracture surgical treatment in the opposite side for patients at high risk of contralateral fracture. A multicenter prospective pilot study is ongoing on a planned cohort of 15 osteoporotic patients. Mid-term tolerance and safety of the studied device are assessed with several criteria, such as walking recovery, pain, radiographic control and adverse events. Clinical efficacy is evaluated through the occurrence of fractures. Ten elderly patients (mean 82±7 yrs.) were implanted because of a severe osteoporosis (mean T-score -3.64±0.8) resulting in first hip fractures. Follow-up ranges from 4 to 46 months and in all patients, wound healing was achieved, with no case of wound infection, bleeding, or inflammation. Radiographic exams performed at 3-month-follow-up revealed that the device was well integrated in the bone. No hospitalization lengthening was needed and all patients recovered walking and no pain was reported at 3 weeks (mean VAS was 0.9±0.7). Several post-operative falls were reported and no post-operative fracture was observed. Preliminary results from this study demonstrated the tolerance and safety as well as the short-term clinical efficacy of the studied device. Additional data need to be recorded on a greater number of subjects and longer follow-up to confirm the clinical benefits of Y-STRUT® implantation.

Biography

Szpalski Marek is the President of the Orthopedic Surgery and Traumatology Department at Iris South Teaching Hospital/ Moliere Longchamp in Brussels (Belgium). He is a Professor of Orthopedic at Libre University of Brussels and Professor of Orthopedic at New York University. He is Co-Inventor of the study device, Y-STRUT®.

mszp@skynet.be

Notes:

Liang Wang, J Clin Exp Orthop 2017, 3:4(Suppl)
DOI: 10.4172/2471-8416-C1-002

Human type H vessels are a sensitive marker of bone mass

Liang Wang
The Second Affiliated Hospital of Soochow University, China

Vascularization is fundamental for bone formation and bone tissue homeostasis. However, in human subjects, a direct molecular relationship has not been identified between angiogenesis and agents that promote bone disease or factors related to age. Osteopenia is a condition in which bone mineral density (BMD) is lower than normal, and it represents a sign of normal aging. Here, we tested whether the type H vessel, which was recently identified as strongly positive for CD31 (also known as PECAM1, platelet/endothelial cell adhesion molecule 1) and endomucin (CD31hiEmcnhi) in mice, is an important indicator of aging and osteopenia in human subjects. We found that age-dependent losses of type H vessels in human bone sections conform to the observations in aged mice. The abundance of human type H vessels and osteoprogenitors may be relevant to changes in the skeletal microarchitecture and advanced osteopenia. Furthermore, ovariectomized mice, a widely used model for postmenopausal osteoporosis, exhibited significantly reduced type H vessels accompanied by reduced osteoprogenitors, which is consistent with impaired bone microarchitecture and osteoporosis, suggesting that this feature is an indicator of bone mass independent of aging. More importantly, oral administration of desferrioxamine (DFO) led to significantly increased bone mass via enhanced angiogenesis and increased type H vessels in ovariectomized mice. Altogether, these data represent a novel finding that type H vessels are regulated in aged and osteopenia subjects. The abundance of human type H vessels is an early marker of bone loss and represents a potential target for improving bone quality via the induction of type H vessels.

Biography

Liang Wang has completed his PhD from the Second Affiliated Hospital of Soochow University. He is an Orthopedic Surgeon and he has published lots of papers in this field.

liangw1010@163.com

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Treatment of post-traumatic elbow stiffness - Our experiences

Cunyi Fan
Shanghai Sixth People's Hospital, China

Introduction: Elbow stiffness is one of the most common elbow disorders because of its nature being vulnerable to contracture. The conservative treatment should be recommended firstly, then the surgical intervention is indicated after the failure of the conservative attempt. From 2010 to 2015, we have treated 258 cases of post-traumatic elbow stiffness in our center.

Pre-operative Assessment: Patient history including the incision, internal fixation, and nerve intervention would guide the plan of surgery. An overall physical examination should be emphasized including extension and flexion deficiency, rotation limitation, stability, skin contracture, and nerve symptoms. Radiographic assessment aims to address the heterotrophic ossification, malunion, joint space, and target pathologies such as synovium.

Surgical Techniques: A single lateral or medial approach is sufficient for moderate elbow stiffness. We recommend the combined medial and lateral approaches to treat severe stiff elbows. General release and clearance should cover the hypertrophic capsule, humeroradial joint, triceps, olecranon fossa, coronoid fossa, and HO. The anterior bundle of the medial collateral ligament and lateral ulnar collateral ligament should be left intact to prevent instability while we further release the ligament contracture. Ulnar nerve anterior transposition is routinely performed to prevent ulnar nerve symptoms. We believe it reasonable and helpful to adopt a hinged external fixator in severe cases. It provides extra stability and security for repaired ligaments, facilitate rehabilitation, and a less painful situation leads to more effective outcoming.

Postoperative Rehabilitation: A prolonged and rigorous rehabilitation protocol after elbow release is important for preserving the arc of motion achieved during surgery. The exercises consist of active, assisted, and passive elbow flexion and extension movements. During the interval of each exercise session, a compressive cryotherapy device is applied to relieve pain. The applying of drains and indomethacin aims to reduce the pain as well as the incidence of edema and heterotopic ossification.

Recent Publications

1. Han B, Xue F, Fan C and Mo X (2017) Surface heparinization and blood compatibility modification of small intestinal submucosa (SIS) for small-caliber vascular regeneration. Bio-Medical Materials and Engineering 28(3):213-222.
2. Chen S, Jiang S, Zheng W, Tu B, Liu S, Ruan H and Fan C (2017) RelA/p65 inhibition prevents tendon adhesion by modulating inflammation, cell proliferation, and apoptosis. Cell Death and Disease 8(3): e2710.
3. Liu S, Chen H, Wu T, Pan G, Fan C, Xu Y and Cui W (2017) Macrophage infiltration of electrospun polyester fibers. Biomaterials Science 5(8):1579-1587
4. Yu S, Chen M and Fan C (2017) Team approach: elbow contracture due to heterotopic ossification. JBJS Reviews 5(1).
5. Sun Y, Cai J, Yu S, Chen S, Li F and Fan C (2016) MiR-630 inhibits endothelial-mesenchymal transition by targeting slug in traumatic heterotopic ossification. Scientific Reports 6:22729.

Biography

Cunyi Fan is a Professor of Orthopedic Surgery. Currently, he is working in 6th People's Hospital as an Orthopedic Surgeon and working as a Professor in Shanghai Jiaotong University, China. His articles are published in PubMed, and respective journals.

fancunyi888@163.com

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Metal on metal hip arthroplasty outcome ten years study

Ahmed Bakr, Arif Razak, Harriet Kennedy and **Aslam Chougle**
North Manchester General Hospital, UK

Background: Patients with metal on metal hip replacements are currently reviewed according to the Medicines and Healthcare Products Regulatory Agency (MHRA) guidelines. Certain implants such as ASR system have been found to have higher revision rates than others. We present the results of multiple brands of metal on metal hip replacement implants used at our institution since 2001.

Methods: We retrospectively reviewed all the records of patients who had metal on metal hip replacements at North Manchester General Hospital. Their metal ions level (cobalt and chromium) and MRI scans were also looked at.

Results: There were 215 patients. Majority were males (162 patients). 50 patients had resurfacing implants. Most implants used were Zimmer Durom Hip systems (85 patients). Other brands included Smith & Nephew BHR, Biomet Recap Magnum and DePuy ASR hip systems. 45 patients (21%) have had revision surgery due to reasons such as raised metal ions level, positive MRI scans or clinical symptoms. The revision rate in each brand or system was comparable to each other. We have now stopped doing metal on metal hip replacement surgery. The last surgery was in 2011.

Conclusion: The revision rate is high (21%) in patients with metal on metal hip replacements done at our institution. The lack of significant difference in revision rates between brands of implants implies metal on metal bearings as a common denominator in causing metallosis.

Implications: Regardless of brands or hip systems, metal on metal hip replacements have higher revision rates than other types of hip replacements at our institution.

Biography

Ahmed Bakr has his expertise evaluation in Orthopaedics and Trauma Surgery. He was graduated from ASU Cairo, Egypt and completed Rotatory Foundation year in ASU Hospitals. Currently, he is working as Senior House Officer of General Surgery at North Manchester General Hospital. His research interest includes Metal Total Hip Replacements.

a.ibrahimbakr@gmail.com

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Workshop

Day 2

Richard M Hall, J Clin Exp Orthop 2017, 3:4(Suppl)
DOI: 10.4172/2471-8416-C1-002

Richard M Hall

University of Leeds, UK

Introduction on Taper Wear and Corrosion – Issues and possible solutions

M G Bryant, J Clin Exp Orthop 2017, 3:4(Suppl)
DOI: 10.4172/2471-8416-C1-002

M G Bryant

University of Leeds, UK

Exploring the degradation mechanisms and preclinical testing of modular tapers - Past, Present and Future

With more people living longer healthier lives, the demand for high performance joint replacements is continuously growing as are the demands on the performance of the artificial joints to operate for longer periods. Whilst revision due to corrosion-related failure seems to increase, there is a need to understand the metal-biological interfaces from a clinical and pre-clinical perspective. The degradation mechanisms of metallic orthopaedic joints are a complex mixture of mechanical and electrochemical reactions, better known as tribocorrosion. Degradation through wear and corrosion results in changes in local environments eliciting soft tissue reactions often requiring intervention. This will also have a direct impact on the performance of the devices not only from a wear but also electrochemical aspect. Not only do interfacial degradation mechanisms need to be considered from a surface integrity point of view, their specific roles and influence on the degradation products generated and their systematic effects need to be understood. Modular taper interfaces present a current and timely issue in total joint replacements. Whilst work has been active in this area over the past few decades, many of the methods used to assess these interfaces remain basic and the effects of taper variables on the complex degradation mechanisms remain unknown. This is despite the tribocorrosion processes, or fretting-corrosion in this case, established at this interface has been implicated in high revision rates due to metal related biological responses. Comparison of in-vitro modular taper test methods with *in-vivo* retrievals present fascinating differences that presently have not been recreated in laboratory conditions. This paper will present the current understanding around the degradation mechanisms occurring at the modular taper interface. Furthermore the need for future physiologically representative test methods for assessing operational envelopes of new devices and the time dependant degradation processes will be discussed.

Recent Publications:

1. S Kurtz, K Ong, E Lau, F Mowat and M Halpern (2007) Projections of Primary and Revision Hip and Knee Arthroplasty in the United States from 2005 to 2030. The Journal of Bone & Joint Surgery. 89 (4): 780-785.
2. M Morlock, D Bunte, J Guhrs and N Bishop (2017) Corrosion of the Head-Stem Taper Junction-Are We on the Verge of an Epidemic? HSS J. 13 (1): 42-49.
3. H S Hothi, A K Matthies, R Berber, R K Whittaker, J A Skinner and A J Hart (2014) The Reliability of a Scoring System for Corrosion and Fretting, and Its Relationship to Material Loss of Tapered, Modular Junctions of Retrieved Hip Implants. The Journal of Arthroplasty. 29 (6): 1313-1317.

Biography

Notes:

M G Bryant is currently developing research and teaching activities devoted to modern aspects of corrosion, tribology and surface science. This includes surface chemical effects in energy production, bio-tribology, bio-corrosion and methods of mitigation. His research is concerned with understanding and optimising the interactions occurring at interfaces commonly found in many applications. His research addresses a wide range of applications including aerospace, automotive, orthopaedic, cardiovascular and incontinence technologies.

M.G.Bryant@leeds.ac.uk

A Falkenberg, J Clin Exp Orthop 2017, 3:4(Suppl)
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A Falkenberg

TUHH - Hamburg University of Technology, Germany

Does SiN coating of tapers influence the mechanics of modular hip prostheses with respect to micromotions and pull-off strength?

Introduction & Aim: Metal debris released from taper junctions of modular hip arthroplasties caused by tribocorrosion can promote implant failure. Micromotion between the mating taper surfaces is assumed to be a major factor contributing to fretting corrosion. Ceramic heads exhibit less taper corrosion. To bypass metal-on-metal contact, a ceramic coating (SiN) for the male taper surface was proposed. The aim was to clarify whether SiN coated tapers can mitigate micromotion and positively influence the strength of the junction.

Material & Methods: 40 head-neck junctions from two suppliers (either CoCr heads, Aesculap, Germany or Ti6Al4V heads, Peter Brehm, Germany) were combined with coated and uncoated neck adapters made of Ti6Al4V or CoCr (each combination n=5). The components were assembled with 2000 N and consecutive dynamic sinusoidal loading representing loads of daily activities was applied (Fmin=230 N; Fmax1=2300 N, Fmax2=4300 N and Fmax3=5300 N). Relative motion between head and neck was measured. The pull-off force was measured quasi-statically.

Results: Ti6Al4V and CoCr necks exhibited relative motion of 12.5±1.2 µm and 6.4±0.4 µm, respectively (Figure 1) if exposed to 2300 N loading. For 4300 N and 5300 N cyclic loading relative motion of 23.8±2.0 µm and 29.7±2.4 µm (Ti6Al4V) and 12.0±0.8 µm and 14.8±1.1 µm (CoCr) was measured, respectively. Tapers made of Ti6Al4V showed significantly increased relative motion ($p<0.001$). Taper coating had no significant influence regarding relative motion ($p=0.969$). However, pull-off strength was increased for coated tapers ($p=0.018$).

Discussion: Coating did not influence relative motion, though bears the potential to separate the metallic taper surfaces and may inhibit fretting corrosion. The higher pull-off strength might potentially reduce the risk for head loosening.

Recent Publications:

1. Del Balso et al. (2015) Article title. Bone Joint J. 97-B: 911-16.
2. Gilbert et al. (1993) Article title. J Biomed Mater Res. 27: 1533-44.
3. Kocagoz et al. (2016) Article title. Clin Orthop Relat Res. 474: 985-994.
4. Bergmann et al. (2016) Article title. PLoS One. 11 (5): e0155612.
5. Haschke et al. (2016) Article title. Proc Inst Mech Eng H. 230 (7): 690-99.

Biography

A Falkenberg gained his expertise in mechanical engineering and biomechanics in educational institutions (Magdeburg University, Rostock University) and research (TUHH, Hamburg). Currently, he is focused on mechanical testing of modular hip prostheses, specifically determining micromotions within taper junctions, which are assumed to promote implant failure. The presented method helps to improve implant longevity and patient contentment by identifying risk factors in implant design.

adrian.falkenberg@tuhh.de

Gerd Huber, J Clin Exp Orthop 2017, 3:4(Suppl)
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Gerd Huber

TUHH - Hamburg University of Technology, Germany

Stem failure due to head bottoming out

Introduction: Bottoming out due to taper mismatch is occasionally reported. If female tapers' diameters exceed the male tapers' dimension, the junction get in contact at the front face of the male taper, this can provoke a wear and corrosion cascade that may lead to severe taper failures. However, bottoming out is also reported for mating taper junctions. Micromotions at the taper interface leading to corrosion appear to be a prerequisite for this.

Aim: Aim of this study was to relate bottoming out and stem taper failure to head taper corrosion patterns observed for revised samples of one particular stem design.

Material & Methods: Retrieved V40 tapers were investigated (Accolade I, Stryker). 30 LFIT CoCr heads (Ø 36 mm and larger) and 9 TMZF stems from disassociation cases (n=8) or fracture (n=1) were harvested. The time of the implant in-situ, patients' gender and age were recorded. The material loss of the tapers was measured by coordinate measurement machine (Mitutoyo).

Results: The material loss increased with time in-situ (r^2=0.49, $p<0.001$) and junctions exhibiting bottoming out have been implanted for a longer time. No influence of size could be found. Stems showed two typical failure patterns: bird beak (n=8) and trumpet (n=1).

Discussion: Widening of the female taper due to fretting and crevice corrosion might enable continuous migration of the head on the stem. Due to the pointed angle of the taper, the migration will be a multiple of the loss in diameter. If the space is used up, bottoming out will initiate a progressing failure cascade. Micromotion and consequently corrosion is most probably influenced by taper stiffness (material and size), assembly conditions (contamination, force) and *in-vivo* loading (magnitude, direction, duration).

Recent Publications:

1. Koper et al. (2014) Article Title. JBJS Case Connector. 4 (1): e25.
2. Gilbert et al. (2012) Article Title. J. Biomed. Mater. Res. 27 (12): 1533-44.
3. Swann et al. (2015) Article Title. J Bone Jt Surg. 5 (3): 1-5.
4. Bishop et al. (2013) Article Title. J. Orthop. Res. 31 (7): 1116-1122.
5. Morlock et al. (2017) Article Title. HSS J. 13 (42) / 13 (1): 42–49.

Biography

Gerd Huber studied Mechanical Engineering at three universities – KIT, Karlsruhe, Germany, INSA, Lyon, France and TU Vienna, Austria. As Research Assistant at TUHH, Germany, he focused on mechanical modelling and multiaxial test rigs. In cooperation with the AO-ARI, Davos, Switzerland he investigated the biomechanical properties of spinal specimens to gain his PhD in Mechanical Engineering. Currently he is deputy of the Institute of Biomechanics, TUHH, Germany and head of the group 'Kinetics and Spine'. His research is focused on the dynamic properties and fatigue loading of specimens and implants in cooperation with academic institutions, industrial partners and public funding sources. So far, he published over 50 publications in peer reviewed journals (h-index 11).

g.huber@tuhh.de

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Abimbola Oladokun

University of Leeds, UK

Assessing the effect of SiNx coating on CoCrMo and Ti6Al4V trunnions to mitigate fretting corrosion at the modular taper junction of hip prostheses

Wear and corrosion at the modular taper interface of hip prostheses is a significant contributor to early implant failure. The emanation of metallic ions and wear particles from the modular taper interface into the peri-prosthetic tissue of the hip often leads to various adverse local tissue reactions (ALTR). Therefore the application of a bio-compatible SiNx coating onto the trunnion of CoCrMo and Ti6Al4V alloy is currently being studied as a means of mitigating fretting corrosion at the modular taper interface. The purpose of this study was to assess fretting corrosion current emanating from a coated trunnion in comparison to an uncoated trunnion of a head-neck modular taper interface; both couples were is subjected to varied cyclic loads. The results showed a significant reduction in fretting corrosion current for the modular taper interface where SiNx coating was applied unto the trunnion (see figure 1.)

Recent Publications:

1. Oladokun A et al (2017) The effect of cyclic load on the evolution of fretting current at the interface of Metal-on-Metal and Ceramic-on-Metal taper junction of hip prostheses. Bone Joint J. 99, no. SUPP 5: 68-68.
2. Bryant M G et al (2017) Surface and subsurface changes as a result of tribocorrosion at the stem-neck interface of bi-modular prosthesis. Biotribology. 10: 1-16.
3. Oladokun A et al (2016) Sub-surface investigation of fretted CO28CR6MO and TI6AL4V alloys. Bone Joint J. 98, no. SUPP 9: 99-99.
4. A Oladokun et al (2015) Fretting of CoCrMo and Ti6Al4V alloys in modular prostheses, Tribology - Materials, Surfaces & Interfaces. 9 (4): 165-173.

Biography

Abimbola Oladokun obtained a Bachelor's degree in Aerospace Engineering from the University of Leeds. He has almost completed a PhD degree, also at Leeds. His research is based on Biotribocorrosion of hip prostheses with specific focus on fretting corrosion of modular taper interfaces. He has experience working with coatings, surface characterization and assessing metallurgical transformations.

mn10a2o@leeds.ac.uk

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Scientific Tracks & Abstracts

Day 2

Sessions

Joint Replacement Surgery | Metabolic Bone Disease | Peripheral Nerve Injuries | Injuries of the Forearm and Wrist | Treatment of Orthropedic Disorders | Back Pain and Management | Arthroscopic Surgery | Orthropedic Surgeries

Session Chair
Carlos Suarez-Ahedo
American Hip Institute | USA

Session Co-Chair
E Krishna Kiran
Maxcure Hospitals | India

Session Introduction

Title: Evaluation of the response of primary human peripheral blood mononuclear phagocytes to silicon nitride nanoparticles

Saurabh Lal, University of Leeds, UK

Title: *In vivo* investigation of nanoscale silicon nitride particles

Jayna Patel, University of Leeds, UK

Title: 3D printing porous tantalum metal module for treatment of DDH

Dewei Zhao, Affiliated Zhongshan Hospital of Dalian University, China

Title: Monitoring of metastatic bone tumor using by near-infrared fluorometric imaging system on mouse xenograft model

Wonbong Lim, Chosun University, South Korea

Title: Effects of Alfacalcidol on the expression of RANK/RANKL/OPG in aged male rats

Zhou Xiongwen, Xiangya Hospital, China

Title: MAKOplasty – Radiological accuracy and clinical outcomes

Cathleen J O'Neill, Cork University Hospital, Ireland

Title: Hyperbaric oxygen treatment for symptomatic Osteonecrosis of the femoral head Stages I and II

Eyal Ginesin, Rambam Health Care Hospital, Israel

Title: Ankle cartilage is more resilient to cytokine-induced catabolism than knee cartilage: A potential target for prevention of knee arthritis?

Ali Abdullah, Cardiff University, UK

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Evaluation of the response of primary human peripheral blood mononuclear phagocytes to silicon nitride nanoparticles

Saurabh Lal, Richard M Hall and **Joanne L Tipper**
University of Leeds, UK

Introduction: Silicon nitride is a new generation orthopaedic bearing material that has shown potential in its monolithic form and as a coating material. Previous studies have shown that silicon nitride has low friction, and wear rates. However, there is limited evidence to support its biocompatibility. This study aimed to evaluate the biological impact of silicon nitride nanoparticles by measuring cytotoxicity, DNA damage and oxidative stress in peripheral blood mononuclear cells (PBMNCs). CoCr and titanium wear debris were used as reference controls.

Materials and Methods: Sterile CoCr and titanium wear debris were generated using a pin-on-plate reciprocator. Amorphous silicon nitride particles (<50 nm, Sigma) were heat-treated at 180°C for 4 h to remove endotoxin. All particles were dispersed by sonication and overnight incubation in serum proteins (10% fetal bovine serum) at 37°C prior to their use in cell culture experiments. PBMNCs were cultured with particles for 24 h in 5% (v/v) CO2 at 37°C in 96-well plates. Cytotoxicity was measured after 24 h by ATPLite assay (PerkinElmer). DNA damage in the cells was measured by using alkaline comet assay (Trevigen). Oxidative stress was measured using 2',7'-dichlorodihydro-fluorescein diacetate (DCFDA) based reactive oxygen species detection assay (Abcam). Hydrogen peroxide was used as a positive control for DNA damage. The results were expressed as mean ±95% confidence limits and the data were analyzed using one-way analysis of variance (ANOVA) and Tukey-Kramer post-hoc analysis.

Results and Discussion: Silicon nitride nanoparticles and titanium wear debris did not reduce cell viability at both low doses (0.5 μm3 per cell) and high doses (50 μm3 per cell). However, CoCr wear debris significantly reduced the cell viability at high doses. The alkaline comet assay detected no DNA damage in the cells cultured with titanium and silicon nitride particles, whereas CoCr wear debris caused noticeable damage to the DNA. Similarly, no significant increase in the oxidative stress was observed for silicon nitride and titanium particles, while CoCr caused significant increase in the oxidative stress in comparison to the cells only control.

Biography

Saurabh Lal is a Research Fellow at the University of Leeds working in a large collaborative EU project (LifeLongJoints). He has over seven years of experience in the development and testing of orthopaedic medical devices, with expertise in several areas such as biocompatibility testing, biotribology, nanomaterial characterization and image analysis. Recently he is also involved in the development of standards for risk-based evaluation of novel orthopaedic implants. He has won national and international awards for his work on isolation, characterization and biological evaluation of orthopaedic bearing materials. He has completed his PhD in Medical Engineering and Computer Science from Durham University and completed his BTech from Indian Institute of Technology, Delhi. Prior to his PhD, he worked in the Tissue Engineering Labs at Harvard Medical School, USA and in the Biomedical Image Analysis group at KAIST, South Korea.

s.lal@leeds.ac.uk

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In vivo investigation of nanoscale silicon nitride particles

Jayna Patel, S Lal, S P Wilshaw, B von Rechenberg, K Nuss, R M Hall and **J L Tipper**
University of Leeds, UK

Introduction: Biocompatible coatings, such as silicon nitride (SiN), may improve the performance of joint replacements. SiN particles dissolve, which would minimize any associated reactions. Furthermore, the ions produced are non-toxic. In this study, SiN particles were investigated for biocompatibility and isolated using a novel methodology for further analysis.

Methods: Commercial nanoscale SiN particles, or clinically relevant CoCr or titanium particles generated by pin-on-plate simulation, were injected into the right stifle joint of rats at a volume of 0.018 mm3 of particles. After seven days of in vivo exposure, animals were euthanized, and the intact treated and contralateral non-treated stifle joints were formalin fixed and either decalcified and processed histologically for H&E staining or subjected to a particle isolation protocol. The isolation protocol involved enzymatic digestion with papain (1.56 mg. mL-1) and proteinase K (1 mg. mL-1, with two subsequent replenishments), and use of sodium polytungstate (SPT) for density gradient ultracentrifugation. Residual SPT was removed and recovered particles were filtered and analyzed by high resolution scanning electron microscopy (SEM) coupled with energy dispersive X-ray spectroscopy (EDX) for elemental analysis. Imaging software (ImageJ) was used to determine size and morphologies (aspect ratio and circularity) of the particles. Particles not subjected to the isolation procedure were analyzed for comparison.

Results and Discussion: SiN particles were aggregated, relatively spherical and up to 60 nm in size, with a modal size range of 20-30 nm. Differences in size and morphology of SiN and CoCr particles before and after isolation were statistically insignificant (KS tests, $p>0.05$). Titanium particles showed no aggregation characteristics, were of varying morphology, and had a size range from 0.1-100 µm, with a modal size of 10-15 µm. Titanium particles were too few before and after isolation to statistically analyze, though size and morphologies were similar. Elemental analysis validated particle composition. Particles were not detected in non-treated stifle joints, demonstrating that particles were not a result of contamination. Initial particle and tissue quantities were low compared to human periprosthetic tissue samples, indicating technique sensitivity. In the histology analysis, CoCr injected joints displayed necrosis, which was absent from SiN and titanium injected joints. Inflammation was greater in the CoCr samples.

Conclusion: Overall the isolation methodology successfully enabled retrieval and characterization of SiN particles, in addition to CoCr and titanium particles. Histological analysis indicated that SiN is more biocompatible than CoCr. Future work aims to further evaluate the histology sections through immunolabelling and semi-quantitative scoring.

Biography

Jayna Patel is pursuing her PhD at the University of Leeds. Her research involves wear particle isolation and the evaluation of joint replacement materials for biocompatibility. Previously, she studied Biological Sciences at Lancaster University.

jaynapatel1@gmail.com

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3D printing porous tantalum metal module for treatment of DDH

Dewei Zhao, Liangliang Cheng and **Benjie Wang**
Affiliated Zhongshan Hospital of Dalian University, China

Objective: To explore a new type of individualized treatment technical process to repair acetabulum defect of developmental dysplasia of the hip (DDH) with 3D printing porous tantalum metal module, and to evaluate the early clinical outcome of patients.

Methods: CT scanning was performed on the DDH patients' hip, constructed the three-dimensional model by MIMICS and 3-MATIC software, and extracted the acetabulum model and femur model respectively; constructed the three-dimensional model for the acetabulum defect reversely, adopted the materialize magic's software to make the porosity-oriented and optimized process for the model; made the finite-element analysis on the acetabulum model with ANSYS software to guarantee the uniform distribution of the joint stress after repair; printed the porous titanium module for the designed three-dimensional model of the acetabulum defect by rapid prototyping, and made the metal spraying of tantalum; done the operation with the personalized acetabulum module and evaluated the clinical follow-up.

Results: The porous metal module produced by 3D printing technology could match with the hip joint of patients optimally and thus achieved primary stability; the clinical follow-up showed: patients' pain was relieved significantly; the function of joints was improved significantly; the implanted prosthesis did not loose and the bone in-growth in the model prosthesis was found according to the radiological evaluation.

Conclusion: The 3D-printing porous tantalum metal module shows good clinical effect for the treatment of DDH patients. Personalized acetabulum module matches with the hip joint of patients greatly, which effectively improves the coverage of acetabulum for the femur head and avoids the traditional periacetabular osteotomy; meanwhile, the porous structural design and the tantalum metal coating is beneficial for the ingrowth of bone in the metal module, which enhances the long-term stability.

Recent Publications

1. Zhao D, Qiu X and Wang B, et al. (2017) Epiphyseal arterial network and inferior retinacular artery seem critical to femoral head perfusion in adults with femoral neck fractures. Clinical Orthopaedics and Related Research 475(8):2011-2023
2. Kamada T, Mashima N, Nakashima Y, et al. (2015) Mid-term clinical and radiographic outcomes of porous tantalum modular acetabular components for hip dysplasia. Journal of Arthroplasty 30(4):607-10.
3. Paton RW (2017) Screening in Developmental Dysplasia of the Hip (DDH). Surgeon 15(5):290-296.
4. Clohisy J C (2017) Developmental dysplasia of the hip: contemporary concepts and treatment innovations. Journal of Arthroplasty 32(9S): S18-S19.
5. Tarpada S P, Girdler S J and Morris M T (2017) Developmental dysplasia of the hip: a history of innovation. Journal of Pediatric Orthopaedics doi: 10.1097/BPB.0000000000000463

Biography

Dewei Zhao is a President of Affiliated Zhongshan Hospital of Dalian University and President of Chinese Association of Microsurgery Surgeons. He dedicates in the treatment of osteonecrosis of femoral head (ONFH) for nearly three decades. Based on anatomical and clinical study, he has made original series surgical techniques for reconstruction of the necrotic femoral head, and these techniques can be applied in every stage of ONFH. He is the Editor of nine academic journals. He has published more than 200 papers in basic and clinical research of ONFH, the new finding of circulation of femoral head, new metal biomaterials and their clinical application. His works are especially important for younger patients with symptomatic ONFH.

zhaodewei2000@163.com

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Monitoring of metastatic bone tumor using by near-infrared fluorometric imaging system on mouse xenograft model

Wonbong Lim
Chosun University, South Korea

Tumors of the prostate or breast are particularly likely to metastasize to the bone, and early diagnosis of metastatic bone tumors is important for designing an effective treatment strategy. Imaging modalities for the detection of bone metastasis are limited, and radiation-based techniques are commonly used. Here, we investigated the efficacy of selective near-infrared (NIR) fluorescence detection of metastatic bone tumors and its role in the detection of bone metastasis in prostate and breast cancer cell lines and in a xenograft mouse model. A targeted NIR fluorophore was used to monitor metastatic bone tumors using a NIR fluorescence imaging system in real time, enabling the diagnosis of bone metastasis in vivo by providing the location of the metastatic bone tumor. The NIR fluorescence imaging technique using targeted NIR contrast agents is a potential tool for the early diagnosis of bone tumors.

Biography

Wonbong Lim has completed his PhD from Department of Oral Pathology at Chonnam National University in South Korea and Postdoctoral studies from same place. He is the Assistant Professor in Department of Premedical Science, College of Medicine, Chosun University and Director of research lab at Department of Orthopaedic Surgery in Chosun University Hospital. He has published more than 50 papers in reputed journals including Bone Biology and Carcinogenesis.

wonbong@chosun.ac.kr

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Effects of Alfacalcidol on the expression of RANK/RANKL/OPG in aged male rats

Zhou Xiongwen and **Jian Xinchun**
Xiangya Hospital, China

The receptor activator of nuclear factor-kB ligand (RANKL) and osteoprotegerin (OPG) system are regarded as the fundamental reason for systemic osteoporosis while alfacalcidol is a basic medicine for osteoporosis. But it is uncertain whether RANK/RANKL/OPG is involved in the mandible osteoporosis and whether alfacalcidol could be used for the treatment of mandible osteoporosis. This study is to investigate the expression of RANKL/RANKL/OPG in mandible and femur and to discuss the relationship between the systematic osteoporosis and mandible osteoporosis, as well as the effects of alfacalcidon on aged male rats. We observed that as the rats aged, the expression of RANKL increased obviously and the ratio of RANKL/OPG also increased, the absorption is obvious in femur. In comparison, the ratio of RANKL/OPG was decreased in mandible and the absorption and formation in mandible was at a relatively low level. Therefore, it was suggested that the mandible osteoporosis was not completely synchronous to femur. Alfacalcidol was conductive to the bone mass and bone mineral density in femur and mandible.

Biography

Zhou Xiongwen graduated from Xiangya Medical School of Central South University as Dentist and obtaining her Master's degree and Doctorate in Surgery. She has been working at Stomatology Department of Xiangya Hospital for 24 years. She worked as a Visiting Scholar in Medical School of Beijing University and Yale University in the year of 2000 and 2014 respectively. She has been the committee member of China Geriatrics Society and China Plastic Surgery Society.

Zhouxw1128@163.com

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MAKOplasty – Radiological accuracy and clinical outcomes

Cathleen J O'Neill and **S A Brennan**
Cork University Hospital, Ireland

Introduction: Uni-compartmental knee replacement with standard instrumentation has demonstrated inconsistent long-term survival. CT based semi active robots have recently become popular to assist in guiding the accuracy of this procedure. The purpose of this study was to examine the implant accuracy and short-term patient outcome using this new technology.

Methods: Fifty consecutive patients undergoing medial compartment robotic assisted knee replacement were analyzed. There were 29 males and 21 females with a mean age of 63 years. The mean height, weight, ASA and pre-operative deformity were documented. Pre-and postoperative Oxford, WOMAC, and Knee Society Scores were compared using a paired student's t-test. Twenty patients underwent post-operative low dose CT scans. The 3D intraoperative implant planning position was then compared to the final postoperative femoral and tibial component position. Root mean square errors were used to quantify average alignment accuracy.

Results: The mean patient height was 1.72 m, weight 89.3 kg and BMI 29.9. Seven patients were ASA grade 1, 29 patients were grade 2 and 14 patients were grade 3. The mean varus deformity was 4.4° and the mean fixed flexion deformity was 2.1°. The mean Oxford score improved from 24.5 pre-operatively to 38.3 post-operatively $p<0.0001$. The mean WOMAC score improved from 39.1 pre-operatively to 13 post- operatively $p<0.0001$. The mean KSS knee score improved from 50.1 to 80.2 and the KSS functional score from 56.2 to 80.6 $p<0.0001$. Root mean square errors for implant position averaged less 3 degrees in all planes.

Conclusion: Robotic assisted medial compartment knee replacement can achieve excellent early clinical and functional results. The high levels of accuracy demonstrated with this technology may help to reduce the rates of early failure associated with malalignment, aseptic loosening, polyethylene wear and disease progression in the non-involved compartment.

Recent Publications

1. Fives C, O'Neill C J, Murphy R, Corrigan M A, O'Sullivan M J, Feeley L, Bennett M W, O'Connell F, Browne T J (2016) When pathological and radiological correlation is achieved, excision of fibroadenoma with lobular neoplasia on core biopsy is not warranted. Breast 30:125-129.
2. Brennan SA, O'Neill CJ, Tarazi M, Moran R (2013) Bilateral neck of femur fractures secondary to seizure. Practical Neurology DOI:10.1136/practneurol-2013-000669.
3. Brennan SA, Devitt BM, O'Neill CJ, Nicholson P (2012) Periprosthetic fractures in the resurfaced hip-A case report and review of the literature Injury 44(2).

Biography

Cathleen O'Neill is currently employed as a Senior House Officer. She is Core Trainee in Year 1 in the Department of Orthopaedics, Cork University Hospital, Cork, Ireland. She has completed her BSc in Physics in 2004. She did her MSc in Medical Physics in 2005. She did her MRCS in 2017 and currently working as Senior House Officer in Cork University Hospital in Ireland.

cathleen.oneill@gmail.com

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Hyperbaric oxygen treatment for symptomatic osteonecrosis of the femoral head stages I and II

Eyal Ginesin
Rambam Health Care Hospital, Israel

Background: Hyperbaric oxygen (HBO) therapy is one of the suggested joint preserving treatments for symptomatic early stage osteonecrosis of the femoral head (ONFH). Limited series of this treatment had been published to date.

Objective: We aimed to evaluate its effectiveness in a relatively large patient cohort.

Methods: We reviewed the files of 68 patients with 78 symptomatic ONFH joints stages Steinberg I and II that were treated at our medical health center with HBO. The pre-treatment and the immediate post-treatment magnetic resonance imaging (MRI) findings were compared. On follow-up, a phone interview was conducted. Noted was the survival of the joint. A modified Harris Hip Score (mHHS) and the 12-Item short form health survey (SF-12) questionnaires for the starting point of treatment and the time of follow-up were given and evaluated for statistically significant differences.

Results: 74 joints had undergone both pre- and post-treatment MRI. 88% of the joints improved on the immediate post treatment MRI. On follow-up of a mean 11.1±5.1 years, 54 patients (58 joints) were located and answered the questionnaires. 93% of the joints survived. The mean mHHS improved from 19 to 74 ($P<0.0001$), the mean physical component of the SF-12 improved from 24 to 46 ($p<0.0001$) and the mean mental component improved from 54 to 59 ($p<0.0001$).

Conclusion: We conclude that HBO treatment is effective in preserving the hip joint in stages I and II ONFH.

Recent Publications

1. Mont M A, Jones L C and Hungerford D S (2006) Nontraumatic osteonecrosis of the femoral head: ten years later. Journal of Bone and Joint Surgery American Volume 88(5):1117–1132.
2. Sharma S, Shah R, Draviraj K P and Bhamra M S (2005) Use of telephone interviews to follow up patients after total hip replacement. Journal of Telemedicine and Telecare 11(4):211–214.
3. Strauss M, Dvorak T, Melamed Y and Reis D N (2008) Femoral head necrosis and hyperbaric oxygen therapy. Hyperbaric Medicine Practice, 3rd ed. Vol.34; p.943.
4. Nylander G, Lewis D, Nordstrom H and Larsson J. (1985) Reduction of postischaemic edema with hyperbaric oxygen. Plastic and Reconstructive Surgery 76(4):596-60.
5. Camporesi E M, Vezzani G, Bosco G, Mangar D and Bernasek T L (2010) Hyperbaric oxygen therapy in femoral head necrosis. Journal of Arthroplasty 25(6):118–23.

Biography

Eyal Ginesin has completed his MD degree in 2011 from Semmelweis University in Budapest, Hungary. A year later, he was selected as an Excellent Internship. In 2013, he started his Residency in Orthopedic Department of Rambam Health Care Hospital and now he is pursuing his final year. During these years he has participated and published many articles including two book chapters. Regarding his academic experience he has given oral presentations in conferences including the annual meeting of the Israel Orthopedic Association.

Eyalgin@gmail.com

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Ankle cartilage is more resilient to cytokine-induced catabolism than knee cartilage: A potential target for prevention of knee arthritis?

Ali Abdullah
Cardiff University, UK

Introduction & Aim: The variation in prevalence of osteoarthritis has been hypothesized to result from the differential responsiveness of joints to catabolic stimuli; therefore the aim of this study was to determine whether ankle cartilage is less susceptible to the catabolic effects of pro-inflammatory cytokines when compared to the knee.

Methods: Human cartilage explants were taken from the talar domes (n=12) and the femoral condyles (n=7) following surgical amputation. Explants were cultured in the presence or absence of either a combination of high or low concentration of cytokines, and media analyzed up to 28 days. Sulphated glycosaminoglycan (sGAG) release to the media and expression levels of nitric oxide and prostaglandin E_2 (PGE_2) were measured.

Results: Significantly more sGAG was lost from knee cartilage explants exposed to 100 ng/ml TNFα (22.2% vs. 13.2%, P=0.01) and 100 ng/ml TNFα in combination with 5 ng/ml IL-1α (27.5% vs. 16.0%, P=0.02) compared to sGAG release from the ankle; low cytokine concentrations did not affect sGAG release. All high concentration cytokine treatments resulted in production of more nitrite and PGE_2 compared to low concentrations; however, no significant differences between the knee and ankle were noted for nitrite although there was significantly more PGE_2 production in knee cartilage.

Discussion: Cartilage explants from the knee and ankle have a divergent response to stimulation by pro-inflammatory cytokines, with high concentrations of TNFα alone, or in combination with IL-1α amplifying cartilage degeneration. This differential response may account for the high prevalence of knee arthritis compared to ankle OA and provide a future pharmacological target to treat OA of the knee.

Biography

Ali Abdullah is a 5th year Medical student and has attained a BSc in Biomedical Sciences (Anatomy) from Cardiff University. He has previously presented research at various national conferences.

a.a.n.abdullah123@gmail.com

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